

**Design, implementation, and evaluation of school-based sexual
health education interventions in sub-Saharan Africa**

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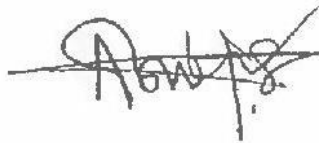
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Abstract

School-based sexual health education is commonly used to promote the sexual health of young people and guide them in their relationships. This thesis reports on research that aimed to provide evidence-based recommendations to optimise the effectiveness of school-based sexual health education in sub-Saharan Africa (sSA).

There are six chapters in the thesis. Chapter 1 introduces the thesis, Chapters 2 to 5 consist of four empirical studies, and Chapter 6 provides an overall discussion and looks at the strengths, limitations, and implications of the findings.

Chapter 2 is a systematic review and meta-analysis of school-based sexual health education in sSA. It provides some evidence of the interventions in promoting self-reported condom use. However, it shows there are no harmful or beneficial effects with respect to sexually transmitted infections (STI) as evidenced by biomarkers. It highlights the paucity of evaluated interventions using biomedical markers, and reports on the process of evaluation, which limits our understanding of why interventions work or do not work. Features associated with effective interventions are noted.

Chapter 3 is a case study involving *MEMA Kwa Vijana*, an adolescent sexual and reproductive health intervention implemented in Tanzania. This study highlights the influence of structural factors in schools and wider environmental factors on the effectiveness of school-based sexual health interventions. Furthermore, it identifies the social and cultural factors that influence young people's sexual behaviours and that must be addressed beyond the education and health sectors.

Chapter 4 is a multiple case study of seven school-based sexual health interventions implemented in five sub-Saharan African countries. It

identifies the design, implementation, and evaluation features that differentiate between effective and ineffective interventions.

Chapter 5 is a qualitative study of researchers' experiences of school-based sexual health education in sSA. This study extends previous work by generating a set of valuable recommendations based on researchers' experiences of interventions that could improve future interventions in sSA.

Overall, this research project demonstrates the potential of school-based sexual health education in promoting sexual health and preventing STIs in sSA. It provides a series of recommendations for the design, implementation, and evaluation of school-based sexual health interventions.

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Author's Declaration

I declare that all the research reported in this thesis is mine. All the work reported in the thesis was planned, conducted, and written by me.

This thesis consists of four studies that have been written as manuscripts for publication in peer-reviewed journals. Chapters 2 and 4 have been published, Chapter 3 has been submitted, and Chapter 5 has been revised and resubmitted, at the time of submitting the thesis. All the four manuscripts are co-authored but all are primarily the result of this doctoral project. All the manuscripts presented in the four chapters are written by me.

All the studies were undertaken under the supervision of Professor Charles Abraham, my lead supervisor, who worked with me closely throughout the doctoral work, and in preparing the chapters for publication.

I developed the protocol for the systematic review and meta-analysis (Chapter 2), which was refined by inputs from Charles Abraham (CA) and Sarah Denford (SD). I conducted the literature search, selected the studies, assessed the quality of the studies included, extracted the data, analysed the data, and drafted the final manuscript. CA helped in refining the inclusion and exclusion criteria, selecting the articles, interpreting the data, and writing and critically revising the manuscript. SD helped by double-screening the articles included and double-checking the data extraction for quality control, and in the data analysis and critical revision of the manuscript. Susan Ball contributed by double-checking the quantitative data extracted for meta-analysis, double-checking the results of the meta-analysis, and critical revising the final manuscript.

I developed the protocol for the single case study (Chapter 3). I recruited the participants, conducted the interviews, identified the project documents, analysed the documents and interviews, and drafted the final manuscript. CA helped in the case selection, recruitment of the participants, double-coding of the interview transcripts for quality control, and writing and critical revision of the final manuscript. SD helped in the case selection, double-coding of the interview transcripts for quality control, and critical revision of the manuscript. Mary Plummer's contribution lay in the data analysis and writing and critical revision of the final manuscript. Catherine Mathews (CM) helped in critically revising the final manuscript.

In collaboration with CA and SD, I developed the protocol for the multiple case study (Chapter 4). I selected the cases, recruited the participants, conducted the interviews, analysed the data and wrote the final manuscript. CA contributed in the selection of the cases, developing of the analysis framework, recruitment of the participants, analysis and interpretation of the data, and critical revision of the final manuscript. SD's contribution lay in developing the analysis framework and the critical revision of the final manuscript. CM's contributed in the selection of the cases, recruitment of the participants, and critical revision of the final manuscript.

I developed the protocol for the study involving the researchers' experiences (Chapter 5). I recruited the participants, conducted the interviews, designed the data analysis framework, conducted the data analysis, and wrote the final draft of the manuscript. CA's contribution lay in the recruitment of the participants, designing of the analysis protocol, data analysis and interpretation of the results, and writing and critical revision of the manuscript. SD helped in the double-coding of the interview transcripts and critical revision of the final manuscript. CM

contributed in the recruitment of the participants and critical revision of the final manuscript.

List of Publications

Four papers for publication were produced from this doctoral project. Chapters 2 to 5 present a version of each paper.

Chapter 2 has been published as:

Sani, A. S., Abraham, C., Denford, S., & Ball, S. (2016). School-based sexual health education interventions to prevent STI/HIV in sub-Saharan Africa: A systematic review and meta-analysis. *BMC Public Health*, 16(1), 1069.

Chapter 3 has been submitted as:

Sani, A. S., Abraham, C., Denford, S., Plummer, M., & Mathews, C. (submitted). Lessons learned from an adolescent sexual and reproductive health intervention: A case study of the *MEMA Kwa Vijana* project in Tanzania. *Global Delivery Library: Case Studies*.

Chapter 4 has been published as:

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Chapter 5 has been published as:

Sani, A. S., Abraham, C., Denford, S., & Mathews, C. (2017). Design, implementation and evaluation of school-based sexual health education in sub-Saharan Africa: A qualitative study of researchers' perspectives. *Sex Education*.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome

aOR: Adjusted odds ratio

aPR: Adjusted prevalence rate

aRR: Adjusted rate ratio

CI: Confidence interval

GRADE: Grading of Recommendations Assessment, Development, and Evaluation

HIV: Human immunodeficiency virus

HP4RY: HIV Prevention Intervention for Rural Youth

HSV2: Herpes Simplex Virus-2

I²: I-squared statistic

IEC: Information, education, and communication

MkV: *MEMA kwa Vijana*

NR: Not reported

OR: Odds ratio

PSABH: Primary School Action for Better Health

RCT: Randomised controlled trial

SATZ: Promoting Sexual and Reproductive Health, a School-based HIV/AIDS Intervention in sub-Saharan Africa

SBSHE: School-based sexual health education

SoF: Summary of findings table

sSA: Sub-Saharan Africa

STI: Sexually transmitted infection

ASRH: Adolescent sexual and reproductive health

AMREF: African Medical Research Foundation

NGO: Non-governmental organisation

LSHTM: London School of Hygiene and Tropical Medicine

MoH: Ministry of Health

MoEC: Ministry of Education and Culture

MRC: UK Medical Research Council

UKDFID: UK Department for International Development

NIMR: National Institute for Medical Research

RDSP: The *Regai Dzive Shiri* Project

HealthWise: Health Wise South Africa

SBRHE: School-based Reproductive Health Education Program in Rural South Western, Nigeria

HP4RY: School- and Community-Based HIV Prevention Interventions with Junior Secondary School Students in Edo State, Nigeria

UNAIDS: United Nations Programme on HIV and AIDS

WHO: World Health Organisation

Chapter 1: Introduction

School-based sexual health education is used worldwide to promote young peoples' sexual health and relationships. Such interventions promote sexual health knowledge, attitudes, intentions, and safe sexual behaviours, and have the potential to prevent transmission of STIs, including HIV. If effective, these interventions can effectively promote public health, e.g., by limiting the prevalence of sexually-transmitted infections. Moreover, their delivery to large numbers of young people mean they have the potential to be cost-effective. The effectiveness of these interventions is, however, limited in sSA where young people are more likely to become infected with HIV than elsewhere in the world. Therefore, it is important to determine how these interventions could be improved to maximise their effectiveness in this context.

The four studies described in this thesis aimed to identify evidence-based features in the design, implementation, and evaluation of school-based sexual health education interventions that are associated with effectiveness. The background of this project and the aims and structure of this thesis are described below.

1.1: Definitions of adolescence and related terms

The World Health Organisation (WHO) defines adolescence as the age between 10 and 19 years, youth as the age between 15 and 24 years, and young people as spanning the 10-24-year-old age group (Patton et al., 2016). The term 'adolescents and young adults' is used interchangeably with young people. The 10-24-year-old age group is further divided into early adolescence (10-14 years), late adolescence (15-19 years), and young adulthood (20-24 years). These definitions apply whenever any of the terms are used in this report.

1.2: Sub-Saharan Africa

Geographically, a zone called 'the transition zone' divides North Africa from the rest of the African continent. Countries south of the Sahara Desert and some within this zone constitute sSA (Berglee, 2012) (Figure 1). sSA includes 49 of the 54 countries on the continent, with more than 1,000 ethnic groups and languages (Plummer, 2012) and an estimated population of 853 million in 2010 (Federal Ministry for Economic Cooperation and Development, 2017). Cultural diversity varies within and between countries and from one ethnic group to another. Nonetheless, there are many shared social and cultural patterns among sSA countries that differentiate them from the North African countries and indeed, the rest of the world (Berglee, 2012). For example, sSA includes some of the poorest countries in the world (Jamison et al., 2006; King & Hill, 1997), and most of the population have limited material and financial resources, including access to health, education, water, and sanitation (Plummer, 2012). Similarly, these countries share the epidemiology of certain diseases and health patterns (Jamison et al., 2006), including prevalence of STIs/HIV.



Figure 1. 1: Map of Africa showing the countries in sub-Saharan Africa

1.3: Extent of the problem

1.3.1: *Burden of sexually transmitted infections*

According to WHO, over one million STIs are transmitted daily (WHO, 2013). These include an annual estimate of about 500 new infections of Gonorrhoea, Chlamydia, Syphilis, and Trichomoniasis. Moreover, a significant number of people are living with incurable STIs. These include about 530 million with herpes simplex virus type 2 (HSV2), 290 million

women with human papillomavirus (HPV), and 36 million with HIV (The Joint United Nations Programme on HIV and AIDS [UNAIDS], 2016; WHO, 2013). The African region accounts for up to 70 % of the world's burden of HIV (UNAIDS, 2016). In 2015, Eastern and Southern Africa had 19 million people living with HIV, and Western and Central Africa had 6.5 million. These two regions are in sSA, which accounts for 25.5 million of the 36 million people living with HIV worldwide. Young people, particularly adolescent girls and young women aged 15-24, are disproportionately affected. They accounted for 25 % of all new infections in sSA in 2015 (UNAIDS, 2016). Therefore, young people in sSA are at the greatest risk of contracting HIV.

The incidence of other STIs, excluding HIV, is highest in the WHO regions of Africa and the Americas (Gottlieb et al., 2014). These infections are more prevalent in young people under the age of 25, particularly young women (Gottlieb et al., 2014; McSorley, 2013). Adolescent girls aged 15-17 account for two-thirds of new infections (Chinsebu, 2009). STIs result in short- and long-term consequences on sexual, reproductive, maternal, and child health. These include genital symptoms, infertility, complications of pregnancy, cancers, pelvic inflammatory diseases, increased risk of HIV transmission, psychosocial consequences, and financial costs (Gottlieb et al., 2014). Biological and social factors contribute to the vulnerability of young people to STIs. Young people are inexperienced and are more likely to engage in high-risk behaviours such as unprotected sex and multiple sexual partnerships. Moreover, young people's reproductive tracts, particularly the cervix in young girls, are immature, and thus susceptible to infections (McSorley, 2013).

Data showed lower prevalence of STIs among young people in schools or communities compared to hospital-based surveys (Table 1.1). These surveys showed low prevalence of STIs/HIV among school-age young

people, which highlights the need for preventive efforts to protect this population.

Table 1.1: Incidence of STIs in some sub-Saharan African countries

Hospital-based surveys								School/community-based surveys				
	Uganda ¹ (n = 360)		Uganda ² (n = 6,659)		Tanzania ³ (n = 304)		Uganda ⁴ (n = 592)		Tanzania ⁵ (n = 9445)		Tanzania ⁶ (n = 9283)	
	F	M	F	M	F	M	F	M	F	M	F	M
HIV (%)	15.2	5.8	10.0	3.0	15.3	7.1	-	-	2.4	0.6	0.3	0.08
Chlamydia (%)	9.0	5.7	-	-	-	-	7.8	-	2.4	1.0	1.6	0.3
Neisseria (%)	4.5	4.7	-	-	-	-	6.8	-	-	-	0.2	0.04
Syphilis (%)	4.0	2.0	-	-	-	-	-	-	-	-	-	-
Trichomonas (%)	8.0	0.0	-	-	-	-	-	-	-	-	-	-

¹ Råssjö, Mirembe & Darj, 2006

² Neema, Ahmed, Kibombo & Bankole, 2006

³ Urassa, Moshiro, Chalamilla, Mhalu & Sandstrom, 2008

⁴ Darj, Mirembe & Råssjö, 2010

⁵ Obasi et al., 2001

⁶ Todd et al., 2004

F - Females

M - Males

1.3.2: Young people's sexual health and behaviour in sub-Saharan Africa

Young people in sSA engage in risky sexual behaviours such as early sexual debut, unprotected sexual intercourse, multiple sexual partnerships, and transactional sex. Studies have found that most young people have had sex for the first time before their 18th birthdays (Adeboye, Yongsong & James, 2016; Eaton, Flisher & Aarø, 2003; Manzini, 2001; Olugbenga-Bello, Adebimpe, Akande & Oke, 2014; Orji & Esimai, 2005; Rwenge, 2000; Tadesse & Yakob, 2015), with some studies reporting the age of sexual debut as low as 10 years (Ajuwon, Olaleye, Faromaju & Ladipo, 2006; Envuladu, Van de Kwaak, Zwanikken & Zoakah, 2017). Furthermore, young people rarely report condom use (Adeboye et al., 2016; Berhan & Berhan, 2015; Eaton et al., 2003; Kaaya et al., 2002; Ndubani & Höjer, 2001; Olugbenga-Bello et al., 2014; Tadesse & Yakob, 2015; Wodi, 2005), and reporting more than one sexual partner is common (Doyle, Mavedzenge, Plummer & Ross, 2012; Eaton et al., 2003; Kaaya et al., 2002; Olugbenga-Bello et al., 2014; Orji & Esimai, 2005; Urassa et al., 2008). Moreover, many young people receive money or other material gifts in exchange for sex, which undermined their efforts to abstain, use condoms or limit the number of their sexual partners (Amuyunzu-Nyamongo, Biddlecom, Ouedraogo & Woog, 2005; Envuladu et al., 2017; Urassa et al., 2008). Several factors have been identified to predispose the youth of sSA to risky sexual behaviours.

Although studies have reported high sexual and reproductive health knowledge among the youth, particularly on STIs/HIV and modern contraceptives (Awusabo-Asare et al., 2006; Neema et al., 2006; Simbayi et al., 2005), the depth and quality of the knowledge varied, and misconceptions persist (Ajuwon et al., 2006; Brown, Jejeebhoy, Shah & Yount, 2001; Katz & Nare, 2002; Wodi, 2005). For instance, some participants did not believe that STIs can be symptomless (Amuyunzu-Nyamongo et al., 2005), and defective knowledge on how HIV is

transmitted was common (Neema et al., 2006). Young people had low self-perception of the risk of contracting STIs, even in regions with high prevalence of HIV (Anderson, Beutel & Maughan-Brown, 2007; Brown et al., 2001; Tenkorang, Rajulton & Maticka-Tyndale, 2009), which made it difficult for them to practise safer behaviour despite the high knowledge.

Other factors found to be associated with young people's sexual behaviour include education, socioeconomic status, peer pressure, parental involvement, and use of alcohol and other substances. Fewer years of education is associated with risky behaviour generally (Simbayi et al., 2005) and the more educated young people are the less they initiate early sexual intercourse (Doyle et al., 2012; Speizer, Fotso, Davis, Saad & Otai, 2013). Studies have also shown an association between low socioeconomic status and risky sexual behaviour (Rwenge, 2000; Tenkorang et al., 2009). A study found that women from poorer backgrounds tend to initiate sex early in Nigeria and Senegal. In Kenya, however, the opposite was observed, although they were more likely to use a condom than their poorer counterparts (Speizer et al., 2013). Peer pressure among young people can undermine safe sex messages (delay sexual debut by abstaining, remain faithful to one sexual partner, use a condom) and health-promoting social norms (Selikow, Ahmed, Flisher, Mathews & Mukoma, 2009).

Parental involvement, including monitoring and communication on sexual matters between parents and children, is associated with sexual activity and contraceptive use in four sSA countries (Biddlecom, Awusabo-Asare, & Bankole, 2009). In these countries, low parental monitoring – that is, not knowing where their children go at night, what they do in their free time, and who their friends are, was associated with their children having sex in the last 12 months. Among Ugandan women and Malawian men, parental communication was positively associated with sexual activity. Such communication was found to be associated with contraceptive use at last

sex for both sexes in Uganda, and for women in Ghana (Biddlecom et al., 2009).

Moreover, studies have found an association between risky sexual behaviour and both alcohol use and substance misuse (Adeboye et al., 2016; Simbayi et al., 2005). For example, HIV risk was found to be associated with marijuana use among young men (Simbayi et al., 2005). Another factor that influences young people's poor sexual health in sSA is the accessibility to sexual and reproductive health services. Several barriers to such services have been identified, including lack of services, lack of information on where to access services, shyness and fear of stigmatisation, negative attitudes of providers, lack of privacy, and cost (Amuyunzu-Nyamongo et al., 2005; Awusabo-Asare et al., 2006; Neema et al., 2006). Young people's poor sexual health and the associated risk factors make any intervention to improve sexual health and reduce vulnerability to STIs/HIV essential.

1.4: Interventions to improve young people's sexual and reproductive health

In their systematic review of systematic reviews, Mavedzenge, Luecke and Ross (2014) identified eight types of interventions that are primarily designed to prevent HIV transmission and reduce morbidity and mortality among young people. These include:

1. HIV prevention education in school
2. Adolescent-friendly services (e.g. training staff to work with young people) that increase uptake of HIV prevention interventions (e.g. condoms, HIV testing)
3. Provision of services in youth centres (e.g. condom provision and HIV testing)
4. School-based health services

5. Community-based interventions targeting a geographically defined population
6. Conditional cash transfers to keep young people in schools
7. Conditional cash transfers to young people who remain STI-free
8. Unconditional cash transfers to young people.

Another type of intervention identified by Mason-Jones et al. (2016) in their review is a material incentive (e.g. free school uniform) to encourage school attendance. Of all these interventions, HIV prevention education in school was found to have the strongest quality of evidence on outcomes such as promotion of health-promoting knowledge, attitudes, and (self-reported) risk-reduction sexual behaviour patterns (Mavedzenge et al., 2014). Thus, school-based sexual health education programmes have the potential to be effective and cost effective.

1.5: School-based sexual health education interventions

Schools, as a learning environment, play a vital role in the development of young people by providing knowledge and skills, and have been recognised as an appropriate setting for health promotion, including sexual and reproductive health (Mason-Jones et al., 2016). In addition to being a setting where young people spend most of their time, schools have the infrastructures in place for educational activities, and serve as a link between young people and their local communities (Gallant & Maticka-Tyndale, 2004; Mason-Jones et al., 2016).

School-based sexual and reproductive health interventions are primarily based on social cognition and behavioural change theories. The most commonly used theories include Social Learning Theory (Bandura, 1977), Social Cognitive Theory and the Health Belief Model (Rosenstock, Strecher & Becker, 1988), and the Theory of Planned Behaviour (Ajzen, 1991). These interventions aim to change attitudes, intentions,

behaviours, risk perceptions, and social norms by increasing sexual health knowledge and awareness of risk-reduction strategies such as condom use and delaying sexual debut. The mechanism through which the interventions might work is illustrated in the logic model below (Figure 2):

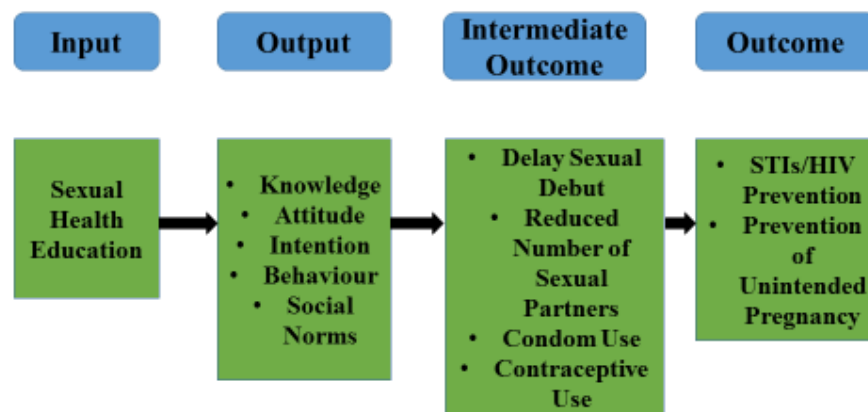


Figure 1. 2: School-based sexual health education logic model

1.6: Rationale, research questions, and objectives

As seen in the preceding sections, young people are generally at greater risk of STIs than the general population, especially in sSA, where the prevalence of HIV is high. School-based programmes starting in primary schools are believed to be necessary to reduce transmission of and protect the general population from STIs (Gallant and Maticka-Tyndale, 2004). Stover et al. identified school-based programmes as an essential foundation for HIV prevention (Stover et al., 2002). Therefore, guidance on how to develop, implement and evaluate effective school-based HIV-preventive interventions in sSA could have a considerable public health impact.

There is a substantial research literature focusing on sexual health education and/or STI/HIV prevention among young people, which has influenced the development of guidance regarding the development, implementation, and evaluation of interventions. I have reviewed 19 sources of guidance, namely:

1. National AIDS programmes: A guide to indicators for monitoring and evaluating national HIV/AIDS prevention programmes for young people (WHO, 2004a)
2. National guide for monitoring and evaluating programmes for the prevention of HIV in infants and young children (WHO, 2004b)
3. Evaluating HIV/AIDS prevention projects: A manual for non-governmental organisations (Bertrand & Solis, 2004)
4. A framework for monitoring and evaluating HIV prevention programmes for most-at-risk populations (UNAIDS, 2008)
5. Global guidance briefs on HIV interventions for young people (ILO, US, UNDP, UNESCO, UNFPA, UNHCR, UNICEF, UNODC, World Bank, WFP, WHO, 2008)
6. Monitoring and evaluation of sexual and reproductive health interventions (Horstman, Cleland, Douthwaite, Ambegaokar & Salway, 2002)
7. Guidance for the prevention of sexually transmitted HIV infections (The US President's Emergency Plan for AIDS Relief, 2011)
8. Program operations guidelines for STD prevention (Centers for Disease Control Prevention, 2001)
9. International Planned Parenthood Federation (IPPF) framework for comprehensive sexuality education (IPPF, 2006)
10. International technical guidance on sexuality education: An evidence-informed approach for schools, teachers, and health educators (Ecker, Kirby & Gordon, 2009)
11. Standards for sexuality education in Europe: A framework for policymakers, educational and health authorities, and specialists (WHO, 2010)

12. Guide to implementing Teens for AIDS Prevention: A peer education programme to prevent HIV and STI (Renfrew, Fothergill, Hauser, Jackson & Klindera, 2002)
13. The evaluation of comprehensive sexuality education programmes: A focus on the gender and empowerment outcomes (UNFPA, 2015)
14. UNFPA operational guidance for comprehensive sexuality education: A focus on human rights and gender (UNFPA, 2014)
15. HIV/AIDS prevention guidance for reproductive health professionals in developing-country settings (Epstein, Whelan, van de Wijgert, Mane & Mehta, 2002)
16. European guidelines for youth AIDS peer education (Svenson, 1998)
17. Included Involved Inspired, a framework for youth peer education programmes (IPPF, 2012)
18. A tool to assess the characteristics of effective sex and STD/HIV education programmes (Kirby, Wilson & Roller, 2007)
19. Evidence- and rights-based planning and support tool for sexual and reproductive health and rights/HIV prevention interventions for young people (Leerlooijer, 2009).

To our knowledge, however, no specific guidance is available for designing, implementing, and evaluating school-based sexual health education interventions in sSA. Developing such evidence-based recommendations would be timely, considering the burden of STIs in sSA, and the potential of the interventions to reduce STI transmission among adolescents. This doctoral programme aimed to provide such evidence-based recommendations for designing, implementing, and evaluating effective school-based sexual health education interventions in sSA by investigating evidence-based practice. The work was designed to answer the two research questions:

1. What are the design, implementation, and evaluation features that characterise effective school-based sexual health education interventions in sub-Saharan Africa?

2. How can we improve the design, implementation, and evaluation of school-based sexual health education interventions in sub-Saharan Africa to maximise their effectiveness?

The objectives of the project were:

1. To identify evaluated school-based sexual health education interventions implemented in sub-Saharan Africa and features that characterise effective interventions
2. To conduct in-depth analyses of school-based sexual health education interventions in sub-Saharan Africa, focusing on what contributes to their effectiveness
3. To explore researchers' experience in designing, implementing, and evaluating school-based sexual health education interventions in sub-Saharan Africa, and their opinions on how future interventions could be improved to maximise their effectiveness.

1.7: Overview of the thesis

This thesis consists of two parts: the main thesis and the appendices. Chapter 1 introduces the work and sketches the sSA context. Chapter 6 is a general discussion of the work highlighting research practice, and policy implications. Chapters 2-5 report the four studies undertaken and each is written as a manuscript suitable for journal submission. The studies in Chapters 2, 4, and 5 have been published in *BMC Public Health*, the *Case Studies Journal*, and *Sex Education* respectively. Chapter 3 has been submitted for publication. Each study used different methods, and because these chapters are presented in manuscript style, some repetition is unavoidable. Furthermore, while the APA referencing style was used in this report, the Vancouver and Chicago styles were used in Chapters 2 and 5, to conform to the respective journals' requirements.

Chapter 2 reports on a systematic review and meta-analysis of school-based sexual health education interventions implemented and evaluated

in sSA. This study aimed to determine the effectiveness of school-based sexual health education interventions in promoting condom use and preventing STIs. It also identified features that characterise effective interventions. This review also allowed identification of interventions that were explored in greater depth in subsequent studies. The results showed that school-based sexual health interventions have the potential to promote self-reported condom use. Although no evidence of their effectiveness in preventing STIs was found, features that may be associated with their effectiveness were identified.

Chapter 3 reports a single case study of a school-based sexual health education intervention implemented and evaluated in sSA. This study explored factors that may be associated with the effective design, implementation, and evaluation in greater depth, which was not possible in the systematic review. Published and unpublished project documents, and interviews with key investigators were analysed. The results showed that providing sexual health education to young people in their communities, in isolation, will have a limited impact on their sexual health and well-being. Structural interventions in schools and health facilities are necessary for sexual health interventions to have the maximum impact. Furthermore, this study highlights the strong influence of socioeconomic factors on young people's sexual health and relationships in sSA.

Chapter 4 reports a multiple case study of school-based sexual health education interventions. This is an extension of the single case study in Chapter 3, utilising a range of cases found to be more or less effective. The study explored design, implementation, and evaluation factors that may be associated with effectiveness. Seven unique interventions, including the case reported in Chapter 3, were included. Project documents and interviews with key investigators were analysed. The results emphasised the importance of environmental influences on young people's sexual health that need to be addressed. Using ecological

models to inform design and incorporating community-based approaches could improve school-based sexual health interventions.

Finally, Chapter 5 presents a qualitative study on the views and experiences of facilitators and barriers to designing, implementing, and evaluating school-based sexual health education in sSA. Researchers, intervention designers, and implementers who were involved in a school-based sexual health education intervention in sSA were interviewed. The interviews explored intervention factors that may be associated with effectiveness from the perspectives of a wide range of experts with experience beyond the interventions included in the systematic review and case studies in Chapters 2-4. In addition to confirming some of the findings from the first three studies (Chapters 2-4), this study provided comprehensive sets of recommendations that could improve future school-based sexual health education interventions in sSA.

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Chapter 2: School-based sexual health education interventions to prevent STI/HIV in sub-Saharan Africa: A systematic review and meta-analysis

2.1: Abstract

Background: School-based sexual health education has the potential to provide an inclusive and comprehensive approach to promoting sexual health among young people. We reviewed evaluations of school-based sexual health education interventions in sub-Saharan Africa to assess effectiveness in reducing sexually transmitted infections and promoting condom use.

Methods: We searched ten electronic databases, hand-searched key journals, and reference lists of included articles for potential studies. Data were extracted on outcomes, intervention characteristics, methods and study characteristics indicative of methodological quality. Where possible, data were synthesized using random effect meta-analysis. Intervention features found predominantly in effective interventions were noted.

Results: The initial search retrieved 21634 potentially relevant citations. Of these, 51 papers reporting on 31 interventions were included. No evaluation reported statistically significant effects on the incidence or prevalence of Human Immunodeficiency Virus and Herpes Simplex Virus 2 infections. However, intervention participants reported statistically significant greater condom use in both randomised controlled trials and non-randomised trials for short (less than 6 months) follow-up periods (OR = 1.62, 95 % CI = 1.03–2.55 and OR = 2.88, 95 % CI = 1.41–5.90 respectively). For intermediate (6–10 months) and long-term (more than 10 months) follow-up periods, the effect was statistically significant (OR = 1.40, 95 % CI = 1.16–1.68) and marginally significant (OR = 1.22, 95 % CI = 0.99–1.50) among the randomised trials respectively. Only 12 of the 31

interventions reported implementation details, out of which seven reported on fidelity.

Conclusion: School-based sexual health education has the potential to promote condom use among young people in sub-Saharan Africa. However, further work is needed to develop and evaluate interventions that have measurable effects on sexually transmitted infections.

2.2: Background

Worldwide, more than one million cases of sexually transmitted infections (STIs) occur daily and 500 million people live with curable STIs including Chlamydia, Gonorrhoea, Syphilis and Trichomoniasis [1]. The burden of STIs is high in sub-Saharan Africa (sSA) with an incidence rate of 241 per 1000 among adults age 15–49, one of the highest in the world [2].

Approximately 70 % of those living with Human Immunodeficiency Virus (HIV) worldwide, and 80 % of infected women aged 15–24, live in sSA where one in six adolescent deaths is attributed to HIV [3, 4].

Approximately half of new HIV infections occur in individuals aged 15–24 [5] and more than 90 % are sexually transmitted. Thus, sexually active young people in sSA, including young women, are at high risk of HIV infection.

Several types of interventions have been employed to reduce the vulnerability of adolescents to STIs, including HIV. These include: preventive education in schools; services delivered in youth centres, including condom distribution; adolescent-friendly health centres that encourage utilisation of prevention services; school-based health services; conditional cash transfers to encourage young people to remain in school or to avoid risky sexual behaviours; various community-based interventions; and unconditional cash transfers [6]. School-based sexual health education (SBSHE) is arguably the most inclusive and potentially comprehensive of these approaches and has the potential to effectively promote population-level sexual health among adolescents and young adults [7], so reducing the spread of STIs, including HIV [8]. Mavedzenge et al. [6] found high quality evidence for effectiveness of SBSHE in relation to a number of STI-related outcomes from evaluations worldwide and recommended such interventions be implemented widely. However, evaluations of SBSHE interventions in sSA have provided mixed findings in relation to reduction of self-reported unprotected sexual intercourse and surprisingly, none has provided evidence of reduction of STI incidence or

prevalence [8–10]. In this review, SBSHE was defined as any intervention delivered wholly or partially in a school setting aiming to reduce risky sexual behaviours, STIs and unplanned pregnancy, and promote positive sexual health.

Four reviews of evaluations of SBSHE interventions in Africa were found [8–10]. None assessed effects of interventions on STI incidence or prevalence. A review by Kaaya et al. [9] included 11 interventions and concluded that most studies reported effects on knowledge, attitudes and communication but fewer reported effects on self-reported onset of sexual intercourse, frequency of sexual intercourse and number of sexual partners. Similarly, a review by Gallant and Maticka-Tyndale [8] also including 11 interventions and concluded that knowledge and attitudes are easier to change than behaviours among African youths. These reviewers recommended that intervention design should be grounded in theorized accounts of behaviour change mechanisms and be directly relevant to local culture. A third review by Paul-Ebhohimhen et al. [10], including 10 evaluations, also concluded that SBSHE interventions had stronger effects on sexual health knowledge and attitudes than on behaviour patterns. More optimistically, a review of seven interventions for Nigerian students found changes in self-reported sexual behaviour patterns including delaying sexual debut, increasing condom and other contraceptives use and reducing frequency of sexual activity [11]. Other reviews include SBSHE interventions [5, 12–26] but draw no conclusions about SBSHE in sSA.

The present study

This review extends previous reviews of effectiveness of SBSHE interventions in sSA [8–10] in four key respects. First, we include an updated and more comprehensive set of experimental evaluations. Second, we assess intervention effects on reduction of STIs indexed by biological markers. Third, we explore intervention characteristics that may

differentiate between effective and ineffective interventions. Fourth, we examine assessment of implementation fidelity.

The review addressed three research questions:

1. How effective are school-based sexual health education interventions in sub-Saharan Africa in promoting condom use and preventing sexually transmitted infections?
2. What characterizes effective school-based sexual health education interventions implemented in sub-Saharan Africa?
3. Are school-based sexual health education interventions implemented with fidelity in sub-Saharan Africa?

2.3: Methods

This review was conducted according to a protocol [see Appendix 2.1, for the review protocol], and reported in accordance to PRISMA statement [27].

2.3.1: Inclusion criteria

Studies were included if they met the following criteria:

- I. Published in English before March 2016.
- II. The study was a randomised control trial (RCT) or quasi-experimental (non-randomised trials and before-and-after studies with comparison groups).
- III. More than 80 % of participants were below the age of 25 years. A 25 year cut-off was applied because age of school enrolment varies considerably across sub-Saharan Africa, particularly in the rural areas. Hence, it is not uncommon to find older students in primary or secondary schools [28].
- IV. The study evaluated a school-based sexual health education intervention delivered in sub-Saharan African schools. The intervention could be

delivered completely in school or include components delivered to school students outside school and/or outside school hours.

- V. The dependent measure was self-reported condom use and/or levels of STIs.

2.3.2: Exclusion criteria

Studies were excluded for the following reasons:

- I. They employed no comparison or control group.
- II. They employed a comparison group that received sexual health education other than the usual curriculum.
- III. They were delivered in universities.
- IV. Twenty percent or more of the participants were aged 25 years and above.
- V. Knowledge, attitudes and behavioural intentions were the only outcomes reported.

2.3.3: Search strategy

Ten electronic databases including Medline, PsycInfo, EMBASE, CINAHL, Web of Knowledge, The Cochrane Library, British Education Index/EBSCOhost, Australian Education Index/ProQuest, Education Research Complete/EBSCOhost and ERIC/ProQuest were searched in February 2015 (see Appendix 2.2, which contains search strategy for Medline that was modified and used in other databases). One new inclusion was identified in an updated search run in March 2016. We also searched the table of contents of Journal of AIDs, AIDs Care, AIDs and Behaviour, AIDs Education and Prevention, Journal of Adolescent Health, and Journal of Youth and Adolescence for relevant studies. Reference lists of similar reviews and included studies were also searched in an iterative fashion until no new article was found.

2.3.4: Study selection

Titles and abstracts of the 21,634 identified studies were screened by the primary reviewer (SAS) with a random selection (n = 500, 2.3 %) screened by a second reviewer (SD). Full texts of articles that passed the title-abstract stage were obtained for full text screening. All the full text articles were screened by SAS and 20 % (n = 53) randomly selected were screened independently by SD. Gwet's [29] AC1 statistic was used to assess the inter-rater reliability at each stage of the screening and any disagreement was resolved through discussion. The opinion of a third reviewer (CA) was sought when, exceptionally, two reviewers (SAS and SD) were unsure how to resolve disagreements.

2.3.5: Data extraction

We extracted data relevant to the review questions, including study design, descriptions of the interventions, theories informing intervention design, features of effective interventions, descriptions of implementation and outcomes categorised by length of follow-up. The data extraction form is available as Appendix 2.3. Where more than one article described the same intervention, data were extracted from all papers. Data was extracted by the primary reviewer (SAS) and independently by a second reviewer (SD) to check accuracy. Furthermore, a statistician (SB) also extracted quantitative outcomes data included in meta-analysis independently.

2.3.6: Quality assessment of included studies

The quality of the included studies was assessed using four main dimensions based on recommendations in the Cochrane Collaboration Tool for Assessing Risk of Bias [30], namely selection bias, performance bias, detection bias, and attrition bias of the included studies. The

Cochrane Collaboration Tool was used to assess the quality of included interventions because it is a domain based evaluation that gives critical assessment of each domain (dimension) in which bias may arise [30]. It has the advantage of encouraging users to tailor how they assess studies and so adds to transparency unlike some other methodology assessment checklists (e.g., Jadad [31]). Selection bias for non-RCTs was assessed by determining selection bias due to confounding as recommended in the Cochrane Collaboration Handbook [30]. Random sequence generation or allocation concealment (or bias due to confounding for non-RCTs) and incomplete outcome data were considered critical for assessing the quality of studies in this review. The critical dimensions were used to score the overall risk of bias of the included studies. Random sequence generation and allocation concealment were scored as one dimension assessing selection bias. A score of two was given for 'high', one for 'unclear' and zero for 'low' risk of bias. Therefore, an intervention can have an overall score ranging from zero to four. An article with a total score of 3 or 4 was assessed as 'high', 2 as 'moderate' and 0 or 1 as 'low' risk of bias.

2.3.7: Data analysis

Review Manager 5.3 software [32] was used to undertake meta-analyses identifying intervention effectiveness in relation to increased condom use and reduced HSV2 infections using outcome measures closest to the median follow-up period. Separate analyses for condom use were conducted dividing evaluations into those with short (less than 6 months), intermediate (6–10 months, based on a median of 8 months) and long-term follow-up (more than 10 months). Random-effects method of meta-analysis that is based on inverse-variance technique that adjusts for varying study weights and heterogeneity was employed [30] because of variability in trial size and intervention content, intensity and duration. Whenever available, adjusted (for baseline) rather than crude odds ratios (OR) were used in the analyses. Heterogeneity across estimates was

quantified using the I-squared statistic (I^2) and the p -value from the chi-squared test for heterogeneity was used to quantify evidence against homogeneity [30]. We did not include studies in meta-analysis if heterogeneity was high (I^2 of 75 % and above). Those studies that provided insufficient data to include in the meta-analyses were reported descriptively.

We also conducted sensitivity, or sub group, analyses to assess the effects of two study characteristics on effectiveness, namely, (i) the measure of condom use employed (condom use at last sex versus other measures) and (ii) use of crude versus adjusted odds ratios.

2.3.8: Quality of evidence

We used “Grading of Recommendations Assessment, Development and Evaluation” (GRADE) [33] to assess the overall quality of evidence reported in studies included in meta-analyses. This approach provides a structured and transparent way of developing and presenting results summaries that are easy to understand [33]. Five criteria were used in grading the evidence including limitations of design (risk of bias), inconsistency (heterogeneity), indirectness, imprecision, and reporting or publication bias. For limitations of design (risk of bias), the quality was downgraded if most of the studies were of high risk of bias as assessed with the Cochrane Collaboration Tool. For inconsistency, unexplained heterogeneity indicated by I^2 of more than 75 % was used to downgrade the quality of evidence for this criterion. Indirectness was assessed by determining how closely the interventions, participants and measures of outcome of interest were similar across studies. A relative risk reduction or increase of greater than 25 % (± 0.25) as suggested by GRADE was used to downgrade the quality of evidence for imprecision. Finally, visual inspection of asymmetry of funnel plots was used to detect the possibility of publication bias, and quality was downgraded if asymmetry was

observed. These assessments were undertaken using GRADEpro software [34] and a summary of findings table (SoF) generated. The overall quality of each outcome was graded as 'high', 'moderate', 'low' and 'very low'. These are interpreted as 'very confident', 'moderately confident', 'limited confidence' and 'very low confidence' that the true effect lies close to the estimated effect respectively [33].

2.3.9: Features of effective interventions

Intervention design and implementation characteristics associated with effectiveness have been identified in previous reviews. Design related features include: needs assessment with the intended participants and involving key stakeholders in the design or development process of the intervention [5, 10]; adapting the intervention or curriculum from other evaluated interventions [5]; basing the intervention on behavioural change theory [9]; and providing the participants with skills that help reduce risky sexual behaviours [10]. Implementation characteristics include: provision of adolescent-friendly health services [5]; distribution of condoms [5]; extending activities to the community outside the school environment [5]; training of facilitators; and fidelity of delivery [10]. Intervention descriptions in the current review were coded for inclusion of these features. We classified interventions as "interventions with evidence of benefit" or "interventions without evidence of benefit". "Evidence of benefit" was identified as a statistically significant increase condom use or less prevalence/incidence of STI at any follow-up among any sub-group of the participants (e.g., among sexually active participants). The frequency of occurrence of potentially effectiveness enhancing features among the interventions with evidence of benefit and those without evidence of benefit was then determined.

An intervention was regarded to have been delivered with fidelity if the authors reported that the intervention was delivered as intended. This

includes how “faithful” components, content, and activities of the intervention were delivered as designed. It also includes frequency and duration of exposure (intensity) of the intervention.

2.4: Results

2.4.1: Selection and description of studies

We obtained 21,634 papers after removing duplicates (Figure 2.1), out of which 271 were selected after screening through titles and abstracts (AC1 = 0.98). After full-text screening two reviewers (SAS and SD) independently screened and agreed (100 % agreement, AC1 = 1.0) on inclusion of 51 papers, reporting on 31 interventions. The *MEMA kwa Vijana* (MkV) intervention was reported in six included papers [35–40], however, Ross et al. [35] is cited henceforth when referring to this intervention because most data were extracted from that report. Similarly, other interventions reported in more than one paper include: (i) Primary School Action for Better Health (PSABH) [41, 42]. (ii) HealthWise South Africa [43–46]. (iii) Promoting Sexual and Reproductive Health, School-based HIV/AIDS Intervention in Sub-Saharan Africa (SATZ) [47–50]. (iv) HIV Prevention Intervention for Rural Youth (HP4RY) [51–54]. (v) ‘Let Us Protect Our Future’ South Africa [55–57]. (vi) The Regai Dzive Shiri Project [58–61]. Subsequently, key papers ([41, 43, 47, 51, 55, 58] respectively) are cited when referring to these interventions.

Seventeen of the evaluations were RCTs and 14 used quasi-experimental designs. Twenty-six of the interventions were delivered in secondary or high schools (84 %), four (13 %) in primary or elementary schools and SATZ intervention in both primary and secondary schools (3 %). Four interventions [35, 51, 58, 62] included out-of-school and community activities, some involving health centres. The MkV intervention [35] had four components namely, a teacher- and peer-led in-school programme;

provision of youth-friendly health services; condom promotion and distribution; and community mobilisation activities. The HP4RY intervention [51] had two components, a teacher delivered school programme and a community programme delivered by young people.

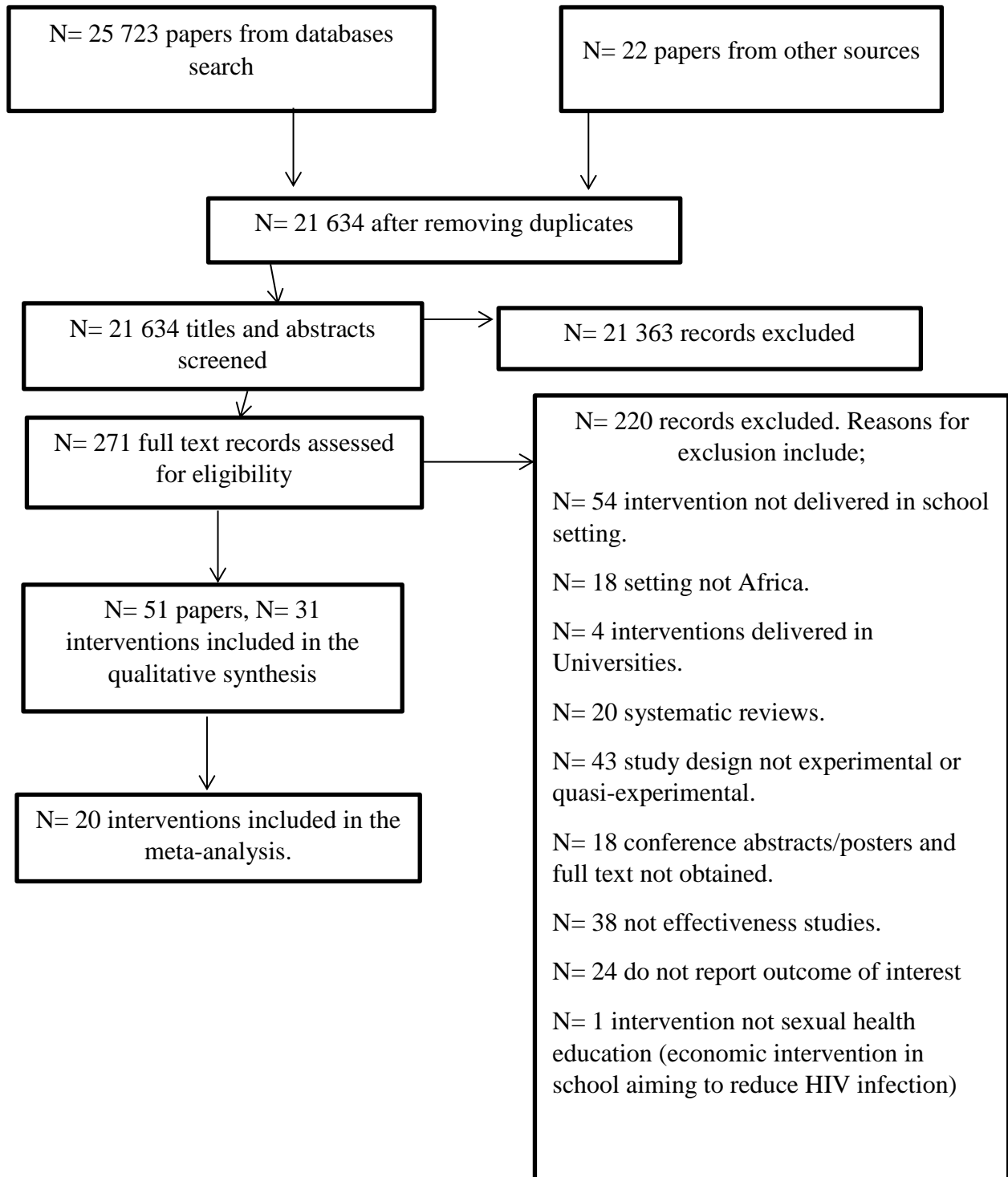


Figure 2. 1: Studies selection flow diagram.

The Regai Dzive Shiri Project [58], had three components, teacher-delivered school activities, community activities targeting parents and other community members, and provision of reproductive health services. The intervention by Brieger et al. [62] was a peer-led activity involving in-school activities as well as visits to, clinics and community centres activities. All interventions included in this review had both female and male participants, and participants were 9–30 years old [55, 63]. The number of participants varied from 24 [64] to 13814 [35], with a total number 70201 across all included evaluations. The median follow-up period for condom use was 8 months and 54 months for the biological outcomes. See Appendix 2.4, which provides lists of excluded studies with reasons for the exclusion and Table 2.1, which provides the characteristics of the included studies. Intervention descriptions included in Table 2.1 are summaries of those provided in the papers describing included interventions. All studies reported on ethical approval and/or received informed consent from the participants.

2.4.2: Methodological quality of included studies

Methodological quality was generally high; 20 of the included studies were assessed as having “low”, 8 as “moderate” and 3 “high” risk of bias (see Appendix 2.5, which contains the quality assessment process). Two of the high risks of bias studies [43, 65] were found to be at risk of attrition bias due to loss to follow up of more than 30 % and ‘unclear’ selection bias. The other high-risk study [66] was assessed to be at risk of selection bias because the baseline characteristics of confounders differed between the two arms of the intervention, which were not adjusted for in the analysis, and ‘unclear’ attrition bias. See Figures 2.2 and 2.3 for risk of bias graph and risk of bias summary for each study respectively.

Table 2. 1: Characteristics of included studies

STUDY (lead author surname and date)	SETTING (LEVEL & COUNTRY)	STUDY & DESIGN	PARTICIPANTS' AGE (YEARS) & NUMBER	INTERVENTION	COMPARISON	LENGTH(S) OF FOLLOW UP
Aderibigbe 2008	Secondary schools, Nigeria	Quasi- experimental	Age range: 10-19 Number: 521	<i>Objectives:</i> to reduce risky sexual behaviours. <i>Content:</i> topics on HIV/AIDs, sexual behaviours including condom use and risks of exchange of sex for gifts were covered. <i>Activities:</i> health education sessions consisting of lectures, film shows, and distribution of information, education and communication (IEC) materials. <i>Dose/frequency/duration:</i> not reported (NR) <i>Theory used:</i> NR	No intervention	3 months
Agha 2004	Secondary schools, Zambia	Quasi- experimental	Age range: 14-23 Number: 416	<i>Objectives:</i> to increase knowledge, normative belief and self-risk perception of contracting HIV. <i>Content:</i> curriculum provided factual information on HIV, modes of transmissions, impact of the infection on immunity, high risk associated with anal sex and other non-sexual modes of transmission of HIV. It also contained	1-hour-long, peer-led water purification intervention.	1 week and 6 months

information on abstinence, correct and consistent use of condom.

Activities: peer led discussions, drama skits and distribution of educational leaflets.

Dose/frequency/duration: one session of 1-hour-and-45-minutes duration.

Theory used: NR

Ajuwon 2007	Secondary schools, Nigeria	Quasi-experimental	Age range: 10-25 Number: 494	<p><i>Objectives:</i> to improve secondary school students' sexual health knowledge, attitudes, perceived self-efficacy and sexual practices.</p> <p><i>Content:</i> information on aspects of reproductive health, STI/HIV/AIDS and condoms were covered.</p> <p><i>Activities:</i> teacher instructions, presentations, rotational talks, health quiz competitions, drama presentations, counselling of students and distribution of condoms with other educational materials.</p> <p><i>Dose/frequency/duration:</i> nine months (i.e., one academic session)</p> <p><i>Theory used:</i> NR</p>	No intervention	Immediate
Arnold 2012	Secondary schools, Nigeria	Cluster Randomised Controlled Trial	Age range: greater than 11 to less than 17 Number: 2589	<p><i>Objectives:</i> to reduce vulnerability of youths to HIV infection.</p> <p><i>Content:</i> the school curriculum included topics on human development, HIV infection, sexual behaviours, personal skills, relationships, and society and culture.</p>	No intervention while waiting for delayed intervention.	12 months and 18 months

				<p><i>Activities:</i> the participants received family life and HIV education programme in schools as well as community interventions from youths trained in working with youths and adults.</p> <p><i>Dose/frequency/duration:</i> the school curriculum was delivered over 3 years of junior secondary schools.</p> <p><i>Theory used:</i> Social Ecology Theory, Social Scripting Theory and AIDs Competent Community Model</p>		
Atwood 2012	Elementary or middle school, Liberia	Randomised Controlled Trial	Mean age: 16.3 Number: 812	<p><i>Objectives:</i> to promote attitudes and skills for safer sex.</p> <p><i>Content:</i> an eight-module programme designed to promote attitudes and skills for safer sex. These include positive attitudes towards condom use, skills to negotiate condom use, refuse sex and use condoms effectively.</p> <p><i>Activities:</i> NR</p> <p><i>Dose/frequency/duration:</i> one module per week over eight weeks.</p> <p><i>Theory used:</i> Social Cognitive Theory and Theory of Reasoned Action.</p>	General health curriculum intervention which includes information on how to prevent malaria, Tuberculosis, worm infestation and HIV/STD knowledge that do not have behavioural theory underpinning and preventive skills.	3 months and 9 months

Brieger 2001	Secondary, post-secondary and out of school youths, Nigeria and Ghana	Quasi-experimental	Age: Adults below 25 years of age Number: 1784	<p><i>Objectives:</i> to improve knowledge of reproductive health, and promote safe sex behaviours with contraceptive use among sexually active adolescent.</p> <p><i>Content:</i> information on sexuality and reproductive health, safer sex behaviours and contraceptives was provided.</p> <p><i>Activities:</i> peer counselling, youth involvement in information education and communication materials development, drama, and provision of contraceptives. Other activities include TV, radio, youth centre activities, nurse workshops, clinic visits, youth centre and street campaigns.</p> <p><i>Dose/frequency/duration:</i> 18 months.</p> <p><i>Theory used:</i> NR</p>	No intervention	18 months
Burnett 2011	High schools, Swaziland	Randomised Controlled Trial	Mean age: 17.35 Number: 177	<p><i>Objectives:</i> an American HIV education programme adapted for Swaziland to improve HIV related knowledge, attitudes and safe sexual behaviours including HIV testing.</p> <p><i>Content of curriculum:</i> topics including “understanding my body”, basics of HIV and STIs, HIV testing, prevention and treatment of HIV, stigma and discrimination for people living with HIV, relationships and assertive behaviours.</p>	No intervention	Immediate

				<p><i>Activities:</i> interactive techniques such as role play and group discussions.</p> <p><i>Dose/frequency/duration:</i> one hour per week for 13 weeks.</p> <p><i>Theory used:</i> Self-efficacy Theory.</p>		
Cowan 2010	Secondary schools & community clinics, Zimbabwe	Cluster Randomised Controlled Trial	Age range: 18-22 Number: 6791	<p><i>Objectives:</i> a community-based multi-component HIV prevention intervention aiming to change adolescents' social norms.</p> <p><i>Content:</i> Modified version of MkV curriculum (see Ross 2007 below). Also included sessions on self-awareness, communication, self-belief and gender issues.</p> <p><i>Activities:</i> peer educators led intervention; parents and community stakeholders programme to improve health knowledge, communication between parents and youths; and community support for adolescent reproductive health and provision of reproductive health services by nurses and staff working in rural clinics.</p> <p><i>Dose/frequency/duration:</i> NR</p> <p><i>Theory used:</i> Social Learning Theory and The Stages of Change Model.</p>	No intervention	48 months
Cupp 2008	High schools, South Africa	Cluster Randomised Controlled Trial	Age range: 13-18 Number: 1095	<p><i>Objectives:</i> to reduce risky behaviours concerning alcohol and sex.</p> <p><i>Content:</i> 40% focused on alcohol-related issues, while the other 60% on reducing risky sexual activity to avoid</p>	Regular Life Orientation curriculum.	4-6 months and 14-18 months

				<p>HIV, other STIs and unwanted pregnancy.</p> <p><i>Activities:</i> role-plays, teachers and peers led group discussions and audio vignettes.</p> <p><i>Dose/frequency/duration:</i> 30-40 minutes per unit (15 units in total) over 8 weeks.</p> <p><i>Theory used:</i> Social Learning Theory, Theory of Planned Behaviour and Social Inoculation Theory.</p>		
Denison 2012	High schools, Zambia	Quasi-experimental	Age range: 11 to less than 19. Number: 2476	<p><i>Objectives:</i> to increase knowledge, attitudes and protective behaviours related to HIV and reproductive health.</p> <p><i>Content:</i> curriculum addressed life skills and sexual behaviours including abstinence, being faithful and condom use.</p> <p><i>Activities:</i> provision of library materials and counselling from a youth resource centre; volunteer peer educators coordinated extracurricular activities; educational events to communities on specific topics; and workshops to teachers on specific topics as a way of capacity building.</p> <p><i>Dose/frequency/duration:</i> 40 minutes weekly over 7-9 months.</p> <p><i>Theory used:</i> NR</p>	No intervention	NR

Esero 2008	Secondary schools, Nigeria	Quasi-experimental	Age range: 13-19 Number: 24	<p><i>Objectives:</i> to reduce risky sexual behaviours and improve quality of sexual behaviours among school going adolescents.</p> <p><i>Content:</i> topics on puberty, reproduction, contraception, and negotiation in relationships, including training in assertiveness skills were covered.</p> <p><i>Activities:</i> active learning through small group discussions and games; skills development through role-play; and information dissemination through leaflets. Subjects on puberty, reproduction, contraception and negotiation/assertiveness skills were taught.</p> <p><i>Dose/frequency/duration:</i> one session per week over eight weeks.</p> <p><i>Theory used:</i> NR</p>	No intervention	Immediate
Fawole 1999	Secondary schools, Nigeria	Randomised Controlled Trial	Mean age: 17.6 (intervention group), 17.8 (control group). Number: 450	<p><i>Objectives:</i> to improve knowledge, attitude and sexual risk behaviours of secondary school students.</p> <p><i>Content:</i> the course targeted knowledge, attitudes and sexual behaviours in relations to STIs including HIV.</p> <p><i>Activities:</i> film shows, lectures, stories, role-plays, songs, essays and debates as well as demonstration on how to use a condom.</p>	No intervention	6 months

				<p><i>Dose/frequency/duration:</i> two hours per session, one session per week over six weeks.</p> <p><i>Theory used:</i> NR</p>		
James 2005	Secondary schools, South Africa	Randomised Controlled Trial	Age range: 15 to less than 22 Number: 1168	<p><i>Objectives:</i> to improve knowledge, attitudes, communication and behavioural intentions concerning sexually transmitted infection.</p> <p><i>Content:</i> Laduma print provides the reader with information on sexually transmitted infections and clears any misconception on the issue. It also provides information that will bring about attitudinal change on the participants including safe sex behaviours, self-efficacy and adaptation skills for safe sex behaviour. Condom use for prevention of STI is clearly explained in Laduma.</p> <p><i>Activities:</i> Laduma print was given to participants to read.</p> <p><i>Dose/duration/frequency:</i> once and take averagely one hour to read the print.</p> <p><i>Theory Used:</i> NR</p>	No intervention	3 weeks and 6 weeks
James 2006	Secondary schools, South Africa	Randomised Controlled Trial	Age range: 12-21years Number: 1141	<p><i>Objectives:</i> to improve knowledge of HIV/AIDS and its prevention; safer sex practices and intentions to practice safer sex; and positive attitudes toward condom use and people living with AIDS.</p>	Students in the control group received odd lessons about aspects of HIV and AIDS	6 months and 10 months

				<p><i>Content:</i> topics included information about HIV and AIDS, modes of transmission, the immune system, the progression of HIV to AIDS, and how to avoid HIV infection. Knowledge, attitude to condom use and people living with AIDS, gender norms, and perceptions about sexual behaviour were addressed.</p> <p><i>Activities:</i> programmes were delivered through combination of different methods including didactic and interactive group work, teaching and role-play guided by a prescribed manual.</p> <p><i>Dose/duration/frequency:</i> one lesson per week over two school terms (20 weeks).</p> <p><i>Theory used:</i> NR</p>	<p>education in a non-structured format and in some cases celebrated awareness days on the topic.</p>	
Jemmott 2015	Primary schools, South Africa	Cluster Randomised Controlled Trial	Age range: 9-18 Number: 1057	<p><i>Objectives:</i> to increase knowledge on HIV risk reduction, sexuality, sexual maturation, sex role and rape myth beliefs, and skills/self-efficacy to negotiate sex.</p> <p><i>Content:</i> topics covered included HIV/STI risk-reduction knowledge; behavioural beliefs that support abstinence and condom use; skills and self-efficacy negotiating abstinence and condom use and to use condoms; and sex-specific modules that addressed sexuality, sexual</p>	<p>Health-promotion intervention designed to increase fruit and vegetable consumption and physical activity and decrease cigarette smoking and alcohol use.</p>	3 months, 6 months, 12 months, 42 months and 54 months

				<p>maturation, appropriate sex roles, and rape myth belief.</p> <p><i>Activities:</i> games, role-playing, group discussions, brainstorming and comic workbooks using series of storylines and characters.</p> <p><i>Dose/frequency/duration:</i> 12 one hour modules (delivered 2 modules per day) over 6 days.</p> <p><i>Theory used:</i> Social Cognitive Theory and Theory of Planned Behaviour.</p>			
Karnell 2006	Secondary schools, South Africa	Quasi-experimental	Median age: 16 Number: 661	<p><i>Objectives:</i> to give facts related to HIV and Alcohol; consequence and alternatives to drinking alcohol and having unprotected sex; and techniques to resist drinking and having sex.</p> <p><i>Content:</i> half of the curriculum focused on alcohol related issues, while the remaining half on HIV-related issues.</p> <p><i>Activities:</i> the intervention was delivered as monologues role-play delivered by four fictional teenage characters that served the basis for class discussion and group assignments.</p> <p><i>Dose/duration/frequency:</i> 10 units, 30 minute each over 8 weeks.</p> <p><i>Theory used:</i> Social Learning, Social Inoculation and Cognitive Behaviour Theory.</p>	Regular Orientation curriculum.	Life	5 months

Mason-Jones 2011	High schools, South Africa	Quasi-experimental	Age range: 15-16 Number: 3934	<p><i>Objectives:</i> to delay sexual debut and increase use of condoms.</p> <p><i>Content:</i> The intervention consisted of a mixture of taught weekly classroom sessions by peer educators following a standard curriculum covering issues on relationships, well-being and sexual health and confidence building.</p> <p><i>Activities:</i> It consists of weekly classroom taught sessions by peer educators trained on issues related to sexual health, confidence building, sexual health and wellbeing.</p> <p><i>Dose/frequency/duration:</i> NR</p> <p><i>Theory used:</i> NR</p>	Comparison schools received their usual Life Orientation programme.	18 months
Mason-Jones 2013	High schools, South Africa	Quasi-experimental	Age range: 15-16 Number: 728	<p><i>Objectives:</i> a high school peer educators training programme to improve safe sexual behaviours and related psychosocial outcomes of the peer educators.</p> <p><i>Content:</i> training included information about sexual and reproductive health including HIV/AIDS and about community services available, learning about leadership, presentation skills, life skills lessons, communication skills, group work and community development. It also included the development of psychosocial skills believed to be protective in reducing risky sexual behaviours such as goal</p>	Students from comparison schools received no extra training.	18 months

				<p>orientation, critical thinking self-esteem and decision-making.</p> <p><i>Activities:</i> the intervention includes training peers that involves giving information on reproductive health including HIV/AIDs, availability of reproductive health services, life skills, presentation skills, communication skills, group work and community development.</p> <p><i>Dose/frequency/duration:</i> two training sessions (1 hour each per month), 11 training sessions (over 3-day camp).</p> <p><i>Theory used:</i> NR</p>		
Mathews 2012	High schools, South Africa and Primary Schools, Tanzania	Cluster Randomised Controlled Trial	Age range: 12-14 Number: 12139	<p><i>Objectives:</i> to reduce young adolescent risky sexual behaviours including delaying sexual debut and promoting condom use.</p> <p><i>Content:</i> topics included self-image and values clarification; personal, social and physical development, sexuality and reproduction; HIV, AIDS, STIs and substance use; condom use; gender roles; skills for protection and safety; intimate partner violence; contraception; sexual decision-making and sexual risk behaviour; sexual risk assessment; myths and misconceptions; healthy lifestyle; and reproductive health rights.</p>	No intervention	6 months and 12-15 months

				<p><i>Activities:</i> teacher led presentations, small group discussions, skills training, small group activities, role-play, condom demonstrations, quiz, drama, song composition and homework to involve parents.</p> <p><i>Dose/frequency/duration:</i> one school semester of approximately 5 months duration and 15-20 school hours.</p> <p><i>Theory used:</i> Attitude-Social Influence Efficacy (ASE) model.</p>		
Maticka-Tyndale 2007	Primary schools, Kenya	Quasi-experimental	Age range: 11-16 Number: 3452	<p><i>Objectives:</i> to provide information on transmission of HIV and skills building to withstand social, cultural or interpersonal pressure to involve in risky sexual behaviours as well as skills to reduce stigma to people living or affected by HIV.</p> <p><i>Content:</i> information on HIV transmission, prevention and progression. Programme content addressed strategies and skills building for resisting the social, cultural and interpersonal pressures to engage in sexual intercourse, sessions to combat stigmatization of people living with or affected by HIV and care of people with AIDS.</p> <p><i>Activities:</i> teachers and peer supporters delivered classroom lessons, facilitate HIV and AIDS learning using anonymous question</p>	Control schools received the country's ministry of education, science and technology guidelines for HIV/AIDS education, but had no PSABH trained teachers or Peer supporters in the schools.	18 months and 30 months

				boxes, information corners, school health clubs and other school activities (assemblies and literary performance). <i>Dose/frequency/duration:</i> once per week over usual school period. <i>Theory used:</i> Social Learning Theory.		
Mba 2007	Secondary schools, Nigeria	Randomised Controlled Trial	Age range: 10-20 Number: 360	<i>Objectives:</i> to improve knowledge of reproductive health and attitudes towards reproductive health issues. <i>Content:</i> information on STIs including HIV and family planning were provided during a workshop. <i>Activities:</i> a workshop on sexually transmitted diseases, HIV/AIDs, and family planning. <i>Dose/frequency/duration:</i> three hours. <i>Theory used:</i> NR	No intervention	6 weeks
Menna 2015	Secondary Schools, Ethiopia	Quasi-experimental	Age range: 15-18 (for about 80% of the participants). Number: 560	<i>Objectives:</i> to prevent and control HIV/AIDs epidemic by changing knowledge, attitudes and practices of school youths in urban Ethiopia. <i>Content:</i> topics related to the structure and functions of human reproductive system, HIV/AIDs, prevention methods of HIV and risky sexual behaviours. <i>Activities:</i> peer educators were trained to educate peers on structure and function of reproductive organs, HIV/AIDs, risky sexual behaviours and methods of prevention of HIV. <i>Dose/frequency/duration:</i> at least 40 minutes, two sessions per week.	No intervention	3 months

Theory used: NR

Michielsen 2012	Secondary schools, Rwanda	Non- randomised Controlled Trial	Mean age: 18.41 (intervention group) and 17.60 (control group). Number: 1950	<i>Objectives:</i> to reduce risky sexual behaviours and promotes sexual/productive health through anti- AIDs-clubs. <i>Content:</i> training of peers consisted of provision of information on HIV/AIDS, sexually transmitted diseases, family planning and pregnancies, the role of the peer educator and teaching methods including message transmission and counselling. <i>Activities:</i> peer educators teach students through group and individual counselling, songs, drama and other interactive activities to adopt positive and responsible behaviours. <i>Dose/frequency/duration:</i> NR <i>Theory used:</i> Theory of Reasoned Action, Social Learning Theory, Diffusion of Innovations Theory and Health Belief Model.	No intervention	6 months, 12 months
Okonofua 2003	Secondary schools, Nigeria	Randomised Controlled Trial	Mean age: 17.4 (intervention group) and 18.2 (control group). Number: 1247	<i>Objectives:</i> an intervention to improve STI treatment-seeking behaviour and reduce STI prevalence among Nigerian youths.	No intervention	10 months

Content: information on STIs and treatment were provided during health club activities.

Activities: (1) establishment of reproductive health clubs in schools that organises campaigns during which health professional provide factual information on STI and treatment. Other activities include: (1) distribution of IEC materials, organising debates, symposia, drama, essay writing, film show on STI treatment and prevention; (2) training of peer educators to provide counselling to peers as well distribute IEC material on STI and refer those who have symptoms of STIs to health care providers; and (3) training of health care providers (medical practitioners, patent medicine dealers and Pharmacist) with emphasis on treatment algorithms, condom promotion and partner tracing with treatment.

Dose/frequency/duration: 11 months.

Theory used: NR

Rijsdijk 2011	Secondary schools, Uganda	Quasi-experimental	Mean age: 16.1 Number: 1986	<p><i>Objectives:</i> To build self-esteem, personal decision making, self-identity, sexual development, role of social environment, gender equity, sexual/reproductive right and sexuality.</p> <p><i>Content:</i> lessons focused on developing self-esteem, personal</p>	The comparison received nothing while waiting to receive intervention	Immediate
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				<p>decision-making, gaining insights into a person's identity and sexual development, the role of the social environment (e.g., peers, family, close friends, teachers, and media), gender equity, sexual and reproductive rights, sexuality issues, sexual health problems and the life skills necessary to know how to avoid or deal with them.</p> <p><i>Activities:</i> low-tech, computer-based interactive sex education. Participants also develop information technology and creative skills, which improve their job prospects.</p> <p><i>Dose/frequency/duration:</i> 14 lessons over a period of six months.</p> <p><i>Theory used:</i> Theory of Planned Behaviour and Health Belief Model.</p>	(waiting-list control group).	
Ross 2007	Primary school Health Centres, Tanzania	Community and Randomised Trial	Age range: 14 - ≥18 Number: 13814	<p><i>Objectives:</i> to reduce the incidence of HIV, STI and unwanted pregnancy by providing knowledge and skills to enable youth reduce sexual risk, delay sexual debut and appropriate use of health services for sexual health issues.</p> <p><i>Content:</i> topics covered included what is reproductive health and why is it important?; leaving childhood: Puberty; what are HIV and AIDS?; the facts about AIDS; the facts about sexually transmitted diseases; girls and boys have equal abilities; misconceptions</p>	No intervention	12 months, 36 months and 96 months (8years)

about sex; refusing temptations; saying 'No' to sex; sexually transmitted diseases: Going to the clinic; how HIV infection causes AIDS; how Sexually Transmitted Diseases are spread; the relationship between HIV and sexually transmitted diseases; the reproductive organs and their functions; pregnancy and menstruation; respecting other people's decisions; recognising and avoiding temptations; protecting yourselves: What are condoms?; how to avoid HIV infection and AIDS; Sexually Transmitted Diseases and their consequences; making good decisions; practising saying 'No'; being faithful; achieving your future expectations; planning for your future; and protecting yourself: Correct use of condoms & the truth about condoms.

Activities: (1) In-school interactive teacher led and peer led programme for primary school years 5-7. (2) Provision of youth friendly health services. (3) Distribution and promotion of condom use in the community. (4) Community mobilization activities including initial mobilization week and health weeks annually. Multiple activities were utilised across the four components of the intervention including question and answer, guided discussions, story

reading, flip chart illustrations, role-plays and a scripted drama serial performed by class peer educators. it also includes: games; poems; comedy; video films; peer counselling; adult involvement; printed materials (pamphlets, brochures, manuals); awareness workshops for district council officials, religious leaders and ward development committee; condom distribution; and Youth Health Weeks held once a year, where interschool competitions take place
Dose/frequency/duration: 12, 40-minutes sessions per year over 3 years.
Theory used: Social Learning Theory.

Stanton 1998	Secondary schools, Namibia	Randomised Controlled Trial	Mean age: 17 Number: 515	<p><i>Objectives:</i> to improve basic knowledge on reproductive biology, HIV/AIDs, and risky behaviours.</p> <p><i>Content:</i> the curriculum focused on improving knowledge of reproductive biology, risky behaviours (alcohol, substance abuse, and partner violence), HIV/AIDs, communication skills and framework for decision-making.</p> <p><i>Activities:</i> variety of narratives, facts, games and exercises coupled with questions and discussions embedded in each session.</p>	Delay-control condition i.e. received intervention after the six month of follow up.	Immediate, 6 months and 12 months
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				<p><i>Dose/frequency/duration:</i> two-hour length per session (14 sessions) over 7 weeks.</p> <p><i>Theory used:</i> Protective Motivational Theory.</p>		
Taylor 2014	High schools, South Africa	Randomised Controlled Trial	Mean age: 14.25 (intervention group) and 14.22 (control group). Number: 821	<p><i>Objectives:</i> to provide information that will improve attitudes and encourage intention to prevent teenage pregnancy.</p> <p><i>Content:</i> topics include knowing yourself, the choice is yours, relationships, making choices, body development, contraception, peer pressure, culture, parenthood, responsibility, and human rights and gender norms.</p> <p><i>Activities:</i> role-play, debates, small and large group discussion, and videos viewing to start up discussions with students.</p> <p><i>Dose/frequency/duration:</i> 12 weekly.</p> <p><i>Theory used:</i> I-change model.</p>	School life programmes.	4 months and 8 months
Tibbits 2011	High schools, South Africa	Randomised Controlled Trial	Mean age: 14.0 Number: 4040 (second cohorts) 2383 (first cohorts)	<p><i>Objectives:</i> to increase knowledge, promote social, emotional and refusal skills on substance use and sexual behaviours as well as encouraging the use of healthy free time.</p> <p><i>Content:</i> topics include social-emotional skill programmes such as decision-making and self-awareness and positive use of time like beating boredom, and leisure motivations.</p>	Students in the comparison schools received the government mandated Life Orientation curriculum, which differ substantially	12 months, 18 months and 24 months

				Specific lessons on attitudes, knowledge, skills surrounding sexual risk and substance use were also included. <i>Activities:</i> teachers delivered class lessons. <i>Dose/frequency/duration:</i> 12 lessons and 6 booster lessons (each lesson 2-3 class periods). <i>Theory used:</i> Self-Determination Theory, Selective Optimization with Compensation and Social Cognitive Theory.	between schools and overlap minimally with HealthWise content.	
Van der Maas 2009	Secondary schools, Nigeria	Quasi-experimental	Age range: 10-30 Number: 250	<i>Objectives:</i> to increase HIV/AIDS awareness and HIV life skills. <i>Content:</i> teaching included relevant topics on HIV and life skills. <i>Activities:</i> sketches, songs, rallies, competitions and videos with scenarios from Africa translated into the local language. UNPFA/UNAIDS peer education toolkit and Family Health International peer-to-peer training guide manuals were used. <i>Dose/frequency/duration:</i> NR <i>Theory Used:</i> NR	The control group did not receive any peer education.	24 months
Ybarra 2013	Secondary schools, Uganda	Randomised Controlled Trial	Age range: 13-19 Number: 366	<i>Objectives:</i> to provide information about HIV, decision making and communication, motivations to be healthy, proper use of condom and healthy relationships.	The control arm was 'treatment as usual': Participants in the control arm	3 months and 6 months

Content: modules were on information about HIV including prevention; decision-making and communication; motivations to be healthy; how to use a condom to be healthy; and healthy relationships.

Activities: self-administered computer interactive sessions.

Dose/duration/frequency: One hour per module (six modules) over six weeks.

Theory used: Information-Motivation-Behaviour model.

received no programming or interaction beyond the HIV programming that was currently being offered at their school as part of their usual schedule of extracurricular activities.

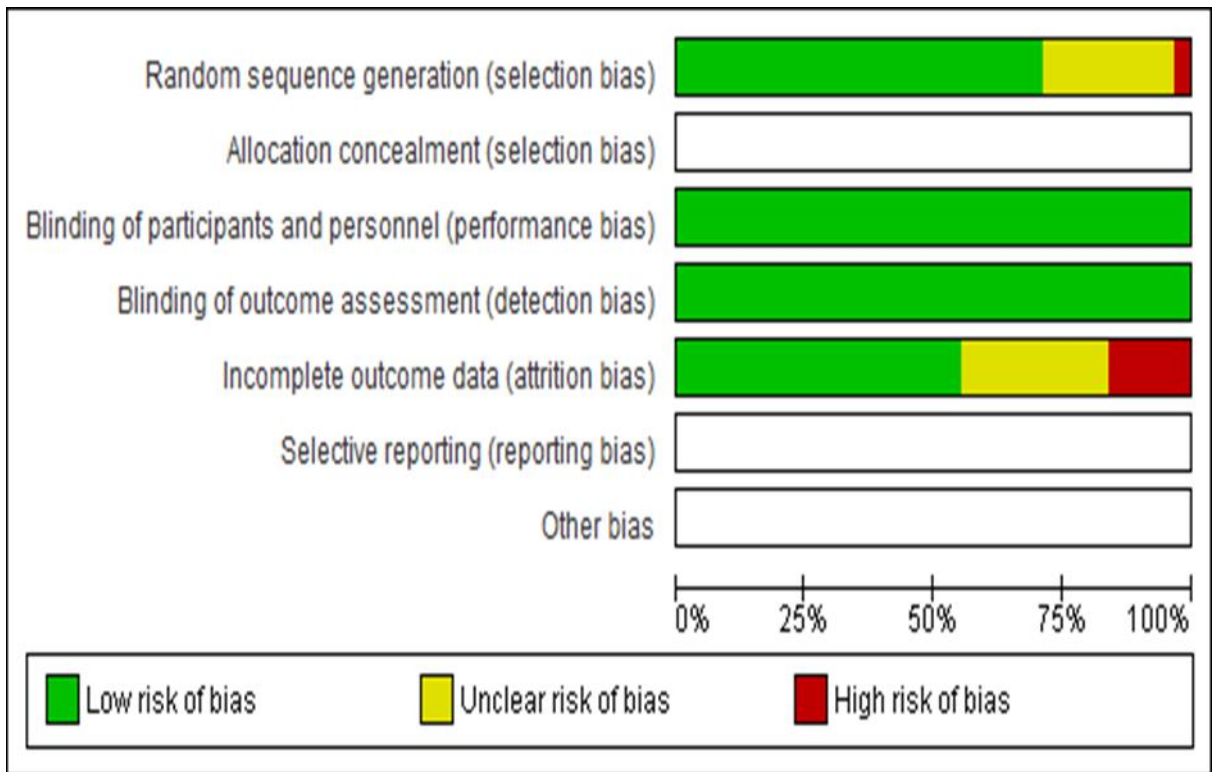


Figure 2. 2: Risk of bias graph

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Aderibigbe and Araoye 2008	+		+	+	+		
Agha and Rossem 2004	+		+	+	?		
Ajuwon and Brieger 2007	-		+	+	?		
Arnold et al 2012	?		+	+	+		
Atwood et al 2012	?		+	+	+		
Brieger et al 2001	+		+	+	?		
Burnett et al 2011	?		+	+	+		
Cowan et al 2010	?		+	+	+		
Cupp et al 2008	?		+	+	?		
Denison et al 2012	+		+	+	+		
Esere 2008	+		+	+	+		
Fawole et al 1999	+		+	+	+		
James et al 2005	?		+	+	-		
James et al 2006	+		+	+	-		
Jemmott et al 2015	+		+	+	+		
Kernell et al 2006	+		+	+	+		
Mason-Jones et al 2011	+		+	+	-		
Mason-Jones et al 2013	+		+	+	-		
Mathews et al 2012	+		+	+	+		
Maticka-tyndale et al 2007	+		+	+	?		
Mba et al 2007	+		+	+	?		
Menna et al 2015	+		+	+	+		
Michielsen et al 2012	+		+	+	+		
Okonofua et al 2003	?		+	+	?		
Rijsdijk et al 2011	+		+	+	+		
Ross et al 2007	+		+	+	+		
Stanton et al 1998	+		+	+	+		
Taylor et al 2014	?		+	+	?		
Tibbits et al 2011	+		+	+	-		
Van der Maas and Otte 2009	+		+	+	?		
Ybarra et al 2013	+		+	+	+		

+ (Low risk), - (High risk), ? (Unclear risk).

Figure 2. 3: Risk of bias summary

2.4.3: Description of interventions

All included interventions delivered comprehensive sexual health education in classroom settings (see Table 2.1 for interventions description). Comprehensive SBSHE provides participants with information on transmission of sexual infections, safer sex practices and prevention of STIs and unwanted pregnancies [67], in contrast to abstinence-only interventions. Various intervention delivery methods were employed in one or more combinations some of which include lectures or presentations (n= 6), group discussions (n = 14), role-plays or dramas (n = 14), and distribution of information, education and communication (IEC) materials (n = 6). Films shows or audio vignettes (n = 7), songs (n = 4), counselling (n = 6), quiz and essay competitions (n = 7) were also used. Condoms were distributed in three interventions [35, 62, 66]. Two were interactive computer-based programmes [68, 69] and one only involved provision of a printed material [65].

The dose and duration of the interventions varied widely and ranged from a single 1 h and 45 min [70] session to multiple sessions delivered over 36 months [35]. However, in general, the interventions employed one session per week of 30–60 min duration over a period of 6–12 weeks [64, 68, 71–76]. Fourteen theories were said to inform the design of 16 of the interventions with Social Learning Theory (n = 6), Social Cognitive Theory (n = 3) and Theory of Planned Behaviour (n = 3) being most frequently used.

2.4.4: Implementation details

Seven of the interventions were delivered by both teachers and peer educators [35, 41, 51, 66, 69, 73, 75]; similarly, seven by peer educators [62, 70, 77–81]; and three by teachers only [47, 72, 82]. Health educators, community physicians, volunteer adults or youths, nurses or other health

personnel were involved in delivering six of the interventions [43, 58, 63, 71, 74, 83] and one was delivered by the researchers that developed it [84]. Twenty-one of the 31 interventions reported that the facilitators received some form of training (see Appendix 2.6, which contains implementation details of the included interventions).

Only twelve (of 31) studies reported monitoring of implementation and only seven of these [35, 47, 58, 68, 69, 75, 82] reported on fidelity of implementation. Just two studies [35, 75] reported that fidelity had been achieved and explained how fidelity had been assessed. In other cases lack of compatibility with local circumstances undermined fidelity of delivery. For example, in the intervention evaluated by Mathews et al. [47] some teachers did not implement condom demonstrations and other skilled based activities due to overwhelming large number of students per class. Similarly, in the intervention evaluated by Rijdsdijk et al. [69] poor availability of computers meant that the intervention had to be modified to delivery through print materials. Sub-sample analyses in this evaluation showed that schools with 'complete' implementation had most of the significant positive effects compared to those with 'partial' implementation [69]. Complete implementation schools are those where the teachers fully implemented more than 50 % of the 14 lessons in the programme.

2.4.5: Outcomes

Three studies reported STI outcomes [35, 55, 58]. Two [35, 58], measured HIV infections close to the median follow-up period of 54 months. Cowan et al. [58] found no evidence of an effect on HIV infections among males or females (adjusted odds ratio (aOR) = 1.20, 95 % CI = 0.66–2.18 and aOR = 1.15, 95 % CI = 0.81–1.64 respectively). Ross et al. [35] reported incidence rate per 1000 person-years and the intervention also did not significantly reduce HIV infection risk for both short (adjusted rate ratio (aRR) = 0.75, CI = 0.34–1.66 for young women) and long-term follow-up

periods (adjusted prevalence rate (aPR) = 0.91, CI = 0.50–1.65 for men and aPR = 1.07, CI = 0.68–1.67 for women).

Three studies [35, 55, 58], also measured HSV2 infections for median follow-up period of 54 months. SBSHE showed no statistically significant effect in reducing the risk of this infection (OR = 1.07, 95 % CI = 0.94–1.23, $p = 0.31$) (Fig. 2.4 Panel a). Ross et al. [35] also did not find any significant effect at long-term follow-up (aPR = 0.94, CI = 0.77–1.15 for males and aPR = 0.96, CI = 0.87–1.06 for females) and similarly, the intervention by Jemmott III et al. [55] did not find a significant effect at 42-month follow-up period.

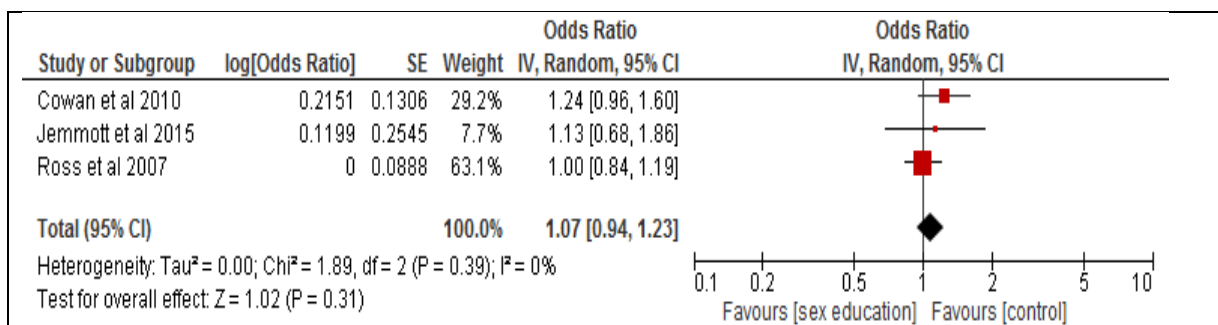
Ross et al. [35] measured other STIs including Syphilis, Chlamydia, Gonorrhoea and Trichomonas and found no statistically significant difference between the intervention and control group in the prevalence of these infections for both short and long-term follow-up periods. However, the intervention by Jemmott III et al. [55] significantly reduced curable STIs (Chlamydia, Gonorrhoea and Trichomonas) at 42-month follow-up period (OR = 0.71, 95 % CI = 0.54–0.95), but not at 54-months follow-up (OR = 1.15, 95 % CI = 0.84–1.57).

All the 31 studies assessed self-reported condom use. Fifteen of the interventions [35, 41, 43, 51, 55, 62, 64, 71, 72, 75, 77, 79, 82, 83, 85] resulted in statistically significant increases in condom use while 16 showed no statistically-significant increases in condom use [47, 58, 63, 65, 66, 68–70, 73, 74, 76, 78, 80, 81, 84, 86]. No intervention resulted in statistically significant reductions in self-reported condom use.

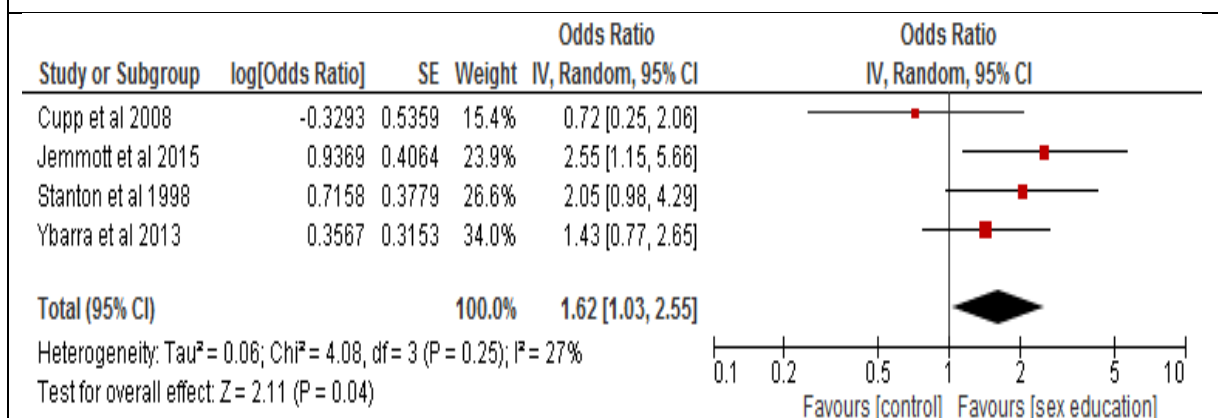
Twenty of the studies that measured condom use provided adequate data to enable inclusion in meta-analyses [35, 41, 47, 51, 55, 58, 63, 66, 68,

70, 73, 74, 76, 77, 79–81, 83, 85, 86]. Measures of condom use at last sex [35, 41, 47, 51, 58, 63, 66, 70, 73, 74, 79–81, 83, 85, 86], consistent condom use in the last 12 months [77], condom use [76], condom use in the past three months [55] and 100 % condom use in the last three months [68] were in the meta-analysis. All of these measures were coded by the original authors as dichotomous use/non-use scores. For short-term follow-up of less than 6 months, intervention participants were more likely to report condom use in both RCTs (OR = 1.62, 95 % CI= 1.03–2.55, $p = 0.04$) (Fig. 2.4 Panel b) and non-RCTs (OR = 2.88, 95 % CI=1.41–5.90, $p = 0.004$) (Fig. 2.4 Panel c). Similarly, intervention participants were more likely to use condoms at intermediate follow-up of 6–10 months with the effect being statistically significant for the RCTs (OR = 1.40, 95 % CI=1.16–1.68, $p = 0.0004$) (Fig. 2.4 Panel d) but not for non-RCTs (OR=1.05, 95 % CI=0.65–1.71), $p = 0.84$) (Fig. 2.4 Panel e). At follow-up of more than 10 months, the effect was marginally significant for RCTs (OR = 1.22, 95 % CI=0.99–1.50, $p=0.06$) (Fig. 2.4 Panel f) and non-significant for non-RCTs (OR = 1.18, 95 % CI = 0.92–1.52, $p = 0.20$) (Fig. 2.4 Panel g).

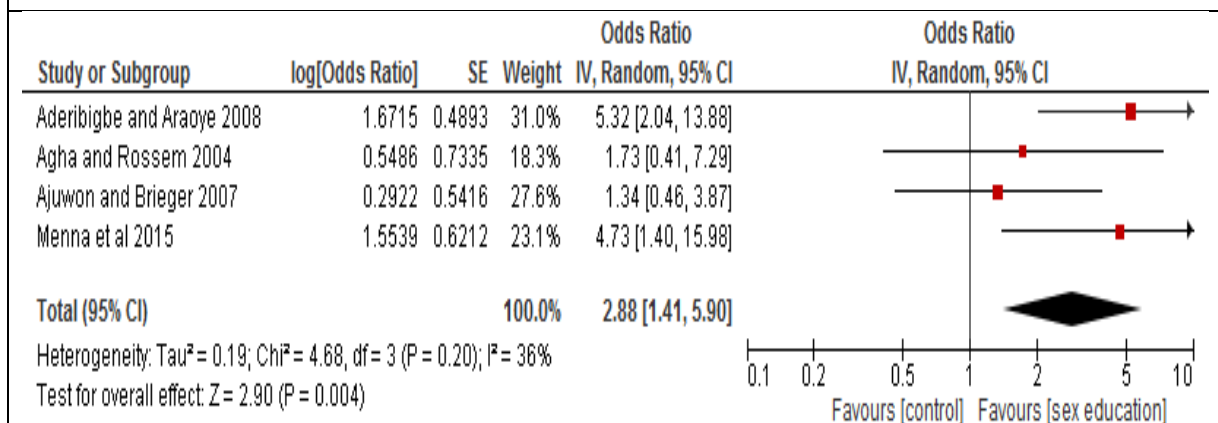
Sub group analyses showed no effect of type of condom use measure on condom use but greater condom use effects when crude, compared to adjusted ORs, were employed (see Appendix 2.7).



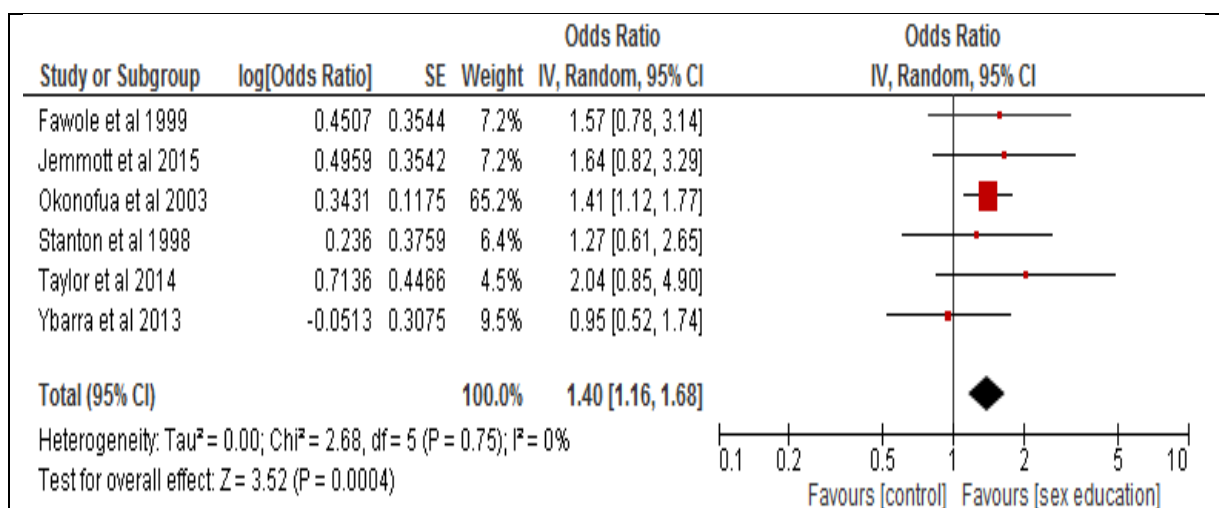
A. HSV2 infections



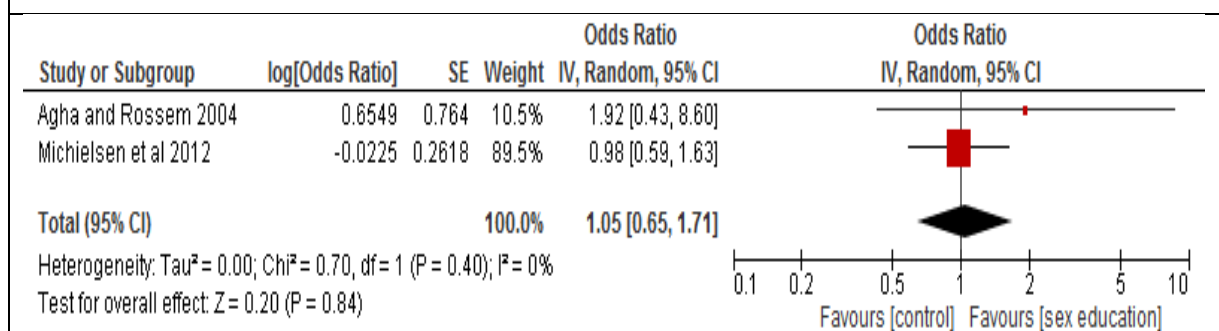
B. Condom use for less than six months follow-up period (RCTs)



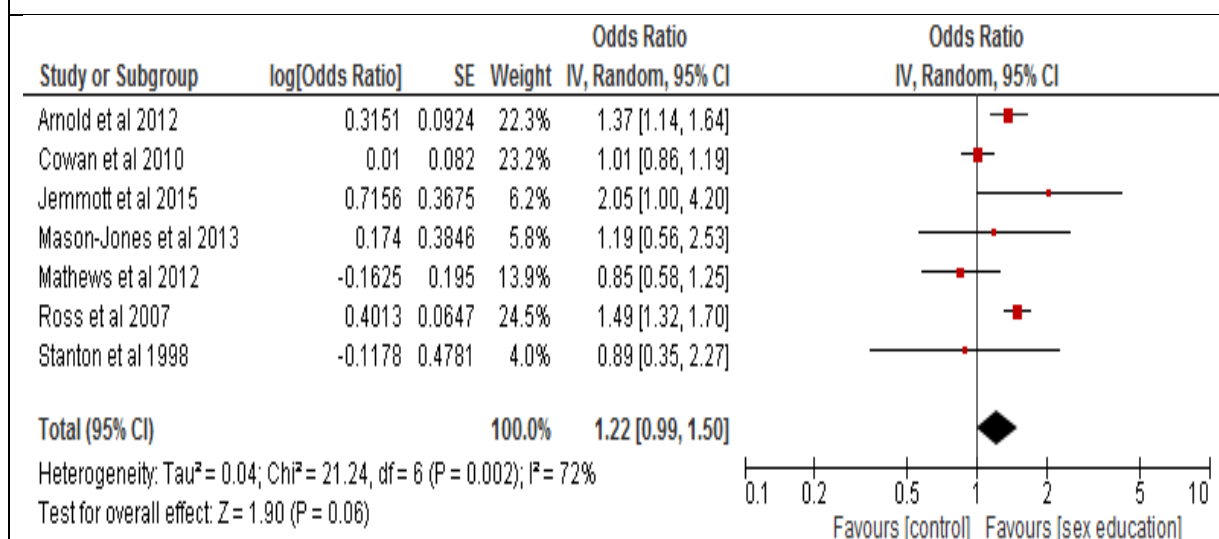
C. Condom use for less than six months follow-up period (non-RCTs)



D. Condom use for six to ten months follow-up period (RCTs)



E. Condom use for six to ten months follow-up period (non-RCTs)



F. Condom use for more than 10 months follow-up period (RCTs)

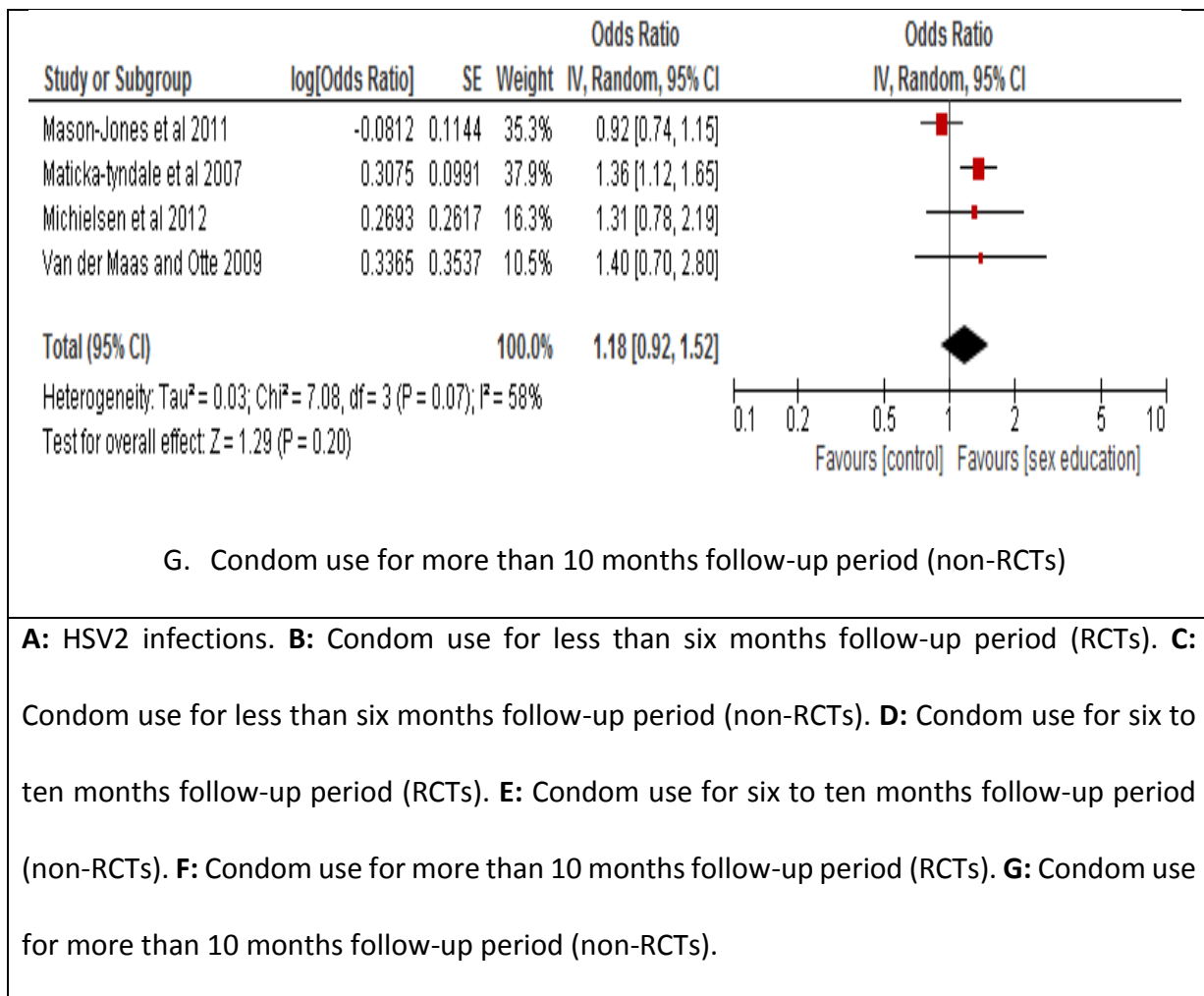


Figure 2. 4: Forest plots for meta-analysis

All authors were emailed to acquire missing data. Nonetheless, three studies [43, 71, 65] were excluded from the meta-analysis because they reported only ORs without CI, standard error of mean or p-value, precluding further analysis. Another study [78] was also removed because the follow-up period was unclear. Another seven studies [62, 64, 69, 72, 75, 82, 84] measured condom use using continuous measures composed of differing items and could not be included. James et al. [82] measured consistent use of condom in the preceding 6 months by assessing whether a condom was used during all intercourse instances, sometimes or not at all. Mba et al. [84] assessed whether participants practised or intent to practise condom use, as a STI-prevention technique. Esere [64]

used a 4-point Likert At-Risk Sexual Behaviour Scale which includes 'do not use condoms while having sex' as a component of the scale. The Ugandan study 'The World Starts with Me' used a 4-item condom use performance behaviour scale to measure condom use [69] and Burnett et al. [72] measured condom use using a 14-item scale. Frequency of condom use was measured on a scale of one (never) to six (always) in the study by Karnell et al. [75]. Finally, Brieger et al. [62] measured contraceptive information including condom use, pills and foaming tablets. This variability of outcome measures prevented the inclusion of these studies in our meta-analysis. Seven of the studies [43, 62, 64, 71, 72, 75, 82] not in the meta-analysis found statistically significant results in increased condom use in the intervention group compared to the control group (see Table 2.2 which contains results and scales used to measure condom use for studies not included in the meta-analysis).

Table 2. 2: Studies that reported condom use not included in meta-analysis.

Intervention	Scale used to measure condom use	Finding
At wood et al 2012	Use /non-use score	Significant effect of increased consistency of condom use in the last three months at 9-month follow-up period for sexually active participants at baseline and controlling for baseline condom use ($B_{9mth} = 0.032, p < 0.05$).
Burnett et al 2011	14-item scale	Statistically significant difference in positive direction between the intervention and control group of the study ($F = 32.39, p < 0.001$).
Brieger et al 2001	Measured modern contraceptive use including condom use, pills and foaming tablets.	Found significantly increased reported modern contraceptive use in the intervention group compared to the control (Fisher's exact $p = 0.004$).
Denison et al 2012	Use/non-use score	No evidence of difference in

		reported condom between the intervention and control group at follow up ($aOR = 0.93$, $95\% CI = 0.57-1.53$)
Eseré 2008	A 4-point Likert At-Risk Sexual Behaviour Scale which include 'do not use condoms while having sex' as a component of the scale.	Significant difference between the intervention and control group ($F = 95.93$, $p < 0.05$).
James et al 2005	Use/non-use score	The intervention (reading Laduma once) was found to have no significant effect on Consistent condom use six weeks post intervention.
James et al 2006	Consistent use of condom in the preceding six months was measured by assessing whether condom was used all the time, sometimes or not at all.	Full implementation group used condom more at last sex ($B = -0.80$, $SE = 0.40$, $Wald (1, 57) = 4.16$, $p < 0.05$, $OR = 0.45$). However, no effect was found for partial implementation group compared with the full implementation ($B = -0.21$, $SE = 0.41$, $Wald (1,157) = 0.27$,

		$p = 0.60, OR = 0.81)$
Karnell et al 2006	Measured frequency of condom use on a scale of 1 (never) to 6 (always).	Participants in the intervention group have significantly higher scores than those in the control group ($p < 0.05$).

2.4.6: Quality of evidence and summary of findings

Table 2.3 shows the summary of findings and quality of evidence for outcomes included in meta-analyses. The quality of evidence for HSV-2 infection, condom use for 6–10 months and more than 10 months follow-up among RCTs is 'high', which means we are very confident that the true effect lies close to the estimate. We are moderately confident in the evidence for self-reported condom use for less than 6 months follow-up among the RCTs. For the remaining outcome categories, we have limited to very low confidence in the proximity of the estimates to the true effects.

Table 2. 3: Quality of evidence and summary of findings table

Outcome (follow up period)	Quality assessment							No of participants		Effect		Quality
	No of studies	Study design	Risk of bias ¹	Inconsistency ²	Indirectness ³	Imprecision	Publication or reporting bias	School-based sexual health education	nothing or usual curriculum	Relative (95% CI)	Absolute (95% CI)	
Herpes Simplex Virus- 2 (54 months)	3	randomised trials	not serious	not serious	not serious	not serious ⁴	none	746/6146 (12.1%)	738/6127 (12.0%)	OR 1.07 (0.94 to 1.23)	7 more per 1,000 (from 6 fewer to 24 more)	⊕⊕⊕⊕ HIGH
*Condom use (less than six months)	4	randomised trials	not serious	not serious	not serious	serious ⁵	none	332/741 (44.8%)	295/720 (41.0%)	OR 1.62 (1.03 to 2.55)	120 more per 1,000 (from 7 more to 229 more)	⊕⊕⊕○ MODERATE

Outcome (follow up period)	Quality assessment							No of participants		Effect		Quality
	No of studies	Study design	Risk of bias ¹	Inconsistency ²	Indirectness ³	Imprecision	Publication or reporting bias	School-based sexual health education	nothing or usual curriculum	Relative (95% CI)	Absolute (95% CI)	
*Condom use (less than six months)	4	quasi-experimental trials	not serious	not serious	not serious	Serious ⁶	None	90/226 (39.8%)	63/197 (32.0%)	OR 2.88 (1.41 to 5.90)	255 more per 1,000 (from 79 more to 415 more)	⊕⊕○○ LOW
*Condom use (six to 10 months)	6	randomised trials	not serious	not serious	not serious	not serious ⁷	none	485/1238 (39.2%)	494/1494 (33.1%)	OR 1.40 (1.16 to 1.68)	78 more per 1,000 (from 34 more to 123 more)	⊕⊕⊕⊕ HIGH

Outcome (follow up period)	Quality assessment							No of participants		Effect		Quality
	No of studies	Study design	Risk of bias ¹	Inconsistency ²	Indirectness ³	Imprecision	Publication or reporting bias	School-based sexual health education	nothing or usual curriculum	Relative (95% CI)	Absolute (95% CI)	
Condom use (six to 10 months)	2	quasi-experimental trials	not serious	not serious	not serious	serious ⁸	publication bias strongly suspected ⁹	62/146 (42.5%)	55/131 (42.0%)	OR 1.05 (0.65 to 1.71)	12 more per 1,000 (from 100 fewer to 133 more)	⊕○○○ VERY LOW
*Condom use (more than 10 months)	7	randomised trials	not serious	not serious	not serious	not serious ¹⁰	none	2955/8106 (36.5%)	2678/8868 (30.2%)	OR 1.22 (0.99 to 1.50)	43 more per 1,000 (from 2 fewer to 92 more)	⊕⊕⊕⊕ HIGH

Outcome (follow up period)	Quality assessment							No of participants		Effect		Quality
	No of studies	Study design	Risk of bias ¹	Inconsistency ²	Indirectness ³	Imprecision	Publication or reporting bias	School-based sexual health education	nothing or usual curriculum	Relative (95% CI)	Absolute (95% CI)	
Condom use (more than 10 months)	4	Quasi-experimental trials	not serious	not serious	not serious	Serious ¹¹	none	1442/2205 (65.4%)	1647/2649 (62.2%)	OR 1.18 (0.92 to 1.52)	38 more per 1,000 (from 20 fewer to 92 more)	⊕○○○ VERY LOW

CI: Confidence interval, **OR:** Odds ratio, *outcomes with statistically significant positive results.

1. Quality was assessed as 'not serious' for all outcomes because majority of the studies included were of 'low' to 'moderate' risk of bias.
2. I^2 were all below 75% and therefore, quality was assessed as 'not serious' for all the outcomes.

3. Quality was assessed as 'not serious' for all outcomes because the interventions were fairly similar, participants were adolescents or young adults and all assessed similar outcomes (condom use and laboratory test of Herpes Simplex Virus-2).
4. Relative risk increase or decrease is less than 25% (95% CI of 0.97-1.23).
5. Relative risk increase or decrease is greater than 25% (95% CI of 1.03 to 2.55).
6. Relative risk increase or decrease is greater than 25% (95% CI of 1.41 to 5.90).
7. Relative risk increase or decrease is very close to 25% confidence interval (95% CI of 1.16 to 1.68).
8. Relative risk increase or decrease is greater than 25% (95% CI of 0.65 to 1.75).
9. Funnel plot was asymmetrical.
10. Relative risk increase or decrease is very close to 25% (95% CI of 0.99 to 1.50).
11. Relative risk increase or decrease is greater than 25% (95% CI 0.92 to 1.52).

2.4.7: Features of effective interventions

Small study samples mean that interpretation of the distribution of characteristics across interventions that did or did not result in increased condom use can only be tentative (see Table 2.4). Nonetheless, we can observe that effective interventions were more often adapted from other programmes, were theory-based, included provision of health services, included activities outside school and were implemented with fidelity.

Table 2. 4: Frequencies of occurrence of features associated with effectiveness.

Intervention Characteristic	Interventions with benefit (N = 15)	Interventions without benefit (N = 16)
Need assessment of target participants and involvement of stakeholders (parents, teachers or students) in designing the intervention	9 (60%)	8 (50%)
Adapting from other programs or curriculum that are found to be efficacious.	7 (47%)	2 (13%)
Theory-based	9 (60%)	5 (29%)
Skilled-based	10 (67%)	9 (56%)
Provision of adolescents health services	3 (20%)	1 (6%)
Distribution of condoms	2 (13%)	1 (6%)
Activities outside school environment	6 (40%)	2 (12%)
Training of facilitators	10(67%)	11 (65%)
Implementation of intervention with fidelity	2 (13%)	0 (0.00)

2.5: Discussion

We conducted a comprehensive review of school-based sexual health education interventions in sub-Saharan Africa evaluated using experimental or quasi-experimental methods. Given the need for public health interventions to reduce sexually transmitted infections, including HIV, and the potential effectiveness of school-based sexual health interventions, the most striking finding is paucity of published evaluations. Across 31 interventions meeting our inclusion criteria, we found no evidence of effectiveness in reducing STIs, including HIV, although one study [55] reported a reduction in curable STIs (Chlamydia, Gonorrhoea and Trichomonas) at one follow-up period. We also found no evidence of harm. This mirrors the findings of previous, comprehensive reviews [22, 25, 87, 88]. More rigorous evaluations of best practice, sustainable, school-based sexual health programmes in sub-Saharan Africa are needed.

Interventions were effective in increasing self-reported condom use and, encouragingly, the positive effect on condom use was stronger among evaluations employing more robust experimental methods (RCTs) for intermediate and long-term follow-up periods. Previous reviews [9, 11, 26] have also found methodically stronger studies to be associated with stronger effects. Perhaps, unsurprisingly, short and intermediate (versus, long follow-up periods) yielded greater condom use gains, suggesting that further intervention may be needed to sustain behaviour change [11]. These findings contrast with previous suggestions that SBSHE in sSA has a poor record of changing sexual behaviours including condom use [8–10] and supports further investment in SBSHE to promote condom use in low- and middle-income countries [5, 25].

Tentative consideration of characteristics found in interventions that did or did not result in statistically-significant increases in condom use

recommends that intervention designers should consider adapting interventions from pre-existing effective programmes, base their interventions on theory-based logic models of mechanism and link them to health service provision including condom distribution. Finally, intervention designers need to ensure that they assess fidelity and take steps to ensure that interventions are delivered as designed. In this review, just two studies [35, 75] reported on fidelity of delivery. It was impossible, therefore, to determine whether or not the interventions were delivered as intended and whether this determined effectiveness. This review highlights the need for further rigorous evaluations of SBSHE to assess impact on incidence or prevalence of STIs including HIV. In addition, future evaluations need to assess and report on implementation processes including fidelity. This will provide better guidance on how and why interventions ‘work’ or ‘do not work’.

Limitations in the available data recommend caution in interpretation of our findings. For example, condom use reporting is subject to social desirability bias and recall bias, although guidance is available on measures that may minimise such bias [89]. Greater consistency in use of best measures of condom use would assist data synthesis, although sensitivity analysis did not reveal differences in effectiveness as a result of the self-report measures used. Ideally, a larger sample of studies would have been available and further moderators of effectiveness could have been considered. In particular, we would have liked to report on whether interventions in primary or secondary schools were more or less effective and whether studies with greater or lesser risk of bias tended to result in greater increases in condom use. However, for both these sub-group analyses multiple cells included just one study across follow up points. The four evaluations of primary school interventions [35, 41, 55, 71] suggest that these can be just as effective as secondary school interventions and this may indicate that early school-based intervention is likely to be more effective. Similarly, we would have liked to assess whether effects were greater or lesser for young men and women but only

four studies [35, 41, 58, 79] included in the meta-analysis presented separate gender analyses. It is worth noting too that because blinding is impossible in relation to school-based sexual health education, we were only able to employ two critical, of four dimensions of the Cochrane Collaboration Tool assessed to score the overall risk of bias of the studies in this review. Reviewing studies published in English may have limited our sample. In addition, although double screening of 500 randomly selected title and abstract entries showed near perfect agreement between two reviewers (generating an ACI score of 0.98) further double screening at this stage could have been conducted.

2.6: Conclusions

We conducted a review of school-based sexual health education interventions in sub-Saharan Africa. Interventions to safeguard adolescents from sexually transmitted infections, including HIV are especially needed in sub-Saharan Africa. School-based interventions have the potential to be inclusive and to provide comprehensive preventive education and training. We assessed the impact of such interventions on incidence or prevalence of STIs and self-reported condom use. We also identified characteristics associated with effective interventions. We found no effect of the interventions on STIs, however, some positive effect on condom use was observed. Certain features present among interventions effective in promoting condom use were observed. Despite limitations, our review indicates that school-based sexual health education may be an effective strategy to promote condom use among sub-Saharan African adolescents over periods of up to 10 months. Interventions may be optimised by including features found in previous effective programmes. Above all, this review highlights the need for further rigorous evaluations of school-based sexual health education interventions in sub-Saharan Africa including assessment of infection prevalence and fidelity of delivery. Guidance on reporting implementation processes including fidelity would be helpful to intervention designers.

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Chapter 3: Lessons learned from an adolescent sexual and reproductive health intervention: A case study of the *MEMA Kwa Vijana* project in Tanzania

3.1: Abstract

Many adolescents in low- and middle-income countries have poor sexual and reproductive health, and are at high risk of unintended pregnancy and sexually transmitted infections, including HIV. *MEMA kwa Vijana* (MkV; Swahili for ‘good things for young people’) is one of very few large-scale adolescent sexual and reproductive health interventions, which have been well-funded, and rigorously designed, implemented and evaluated in sub-Saharan Africa. We conducted a case study of the MkV intervention and evaluation, investigating the design and content of the intervention as well as the delivery challenges that hindered its development and implementation, scaled-up roll out, and impact. We reviewed the reasons for the limited impact of this intervention. This case study is based on a literature review of published programme impact and process evaluation articles and project documents as well as a series of interviews with key investigators.

The MkV intervention was developed, implemented and evaluated through multi-stakeholder, inter-sectoral and multidisciplinary collaborations. The project produced a carefully-designed intervention that addressed relevant cultural practices (such as material exchanges for sexual intercourse) and followed local guidelines and international recommendations for best practice. The four intervention components, i.e. community mobilization, a school-based curriculum, youth-friendly health service training, and a condom distribution initiative, were implemented largely as intended. Nonetheless, their potential effectiveness was reduced by limitations in their design (e.g. restrictions on curriculum content by the education authorities) as well as external challenges

encountered during the implementation. For example, resistance to the intervention by a few religious leaders was overcome by meeting with the leaders and explaining programme content. Other challenges were reluctance and/or opposition by school authorities to full implementation of condom-related lessons. Additional limitations were the inherent weaknesses in the health and education sectors. These latter constraints were overcome using participatory training of facilitators; provision of simply-worded yet comprehensive facilitators' guides; and supportive supervision. Some of the reasons for limited effectiveness identified by the project investigators included restrictions by education authorities on programme content; targeting adolescents in schools without also intensively targeting their families, peers and sexual partners out of school; and failure to adequately address other social and cultural contextual factors. This case study highlights key lessons that can facilitate future intervention design and implementation in sub-Saharan Africa.

3.2: Introduction

Young people in sub-Saharan Africa (sSA), and especially adolescent girls and young women, have some of the poorest sexual and reproductive health in the world. In some communities, Human Immunodeficiency Virus (HIV) prevalence is as high as 30% (Hegdahl et al., 2016; UNAIDS, 2016) alongside high rates of other sexually transmitted infections (STIs) (Sonnenberg and Johnson, 2016), and high rates of adolescent pregnancy (Sedgh et al., 2015). There is, therefore, an urgent need for large-scale and sustainable adolescent sexual and reproductive health (ASRH) interventions in sSA to improve sexual and reproductive health, and to prevent STIs (including HIV) and unintended pregnancy.

The Challenge of Intervention Development: Adolescent Sexual and Reproductive Health Burdens

In the 1990s, the Mwanza region was a typical sub-Saharan African rural setting in Northwestern Tanzania. The high burden of HIV in the region accounted for 53% of deaths in young people aged 20-29 years (Obasi et al., 2006). About 5% of young women were infected with HIV by the age of 19 and more than one-third acquired Herpes Simplex Virus-2 (HSV2) infection as teenagers. Additionally, unwanted pregnancy was one of the major reasons for primary school dropout by young women (Obasi et al., 2006). The high prevalence of HIV in the general population in Tanzania, combined with the relatively low prevalence among adolescents at this time, provided a window of opportunity in which the epidemic could be controlled by protecting adolescents. The importance of proper treatment of symptomatic STIs to the reduction of HIV transmission in the general population was also supported by a previous trial in Mwanza (Grosskurth et al., 1995). However, sexual debut was early in Tanzania and young people had limited access to family planning services and condoms (Hayes et al., 2005), emphasising the importance of timely intervention.

The Challenge of Intervention Delivery: Providing an Adolescent Sexual and Reproductive Health Intervention to Reduce the Burden of STIs, HIV and Unintended Pregnancy

These factors and the consequences of poor sexual and reproductive health among adolescents in Tanzania, coupled with the effects of teenage pregnancy and the increasing prevalence of STIs and HIV during teenage years, called for the design of an adolescent-targeted intervention. An innovative intervention called *MEMA kwa Vijana* (Swahili for 'good things for young people') was developed and implemented in three phases (pilot, trial and scale-up) between 1996 and 2009. In Swahili, the full name of the project is '*Mpango wa Elimu na Maadili ya Afya (MEMA) kwa Vijana*' which is translated to English as '*Health Education and Ethics/Morals Programme for Youth*' (Plummer, 2012), hereafter abbreviated as MkV. The project was designed to be delivered and sustained in a resource-poor setting through existing government facilities. Thus although considerable research was available on targets for school-based sexual health education (e.g., Abraham & Sheeran, 1993; Abraham et al., 1991) the development team had to develop an intervention likely to be effective in this challenging environment.

MkV was the first of few large-scale ASRH interventions to be carefully designed, implemented and sustained over a long period; rigorously evaluated; and assessed for its impact on biological markers (HIV, STIs and pregnancy) among young people in a rural setting in sSA. Its rigorous process and impact evaluation within a community-randomised trial used multiple assessment methods (Hayes et al., 2005). The scale of design and roll out, and the sequence of published papers describing the intervention and its evaluation, provide valuable lessons on how to optimise school-based interventions to prevent STIs in sSA. MkV was the largest trial with the longest period of implementation identified in a recent systematic review of such interventions in sSA (Sani et al., 2016).

Therefore, we (SAS, CA, SD and CM), as independent evaluators, enlisted the support of the MkV team (including MP) to highlight lessons that could improve the design and implementation of ASRH interventions and so inform other intervention designers, implementers and funders.

The MkV intervention was developed and implemented by a team working within the African Medical Research Foundation (AMREF), a non-governmental organisation (NGO) in collaboration with researchers from the London School of Hygiene and Tropical Medicine (LSHTM), officials from the Tanzanian Ministry of Health (MoH) and the Ministry of Education and Culture (MoEC) (See Appendix 3.1, for a list of major actors and implementers). It was a large-scale ASRH intervention that consisted of four interrelated components which were intended to act synergistically (Obasi et al., 2006). The four components were:

- (i) Teacher-led and peer-assisted reproductive health education in upper primary school, which was the key component of the intervention
- (ii) Provision of empathic and confidential adolescent-friendly reproductive health services by training healthcare providers
- (iii) Promotion and provision of condoms in the community by trained young people
- (iv) Community activities, including initial participatory mobilisation meetings with community stakeholders, and reproductive health activities during the annual Youth Health Week

Although primary school was the best venue to reach the majority of adolescents in Mwanza, several structural, cultural and socio-economic factors are likely to have affected intervention delivery. These include: limited capacity of the education sector; refusal on the part of education authorities to address some topics related to safe sex; and limited funding. The MkV team worked closely with local government authorities to

implement the intervention in the Mwanza region and also provided technical support to implement the district's multi-sectoral AIDS prevention plan. The intervention arm of the randomised controlled trial that evaluated MkV consisted of 10 communities, including 62 primary schools and 18 health facilities (Hayes et al. 2006). The trial took place between 1999 and 2002, but MkV activities continued in intervention communities and were expanded into control communities after the trial completion. The encouraging results of the trial (called MkV1), and the feasibility of implementation through government structures (schools and health facilities) led to a large-scale implementation (Renju et al. 2010; Renju et al. 2011). Figure 3.1 illustrates the project timelines and see Appendix 3.2 for an annotated timeline.

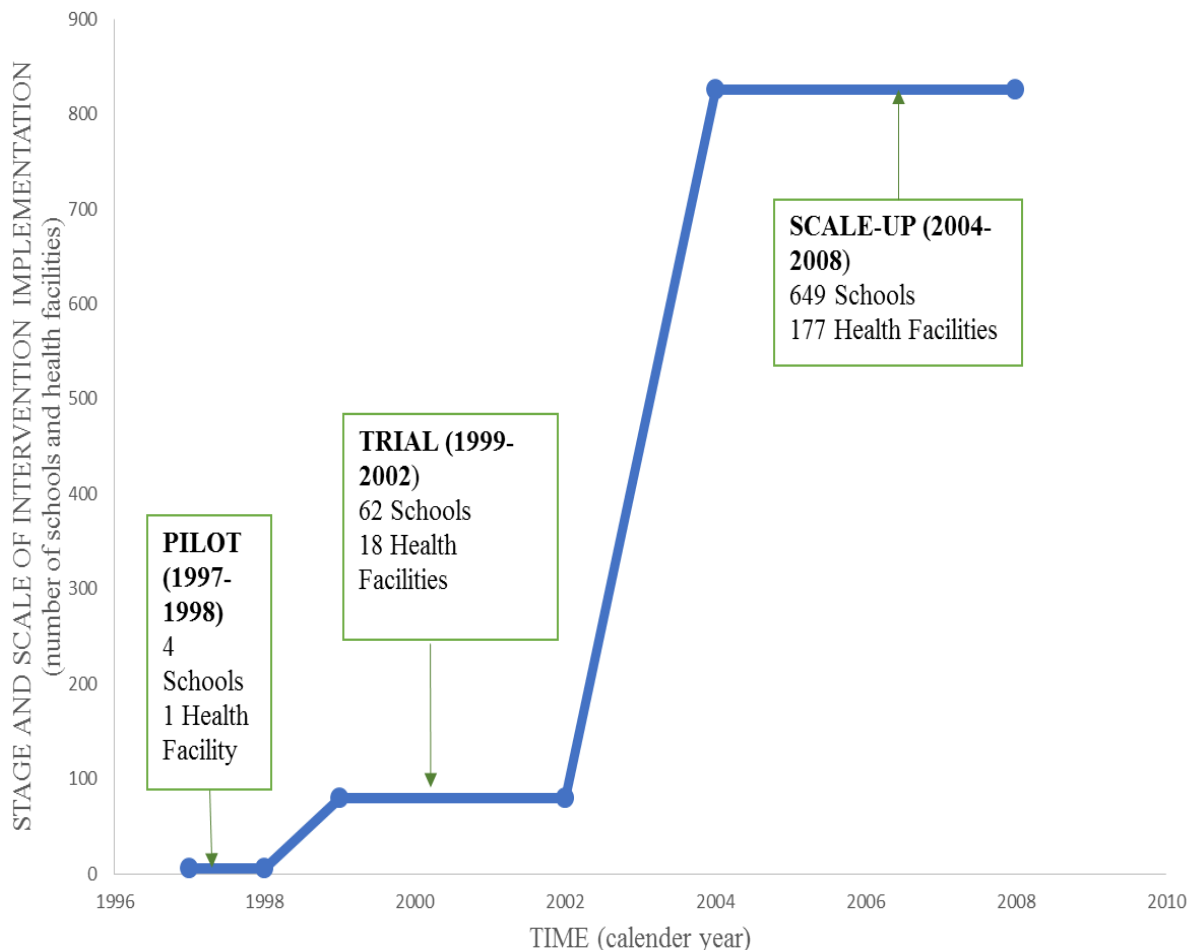


Figure 3. 1: *MEMA kwa Vijana* intervention development, pilot-testing, trial, and scale-up

The MkV intervention was effective in improving reproductive health knowledge, attitudes and some reported sexual behaviours, and change was sustained over time (approximately eight years post-intervention). No beneficial or harmful effects were observed in relation to transmission of HIV, other STIs or unintended pregnancy. The failure to translate self-reported sexual behaviour change into changes in STI prevalence by such an innovative, well-funded and carefully developed intervention warrants further investigation. This case focuses on understanding ‘why’ and ‘how’ the intervention was effective in relation to some outcomes and not others. The following three questions guided our case study:

1. How was the *MEMA kwa Vijana* intervention designed to overcome sexual and reproductive health challenges faced by adolescents in rural Mwanza, Tanzania?
2. What were the technical or non-technical challenges that hindered the successful development and implementation of the *MEMA kwa Vijana* intervention, and how was the intervention adapted to overcome the challenges where possible?
3. Why did the *MEMA kwa Vijana* intervention not have an impact on HIV, other STIs and unintended pregnancy, when long-term cognitive and behavioural change was reported?

3.3: Contextual conditions

At the time of the MkV intervention trial, the Mwanza region consisted of an area of 19,592 km², including one city, six semi-urban centres, and a population of about 3 million living mostly in rural areas (80%) (Plummer, 2012). Rural settlements were mostly isolated with a few clustered, near economically-vibrant towns. More than 50% of the population were under 15 years of age and subsistence farming was the major economic activity. Although the main national language of Tanzania is Swahili, most people in rural Mwanza spoke Sukuma. The secondary and tertiary education systems were among the least inclusive in the world, with only 7% of the

population of official school-age enrolled in secondary education at the time of the intervention development (Plummer, 2012). Similarly, the health system was relatively small, with just 13 private and government hospitals in the region.

In rural Mwanza at that time, a wide variety of explanations for STI infections were believed, including chance, natural causes, God's will, the work of ancestral spirits and/or witchcraft (Mshana et al. 2006). HIV infection, in particular, was sometimes believed to be caused by witchcraft. For some people, these causal beliefs undermined faith in the effectiveness of infection control actions (such as condom use), and many people preferred traditional healers to medically-based health providers (Plummer, Mshana et al., 2006; Mshana et al., 2006). In addition, young people (particularly adolescent girls) delayed or avoided seeking treatment for STIs for fear of stigma (Plummer, Mshana, et al., 2006). Some social norms constrained sexual activity such as the expectation of abstinence for school students, taboos around the open discussion of sex, and an emphasis on sexual faithfulness in sexual relationships, especially for women. On the other hand, other cultural norms facilitated sexual activity such as acceptance of sexual activity as an economic resource for women, especially during festivals and the view that sexual activity was an essential part of young men's masculinity (Wight et al., 2006). Motivation for girls and women to engage in transactional sex, which was not necessarily perceived as immoral, included poverty, peer pressure and the need to purchase cosmetics or acquire business capital (Wamoyi et al., 2010).

A variety of culturally-accepted practices were not based on medical science. Some people in rural Mwanza believed that traditional medicines could be used to suspend pregnancy for months or years, and young women attempted abortion intra-vaginally or by ingestion of chloroquine, ashes or traditional herbs (Plummer et al., 2008). Some unmarried girls

and women wore charms or ingested ash as contraception. Use of hormonal contraception was inconsistent due to a fear of needles, and condoms were often rejected because of anticipated pleasure loss (Plummer et al., 2010). Condoms were also perceived negatively because they were widely associated with sexual promiscuity and prostitution, and because some people believed sexual intercourse was not meaningful without the exchange of bodily fluids. Men usually controlled sexual encounters and reported that they would never use a condom unless they perceived their partner to be high-risk (Plummer, Wight et al., 2006).

Before the MkV trial, a population-based cross-sectional survey of 9445 15-19 year-olds in rural Mwanza found HIV infection prevalence to be higher in young women than men (2.4% versus 0.6%), and the same for *Chlamydia trachomatis* infection (2.4% versus 1.0%) (Obasi et al., 2001). Further analysis showed that HIV prevalence was very low in girls below the age of 15 years, but then increased steeply to 5% among young women by the age of 20. In contrast, the *MEMA kwa Vijana* trial baseline survey of 9283 pupils in years 4-6 of primary school and aged 14 years and above, found HIV infection to be 0.2%, compared to 0.9% for *Chlamydia trachomatis*, 0.1% for *Neisseria gonorrhoeae* and 0.8% positive for pregnancy (young women only) (Todd et al., 2004). While almost half of the young men reported sexual activity, only one-fifth of the young women did so (Todd et al., 2004).

Senior primary school classes (years five to seven) were selected as the most appropriate setting for the main MkV intervention, that is, teacher-led and peer-assisted reproductive health education, because more than half of the students in year seven were 15-17 years old and very few of them proceeded to secondary school (Plummer, Wight, Wamoyi et al., 2007). Other cultural and socioeconomic factors in rural Mwanza, such as low attendance rates, poor teacher training, limited teaching resources, poor

teaching practices and corporal punishment, affected implementation in schools.

3.4: Case study methods

In 2016-2017, we conducted an in-depth case study of the MkV intervention based on a review of published programme impact and process evaluation articles, project documents and interviews with researchers involved in the design, implementation and/or evaluation (see Appendix 3.3, for a list of interviewees). The reviewed articles were based on biomedical and social science surveys; qualitative interviews with students, teachers, school and health facility officials, government officials and officials of NGOs; and participant observation of communities and intervention activities. This review allowed us to investigate the MkV implementation and evaluation in the context in which it operated (Yin, 2014) and to uncover reasons for its limited effectiveness (Balbach, 1999). This case study was conducted following the Global Delivery Initiative, Delivery Case Study Guidelines (Maassen & Bathanti, 2015).

We conducted analyses of project documents and publications to understand the development and implementation processes (see Appendix 3.4, for a list of the project documents and publications). Our understanding of the project from the review of these documents was presented to interviewees to confirm and challenge our findings and clarify any misunderstandings prior to interviews. Four key investigators in the project were interviewed (see Appendix 3.3 for the list of interviewees). The interviews were conducted via Skype and lasted between 50-60 minutes. They were guided by an interview topic guide, which was adapted from the Science of Delivery guidelines (Maassen & Bathanti, 2015) (see Appendix 3.5, for the interview topic guide). Interviews were audio-recorded and transcribed verbatim. Formal ethical approval for the interviews was obtained from the University of Exeter Medical School

ethics committee and each participant gave informed consent. Interviewees also confirmed our interpretations of their interviews by double-checking their quotes and how they were contextualized within this report.

3.5: Findings (the case study)

3.5.1: Tracing the implementation processes

In this section, we will discuss the development of the MkV intervention, provide an overview of each component of the intervention, and trace delivery challenges as well as how the intervention was adapted to overcome those challenges. We used the terms 'Inflection points', 'Pain points' and 'Adaptation/refinement' as recommended by the Global Delivery Library (Maassen & Bathanti, 2015). These terms are defined as follows:

- Inflection points refer to actions that critically advanced or thwarted, the intervention;
- Pain points refer to factors impeding implementation including adverse conditions, dissatisfaction, bottlenecks/roadblocks impeding implementation, and policy changes;
- Adaptation/refinement refers to changed plans during initial implementation that overcame or ameliorated challenges.

The Project Team and Cost

The MkV intervention was funded by grants from the European Commission, Irish Aid, UNAIDS, the UK Medical Research Council (MRC) and the UK Department for International Development (UKDFID). It was designed and evaluated in collaboration with the Tanzanian National Institute for Medical Research (NIMR), the AMREF, the Tanzanian MoH

and MoEC, the Mwanza Regional Administration, LSHTM, the MRC Clinical Trial Unit (London) and the MRC Social and Public Health Sciences Unit (Glasgow). The cost of the programme per participant was US\$17 per year during the pilot phase, US\$7.63 in the second year and US\$1.37 per participant per year subsequently (Valerio and Bundy, 2004). The 3-year total cost of implementing all the components of the trial was US\$879,032, 70% of which was spent on the school component. Substantial costs were required for the development and start-up (approximately 21% of the total cost). The estimated incremental financial cost for scale-up over a 4-year period in the targeted four districts was US\$1,866,879 (about 60% was for the one-off cost required in the beginning). However, the incremental cost for the scale-up was minimal (approximately one-fifth of the trial implementation costs) (Terris-Prestholt et al., 2006).

Development of the MEMA kwa Vijana Intervention

The MkV intervention was designed in four overlapping stages (Obasi et al., 2006):

- i. An extensive literature review of best practice frameworks and recommendations; surveys and intervention studies in the Mwanza region and elsewhere in Africa; and guidelines by the Tanzanian MoH and MoEC.
- ii. A situation analysis that included interviews with key officials from relevant government ministries; leading family planning organisations and leading condom social marketing organisations in the region; as well as senior social scientists from a local university. In addition, interviews were conducted with teachers, pupils, and health and family planning staff in some schools and health facilities.
- iii. The development of a school curriculum, which included modified exercises from various programmes, such as WHO/UNESCO guides, the UK SHARE project and other programmes from Southern and

East Africa. Adolescent-friendly health services and the condom promotion and distribution component were developed in collaboration with Population Services International. All components were pilot tested.

- iv. The continued modification of the programme over the three years of the trial, in light of formative evaluation.

See Appendix 3.6 for the intervention process mapping.

[Pain point] At the initial stage of the MkV intervention development, the AMREF team faced serious resistance from regional educational authorities, which were part of the development team, regarding the inclusion of condom information in the curriculum. The authorities were especially concerned that showing or demonstrating condom use in schools might encourage sexual activity and lead to negative reactions from the public (see Box 1).

Box 1

“There were fears that, if teachers demonstrated how to use condoms, it would encourage students to engage in early sexual activity. So the Ministry of Education wanted the main focus of the school component to be on abstinence and delaying sexual activity, rather than condom promotion. We were allowed to include condom education in the school programme, but that content was quite superficial and was largely limited to the upper [older] classes, and we were not able to do practical demonstrations at all” (R.H.)

“Although the official policy of the Ministry of Education was that it was fine to explicitly talk about condoms and explain how condoms were used and even to show condoms, that was not

allowed by the regional education authorities under the rationale it might lead to opposition from the parents.” (D.R.)

“The education system was very conservative about the discussion of condoms and demonstration of condoms. There was a lot of resistance and [the Intervention Coordinator], who was the key person developing the programme, spent a lot of time negotiating with the Ministry of Education to get permission to even mention condoms in the programme.” (D.W.)

[Inflection point] After extensive engagement, awareness-raising and advocacy with regional authorities, MkV was granted permission to discuss condoms in classroom sessions, including the basic information that condoms can prevent the transmission of STIs, and the correction of certain myths regarding condom use (see Box 2). They were prohibited from demonstrating or distributing condoms in schools. Even during training, however, class peer educators were not told or shown how to use condoms, which left them confused about condom use and made any discussion about condoms with their peers difficult (Plummer, Wight, Obasi et al., 2007).

Box 2

“One of the biggest constraints for the school curriculum, and a weakness of the intervention overall, is that we could not fully implement what we believed would be best practice, including comprehensive condom information and skills training. We counteracted some condom myths and promoted condoms as generally protective, but very little practical information was provided in schools, such as how to use a condom properly, or how to negotiate condom use with a reluctant sexual partner. We were never, at any point, allowed to show a condom in schools,

or even a drawing of a condom in school, and we could not even show them to the peer educators during their trainings.” (M.P.)

“We were not able to persuade the Ministry of Education that it was acceptable to demonstrate condoms in the schools. And there was very little mention of them within the programme in the school, but the compromise was that, in the health centres, health workers demonstrated condom use and provided condoms.” (D.W.)

[Adaptation/refinement] The designers of the intervention had to design other activities to compensate for the deficiencies in condom education in the school curriculum. These activities were included in two of the four components of the intervention namely, youth-friendly health services and youth condom social marketing in communities (see Box 3) and are discussed in more detail below.

Box 3

“As part of the youth-friendly health services component, clinics held annual youth health days, so that students could visit their local clinic and meet health workers. This provided a very useful opportunity for condom education and demonstrations. Another component of the intervention was a special system of condom promotion and provision by and for young people in villages”
(R.H.)

Despite these limitations, the project team were successful in negotiating the provision of basic condom information in classrooms as well as condom demonstrations during class visits to health facilities. This is particularly noteworthy in a setting where there was such strong opposition to inclusion of condom education in general, and particularly for young people (Plummer, Wight, Obasi et al., 2007).

Overview of the Components of the MEMA kwa Vijana Intervention

1. Community Mobilisation and Other Community Activities

Community engagement activities were designed to raise awareness of the intervention; increase acceptance; address any misconceptions; and create community support for teachers, health personnel and other implementers (Obasi et al., 2006; Hayes et al., 2005). The activities also aimed to ensure inter-sectoral collaboration (e.g. facilitation of linkages between the health and education sectors), the establishment of committees to oversee MkV activities, and to address cultural and social factors that could influence ASRH. Initially, six days of participatory meetings were held in each community with parents, local government (political, school, health) authorities, religious leaders and women's groups. During that initiative, advisory committees were formed, and they selected young people who assisted in the training of class peer educators and in organising other community activities. Subsequently, annual activities were held with parents and religious leaders. Other activities (drama, poetry, songs and rap music) with sexual and reproductive health themes were conducted annually during Youth Health Week and at health facilities visits on special open days for the young people (Obasi et al., 2006).

[Pain Point] Although intended communities were engaged from the earliest stages of the MkV development, misunderstandings of the programme in some communities raised tensions. This became a public concern in a few cases where religious leaders initially forbade young people to participate in the intervention (see Box 4). Participant observation studies also found confusion among some parents regarding the content of MkV, in particular, concerns about whether it would promote immorality (Plummer, Wight, Obasi et al., 2007). A process

evaluation of the one-week community mobilisation also found that a small number of young people had been withdrawn from the MkV classes due to parental concern about the intervention (Plummer, Wight, Obasi et al., 2007). In those communities, adults knew little about the content and purpose of the programme, and mention of condoms remained controversial (Wight et al., 2012).

Box 4

“There were some individuals who had opposition to it at various stages. So, for example, in some communities, some of the religious leaders misunderstood what we were trying to do early on in the programme and so forbade the young people from their denomination to participate in the classes.” (D.R.)

[Inflection Point] This misunderstanding by the religious leaders served as a threat to the successful implementation of the programme. There was a risk of some participants not attending activities and the programme not being implemented fully in some communities.

[Adaptation/refinement] In those communities, the MkV team met with the religious leaders and explained to them what the programme entailed. The team succeeded in allaying fears and so removed initial resistance, which allowed the programme implementation to proceed smoothly (see Box 5).

Box 5

“When we met with the religious leaders of those places and explained exactly what we were going to do, showed them or gave them a copy of the curriculum and so forth, they actually became supporters of it.” (D.R.)

2. In-School Sexual Health Education

Teacher-delivered and peer-assisted sexual health education in upper primary school (years five to seven, ages 14-17 years) was the main component of the MkV intervention. Its development was informed by best practice as discussed earlier and aimed to: provide basic sexual and reproductive health knowledge; improve personal risk perception; encourage safer sexual behaviours and practices; develop sexual negotiation skills; and discuss and challenge common stereotypes as well as sexual and reproductive health myths (Hayes et al., 2005). To affirm its legitimacy and importance, regional education authorities formally confirmed their approval in writing to the district authorities (Obasi et al., 2006). Furthermore, guidance was given for the inclusion of the MkV curriculum in school timetables and the examination of its contents in intervention schools alongside core subjects in the year seven national examinations.

The MkV school programme consisted of 10-15 participatory lessons each year, which involved role-plays, drama, stories, exercises and games. Teachers were trained to deliver the intervention, and were assisted by trained class peer educators, who mainly acted in carefully scripted short dramas and role-plays, which served as a basis for class discussions (Hayes et al., 2005). Due to the limited resources (textbooks and teaching materials) in Tanzanian schools, MkV was designed to be delivered using a specific teacher's guide for each of three school years (5, 6 and 7) supplemented by an additional teacher's resource book (Obasi et al., 2006).

[Pain point] Another limitation faced by the MkV team during implementation was the inherent weakness of the education sector. This

ranged from poor quality teaching to other systemic constraints. Most of the teachers were not well educated or trained to the required standard to deliver the intervention competently even with additional MkV training (see Box 6). For instance, some teachers did not understand basic human reproductive biology. In addition, teaching styles tended to be authoritarian rather than interactive and did not encourage pupils to think critically. This was at odds with the learning processes around which MkV was designed. Moreover, rapid teacher turnover and absenteeism were common in the Mwanza area.

Box 6

“The Tanzanian education system itself was quite limited at that time, particularly in rural Mwanza, even in comparison to other African countries. The intervention team was working in schools that often had illiterate fifth- or sixth-graders, and sometimes the teachers themselves had failed seventh grade before getting one or two years of teacher training. Some of the teachers had finished tenth grade before their teacher training, but again, even that was not what people think of as tenth grade education in a better quality system. Often, teachers had had no biology education at all, so the intervention team was essentially starting from zero, trying to convey very basic concepts related to sexual and reproductive health.” (M.P.)

[Inflection point] For the successful implementation of the school-based component of the intervention, quality teaching and participatory teaching methods that engaged students were needed. [Adaptation and refinement] The MkV team was successful in making their sessions interactive, which was novel in Mwanza at that time. This was achieved by giving the teachers participatory training. To compensate for limited knowledge among the teachers, the MkV intervention provided simple yet comprehensive teacher manuals that could be used effectively by any

teacher with minimal training. In addition, regular supportive supervision was provided. All of these initiatives made implementation fairly successful, despite limitations in the education sector (see Box 7).

Box 7

“Process evaluation during the trial found that intervention implementation followed the teacher’s guide books very closely. Those books were written in quite simple and directive ways, so that teachers had reference texts that covered key content, and they were walked through each step to be able to facilitate participatory activities as intended.” (M.P).

Process evaluation (Plummer, Wight, Obasi et al., 2007) revealed that the MkV intervention was successful in reducing some undesirable teaching methods (e.g. corporal punishment), but had only limited impact on others, such as enforced mass pregnancy testing of female students by teachers and health workers, and/or the sexual exploitation of female students by male teachers (Wight et al., 2012). Consequently, Plummer, Wight and Obasi et al. (2007) argued that whole school system reform in training and supervision is required to address such problems. Such structural reform may be beyond the scope of any one intervention because changes may be needed in the overall school’s ethos, which includes the social and physical environment, school rules and policies, management and organisational structures, disciplinary culture, teacher-student relationships, quality of teaching, pastoral care, extra-curricular activities, school health services and whole-school health promotion. Interventions that address the whole school environment are recommended and have been argued to have greater positive impact on young people’s wider health and well-being (Patton et al., 2016).

3. Youth-friendly Health Services

Another component of the MkV intervention was to train healthcare providers to provide adolescent-friendly sexual and reproductive health services. The training focused mainly on promoting non-judgemental attitudes and respecting the privacy and confidentiality of young people seeking sexual health services. In addition, training was provided on the syndromic management of STIs, and drugs for STIs and other consumables were provided. The MkV intervention included school visits by trained healthcare providers to introduce available services to students. Students also visited health facilities as a class, to familiarise themselves with services and to receive condom use demonstrations (Hayes et al., 2005).

[Adaptation/refinement] Activities in the health centres included annual clinic visits by classes of students, where condom education and condom demonstrations compensated for the limitations in the in-school curriculum mentioned earlier. This seems to have worked well, although there were limitations in terms of reach. [Pain point] For instance, most health facilities were far from the schools (up to a four-hour walk away) and, on any given day, up to a quarter of the pupils were absent from the schools. Since such visits were only annual, a substantial proportion of the students may not have received this part of the intervention. This was further compounded by other normative factors. For instance, it was not normative for young people to go to health centres without the knowledge of their parents. In addition, if they visited health centres to request condoms or other contraceptives, healthcare providers could send them away in the belief that they should not be sexually active; only two providers in each intervention facility received the MkV training (see Box 8).

Box 8

“The only opportunity for meaningful or in-depth condom education came during the annual class trip to a local health facility, which could mean a day-long walk to the health facility and back. It was not an easy trip to make, for either the teachers or their students. Keep in mind that the teachers were doing this above and beyond their normal duties, and they were not receiving extra compensation for it. Nonetheless, process evaluation during the trial found that most classes made the annual health facility visits, and that was a strong, successful part of the intervention. The intervention team stressed the importance of those annual visits with both teachers and health workers, to compensate for the lack of condom information in schools.” (M.P.)

“The health facility visits were also a good intervention component because health workers were some of the most educated people in rural areas. They understood the biology and they saw the consequences of HIV and other STIs first-hand in their clinics, so they knew the urgency of the situation. Generally, they were committed and - after they had gone through the MkV training - they were good advocates. They were open to talking about condom use and other sexual issues with adolescents in a way the teachers often were not. Some health workers managed to visit schools, but otherwise most interactions with students happened during the annual class visit to a facility, and it depended on a student being in school that day. Non-attendance rates were high, so it was a lot to hinge on that one piece.” (M.P.)

4. Condom Promotion and Distribution

The final component of the MkV intervention involved training young people in condom use and social marketing approaches to promote and supply condoms at an affordable price to students (Hayes et al., 2005).

This was necessary due to limited access to condoms in the Mwanza region in general at the time, particularly for adolescents. The available sources, namely health facilities and village vendors, were inadequate because of multiple issues such as distance, lack of stock and the associated stigma for the youth, especially girls who might seek condoms (Obasi et al., 2006).

[Adaptation/refinement] Social marketing of condoms by young people aimed to fill the gap in condom access, and also to complement the education provided in schools and health facilities. [Pain point] However, this component was not effective because of low demand for condoms from young people. This was due to several factors including cost, stigma associated with condoms (e.g. associating condoms with sex work or casual sex), problems with confidentiality in obtaining condoms, and young people – especially men – negatively evaluating condom use. Nevertheless, for some young men this component proved helpful (see Box 9).

Box 9

“The youth condom promotion and distribution initiative had some success, particularly with young men. It was least successful in directly reaching young sexually active students, such as the early to mid-adolescents who participated in the trial. Qualitative research within the trial, and monitoring by the intervention team, both found that most of the customers of condom distributors were young men in their late teens or twenties.” (R.H.)

3.5.2: Effectiveness of the MEMA kwa Vijana intervention

The MkV1 intervention was evaluated using a community-randomised trial involving 9645 young people over three years of implementation (Ross et al., 2007). Twenty communities were randomly allocated to ten intervention communities (62 primary schools and 18 health facilities) and ten control communities (58 primary schools and 21 health facilities) that did not receive the intervention. MkV showed significant impact on some measures of reproductive health knowledge, and some reported attitudes, STI symptoms and sexual behaviours. However, no beneficial or harmful effects were observed for biological outcomes. Only five HIV infections occurred in male participants, and for female participants, the adjusted rate ratio (aRR) for HIV infections was 0.75 with 95% confidence intervals (CI) of 0.34-1.66. For the HSV2 infection, adjusted prevalence ratios (aPR) for male and female participants were 0.92 (CI 0.69-1.22) and 1.05 (CI 0.83-1.32) respectively (Ross et al., 2007).

Process evaluation of the health facility intervention component found that mean monthly attendance per health facility for STI symptoms was greater in the intervention communities than in the control communities, after adjusting for baseline attendance (mean difference(MD)=0.7, CI 0.1-1.4, $p=0.005$). This increased over time (p -trend=0.022) for young men and young women but did not reach statistical significance in the latter (MD=2.6, CI -0.9-4.2, $p=0.087$) (Larke et al., 2010). Greater numbers of condoms were also distributed in the intervention facilities (MD=0.7, CI -1.1-1.6, $p=0.008$) (Larke et al., 2010).

The long-term impact of the intervention was evaluated using a cross-sectional design after 8-9 years of implementation among 13,814 young people aged 15-30 years who attended the MkV intervention or control schools during the trial (Doyle et al., 2010). The long-term results should however be interpreted with caution due to the weakness of the cross-

sectional study design, in contrast to randomised trial design used for the short-term evaluation. The intervention did not find significant association in HIV prevalence between participants from the intervention communities compared to the control (aPR=0.91, 95% CI 0.50-1.65 and aPR=1.07, 95% CI 0.68-1.67 for young men and women respectively) and also did not do so for HSV2 (aPR=0.94, 95% CI 0.77-0.15 and aPR=0.96, 95% CI 0.87-1.06 for young men and young women respectively). Similarly, no long-term significant association was observed for reported sexual risk attitudes, some reported behaviours and reported pregnancies. However, there was a significant improvement in knowledge, a significant reduction in the number of individuals who reported having more than four lifetime sexual partners (aPR=0.87, 95% CI 0.78-0.97) and a significant increase in the number of females who reported using a condom with their last non-regular sexual partner (aPR=1.34, 95% CI 1.07-1.69) (Doyle et al., 2010). The number of years of exposure to the intervention were found to be associated with increased pregnancy knowledge and desirable attitudes towards sexual risk reduction (i.e. highest association if exposed to all three years of the school intervention during the trial) (Doyle et al., 2011). Detailed results for short- and long-term impacts are presented in Table 3.1 and Table 3.2 respectively.

Table 3. 1: Knowledge, attitudes and behavioural outcomes [source: Ross et al. (2007) and Doyle et al. (2010)]

OUTCOME S	MALES						FEMALES					
	2001/2002			2007/2008			2001/2002			2007/2008		
	Frequency		aRR	Frequency		aRR	Frequency		aRR	Frequency		aRR
	Intervention	Control	¹	Intervention	Control	²	Intervention	Control	¹	Intervention	Control	²
	(N=2076)	(N=2024)	(CI)	(N=3807)	(N=3493)	(CI)	(N=1448)	(N=1492)	(CI)	(N=3276)	(N=3238)	(CI)
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Knowledge³												
HIV acquisition	1356 (65)	908 (45)	1.44 (1.42-1.67)	2773 (73)	2295 (66)	1.11 (0.99-1.23)	832 (58)	601 (40)	1.41 (1.14-1.75)	2233 (68)	1952 (61)	1.11 (1.00-1.24)
STI acquisition	1074 (52)	807 (40)	1.28 (1.07-1.54)	2056 (56)	1591 (46)	1.18 (1.04-1.34)	522 (36)	376 (25)	1.41 (1.06-1.88)	1253 (38)	974 (30)	1.24 (0.97-1.58)
Pregnancy prevention	1746 (84)	1018 (40)	1.66 (1.55-1.78)	3133 (83)	2410 (69)	1.19 (1.12-1.26)	1047 (72)	688 (46)	1.58 (1.26-1.99)	2304 (71)	1934 (60)	1.17 (1.06-1.30)
Reported attitudes³												

Attitudes to sex	454 (22)	247 (12)	1.77 (1.4-2.22)	1053 (28)	759 (22)	1.31 (0.9-1.77)	383 (27)	283 (19)	1.42 (1.1-1.81)	359 (11)	332 (10)	1.09 (0.6-1.77)
Reported sexual behaviour												
Age at first sex <16 y⁴	638 (60)	677 (72)	0.84 (0.7-1.01)	954 (25)	956 (28)	0.91 (0.8-1.05)	801 (68)	763 (67)	1.03 (0.9-1.16)	903 (28)	865 (27)	1.01 (0.8-1.28)
>2 (female) or >4 (male) lifetime sexual partners	-	-	-	1412 (37)	1531 (44)	0.87 (0.7-0.91)	-	-	-	1096 (34)	1191 (37)	0.89 (0.7-1.05)
>1 partner in last 12 months	394 (19)	556 (28)	0.69 (0.4-0.95)	1542 (41)	1557 (45)	0.92 (0.7-1.08)	123 (9)	116 (8)	1.04 (0.5-1.89)	333 (10)	325 (10)	0.97 (0.7-1.23)
First used condom during follow-up⁴	548 (39)	427 (28)	1.41 (1.1-1.73)	-	-	-	387 (38)	297 (28)	1.30 (1.0-1.63)	-	-	-
Used condom at	431 (39)	326 (20)	1.47 (1.1-1.73)	1021/298 8 (34)	795/27 76 (29)	1.19 (0.9-1.47)	284 (27)	238 (22)	1.12 (0.8-1.47)	541/2832 (19)	407/27 75 (15)	1.27 (0.9-1.54)

last sex in past 12 months^{6,7}			2- 1.93)			1- 1.54)			5- 1.48)		7- 1.23)	
Used condom at last sex in past 12 months with non-regular partner⁸	-	-	-	903/1821 (50)	760/17 46 (44)	1.15 (0.9 7- 1.36)	-	-	-	189/427 (45)	136/43 4 (31)	1.34 (1.0 7- 1.69)
Ever used modern contraceptive⁹	-	-	-	2232 (59)	1911 (55)	1.09 (0.9 4- 1.26)	-	-	-	1561 (48)	1371 (42)	1.11 (0.9 5- 1.30)
Used modern contraceptive at last sex^{7,9}	-	-	-	1040/299 2 (35)	803/27 81 (29)	1.21 (0.9 2- 1.58)	-	-	-	632/2841 (22)	538/27 96 (18)	1.16 (0.9 1- 1.47)
>1 partner in same time period in past 12 months	-	-	-	1087 (29)	1132 (32)	0.90 (0.7 6- 1.06)	-	-	-	209 (6)	219 (7)	0.87 (0.6 3- 1.20)
>1 partner in past 4 weeks	-	-	-	435 (11)	464 (13)	0.87 (0.6 5-	-	-	-	57 (2)	57 (2)	1.04 (0.6 6-

1.15
)

1.66
)

aRR, Adjusted rate ratio (risk or rate ratio); CI, 95% Confidence Intervals; HIV, Human Immunodeficiency Virus; STD, Sexually Transmitted Diseases

¹Adjusted for: stratum, tribe (Sukuma Versus non-Sukuma), age group (≤ 17 , 18, ≥ 19 years), number of lifetime partners at baseline (0, 1, 2, ≥ 3)

²Adjusted for: stratum, tribe (Sukuma Versus non-Sukuma), age group (<21, 21-22, 23-24, ≥ 25 years)

³Percentage with all 'correct' three responses

⁴Sexual debut during follow-up for 2001/2002 assessment

⁵Those who had not reported ever-used condom at recruitment and reported sexual activity at final follow-up

⁶Among those who reported sexually activity in the past 12 months

⁷Used condom at last sex for 2001/2002 assessment

⁸Among those who reported having ever had sex with a non-regular partner in past 12 months

⁹Condom, oral contraceptive pill and injectable contraceptives

Table 3. 2: Biological outcomes [Source: Ross et al. (2007) and Doyle et al. (2010)]

OUTCOMES	MALES						FEMALES					
	2001/2002			2007/2008			2001/2002			2007/2008		
	Prevalence		aPR ²	Prevalence ¹		aPR ³	Prevalence		aPR ²	Prevalence ¹		aPR ³
	Intervention (N=2076) n (%)	Control (N=2024) n (%)	(CI)	Intervention (N=3807) n (%)	Control (N=3493) n (%)	(CI)	Intervention (N=1448) n (%)	Control (N=1492) n (%)	(CI)	Intervention (N=3276) n (%)	Control (3238) n (%)	³ CI
Reported clinical/biological outcomes												
Genital discharge (last 12 months)	-	-	-	288 (8)	320 (9)	0.83 (0.63 - 1.09)	-	-	-	122 (4)	178 (6)	0.70 (0.45 - 1.09)
Genital ulcer (last 12 months)	-	-	-	193 (5)	245 (7)	0.76 (0.59 - 0.99)	-	-	-	149 (5)	216 (7)	0.69 (0.47 - 1.01)
Went to health facility for most recent STI symptoms within past 12 months⁴	26/91 (29)	52/150 (35)	0.84 (0.50 - 1.41)	192/401 (48)	195/451 (43)	1.19 (0.91 - 1.56)	33/93 (36)	54/160 (34)	1.02 (0.62 - 1.70)	102/216 (47)	154/326 (47)	1.02 (0.77 - 1.37)
Reported pregnancy at follow-up⁵	-	-	-	-	-	-	489 (46.9)	489 (45.5)	1.03 (0.89 - 1.20)	-	-	-

>2 reported pregnancy (lifetime)⁶	-	-	-	207 (5)	220 (6%)	0.95 (0.70 - 1.29)	-	-	-	587 (18)	605 (19)	0.96 (0.80 - 1.15)
Reported pregnancy while in primary school⁶	-	-	-	113 (3)	132 (4)	0.84 (0.57 - 1.23)	-	-	-	102 (3)	91 (3)	1.16 (0.68 - 1.97)
Reported ≥1 unplanned pregnancy⁶	-	-	-	675 (39)	782 (47)	0.87 (0.69 - 1.10)	-	-	-	792 (25)	759 (24)	1.03 (0.83 - 1.26)
Primary biological outcomes												
HIV prevalence⁷	3 (0.43)	2 (0.30)	NC	74 (2.0)	59 (1.7)	0.91 (0.50 - 1.65)	16 (3.18)	24 (4.73)	0.75 (0.34 - 1.66)	126 (3.9)	136 (4.2)	1.07 (0.68 - 1.67)
HSV-2 prevalence	234 (11.3)	251 (12.5)	0.92 (0.69 - 1.22)	948 (25.0)	928 (26.7)	0.94 (0.77 - 1.15)	305 (21.3)	309 (20.8)	1.05 (0.83 - 1.32)	1313 (40.3)	1369 (42.5)	0.96 (0.87 - 1.06)
Secondary biological outcomes												
Syphilis seroprevalence (TPPA+)	28 (1.4)	37 (1.8)	0.78 (0.46 - 1.30)	218 (5.8)	183 (5.3)	1.06 (0.74 - 1.52)	47 (3.3)	54 (3.6)	0.99 (0.67 - 1.46)	206 (6.3)	241 (7.5)	0.86 (0.62 - 1.21)
Active syphilis prevalence (TPPA+, RPR+)	-	-	-	144 (3.8)	113 (3.3)	1.11 (0.72 - 1.72)	-	-	-	147 (4.5)	167 (5.2)	0.91 (0.65 - 1.28)

Chlamydia prevalence	11 (0.5)	11 (0.5)	1.14 (0.53 - 2.43)	80 (2.1)	73 (2.1)	1.24 (0.66 - 2.33)	71 (4.9)	54 (3.6)	1.37 (0.98 - 1.91)	85 (2.6)	69 (2.1)	1.27 (0.87 - 1.86)
Gonorrhoea prevalence	8 (0.4)	2 (0.1)	NC	13 (0.3)	15 (0.4)	0.71 (0.21 - 2.41)	35 (2.4)	18 (1.2)	1.93 (1.01 - 3.71)	11 (0.3)	12 (0.4)	0.73 (0.20 - 2.63)
Trichomonas prevalence	-	-	-	-	-	-	413 (28.6)	383 (25.8)	1.13 (0.92 - 1.37)	-	-	-
Positive pregnancy test prevalence	-	-	-	-	-	-	277 (19.2)	268 (18.0)	1.09 (0.85 - 1.40)	-	-	-

aPR, adjusted prevalence ratio; CI, 95% confidence intervals; HIV, Human Immunodeficiency Virus; STD, Sexually Transmitted Diseases; STI, Sexually Transmitted Infections; HSV2, Herpes Simplex Virus 2; NC, number of events too enough to justify comparison

¹Due to missing values, denominators varied and unless specified they include the following ranges: Male intervention 3786-3807; Female intervention 3256-3276; Male control 3473-3493; Female control 3220-3238

²Adjusted for: stratum, tribe (Sukuma Versus non-Sukuma), age group (≤ 17 , 18, ≥ 19 years), number of lifetime partners at baseline (0, 1, 2, ≥ 3)

³Adjusted for: stratum, tribe (Sukuma Versus non-Sukuma), age group (<21, 21-22, 23-24, ≥ 25 years)

⁴Among those that reported STI symptoms (genital ulcer or genital discharge) in the last 12 months

⁵Among women that reported never being pregnant at recruitment

⁶Reported times males had made a female pregnant, have unplanned pregnancy or pregnant in primary school

⁷HIV incidence per 1000 person-years for 2001/2002 assessment

3.5.3: The research team's views on reasons for the limited impact of the MkV intervention on biological outcomes (STIs and pregnancy)

These were some of the explanations for the limited impact of the MkV intervention:

- i. The initial trial was underpowered because the incidence of infections in the cohorts was overestimated. This was partially accounted for in the long-term follow-up, but which also did not find an impact on biological markers (Doyle et al., 2010). However, a much longer follow-up with larger cohorts might have detected significant change in the infections (see Box 10).

Box 10

"I think there were two factors. First of all, one needs to do very large studies to be able to detect differences in STIs and HIV. We originally powered the trial to be able to detect a 50% reduction in HIV. In the end, the incidence of HIV was much lower than we had predicted, and that was probably largely because the estimates were based on population surveys, not school-based surveys. The incidence in young people going to school is lower than in those of the same age in the general population. Secondly, I think it was unrealistic within a three-year period that this kind of school-based intervention would reduce HIV incidence by 50%. So we were underpowered. We tried to do something about that by the eight-year follow-up survey, but that was only a partial solution. It is probably unrealistic to think that a school-based intervention like this will have even a 20% impact on HIV or STI incidence." (D.R.)

- ii. The limited impact of the intervention might also be attributed to restrictions put in place by the education authorities in the final school

programme, leading to the ‘dilution’ of the curriculum (see Box 11). This meant that the project team was not able to do what was most evidence-based, including the provision of condom education and training.

Box 11

“During the initial year of intervention development, the intervention team worked closely with regional educational authorities to raise awareness about adolescent sexual and reproductive health needs, and to incorporate their input into the draft curriculum. The intervention team argued strongly for the most evidence-based approaches when they encountered resistance. Their advocacy succeeded, to an extent. For example, in the beginning the Regional Education Officer was quite opposed to some of the proposed curriculum content, but ultimately he supported most of it enough to become a co-author of the published curriculum. He also officially required that the curriculum be integrated within the formal school schedule in intervention schools. Nonetheless, in the end, he only provided such permissions and support on the condition that condom discussion in schools was kept very brief and superficial – mainly just simple statements like ‘condoms prevent HIV’ – and he forbade the depiction of condoms in any form.

As a result, the intervention team removed most condoms content and knowingly implemented a weaker curriculum. They continued their advocacy with regional education authorities throughout the trial so that, by the third and final year of the trial, the regional educational authorities agreed that the final session of the Year 7 curriculum –

which for most students was their final intervention session before leaving school and assuming adult responsibilities – could focus entirely on condoms if teachers chose that option. Teachers were provided with an alternative session if they did not want to teach that condom session in full. But in either scenario, teachers still could not depict condoms in any form. The intervention team deserves credit for making the most of a difficult situation but, in the end, they were not able to implement their most evidence-based and best practice curriculum, and in fact they intentionally diluted it. And that is the intervention that we evaluated during the trial.” (M.P.)

- iii. Another limitation identified by the researchers was targeting school students only, when decisions about their sexual activity and STI protection often involved other people. Parents, siblings and young people not attending school had limited exposure to the programme, and this was particularly important for young women who had older sexual partners who might not have been exposed to the intervention (Plummer, Wight, Obasi et al., 2007) (see Box 12). Therefore, a more intensive community-based intervention component (at least with young adults) - implemented together with the school intervention - may have been more effective.

Box 12

“When the intervention team was developing the intervention, they knew it would be ideal to have a strong community component beyond the initial community mobilization. However, given limited resources – and the goal to design an intervention that could be scaled up and sustained in a low-resource setting - they decided to prioritize the school and health facility components. Unfortunately, one of the major things we learnt was that it may not be possible to have an effect on sexual risk in young people if that group is primarily targeted in isolation from the rest of the population. If the school-based component had been embedded in a wider, more intensive community programme, one that also addressed risks and norms with parents and young adults, it may have been more effective in shifting the behaviour of adolescents. It would have been particularly valuable to target the young men who were sexual partners of the adolescent girls who were participating in the school-based MEMA kwa Vijana programme.” (R.H.)

“One limitation is when you have an instructional programme like MEMA kwa Vijana, where only a very small proportion of the population that have been through the programme and for example, the girls are having sex with older boys and men who have not been through the programme.” (D.R.)

- iv. Finally, the MkV team recognised that cultural and socio-economic factors in Mwanza had an important influence on young people’s sexual behaviour. These include acceptance of young women having sex with older men, and contradictory cultural norms and expectations which both disapprove of pre-marital sex for young

women but also accept (and even expect) that unmarried girls and young women have sex in exchange for needed money, materials and gifts (see Box 13). Therefore, for any intervention to have a substantial impact on sexual behaviour, it would have needed to change wider social norms, underlying poverty and gender power inequities. This is likely beyond the scope of a school-focused intervention such as MkV, and requires interventions even beyond education and health services. Extensive structural (e.g. school policy changes), media, community (e.g. work with local communities and parent involvement) and economic changes (e.g. incentives for girls to remain in school) would be required (Patton et al., 2016; Shackleton et al., 2016). Such society-wide interventions may be more likely to result in population-level changes in young people's behaviours and sexual health (Shackleton et al., 2016) and general well-being (Patton et al., 2016).

Box 13

“We have to consider the wider community influences, such as cultural norms and economic factors that make it very difficult for young people, and especially adolescent girls, to choose their behaviour. There were cultural and social barriers to young people engaging in safer behaviour. For instance, girls typically received money or gifts in exchange for sexual encounters, and this was a major consideration for them growing up in a very resource constrained setting with few other ways to meet their basic needs. But it was not only a case of such economic pressures; complex cultural norms and expectations also played an important role. For example, early sexual activity was generally frowned upon by adults, but nonetheless it seemed to be widely expected and accepted, if young people were discreet. So, looking

forward, it would be useful to explore how to better combine interventions for adolescents with wider interventions in the community aimed at changing such contradictory norms and expectations.” (R.H.)

Wider contextual factors were explored in more detail in a qualitative process evaluation using extensive participant observation (Wight, Plummer and Ross, 2012). Culture (systems, beliefs and practices), social status, economic concerns and gender power imbalances were all interrelated, structural factors. Briefly, economic barriers included the financial dependence of women on men; women’s low social status; sex as an economic resource for women (transactional sex for cash or in kind goods); and the poor quality of the health and education systems. Therefore, structural interventions in health and education sectors are required. This is probably beyond the capacity of an ASRH research project, even if it is well funded like the MkV, although, there is a possibility of such projects to focus on these structural barriers. Furthermore, other key barriers included the low status of young people (serving as a barrier to interventions targeting young people), and the effect of social constructions of masculinity on sexual behaviour patterns (perpetuating the sexual power of men and risky sexual behaviour patterns). Moreover, important cultural barriers included contradictory sexual norms; the secrecy involved in conducting multiple or concurrent sexual partnerships; negative attitudes and beliefs towards condoms; a low perceived salience of HIV/AIDS; short-term decision-making; and the limited agency of young people.

A study of 23 in-depth interviews conducted 7–9 years after the MkV intervention explored the intervention’s relevance and participants’ ability to apply what they learned in schools. Results indicated that cultural norms (around fertility and gender power relations) deterred participants from applying what they had learned (Wamoyi et al., 2012). However,

Wight, Plummer and Ross (2012) also identified facilitating socio-cultural factors that may help prevention, including restrictive norms (e.g. abstinence for school students and before marriage and designation of multiple sexual partnerships as immoral); religion and education (e.g. prohibition of pre-marital sex and avoiding pregnancy so as not to end a young woman's schooling); and parental concern for adolescent health and well-being.

3.5.4: Scaling up of the MEMA kwa Vijana intervention

The MkV intervention was designed to be scaled up and rolled out through existing government systems (i.e. regional, district, ward, and village school and health systems), and to transition from NGO funding to government funding. The complexity of programme scale-up goes beyond 'blue-print' large-scale replication; implementation inevitably involves interaction between the designed-and-tested intervention and the environments (priorities, cultures and structural capacities) into which it is introduced (Renju, Makokha et al., 2010). Models of scale-up developed by Simmons et al. (2002) were adapted to evaluate the MkV scale-up process. These models were based on innovation and organisational theories and cross-examination of public health case studies. They provide a series of recommendations and suggest that a sustainable intervention must be scaled up through existing systems and must be tailored to the intended structures. A summary of intervention attributes that promote successful translation into large-scale implementation, as proposed by Simmons et al. (2002), would include credibility, observability, relevance, relative advantage, ease in understanding, compatibility, accessibility, user orientation, gender and rights perspectives, empowerment and the ability to be tried and tested.

The resource system in which an intervention is implemented (e.g. an NGO) includes skilled health trainers, skilled organisation development

practitioners, commitment to social justice, skilled service-delivery researchers and donor support. The scale-up system attributes include perceived need, expected benefit, capacity, values, openness, timing and circumstances (including policy windows), proximity/homophily, leadership, policy entrepreneurs, political support, ownership and internal advocacy. The attributes linking the innovation and the scale-up system include clear messages, personal contact and informal communication, early community involvement, training and development of intervention team, technical assistance, organisational support, sufficient time, strong diffusion channels (including policy advocacy, and benchmarking and networking) and phased implementation and adaptation (Simmons et al., 2002). This may also involve an iterative cycle of problem identification and problem solving. Renju and Makokha et al. (2010) used an integrated version of Simmons's et al. model to evaluate the scale-up of the MkV intervention (Figure 3.2).

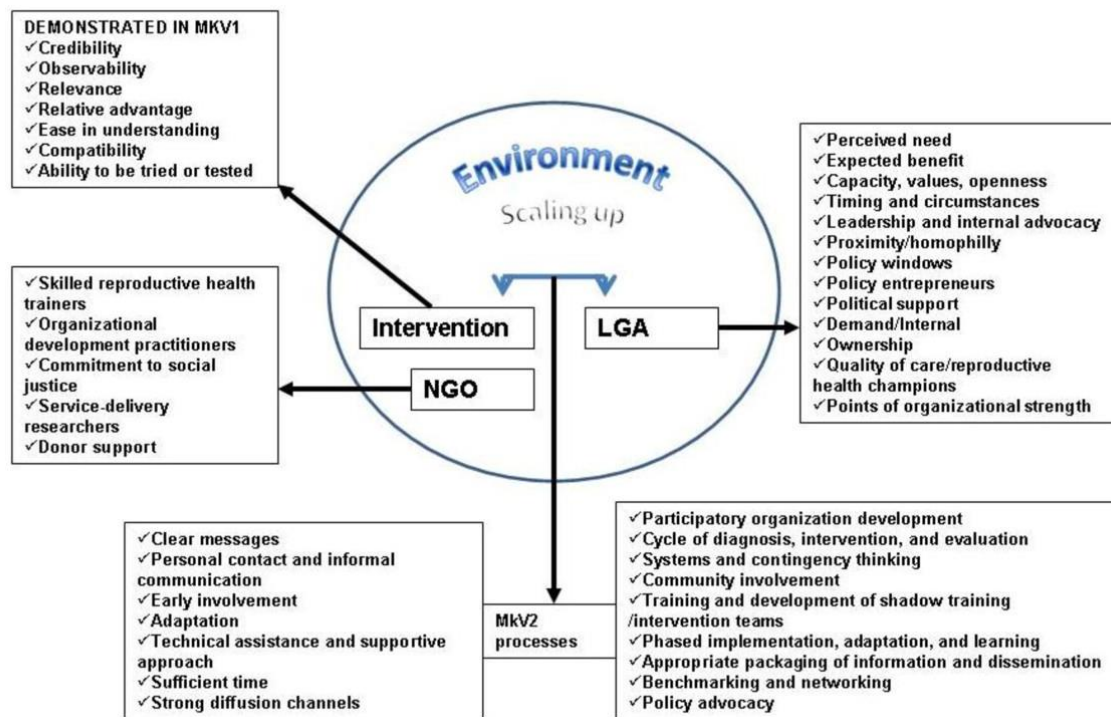


Figure 3. 2: An integrated model of intervention scale up modified from Simon's et al. models (Source: Renju, Makokha et al., 2010)

All the components of the MkV intervention were scaled up except condom promotion and distribution due to low patronage and high cost per condom distributed. Four overlapping strategies were employed to facilitate the transition of the MkV intervention from an NGO project to government-led programme (Renju, Makokha et al., 2010). These were as follows:

- i. Training of two teams of health and education government officials, as district trainers and supervisors. These, in turn, trained and supervised teachers and health workers during the scaling up using a training cascade approach.
- ii. Placing the district level implementation under the District Planning Office, which is responsible for planning local government programmes. A memorandum of understanding detailed sharing the financial costs between the NGO and the government during the

transition, with the NGO paying 100% in year one, 50% in year two, 25% in year three and transferring funding entirely to the local government in year four.

- iii. Establishment of a NGO staff member in each local government to provide technical assistance and to be responsible for working with the District Planning Officer to support development of a multi-sectoral AIDS plan involving capacity-building and linking sectors with other organisations and networks in the region.
- iv. Explicit identification of MkV2 as a means to support the local government implementation of the National Multi-Sectoral Strategic Framework for HIV/AIDS because of the compatibility of the objectives of the two programmes.

These strategies are shown in Figure 3.3.

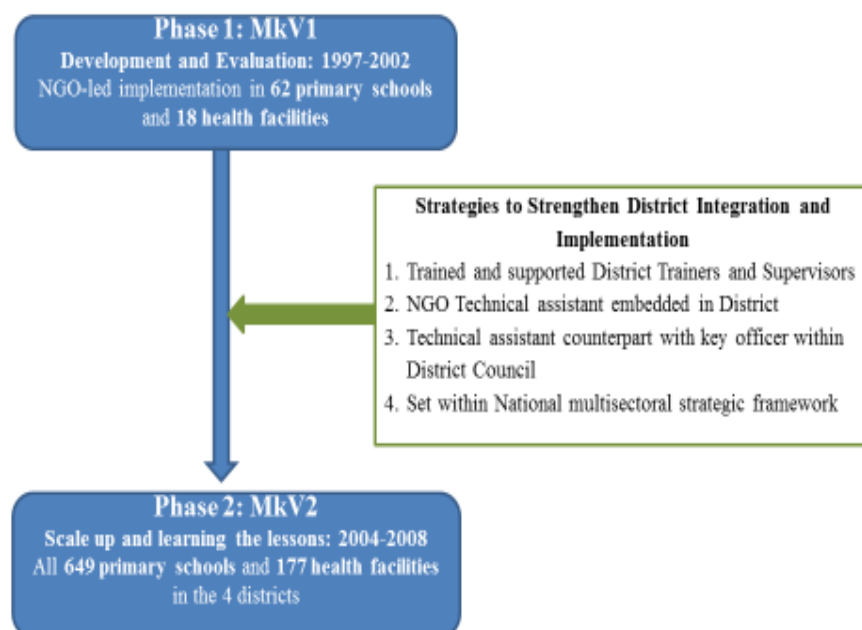


Figure 3. 3: Modifications made in the MkV intervention to facilitate the transition from a NGO-led project to district government-led programme (Source: Renju, Makokha, et al., 2010)

School and health authorities were involved at all levels throughout the MkV trial. Although there was government disappointment that the trial showed no effect on STIs and pregnancy, there also was enthusiasm to continue scale up because of its effects on knowledge and some reported behaviours. This enthusiasm was evident in the form of support by senior officials at both regional and national levels facilitated scale-up. The positive effects on knowledge and behaviours provided a rationale for the wide-scale implementation. In addition, financial support from external donors, the low cost of maintaining the intervention, and the championing role played by researchers or implementers during the scaling up process, were all critical (see Box 14).

Box 14

“The impression from the Ministry of Education staff was: ‘Wow, these are fantastic results’. You have improved knowledge, changed reported attitudes [and], changed reported behaviours. They were very positive about that and I think it was a huge influence on being able to scale up the interventions. And clearly having money to be able to do it was also very influential...”

(D.R.)

“Intervention implementation was kept very low cost, so it would be cost-effective and eventually could be taken to scale and be sustainable. Unlike a lot of interventions, which rely on paid professionals or community members, the MkV intervention was implemented almost entirely by existing government staff and institutions, using existing infrastructure. At that time, the only way you could reach adolescents on a large scale in rural Mwanza was through primary schools, so the very small team of trainers got the intervention started and monitored it over time, but the goal was for educational supervisors and teachers to be

trained and to have the basic resources to continue conducting training courses and teaching it long-term.” (M.P.)

“The main institutions were the Ministry of Education and the Ministry of Health...at each level, you need to have the buy-in from the officials. And the [Intervention Coordinator] led a programme of scaling up MEMA kwa Vijana for the whole of Mwanza region by working at each level with those officials.” (D.W.)

“The study showed that the intervention was highly successful in improving knowledge and attitudes around sexual health. Those effects were not only seen after three years of follow up, but were even evident after further follow up, six or seven years later. Knowledge, attitudes, and perceptions are pre-requisites to change behaviour in the longer term, so those were very encouraging findings. Based on them, we felt there was a strong case for implementing this intervention more widely.” (R.H.)

“My understanding is that it would work well if there is a lot of input from external researchers or implementers. But once it is left entirely to the existing education officials and health service officials, then other factors, other contingencies, demands on people’s time, demands on budgets mean that it will gradually get eroded. It needs to have people championing it all the time, I think.” (D.W.)

The following factors were also observed to have facilitated scale-up (Renju, Nyalali et al., 2010): the selection of teachers most likely to understand reproductive health (i.e. science teachers); a small financial incentive to teachers and health personnel to cover travelling and meals for the scale-up period; participatory training methods; supportive

supervision during training; and the detailed, instructive and structured nature of the intervention. A barrier to scale-up was the cost of extra work in an already overloaded system with a small workforce. Policy-makers' support facilitated wide-scale implementation and was founded on good relationships between the intervention team and the local authority (see Box 15).

Box 15

“The district and ward level education staff do not already have enough resources for their existing work, and adding work was problematic for them. So the agreement was that the additional work would be paid for by the project in the first year, and then there would be a reducing amount of money each year, with the plan that the district finances would gradually provide those funds from the money that they were getting for health and HIV prevention.” (D.R.)

“In terms of the policy buy-in, we benefitted from the very close relations we had already built with the Tanzanian national and regional health and education authorities. They were truly partners in the MEMA kwa Vijana programme from the start.”
(R.H.)

The school component of the MkV intervention was successfully scaled up from 62 to 649 schools from 2004 to 2008. A cascade of training on all the education levels led to the training of three science teachers per school (see Figure 3.4), and other modifications were made to facilitate the process (Renju et al., 2011). The modifications included: (1) teachers were trained once instead of annually; (2) peer assistants were trained by teachers instead of receiving an annual training by the NGO; (3) routine local government supervision of implementation instead of quarterly

district supervision by the NGO team; and (4) a one-day annual health event instead of a dedicated youth health week. These modifications were not found to substantially reduce the integrity of the training process (Renju, Nyalali et al., 2010). A detailed process evaluation conducted three to four years after the trial (including observations of students' exercise books, class sessions, peer-assisted activities and interviews with teachers) to assess the coverage and quality of the sessions of a sample of schools showed a high coverage generally (Renju et al., 2011). However, coverage varied across schools, with the earlier sessions and biology-based topics covered better than the life skills-based sessions. This was partly because of a reduced number of teachers trained during the scale-up (from three per year per school, to three throughout the project); regular teacher turnovers; biological topics being in-line with a government-approved science syllabus; the arrangement of the syllabus with the biological topics first, followed by the life skills topics; the non-examination status of the skills-based topics; and the teachers' lack of skills in teaching skills-based topics (Renju et al., 2011). Thus, the reduced training programme may well have diluted non-biological elements of the intervention when scaled-up. In addition, the reduction in supervision from quarterly to bi-annually might have reduced the quality of delivery. Renju and colleagues (2011) argued that systemic pre-service training would have been more cost-effective than the in-service training offered in MkV2. Moreover, modifications during the large scale-up to a government programme meant that skills and participatory components were not as strong as in the trial phase of the project (Renju et al., 2011). In addition to the high turnover of trained teachers and low levels of supervision, overcrowded classes formed another key barrier (Renju, Nyalali et al., 2010).

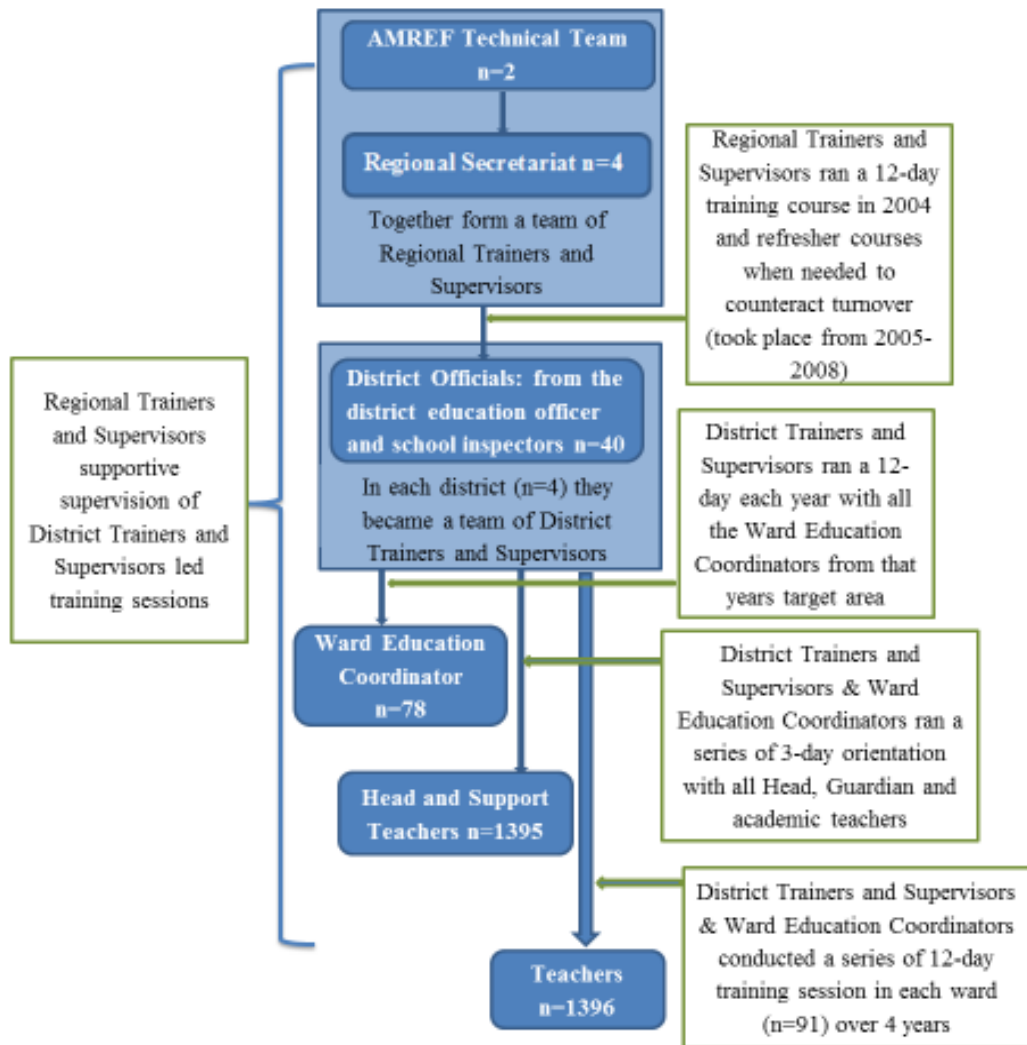


Figure 3. 4: MkV school component training cascade during intervention scale-up (2004-2008) (Source: Renju et al., 2011)

The young-people-friendly health service was also scaled up successfully from 18 to 177 health centres across the Mwanza region (Renju, Andrew et al., 2010). In a similar manner to the school-based intervention, local government officials were trained in a cascade fashion in two phases (2005 and 2007) (see Figure 3.5). Modifications of initial training procedures included: (1) the training of healthcare providers by AMREF-trained local government officials instead of directly by the intervention team; (2) only one training session for health workers instead of an initial

training and annual refresher courses; (3) health workers were selected by the local government instead of by the trial team, following specified selection criteria; and (4) the use of a newly launched government training manual, which was similar to the MkV training manual, but more substantial in duration and content. This new manual was based on the experiences of the MkV trial and the initial scale-up. A monitoring study found high levels of in-service training, good coverage of health centres and improved the young-person-friendliness of some services (Renju, Andrew et al., 2010). However, several factors limited the quality of the community-based scale-up, including high turnover of trained staff turnover, low numbers of trained staff at each facility, and structural limitations (e.g. few and poor quality consulting rooms and low staff salaries). Renju and Andrew et al. (2010) argued that the reduction of training to once per health worker may have compounded problems related to already high staff turnover levels. In addition, the selection of trained staff by local authorities favoured professionals holding managerial roles over those with direct contact with young people. The failure of trained staff to transfer knowledge and skills to untrained staff may also have diluted intervention content.

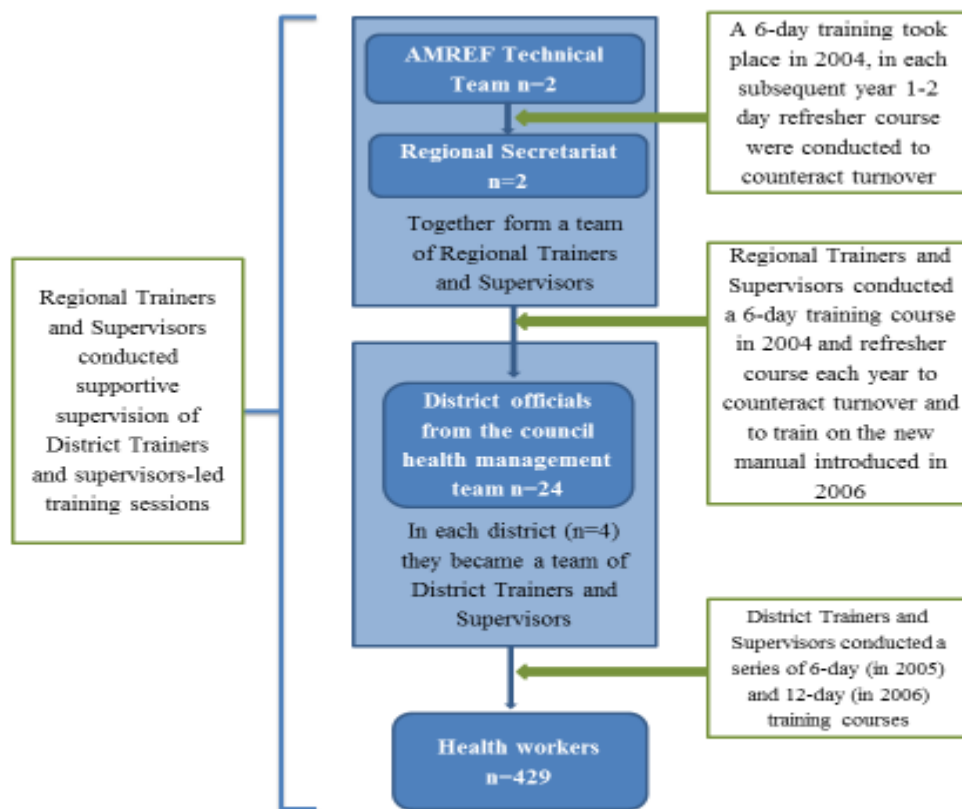


Figure 3. 5: MkV youth-friendly health services training cascade during intervention scale-up (2004-2008) (Source: Renju, Andrew, et al., 2010)

Finally, operational research (Renju, Makokha et al., 2010) involving all stakeholders in the scaling up period revealed factors that facilitated and inhibited the process. According to Simmons's et al. (2002), successful integration of a novel intervention into an existing system involves acceptance and establishment at several levels, including formal (political or legal support for MkV), financial (funding of MkV activities by the local government), operational (day-to-day commitments to MkV) and psychological (perceived ownership and compatibility with local government activities). A barrier to financial integration in the MkV project was traditional NGO-donor-district pathways of administration and

funding. MkV2 was separate from other government projects and this led to reluctance from the local government to provide financial support (Renju, Makokha et al., 2010). The perceived need for the project helped psychological integration, but this may have been undermined by the availability and control of financial resources, which determines ownership.

In addition, the model by which technical assistance was provided, while possibly promoting technical capacity building within the project's lifetime, may have been a barrier to long-term capacity and integration. Renju and Makokha et al. (2010) argued that the training of local government employees to provide technical assistance would have facilitated better integration. Research showed that capacity building is not only important for the intended scale-up target (the local government staff), but also for the original resource system (the NGO) (Renju, Makokha et al., 2010). Therefore, capacity building would have been enhanced if MkV activities had not been initially designated as NGO activities, but rather had been shared between the local government and the NGO. In addition, NGO activities need to adapt to the local government planning and reporting cycle. MkV2 did not adapt fully to such cycles and this compromised integration. Another challenge to the continuity of MkV2 was the rapid turnover of trained leaders (District Planning Officers and Technical Assistants) in both the local government and the NGO. This meant that individuals without adequate knowledge of the project's aims and strategies replaced trained personnel. Renju and Makokha et al. (2010) argued that future interventions should strategize systems to retain expertise in contexts where high staff turnover is likely. The National Multi-Sectoral Strategic Framework served a policy window to help the psychological and operational integration of MkV2, although it was undermined by limitations in its conception and dissemination. This resulted in lack of ownership and clear understanding of the framework, as well as uncertainty regarding responsibilities at the districts (Renju, Makokha et al., 2010).

3.6: Conclusions

3.6.1: Lessons learned

Drawing on the questions that guided our inquiry, we now highlight lessons provided by this case study.

How was the MEMA kwa Vijana intervention designed to overcome sexual and reproductive health challenges faced by adolescents in rural Mwanza, Tanzania?

It is feasible to develop a collaborative adolescent sexual and reproductive health (ASRH) intervention including local and national government, NGOs, academics, teachers, young people and community members in a conservative setting and to deliver such programme through existing government schools and health facilities utilising already existing resources. However, in regions with poor quality education and health systems, participatory training of those involved in intervention delivery, and provision of detailed but simply worded teaching materials are crucial. Persistent advocacy with authorities may facilitate mobilisation of support even from the most conservative members (e.g. religious leaders), and to negotiate sensitive topics like condom education in primary schools and demonstration with school-going young people in health facilities.

ASRH interventions can be scaled up successfully in schools and health facilities in resource-poor settings by a cascade of staff training. It is likely that such integration will be most effective if other factors are addressed, including pre-service training, continuous supportive supervision, rapid staff turnover and other structural challenges. It is important to involve the authorities of the systems into which an intervention is to be integrated at all stages of intervention development [e.g. planning, piloting and

evaluation – see the Intervention Mapping framework (Eldredge, Markham, Kok, Ruiter, & Parcel, 2016)]. The close relationships with authorities may play a role in ensuring buy-in from the senior officials within those systems, who can be a catalyst for sustainability. Finally, for innovative ASRH interventions to be integrated successfully into routine activities and sustained over time, traditional funding pathways and sources of technical expertise need to be harnessed through high-level support.

What were the technical or non-technical challenges that hindered the successful development and implementation of the MEMA kwa Vijana intervention, and how did the intervention adapt to overcome the challenges where possible?

Resistance to ASRH interventions is common and should be expected due to the sensitive nature of the content and the potential challenges to social norms involved. However, simple explanations and demonstrations of content to opinion leaders and representatives of the target audience may be sufficient to remove or undermine such resistance. Resistance to sensitive topics in school programmes may require alternative approaches. For instance, condom demonstration in school sexual health education was made possible in the MkV intervention through health facility visits. This was not, however successful due to other social and environmental factors. Therefore, whenever possible multiple approaches should be considered and possibly adopted to overcome resistance.

Why did the MEMA kwa Vijana intervention not have an impact on HIV, other STIs, and unintended pregnancy, when long-term cognitive and behavioural change was reported?

Adequately powered trials are necessary to detect meaningful impact on STIs, HIV or pregnancy among students in school-based interventions due to low initial prevalence and subsequent incidence at that age. It is,

therefore, important to undertake population-appropriate power calculations during the evaluation design stage (Eldredge, Markham, Kok, Ruiters, & Parcel, 2016). Although negotiation with stakeholders, particularly authorities, regarding the content of ASRH is important, great caution regarding compromises on evidence-based features is needed to avoid dilution of effectiveness. Isolated interventions targeting only school students in communities where sexual norms and even individual sexual decision-making may be seen as collective may have limited effectiveness. Hence, community-wide ASRH interventions may be more likely to be effective. Finally, the impact of socio-economic and cultural factors on the effectiveness of ASRH interventions in resource-poor regions should not be underestimated. Therefore, in addition to structural interventions, (e.g. school-policy changes) in the health and education sectors, interventions should consider influencing factors in non-health and non-education sectors (e.g. working with local communities and parental involvement).

3.6.2: How the case study informs the Science of Delivery

Relentless Focus on Citizen Outcomes

This case study is designed to highlight challenges that designers and implementers can prepare for and manage to improve interventions to enhance the sexual and reproductive health and well-being of young people in resource-poor, rural communities, and to undertake effective large-scale rollouts of such interventions.

We incorporated research from a variety of evaluations, surveys, in-depth interviews and participant observation, tracing the impact on citizen outcomes throughout the lifespan of the project. This research included data on HIV, STI and pregnancy incidence as well as assessment of self-reported reproductive health knowledge, cognitions and safe/risky sexual behaviour patterns such as the number of sexual partners, condom use

and clinic visits. The focal intervention was based on a thorough situation analysis of local young people's sexual and reproductive health needs, available resources and an on-going feedback loop for improvement during the pilot and trial implementation. However, only limited attention was given to contextual social and cultural factors that determine young people's sexual behaviours, which contributed to the limited impact of this intervention on HIV, STI, and pregnancy incidence.

Multi-sector, Interdisciplinary and Multi-stakeholder Approaches and Partnerships

Sexual and reproductive health challenges faced by young people in the target region necessitated a multi-sectoral approach involving education and health sectors. The intervention combined provision of factual information on sexual health, promotion of skills to reduce risky sexual behaviours, and increasing the young-people-friendliness of health facilities. The involvement of multiple stakeholders including adolescents, teachers, parents, key government officials from relevant government ministries, leading family planning organisations, leading condom social marketing organisations in the region, and senior social scientists from a local university and the UK MRC and the LSHTM was an important strength. This ensured the identification of young people's sexual problems and the provision of context-specific solutions (Eldredge et al., 2016). Close collaborations between development partners including local NGOs, UKDFID, the European Commission, Irish Aid, UNAIDS, the UK MRC and the regional and district government officials ensured technical and financial support and the legitimacy of the intervention through policy changes. However, the intersectoral collaborations in such a setting should go beyond intervening in health and education sectors for maximum impact on ASRH, to also include intensive community-based interventions.

The Use of Evidence to Inform Experimentation, to Learn, to Adapt and to Measure Results

The intervention considered here was developed on the basis of a situation analysis, providing local solutions according to the available best practice evidence. In addition, studies using multiple data sources were used throughout the project, providing local evidence to refine the project. This provides us with over a decade of knowledge on the development and implementation of an ASRH intervention in a resource-poor setting.

Change Management, Leadership and Learning from Practitioners

This case identifies and provides the training of staff as a key driver of behavioural change leading to the successful implementation of an ASRH intervention in a conservative, resource-poor setting. Having a project coordinator in each project community and quarterly supportive supervision were also important to effectiveness.

Being Adaptive, Flexible and Iterative when Implementing Solutions

Throughout the lifespan of the project, several adaptive and innovative modifications were made in response to emerging contextual and delivery challenges. One of the modifications was the demonstration of condoms in health centres when this was not possible in school education. Another innovative approach was condom social marketing in the community to increase the availability and usage of condoms, which was abandoned in the scaling up phase of the project due to logistical difficulties and limited cost-effectiveness. Not all these modifications were successful, so while adaptability is crucial for effective integration into established systems, modification need to be risk assessed prior to roll out, as was done for this intervention. Otherwise, a scaled-up intervention may differ from the intervention that was initially evaluated in important ways that determine its effectiveness.

Although there is a possibility of adaptation through a project's lifespan, in this case this approach had limited potential to address the structural barriers in the school and education sectors encountered in this project. Therefore, we suggest that addressing such barriers during initial planning rather than during the project's life span.

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Chapter 4: School-based sexual health education interventions in sub-Saharan Africa: A multiple case study

4.1: Abstract

School-based sexual health education is one of the most comprehensive and effective ways of promoting young people's sexual health, reducing risky sexual behaviours and preventing sexually transmitted infections. This study investigated the design, implementation and evaluation of seven school-based sexual health education interventions in five sub-Saharan African countries, to identify features that may be associated with effectiveness or ineffectiveness on self-reported condom use and preventing sexually transmitted infections. A multiple case study design was employed. Data from each intervention were collected through documents review and interviews with key investigators. Data were analysed using a combination of case study methods. The findings confirmed that interventions that had greater numbers of features recommended by previous evidence synthesis studies were more likely to be effective. Findings suggested that young people's sexual health needs assessment could be improved by applying ethnography, and Sexual Script research, which, in turn, could make interventions more effective. School-based interventions should consider environmental factors by incorporating community-based approaches and using ecological models as theories underpinning interventions. Interventions were also more likely to be effective if delivered by both teachers and peer educators. Finally, optimum impact is likely if young people are exposed to interventions for at least two years/academic sessions. Future intervention design should consider these features to optimise effectiveness of school-based sexual health education in sub-Saharan Africa.

4.2: Introduction

School-based sexual health education interventions are programmes that have been promoted in school settings to improve sexual health and relationships among young people, by reducing risky sexual behaviours and preventing sexually transmitted infections (STIs), including Human Immunodeficiency Virus (HIV). School-based HIV-preventive interventions, starting in primary schools, are recommended as a necessary foundation for non-school-based preventive interventions (Gallant & Maticka-Tyndale, 2004) for three reasons. First, schools can provide knowledge and skills to the majority of young people. Second, studies have shown that most young people initiate sexual activity while they are of school age. Finally, evidence has shown that interventions are most effective in preventing STIs if initiated in primary schools, prior to sexual debut (Gallant & Maticka-Tyndale, 2004). Widespread implementation of school-based sexual health education has also been recommended due to high quality evidence of their effectiveness on some STI-related outcomes (see Mavedzenge, Luecke, & Ross, 2014 for a global review).

Despite these recommendations, the effectiveness of school-based sexual health interventions in sub-Saharan Africa in preventing STIs, including HIV, is limited. In fact, to date, no such intervention has demonstrated a significant HIV-preventive effect in sub-Saharan Africa (Denford, Abraham, Campbell, & Busse, 2016; Mason-Jones et al., 2016; Sani, Abraham, Denford, & Ball, 2016). This is disappointing considering the devastating effects of the HIV pandemic in the sub-continent. Sub-Saharan Africa where just 12% of global population live, bears more than 70% of the world HIV burden with young people, especially young women aged 15-24, being disproportionately affected (Kharsany & Karim, 2016). Therefore, effective HIV prevention in sub-Saharan Africa has potential to reduce the global HIV-related health burden. Young people are the 'window of opportunity' for HIV prevention and school-based HIV

prevention interventions offer a means to halt spread of the infection in the general population (Gallant & Maticka-Tyndale, 2004).

Several studies have recommended design, implementation and evaluation characteristics of school-based sexual health education that could be associated with effectiveness. Kirby, Laris, and Rolleri (2006) provided a widely cited review identifying intervention characteristics associated with effective STI prevention and this was recently updated by Denford et al. (2016) in a review of reviews of school-based sexual health interventions, worldwide. Reviews of studies from sub-Saharan Africa have also provided helpful recommendations (Gallant & Maticka-Tyndale, 2004; Kaaya, Mukoma, Flisher, & Klepp, 2002; Paul-Ebhohimhen, Poobalan, & Teijlingen, 2008; Sani et al., 2016).

The present study aimed to identify characteristics explaining why school-based sexual health education interventions are, or are not, effective in promoting condom use and/or preventing STIs/HIV in sub-Saharan Africa. We explored features of intervention design, implementation, and evaluation that may be associated with effectiveness. Our focus was on carefully-selected cases that is different from previous evidence synthesis studies, by examining particular interventions in detail, including unpublished project documents and interviews with researchers involved in seven large-scale interventions implemented and evaluated in five sub-Saharan African countries.

4.3: Methods

4.3.1: Design

A qualitative multiple case study was undertaken. Case studies are relevant to understanding 'how' and 'why' social interventions work, and

facilitate in-depth exploration of interventions and their real-life contexts (Yin, 2014). Cases for this study were defined as school-based sexual health education interventions implemented and evaluated in sub-Saharan Africa, and were selected from a recent systematic review of school-based sexual health interventions in sub-Saharan Africa (Sani et al., 2016). Seven out of the 31 interventions included in the review were purposively selected using the following criteria, each intervention was:

- i. Implemented in large number of schools (more than 50 schools) and/or was evaluated using a large number participants (more than 1000);
- ii. Implemented in countries with high burden of HIV infection;
- iii. Shown to be either effective or ineffective in promoting self-reported condom use and/or preventing STIs/HIV;
- iv. Supported by documents in addition to published journal articles; and
- v. Involved researchers were willing and available to be interviewed.

4.3.2: Overview of the included cases¹

The seven interventions varied in size and were implemented in five sub-Saharan African countries (Kenya, Nigeria, South Africa, Tanzania and Zimbabwe). Four of the seven interventions were implemented in Nigeria and South Africa; the two countries with the highest burden of HIV in the region. Some of the interventions included a combination of community-

¹ We intended to include the Peer Education Evaluation Project: a provincial initiative that was implemented in 150 high schools and evaluated among 3934 students in the Western Cape, South Africa (Mason-Jones, Flisher, & Mathews, 2013). However, we had difficulty in recruiting researchers involved in this project. We were only able to interview a researcher involved in the evaluation of the project and found it difficult to clarify design and implementation processes.

and school-based programmes (see Table 4.1, for the summary of the cases).

The Primary School Action for Better Health intervention (PSABH) was implemented in 80 primary schools and communities in Kenya. The intervention trial was evaluated among 3940 students (Maticka-Tyndale, Wildish, & Gichuru, 2007) and was rolled out across the country.

The *MEMA kwa Vijana* intervention (MkV) trial was a multicomponent intervention implemented in 62 primary schools, 18 health facilities and communities in rural Tanzania. The MkV trial was evaluated among 9645 students (Ross et al., 2007) and was rolled out to 649 schools and 177 health facilities (Renju et al., 2010; Renju et al., 2011).

The *Regai Dzive Shiri* project (RDSP) was also a school- and community-based intervention implemented in 82 high schools and 30 communities in Zimbabwe, and evaluated among 3960 participants (Cowan et al., 2010). However, only the community component of the RDSP intervention was rolled out.

The HIV Prevention Intervention for Rural Youth (HP4RY) in Nigeria was also a community- and school-based implemented in 30 secondary schools and 10 communities, and evaluated among 5201 students (Arnold et al., 2012).

Table 4. 1: Overview of included interventions (cases)

Intervention (Case)	Country	Size
Primary School Action for Better Health (PSABH)	Kenya	80 Primary Schools Some Communities 3940 Students
School- and Community-Based HIV Prevention Interventions with Junior Secondary School Students in Edo State, Nigeria (HP4RY)	Nigeria	30 High Schools 10 Communities 5201 Students
School-based Reproductive Health Education Program in Rural South Western, Nigeria (SBRHE)	Nigeria	4 High Schools 1029 Students
Health Wise South Africa (HealthWise)	South Africa	70 High Schools 2383 Students (wave 1)
Promoting sexual and reproductive health. School-based HIV/AIDS intervention in Sub-Saharan Africa (SATZ)	South Africa and Tanzania	56 High Schools (South Africa) 24 Primary Schools (Tanzania) 12139 Students
<i>MEMA Kwa Vijana</i> intervention (MkV)	Tanzania	62 Primary Schools 18 Health Facilities 10 Communities 13814 Students
The <i>Regai Dzive Shiri</i> Project (RDSP)	Zimbabwe	82 High Schools 30 Communities 3960 Students

The School-Based Reproductive Health Education intervention (SBRHE) was the only secondary-school intervention and was implemented in four schools and evaluated among 1029 students in Nigeria (Ajuwon & Brieger, 2007).

The Promoting Sexual and Reproductive Health, School-based HIV/AIDS Intervention in sub-Saharan Africa (SATZ) was implemented in 56 high schools in South Africa and 24 primary schools in Tanzania. It was evaluated among 12139 students (Mathews et al., 2012).

Finally, the Health Wise South Africa (HealthWise) was implemented in waves including excess of 70 high schools in South Africa. The first wave of the intervention was evaluated among 2383 students (Smith et al., 2008).

Four of the cases (PSABH, HP4RY, HealthWise and MkV) were classified as 'effective' and the remaining three (SBRHE, SATZ, and RDSP) as 'ineffective'. This was based on statistically significant effects on reported condom use (henceforth referred to as condom use) and/or incidence or prevalence of STIs/HIV among at least one sub-group of the participants.

The MkV found statistically significant increase in condom use for first-time users during follow-up, for both males and females (aRR [adjusted rate ratio] =1.41, 95% CI [95% confidence interval] = 1.15-1.73 and aRR=1.30, 95% CI=1.03-1.63, respectively). Similarly, condom use in the last 12 months for males (aRR=1.47, CI=1.12-1.93) and with non-regular partners for females (aRR=1.34, CI=1.07-1.69) (Doyle et al., 2010; Ross et al., 2007) were significantly increased. Moreover, pooled results for both males and females found statistical significant effects on condom use at last sex (OR=1.49, 95% CI=1.32-1.70) (Sani et al., 2016). However, the

evaluation of MkV found no statistical significant beneficial or harmful effects on HIV and other STIs (Doyle et al., 2010; Ross et al., 2007).

The PSABH found a statistically significant increase in condom use at last sex for males exposed to condom training through school club and/or a question box for pre-programmes virgins and non-virgins pre-programme (aOR [adjusted odds ratios]=1.56, 95% CI=1.01-2.41 and aOR= 1.47, 95% CI=1.09-2.00, respectively). Long-term follow up also found a significant increase in condom use among girls 18-30 months post intervention (aOR=1.40, 95% CI=1.00-2.30) (Maticka-Tyndale et al., 2007; Maticka-Tyndale, Wildish, & Gichuru, 2010). Furthermore, pooled results for both girls and boys found significant effects on condom use at last sex (OR=1.36, 95% CI=1.12-1.65) (Sani et al., 2016).

The HP4RY intervention found statistically significant effects on condom use at last sex for first-year junior secondary school males (Arnold et al., 2012), and aggregates of results for all classes and genders of participants that received both school and community components of the intervention (OR=1.37, CI=1.14-1.64) (Sani et al., 2016).

The HealthWise found significant effects for risk at last sex including increased condom use ($\beta=-0.16$, SE=0.08, $p<0.05$) (Tibbits, Smith, Caldwell, & Flisher, 2011).

By contrast, the RDSP found no statistical significant effects on condom use (OR=1.01, 95% CI= 0.86-1.19) or STIs including HIV (Cowan et al., 2010; Sani et al., 2016). Similarly, the SATZ found no statistically significant effects on condom use (OR=0.85, 95% CI=0.58-1.25) (Mathews et al., 2012; Sani et al., 2016). When compared to the control group, the SBRHE intervention group also showed no statistically

significant effects on condom use (OR=1.34, CI=0.46-3.87) (Ajuwon & Brieger, 2007; Sani et al., 2016).

4.3.3: Data collection

Two types of data were synthesised; project documents and interviews with researchers involved in the cases. Documents were identified from electronic databases and contacts with authors for unidentified or unpublished project documents. There was variation in types and number of project documents identified across the seven cases with only two (a journal article and a thesis chapter) for SBRHE and more than 30 for MkV. Interviews were conducted between May and November 2016, and at least one interview was conducted for each case depending on the availability of the researchers. See Table 4.2 for overview of documents identified and number of interviews conducted. List of the documents for all the cases is available as an appendix (Appendix 4.1).

Prior to the interviews, documents were analysed, and summary of the analyses were presented to researchers with requests to provide any missing information and to endorse, clarify or correct initial findings. These together with the researchers' opinions on factors associated with effectiveness or ineffectiveness of their interventions were discussed during the interviews. Interviews were semi-structured, conducted face-to-face or via Skype, audio-recorded and transcribed verbatim. An interview topic guide that is available as Appendix 4.2 guided the interviews.

Table 4. 2: Project documents identified and number of interviews conducted

Case	Documents	Interviews
PSABH	5 Published Journal Articles, 1 Project Documents, 1 School Health Activity Guide, 1 Training Manual, 5 Newsletters, 2 Poems/Songs, 3 Posters, 3 Unpublished Articles	1
HP4RY	7 Published Journal Articles, 2 Projects Reports, 1 PowerPoint slide, 1 School Curriculum	1
SBRHE	1 Published Journal Article, 1 Thesis Chapter	1
HealthWise	10 Published Journal Articles	3
SATZ	8 Published Journal Articles, 1 Project Proposal, 3 Students' Workbooks, 4 Teachers' Manuals	4
MkV	30 Published Journal Articles, 8 Books/Chapters, 4 Policy Briefing Papers	4
RDSP	4 Published Journal Articles	1

4.3.4: Data analysis

Each intervention was regarded as one case with all documents and interviews from that case analysed collectively so that the case, not the associated documents or interviews, was the unit of analysis. Analyses were completed in four iterative stages using a combination of four analytic techniques proposed by Yin (2014) and Hak & Dul (2010b), that

is, 'Pattern Matching', 'Explanation Building', 'Replication Logic', and 'Cross Case Synthesis'.

First, Pattern Matching (Yin, 2014) "*compares an empirically based pattern that is based on the findings from your case study-with a predicted one made before you collected your data*" (p. 143). An Analysis Framework was developed to identify key findings, as well as intervention and study characteristics. The framework was based on recommendations of previous reviews that identified features associated with effective design, implementation and evaluation of school-based, sexual health interventions or health-promoting schools. In particular, we drew upon recommendations based on a comprehensive review of adolescents' sexual health interventions (Kirby et al., 2006) and a subsequent review of reviews of school-based sexual health interventions worldwide (Denford et al., 2016) as well as reviews of school-based sexual health interventions in Africa (Gallant & Maticka-Tyndale, 2004; Kaaya et al., 2002; Paul-Ebhohimhen et al., 2008; Sani et al., 2016), a realist review of implementation in health promoting schools (Pearson et al., 2015) as well as a review of evaluations in health promoting schools (Mūkoma & Flisher, 2004). Kirby et al. (2006) is one of the most widely cited reviews of such interventions, which was extended and updated by Denford et al. (2016). Gallant and Maticka-Tyndale (2004), Kaaya et al. (2002), Paul-Ebhohimhen et al. (2008), and Sani et al. (2016) report reviews focusing on school-based sexual health education interventions in sub-Saharan Africa while Mūkoma and Flisher (2004) and Pearson et al. (2015) report evidence synthesis studies based on evaluations and implementations of health promotion interventions in schools, more generally. The Analysis Framework consists of 35 recommendations identified across these reviews.

Intervention Mapping is a protocol widely used in planning health promotion interventions including school-based, sexual health programmes. This protocol sets out sequential stages of intervention

development and evaluation. Each recommendation included in our analysis framework was ascribed to one of the six steps of the Intervention Mapping protocol (Eldredge, Markham, Kok, Ruiters, & Parcel, 2016). Table 4.3 presents the final Analysis Framework. The recommendations in the framework were 'predicted patterns' that served as point of comparison with findings from documents and interviews. The documents and interviews, were read to identify implementation or absence of these recommendations following the principles of Pattern Matching (Yin, 2014). Initially, each source (documents and interviews) were imported into Nvivo 10 qualitative software to facilitate coding. The six stages of Intervention Mapping were used to identify each part of the source and then followed by line by line coding to identify implementation of each of the 35 recommendations in the framework.

Table 4. 3: Analysis framework

<p>Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)</p>
<p>1. Needs and asset assessment of the target participants (Denford et al., 2016; Kirby et al., 2006; Sani et al., 2016): This may involve review of survey data (STI/HIV data, pregnancy data, adolescent sexual behaviour data etc.). Focus groups or interviews with adolescents and adults working in areas of reproductive health may also be conducted. This would provide information on prevalence of sexual behaviours and factors affecting those behaviours in the population.</p>
<p>Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change</p>
<p>2. Concentrate on clear health goals (Kirby et al., 2006) or tactically communicate aim as health goals to avoid unending debate on the legitimacy of the intervention (Paul-Ebhohimhen et al., 2008): The aim of the curriculum should address at least one of these reproductive health goals; prevention of STI, prevention of HIV and/or pregnancy.</p> <p>3. Focused on specific behaviours that would lead to health goals (Kirby et al., 2006) and specify multiple measurable behavioural targets/outcomes (Denford et al., 2016): This involves selecting a specific behaviour that lead to the health goal(s) above and giving specific information on what might lead to it and how to avoid it. Specific behaviours that would lead to STI/HIV prevention for example include; abstinence, reduced frequency of sex, reduced number of partners, condom use, STI testing and treatment, HIV testing and treatment.</p> <p>4. It used a logic model approach (Denford et al., 2016; Kirby et al., 2006) or theory-based (Gallant & Maticka-Tyndale, 2004; Kaaya et al., 2002; Sani et al., 2016): The use of model that clearly shows links between the health goal(s), behaviours, determinants of the behaviours and intervention activities that would lead to desired change in the determinants. Some developers may not use a formal model but a discussion on the four components of a logic model (goals, behaviours, determinants, activities) is enough to suggest it was used.</p>
<p>Intervention Mapping Step 3: Programme Design: Identifying regulatory processes that maintain current behaviour and developing effective change techniques that are theory-based and practical to modify the behaviours: intervention is likely to be successful if;</p>
<p>5. Intervention identifies and addresses multiple risks factors that can lead to behaviours (Denford et al., 2016; Kirby et al., 2006): Effective programme identify psychosocial risk and protective</p>

factors, and develop activities to address them. Effective curriculum addresses one or more of the following factors: Knowledge including methods of prevention of STIs, HIV and pregnancy; perception of STI/HIV risks; personal norms about sex and abstinence; attitudes and perceived barriers towards condom use; perception of peer norms about sex and sexual behaviours; self-efficacy to use condom, refuse sex, avoid STI/HIV risk; intention to avoid sex, use condom, reduce number of partners and reduce frequency of sex; communication about sex, condoms and contraception with parents and other adults; avoidance of places and conditions that may lead to sex etc.

6. Activities are designed to be consistent with community values and available resources (Denford et al., 2016; Gallant & Maticka-Tyndale, 2004; Kirby et al., 2006). Community norms may include beliefs about sex, condom use or abstinence. Organizational capacity may include teachers' skills, time, equipment or funding.
7. Activities employed are appropriate to youth's developmental age and sexual experience (Denford et al., 2016; Kirby et al., 2006).
8. Adopting from previous effective programmes, where appropriate (Sani et al., 2016).

Intervention Mapping Step 4: Programme production: intervention is more likely to be effective if;

9. It involved key stakeholders (Denford et al., 2016; Kirby et al., 2006; Paul-Ebhohimhen et al., 2008; Sani et al., 2016) and negotiated content where necessary (Pearson et al., 2015). People from different backgrounds and expertise particularly in areas of behaviour change theory, adolescent and young adults' sexual behaviour, STI/HIV education, intervention design and evaluation, and cultural norms.
10. It involved multiple activities matching specified mechanism with behaviour change techniques (Denford et al., 2016; Kirby et al., 2006). Effective intervention include multiple activities to address each of the factors mentioned in (5) above.
11. It employed multiple teaching methods that address each factors, make youth personalise the information and employed teaching methods aiming to change the target risks (Denford et al., 2016; Kirby et al., 2006). Effective intervention includes a combination of activities appropriate in the community that involve the youth and help them personalise the information. These activities may include short lectures, class discussion, small group works, role plays, stories, condom demonstrations, problem-solving activities etc.
12. It does not include abstinence only content (Denford et al., 2016).
13. It includes education to increase HIV/STI knowledge (Denford et al., 2016).
14. It includes attitudinal and motivational arguments that encourage positive outcomes e.g., HIV testing (Denford et al., 2016; Kaaya et al., 2002).

15. It includes behavioural skills training for condom use including ability to get and use condoms (Denford et al., 2016; Kaaya et al., 2002; Paul-Ebhohimhen et al., 2008; Sani et al., 2016).
16. It includes negotiation skills training for condom targeting condom communication and use (Denford et al., 2016).
17. It does not induce HIV/STI fear (Denford et al., 2016).
18. Topics and activities are covered in a logical sequence (first, basic information on HIV/STI/Pregnancy, followed by discussion of behaviours to reduce vulnerability/knowledge, values, attitudes, barriers, and finally provide protective skills) (Denford et al., 2016; Kirby et al., 2006)
19. It includes school-based or school linked adolescent-friendly health centres (Denford et al., 2016; Sani et al., 2016).
20. It involves community activities outside school environment (Sani et al., 2016).
21. It is of adequate intensity and duration (Denford et al., 2016; Paul-Ebhohimhen et al., 2008).

Intervention Mapping Step 5: Programme Implementation Plan: this is likely to be successful if it involves;

22. Pre-delivery consultation with school staff and parents (Pearson et al., 2015).
23. Secured at least some support from appropriate authorities such as ministries of health and education, school authorities and community leaders (Denford et al., 2016; Kirby et al., 2006; Pearson et al., 2015).
24. Piloting the programme (Denford et al., 2016; Kirby et al., 2006) to test the feasibility of the programme and make necessary adjustments before formal implementation.
25. Policy and institutional anchoring (Pearson et al., 2015). Inclusion of the programme into school policy documents and aligning the goals of the intervention to the overall goal of the school is necessary for successful implementation.
26. Training of educators, and providing monitoring supervision and support (Gallant & Maticka-Tyndale, 2004; Kirby et al., 2006; Sani et al., 2016): Selecting educators particularly those with background in health education and having plan in place to monitor, supervise and support them.
27. Trained educators as facilitators instead of peers for peer-led interventions (Denford et al., 2016; Paul-Ebhohimhen et al., 2008).
28. Students' engagement to ensure programme is appealing to them as well as stretching their understanding of health issues that may be beyond their experience (Pearson et al., 2015).
29. Teachers and students should feel a benefit from participating in the programme e.g., transferrable skills (Pearson et al., 2015)
30. Leadership (Pearson et al., 2015): appointment of project co-ordinator, leader or co-ordination team to ensure successful implementation.

31. Implementation of all activities as planned (fidelity) (Denford et al., 2016; Kirby et al., 2006; Sani et al., 2016).
Intervention Mapping Step 6: Evaluation Plan
32. Multiple methods (Mūkoma & Flisher, 2004): Quantitative and qualitative methods of evaluation that evaluate processes and outcomes should be employed.
33. Short-and-long term outcomes including health outcomes (Denford et al., 2016; Kaaya et al., 2002) and contextual outcomes should be measured (Mūkoma & Flisher, 2004).
34. Combination of people directly involved in the programme (e.g., Students, teachers and parents) together with an external evaluators in evaluation (Mūkoma & Flisher, 2004).
35. Long-term implementation and evaluation is necessary to detect long-term outcome (Mūkoma & Flisher, 2004).

The frequency of implementation of the recommendations in each case was noted. Complete implementation was indicated by score of 1.0, partial implementation by a score of 0.5 and a score of zero was allocated when the recommendation was absent. As checking of implementation of recommendations proceeded, cases were compared with one another to check for if findings were repeated across the seven cases. This was facilitated by displaying findings of all the cases in spreadsheets that are available as appendices (Appendices 4.3a-f). This comparison of findings across cases has been referred to as “Replication Logic” (Hak & Dul, 2010b). Finally, conclusions were made by synthesising findings across the seven cases by highlighting the salient features that differentiate the ‘effective’ from ‘ineffective’ interventions; a technique referred to as “Cross Case Synthesis” (Yin, 2014).

In addition to checking for implementation of each recommendation across all cases, a narrative explanation of ‘why’ or ‘how’ cases were effective or ineffective based on findings from the documents and opinions of researchers involved in the case was developed. This technique is known as Explanation Building (Yin, 2014) and allowed us to make sense of the recommendation scoring patterns.

4.3.5: Ethical considerations

The first three authors' institution granted ethical approval for this study. Informed consent for interviews and publication of anonymised data was obtained from each participant.

4.4: Results

The recommendations implemented by each case are presented in Table 4.4. Unsurprisingly, the four effective interventions implemented more of the Intervention Mapping recommendations from the Analysis Framework than the ineffective interventions. MkV scored 33.5 scores out of 35. The HealthWise and PSABH both scored 31 and HP4RY scored of 28.5 among the effective cases. The ineffective interventions implemented fewer recommendations but there was no marked discontinuity between the two sets with the RDSP and SATZ interventions scoring 27.5 and 28.5, respectively. By contrast, SBRHE scored only 20 points. The scoring patterns across cases and their meaning is explained below using the Intervention Mapping steps to structure our consideration of differences in the seven intervention teams' design, implementation and evaluation of their intervention.

Table 4. 4: Implementation of recommendations across cases

Case	Recommendations Implemented	Total Score (out of 35)
PSABH	1-14, 15*, 17, 18, 20-27, 28*, 29, 30, 31*, 32, 33*, 34, 35.	31
HP4RY	1-7, 9, 10-16, 17*, 18, 19*, 20-23, 25-27, 28*, 30, 31, 32*, 33*, 34.	28.5
MkV	1-14, 15*, 16*, 17-27, 28*, 29-35.	33.5
HealthWise	1-21, 22*, 23-25, 26*, 27, 28*, 30, 31*, 32, 33*, 34*, 35.	31
SATZ	1-7, 9, 10*, 11-18, 19*, 20*, 22*, 23*, 24-27, 28*, 30-32, 33*, 34*, 35*.	27.5
RDSP	1-5, 7-14, 15*, 16*, 17-24, 26, 27, 28*, 31*, 32, 33, 34*, 35,	28.5
SBRHE	1, 3-5, 7, 10*, 11-14, 17, 21, 22, 23*, 26, 27, 28*, 29, 30, 32, 33*, 34*, 35*.	20

*features partially implemented

Intervention Mapping Step 1: Needs Assessment

As recommended in the Intervention Mapping protocol, all cases reported that formative work was undertaken to inform intervention development. This could include reviews of adolescent sexual health data, review of previous adolescent reproductive health interventions and interviews with relevant stakeholders including young people (Recommendation 1). However, two of the effective interventions (PSABH and HP4RY), in addition, identified sexual scripts that precede young people's sexual encounters during the needs assessment, which informed their development. This was emphasised as a factor that could explain success of the PSABH intervention in interviews: *“The sexual scripts threw light onto issues of expectations during dating, the economic context around sex, the complicity of families in early sex and the inability of both genders*

to create alternative dialogues and outcomes around dating and sex. This enabled the programme to engage at a very honest level with the risk environment faced by young people. Following the sexual scripts we were able to include material that addressed the actual scenarios that young people had described” (Participant [P.] PSABH).

Ethnographies were also conducted as part of the needs assessment in HP4RY, which helped in identifying cultural vulnerabilities to HIV infection addressed in the programme. Furthermore, the usefulness of ethnographies in identifying young people’s sexual behaviours was highlighted in MkV because of secrecy surrounding sexual relationships in sub-Saharan Africa. Overall, then, culturally-relevant ethnography, and development and application of sexual scripts prior to intervention design may improve effectiveness of school-based sexual health interventions in sub-Saharan Africa.

Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change

All the cases included in this study, except SBRHE, clearly specified aims to include one of the following aims: prevention of STIs, prevention of HIV and/or pregnancy prevention, as recommended in the Analysis Framework (Recommendation 2). So defining objectives did not differentiate between effective and ineffective interventions.

In addition, to the behaviour patterns directly associated with sexual health (e.g., abstinence, reduced number of sexual partners, condom use etc.) (Recommendation 3), some of the effective interventions targeted other behaviours. These included: communication with parents and teachers about sexuality and HIV/AIDs (PSABH); helping students to assists each other in avoiding sex (PSABH); gender roles, cultural beliefs and dominant traditions that influence sexuality (HP4RY); and substance

use and productive use of leisure or free time (HealthWise). This pattern may suggest that targeting the wider cultural determinants of sexual health, rather than sexual behaviour alone, is important to the effectiveness of school-based intervention. However, the RDSP intervention, which was ineffective, also addressed self-awareness, communication and gender issues so wider targeting is not a guarantee of success.

All the cases used a logic model and/or behaviour change theory to inform programme design and evaluation (Recommendation 4). However, three of the four 'effective' interventions (PSABH, HP4RY, HealthWise) used theories set within ecological models that accounted for interpersonal and environmental factors. This was emphasised during interviews: *"Given the sexual context of HIV infection, we knew we had to work with the communities as well as the schools and parents. Bandura's theory set within an ecological framework seemed the best model to explain our expectations, as opposed to models such as Health Belief Models or other Learning Models which tended to focus on the individual and their ability to manage their behaviour in isolation from community norms and influences."* (P. PSABH). Therefore, theoretical models set within ecological frameworks as theoretical underpinning school-based sexual health education interventions in sub-Saharan Africa may be optimal to developing helpful logic models.

Intervention Mapping Step 3: Programme Design

Interventions that identified and addressed multiple psychosocial risks factors, such as beliefs likely to promote risky sexual practices, seemed to be more likely to be effective (Recommendation 5). Evidence of this was seen in three of the effective cases (PSABH, HP4RY and HealthWise) and, moreover, the MkV intervention was found to have limited effectiveness on biomedical markers, in part due to failure to address some of these factors. Hence, the importance of addressing psychosocial

risk factors in school-based sexual health education can be emphasised. Psychosocial risk factors identified across cases could be classified into:

- a. Cultural beliefs and practices: these include taboos around adult-child sex communication (PSABH, HP4RY, RDSP) and showing affection in sexual relationships (PSABH, HP4RY, HealthWise). Misinformation/lack of information on HIV/AIDS (PSABH), HIV perceived as 'not real' and associated with witchcraft 'night disease' (HP4RY, MkV), and the belief that abstaining from sex will lead to accumulation of sperm with consequent health consequences like abdominal cramps (SBRHE), and sex as food for the vagina or penis (HP4RY). Contradictory beliefs around sexuality and condoms (PSABH, MkV) including the idea that condoms do not fit well and hence, get stuck in the vagina (HP4RY), and that pregnancy cannot occur after having sex once. Similarly, the belief that blood will run in the head (madness) if one do not engage in sex, or that people who do not have sexual relations are abnormal. Misleading preventive beliefs included the idea that consuming certain soft drinks can prevent pregnancy and STIs, that lying on one's abdomen after sexual intercourse can prevent pregnancy and that oral contraception can protect from STIs (SATZ). Additionally, the low status of young people in communities was seen as a cultural barrier to effective interventions that target young people (MkV).
- b. Economic pressures: these include exchanging sex for favours (gifts, money, grades) (PSABH, HP4RY, MkV, RDSP) and economic dependence of women on men (MkV). Teenage pregnancy is sometimes seen as a misfortune for the young woman and her family due to increase financial burden and ruining of future marriage prospects or on the other hand, as triumph because it proves fertility and provides economic gain if the father is wealthy (HP4RY). Family complicity in early sex (PSABH), including parental pressures to engage in sex for material favours (SBRHE).

- c. Gender roles: These include peer pressure to engage in sex especially for young women (SBRHE, HealthWise), and peer stigmatisation of sexually inexperienced young men and young men who insist on condom use (HealthWise). Sex was also seen as rite of passage into adulthood for young men (HP4RY).

Both the effective and ineffective interventions except SBRHE were said to be designed to be sustainable within available resources (e.g., local infrastructures, school capacity) and community values (Recommendation 6). Therefore, while such sustainable development is crucial to long-term implementation with fidelity, these considerations did not differentiate between effective and ineffective interventions included here.

Evidence of consideration of the developmental age of participants and sexual experience when designing interventions (Recommendation 7) was found in three of the effective interventions (PSABH, HP4RY, HealthWise) and was absent in one of the ineffective interventions (RDSP). This was also emphasised in interviews: *“There are those who have never had sex, there are those who have had sex, so we made sure that the message fitted into whatever situation the students find themselves. For those who have had sex we said ‘Well, it is okay, you can still practise secondary abstinence.’”* (P. SBRHE.). Similarly, three of the effective interventions (PSABH, MkV, HealthWise) and one of the ineffective interventions (RDSP) adopted their curricula from previous successful programmes (Recommendation 8).

Intervention Mapping Step 4: Programme production

The four effective interventions and two of the ineffective interventions (SATZ and RDSP) involved wide ranges of stakeholders with different expertise in behaviour change theory, young people’s sexual behaviours, STI/HIV education, school curriculum development, intervention design

and evaluation, and cultural norms as recommended in the framework (Recommendation 9). The importance of this multidisciplinary approach was also emphasised during interviews: *“I really think it helps strengthen any intervention if it is a multi-disciplinary effort.”* (P. HealthWise). Fewer stakeholders were involved in one of the ineffective interventions (SBRHE).

Both the effective and ineffective interventions employed multiple activities and teaching methods (Recommendation 11). However, only the effective interventions (PSABH, MkV, HealthWise, HP4RY) explicitly matched specified activities with change techniques (Recommendation 10). For instance, in HP4RY, knowledge and awareness were provided through seminars, group presentations, drama, poems and songs. Critical thinking to change local beliefs and normative beliefs that negatively affect sexual behaviours were addressed using drama, debate and moonlight dance.

Both effective and ineffective interventions curricula were not abstinence-only (Recommendation 12), addressed education to increase HIV/STI knowledge (Recommendation 13) and did not induce HIV/STI fear (Recommendation 17). Three of the effective interventions (HP4RY, MkV, HealthWise) and two of the ineffective interventions (SATZ, RDSP) included behavioural skills training (e.g., how to get and use condoms) and negotiation skills training on communication on condom use (Recommendations 15 and 16, respectively). Evidence of such training were not found in PSABH and SBRHE. The curricula of all the interventions, except SBRHE, included attitudinal and motivational arguments that encourage positive outcomes e.g., early diagnosis and treatment of STI/HIV (Recommendation 14) and arranged topics in a logical sequence (Recommendation 18). Finally, lessons or topics in the curricula were spread over the period of two to three years in the effective interventions while in the ineffective interventions, they were delivered in less than one year (Recommendation 21). Overall then, while

recommendations 12 to 18 are undoubtedly important to effective intervention design, evidence from this study, did not demonstrate that implementation of these recommendations differentiated between effective and ineffective school-based, HIV-preventive interventions delivered in sub-Saharan Africa.

Two effective (MkV, HealthWise) and one ineffective (RDSP) intervention included school-based or school-linked adolescent-friendly health centres (Recommendation 19). Similarly, the HP4RY worked with community patent medicine stores to ensure provision of condoms. All the four effective cases provided interventions beyond school environment and/or activities in the community to improve young people's sexual health (Recommendation 20). The PSABH intervention mobilised communities so that they would not create barriers to implementation and introduced educational activities to local festivals. The HP4RY intervention had community activities targeting out of school students, parents, older residents and elders. The MkV intervention had three other components including community mobilisations to encourage acceptance of the programme by parents and other community members; provision of adolescent-friendly health services; and social marketing and distribution of condoms. The HealthWise intervention provided students with information on where to get additional sexual health information in their communities and where to do recreational activities. The RDSP intervention on the other hand, had a community component but the school component was implemented only in the first year of the programme because of political barriers: *"we only worked in schools for the first year and it came out of school. It was not in school for very much of the time"* (P. RDSP). This may imply that extensive and integrated intervention targeting both schools and the communities in which they operate is likely to optimise effectiveness.

Intervention Mapping Step 5: Programme Implementation Plan

In three of the effective interventions (PSABH, HP4RY, MkV) and two of the ineffective interventions (RDSP, SBRHE) pre-delivery consultations with school staff and parents were important to successful implementation (Recommendation 22). This was emphasised on interviews: *“I would say community support for the intervention despite the fact that it dealt with very difficult topics of sexuality with upper primary school children. This was not something that parents, religious leaders, communities, teachers are really keen on, but there was enthusiasm among the teachers, parents, religious leaders, among everyone and this became an intervention that was owned by communities and I think that was what contributed to its success more than precisely than what was taught”* (P. PSABH).

All cases received some support from appropriate school authorities for the interventions as recommend in the framework (Recommendation 23). This was emphasised as key to successful implementation during interviews: *“we have got a lot of teachers’ buy in and principal support, I think those were the critical issues that the teachers were very enthusiastic about the programme”* (P. HealthWise). Similarly, all the interventions, except HP4RY, were pilot tested (recommendation 24). All of the effective and one of the ineffective interventions (SATZ) were delivered into existing curricula that were already present in school policy (Recommendation 25). The importance of this was also emphasised during interviews: *“implementation is much easier if you can embed an intervention into the school programme, and make it an examinable topic, so that it is taken seriously by both the teachers and the students, and design it well”* (P. MkV).

All the cases provided training and some support to their facilitators (Recommendation 26) so this did not differentiate between the effective and ineffective interventions. Similarly, it was not possible to judge

whether interventions delivered by trained adult educators were more effective than peer educators (Recommendation 27), because none of the interventions was peer-led. However, three of the effective cases (PSABH, HP4RH, MkV) were delivered by teachers with some support of peers or young people that served as peers. The importance of the synergy between teachers and peer educators was highlighted in the SBRHE case, where the most positive effects were observed in schools with the combination of facilitators. *“And of course our results show that it is better you have an intervention where the teachers and the peer educators work in synergy and the results show that is the best form of intervention”* (P. SBRHE).

In all the cases, activities appealing to the students were employed to enhance engagement (Recommendation 28). In two of the ‘effective’ interventions (PSABH, MkV) and one ‘ineffective’ (SBRHE), teachers felt personal benefits of developing their skills from participating in the programmes (recommendation 29). All the effective and two of the ineffective interventions (SATZ, SBRHE) had some form of leader(s) who oversaw activities during implementation (Recommendation 30). Finally, fidelity of implementation (Recommendation 31) varied among schools with programmes largely implemented as intended in one effective (MkV) and one ineffective (SATZ) intervention. Thus fidelity of implementation is likely to be a criterion of effectiveness when the intervention is optimal but may matter less with sub-optimal interventions, including those that are limited in ecological scope.

Intervention Mapping Step 6: Evaluation Plan

All the cases were evaluated using multiple methods utilising both quantitative and qualitative data (Recommendation 31) and participants emphasised the importance of using mixed methods in evaluation: *“There was huge advantage to using both quantitative and qualitative approaches in the evaluations. I would like to emphasise the importance of the*

process evaluation because we were able to modify the intervention and improve it as we went along” (P. MkV).

All the cases measured short- and long-term behavioural outcomes (Recommendation 33) but only one effective (MkV) and one ineffective (RSDP) intervention measured STIs/or pregnancy. Similarly, all the cases involved teachers and students in their evaluation, but only two effective interventions (MkV, PSABH) employed external or independent evaluators (Recommendation 34). All the ‘effective’ interventions were implemented and evaluated over a long time period (more than 2 years) (Recommendation 35). However, the three ‘ineffective’ interventions were implemented and/or evaluated for less than one year (school component of RDSP, SATZ, SBRHE).

4.5: Discussion

This study identified factors that may be associated with effective development, implementation and evaluation of school-based sexual health interventions based on evidence from seven interventions implemented and evaluated in five sub-Saharan African countries. An in-depth multiple case study was conducted utilising data from published and unpublished projects documents as well as discussions with investigators about factors associated with effectiveness or ineffectiveness of their interventions. An Analysis Framework comprising 35 recommendations from evidence synthesis studies provided the bases for the analyses. This provided a robust scrutiny of the inclusion or exclusion of recommended intervention and evaluation features across seven unique interventions, each with broadly the same behaviour change aim. In addition to confirming the usefulness of the 35 recommendations in improving interventions, six key features that may be associated with effectiveness were identified, namely:

- 1) Ethnography of young people sexual behaviours and other contextual factors that influence such behaviours, and development of sexual scripts during needs assessment;
- 2) Theoretical models set within ecological frameworks that address environmental and psychosocial risks factors as theoretical underpinning interventions;
- 3) Matching intervention activities with change techniques;
- 4) School- and community-based approach;
- 5) Combination of teachers and peers as facilitators; and
- 6) Duration of implementation and evaluation.

In sub-Saharan Africa, there is little open communication about adolescents' sexual relationships and such communication is often seen as a taboo (Bastien, Kajula, & Muhwezi, 2011). This may mean that young people do not openly report their sexual activities for fear of disapproval, so limiting the capacity of surveys and interviews to elicit real-world sexual behaviour patterns and antecedents. Therefore, sexual health needs assessment may be improved by including ethnography, especially if conducted by young people where the observers live over time in the targeted communities. In addition, Sexual Scripts research conducted as part of needs assessment can better specify situations and activities that lead to sexual encounters. Sexuality research using 'scripts' suggests that sexual activities occur in a given sequence (Frith & Kitzinger, 2001). This can identify context-specific points for intervention and effective ways to derail risky scripts and, thereby, improve effectiveness of school-based sexual health interventions.

Perhaps particularly, but not exclusively, in sub-Saharan Africa, young people's sexual decisions are culturally shaped and collective rather than individual and independent so that external influences (e.g., peer and

community pressures) may be especially important (Wood & Roller, 2014). This, together with other environmental influences, renders an ecological approach most appropriate. Ecological modelling characterises individual behaviour patterns contextualised within their social environment addressing personal, interpersonal, organisational, community and public policy factors that maintain and support undesired behaviours (McLeroy, Bibeau, Steckler, & Glanz, 1988). Moreover, within this approach the more comprehensive the targeting of psychosocial risks factors the more effective the intervention is likely to be. These include cultural beliefs and practices, economic pressures and gender roles.

The importance of external influences on young people sexual health outcomes in sub-Saharan Africa was further emphasised by the finding that interventions including community activities (in addition to school curricula) were more effective. Interventions with school- and community-based components were found to have the largest impact on HIV risky behaviours in low- and middle-income countries (Fonner, Armstrong, Kennedy, O'Reilly, & Sweat, 2014). Community-based components include intervention activities beyond school environment such as adolescent-friendly health services, condom provision, community mobilisation for programme support and activities targeting out of school young people and parents.

While all interventions studied here used logic models to identify modifiable determinants of targeted behaviour patterns and employed multiple activities and teaching methods (as recommended), only the effective interventions provided evidence of matching change techniques included in intervention activities to logic models developed during the design stage. This suggests that more precise linking of mechanisms of change identified in logic models to specific change techniques within interventions may optimise effectiveness.

School-based sexual health interventions delivered by teachers in synergy with peer educators are more likely to be successful than teachers-only. The only evaluation among the cases that compared the relative effectiveness of teacher-and-peers delivery to teachers or peers-only concluded that teachers and student peer educators can reinforce and complement one another and, thereby, enhance effectiveness. The two groups can develop a sense of partnership and accountability whereby each challenge the other to perform well in their roles (Ajuwon & Brieger, 2007).

Finally, it is worth emphasising that school-based sexual health education interventions were more effective when implemented and evaluated for at least two academic sessions or years. A longer intervention duration is likely to reach more students and to facilitate repeated exposure for individual participants. All the effective interventions in this study were implemented as on-going curricula so, if effective and sustainable, could have long-term impact. These observations are consistent with the evidence that successful maintenance of behaviour change, more generally requires longer term intervention. For example, physical activity and/or dietary interventions have been found to be more effective in promoting maintenance of behaviour change if implemented for more than 24 weeks (Fjeldsoe, Neuhaus, Winkler, & Eakin, 2011).

This multi-case review has a number of limitations that should be considered when applying our findings. First, the classification of the cases into 'effective' and 'ineffective' would have been more robust if other outcomes, in addition to self-reported condom use were considered. We did not find enough cases evaluated in terms of biological outcomes to employ such outcomes (Sani et al., 2016). Nonetheless, condom use is a good indicator for sexual behaviour in the absence of more objective biomarkers, and it has been shown to be strongly associated with reduce STI incidence (Shew et al., 1997). Second, all the seven cases were

implemented in only five sub-Saharan African countries, which challenges our claim to generalise to the subcontinent. However, considering the richness of the cases in terms size and strategic locations (West Africa, East Africa and Southern Africa), it could be argued that insights from these cases are relevant more widely than these five countries. Third, one of the authors (CM) was an investigator on one of the case (SATZ), which could have introduced bias but, we were mindful of this and none of the other three authors was involved in any of the cases. Fourth, some of the cases were implemented sometime ago and therefore, responses from the investigator may be subject to recall bias. However, triangulation of data from multiple sources (documents and interviews) will have enhanced the validity of our findings. Furthermore, having investigators to validate findings from analyses of documents of their cases also adds credibility to the results.

4.6: Conclusions

School-based sexual health education is an essential tool for improving young people sexual health and is cost-effective in preventing STI/HIV if implemented in combination with other approaches (Hogan, Baltussen, Hayashi, Lauer, & Salomon, 2005). The effectiveness of such interventions could be improved in sub-Saharan Africa if designers and implementers consider a series of research-based recommendations, and pay particular attention to the recommendations differentiating effective and ineffective interventions reviewed here. This study advanced our understanding of the range of design, implementation and evaluation characteristics that can and should be considered when designing such interventions. Our results show that more effective interventions can be distinguished from less effective ones in relation to inclusion/exclusion of specific design, implementation and evaluation features, so recommending careful inclusion of such features in future intervention design.

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Chapter 5: Design, implementation and evaluation of school-based sexual health education in sub-Saharan Africa: A qualitative study of researchers' perspectives

5.1: Abstract

We investigated facilitators and challenges to designing, implementing and evaluating school-based sexual health education in sub-Saharan Africa, through interviews with intervention designers and researchers. At pre-planning and planning stages, participants reported that facilitating factors included addressing reproductive health needs of participants, contextual (culture, religion, economic and social) considerations, and adoption of holistic approach to sexuality education. Lack of open communication on sexual health matters between young people and adults; concerns that sexual health education could encourage sexual activity; and inadequate funding, were key barriers. Implementation was facilitated by involvement of relevant stakeholders, training of facilitators and adopting strategies to overcome resistance to sexual health education. Provision of structured, detailed lessons plans and monitoring with supportive supervision optimised fidelity of delivery. Barriers to implementation were facilitators' resistance to teaching safe sex promotion and logistical challenges in school environments. Participants also noted that validity of self-reported adolescent sexual behaviour (during evaluation) may be improved by complimenting well-designed self-report surveys with computerised audio devices for data collection, qualitative interviews and participant observations. This investigation extends previous work by generating a set of valuable recommendations based on researchers' experience that could improve future interventions in sub-Saharan Africa.

5.2: Introduction

Young adults in sub-Saharan Africa (sSA) have poor sexual and reproductive health (Snow, Laura, and Massy 2015), with a high prevalence of sexually transmitted infections (STIs) (Gottlieb et al. 2014), including Human Immunodeficiency Virus (HIV), and unplanned pregnancies. According to the United Nations Programme on HIV and AIDS (UNAIDS), young people aged 15-24 accounted for 37% of all new HIV infections in the region in 2015 (UNAIDS 2016). Thus, there is an urgent need for effective intervention.

We will use the term 'school-based sexual health education' (SBSHE) to refer to interventions or programmes delivered in or linked-to schools to promote young adults sexual health and relationships by reducing risky sexual behaviour. Such interventions have the potential to reach the majority of young people and, if effective, improve sexual health and well-being. Research has demonstrated the effectiveness of SBSHE interventions in improving sexual health knowledge, attitudes, behavioural intentions, and safer behaviours in sSA (Sani et al. 2016, Gallant and Maticka-Tyndale 2004, Paul-Ebhohimhen, Poobalan, and Teijlingen 2008). However, effects on biomarkers including STIs/HIV infections and unintended pregnancy are, at best, weak (Sani et al. 2016, Mason-Jones et al. 2016).

The limited effectiveness of SBSHE on biomarkers may be, in part, due to limitations in curricula content, implementation and overarching environmental and cultural factors that shape sexual relationships and sexual behaviour in sSA. It may also be due to the design of evaluations of such programmes (Michielsen et al. 2010, Vanwesenbeeck et al. 2015, Wight, Plummer, and Ross 2012) coupled with the fact that biomarkers are relatively rare in school going young people and would need higher numbers with long term follow-up. However, effectiveness of such

interventions could be improved if challenges of implementation could be overcome (Wood and Rolleri 2014, Harrison et al. 2010). Unfortunately, very few evaluations of SBSHE interventions in sSA (Vanwesenbeeck et al. 2015, Wight, Plummer, and Ross 2012, Ahmed et al. 2006, Renju et al. 2011, Mukoma et al. 2009, Renju et al. 2010, Rijdsdijk et al. 2014, Karnell et al. 2006, Shamagonam et al. 2006, Plummer et al. 2007) report processes of implementation, so it is often unclear which factors facilitated or inhibited the implementation and evaluation.

The present study

Researchers have first-hand knowledge of factors that contributed to success or failure of their interventions. Their recommendations can, therefore, be applied to improving future interventions. Our aim was to elucidate what design, implementation and evaluation factors limit the effectiveness of SBSHE interventions in sSA. To do so, we interviewed researchers with experience of designing, implementing or evaluating SBSHE interventions in sSA. Interviews explored how SBSHE interventions in sSA could be improved and generated a series of recommendations for future work.

5.3: Methods

5.3.1: Design and recruitment

We conducted a qualitative study using semi-structured interviews. We used purposive sampling (Strauss and Corbin 1998) to recruit researchers who have published reports of at least one evaluated SBSHE intervention in sSA. We identified potential researchers using a recent systematic review of SBSHE interventions in sSA (Sani et al. 2016). All authors of SBSHE interventions in sSA included in, or excluded from, this review were contacted. In addition, we contacted other researchers involved in

implementation of SBSHE in sSA identified by experts in the field. We invited all potential participants by sending emails containing information on the study, and those who consented were recruited. Therefore, our criteria for selecting participants for this study were based on whether they have published a SBSHE in sSA and their availability to be interviewed.

5.3.2: Participants

We interviewed 27 experts involved in designing, implementing or evaluating at least one SBSHE intervention in sSA. This included interventions developed and evaluated in nine sSA countries (Kenya, Niger, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia and Zimbabwe). Participants' experience of working with sexual-health interventions ranged from two to more than 30 years. Some of the interventions they worked on were effective while others showed limited effectiveness. These interventions were implemented and evaluated from 1997 to 2013, and evaluations were published between 2007 and 2016. See Appendix 5.1, for table of characteristics of participants and impact of their interventions.

5.3.3: Data collection

Participants were widely distributed globally, but, where possible, we conducted face-to-face interviews or interviews using Skype video. Where this was not possible we conducted telephone interviews. We were consulting participants' as experts and, in this capacity, social cues that might be lost, for example, in telephone interviews, were judged to be of less importance than for other research questions (Opdenakker 2006). All interviews were conducted between May and September 2016, lasted between 30-60 minutes, and audio recorded with permission.

Interviews began by checking which sexual health interventions for young people the participant/researcher had developed, implemented or evaluated. Interviewees were encouraged to discuss their experiences on 'what worked', challenges encountered in the process of designing, implementing or evaluating their interventions and recommendations for change that could foster the development of more effective and cost effective interventions. Interviews were semi-structured so participants could talk freely about their experiences and, at the same time, the interviewer could steer conversations to address a range of key topics. An interview topic guide including three overarching categories (design or development, implementation and evaluation) was developed to structure interviews (see Appendix 5.2, for the interview topic guide). The University of Exeter Medical School ethics committee granted ethical approval for the study (UEMS REC Reference Number: April/B/088). Informed consent was obtained from each participant prior to recruitment.

5.3.4: Data analyses

Interviews were transcribed verbatim and checked for accuracy by the first author. Participant identifiers were replaced with serial numbers (e.g., Participant 1) to ensure anonymity. We analysed transcripts using thematic analysis as described by Braun and Clarke (Braun and Clarke 2006) and stored data using NVivo 10 software (Edlund 2012). The first author read all transcripts several times to become familiar with the content and noted initial ideas. These ideas were grouped into emerging themes relevant to our research question. Emerging themes were then grouped into higher-level themes. Transcripts were then re-read and coded sentence-by-sentence using this thematic structure and any new themes corresponding to text that could not be attributed to existing themes was considered as contributing to new themes. Quotes relevant to each theme were then reviewed to ensure within-theme consistency and coherence and the final themes were defined. Throughout the analysis, the first three authors discussed ongoing progress and considered the

most appropriate thematic definitions. The second and third authors also independently analysed randomly selected transcripts (four each) and a high degree of consistency was found in identification of defined themes. We analysed interview transcripts as data were collected and continued analyses until no new instances or themes emerged.

Although we did not explicitly ask questions corresponding to the Intervention Mapping (IM) approach during interviews, as analyses proceeded, it became clear that emerging themes corresponded well to the stages of the IM approach to intervention design, implementation and evaluation in health promotion (Eldredge et al. 2016). This is unsurprising because IM provides a guide to planning design, implementation and evaluation of behaviour change interventions; the same issues addressed by our research. Since most themes could be readily allocated to defined IM stages, we used this as a helpful way to summarise our results.

IM recommends six iterative planning steps to optimise intervention design, implementation and evaluation with specific tasks specified for each step and is widely accepted as an optimal approach to intervention design (Eldredge et al. 2016). The steps include (i) Logic Model of the Problem or Needs Assessment; (ii) Programme Outcomes and Objectives including the underpinning Logic Model of Change; (iii) Programme Design; (iv) Programme Production; (v) Programme Implementation Plan; and (vi) Evaluation Plan. IM is widely used in planning health promotion interventions including adolescent school-based sexual health programmes (e.g., Aarø et al. 2006, Schaalma et al. 2006). Figure 5.1 illustrates the IM steps with brief description of expected tasks for each stage:

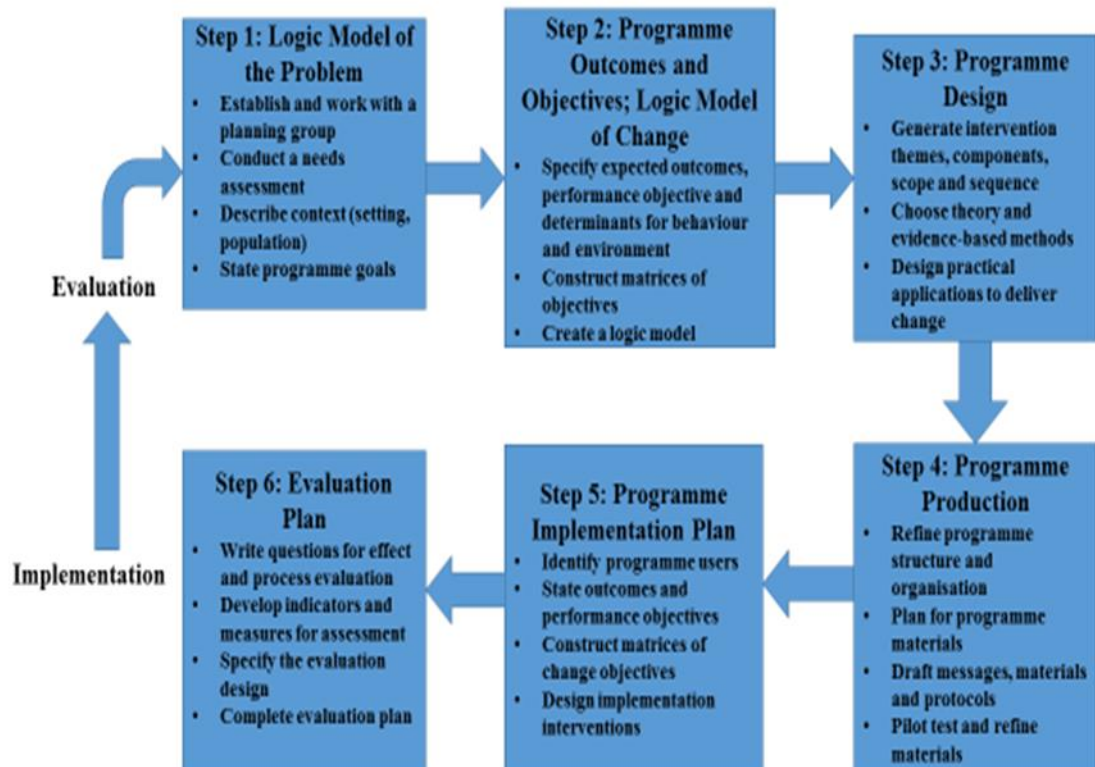


Figure 5. 1: Six steps of the Intervention Mapping (Adapted from Eldredge et al. 2016)

5.4: Results

Our analyses generated defined sub-themes that were categorised into six themes as corresponding to one of the six steps of the IM framework and two higher-level themes (facilitators or challenges). More than 65% of transcript text was included within these themes. The remaining text was not clear enough to be coded or did not fall within the scope of this study (see Appendix 5.3, for summary reports for each transcript). Table 5.1 shows the themes and sub-themes. It should be noted that two of our sub-themes ('tensions and benefits in a diverse research team' and 'influencing policy advocating for funding') did not easily fit into any step in the IM framework. However, we discussed these as part of step 1 (Programme Logic Model of the Problem (needs assessment) to achieve

parsimony of presentation and because both these sub-themes refer to intervention planning issues.

Below we present each theme and sub-themes with just one corresponding illustrative quote. We found little disagreement between respondents in their recommendations. In rare cases of differing perspectives being evident across researchers, we provide more than one quote to represent these differing perspectives. All coded quotes ascribed to each category are available in Appendix 5.4.

Table 5. 1: Emergent themes

INTERVENTION MAPPING STEPS	FACILITATORS	CHALLENGES
1. Logic Model of the Problem (needs assessment)	a. Address participants' need	b. Influencing policy advocating funding c. Tensions and benefits in a diverse research team
2. Programme Outcomes and Objectives; Logic Model of Change	a. Theoretical underpinning b. Contextual considerations	c. Differing expectations in intervention content or scope d. Open Communication
3. Programme Design	a. Comprehensive sexuality education b. Holistic approach	
4. Programme Production	a. Biomedical preventive measures and other contemporary issues b. Pretesting (pilot testing)	
5. Programme Implementation Plan	a. Stakeholders Involvement b. Training of facilitators	j. Negotiating timetable space k. Resistance to sexual health education

	c. Overcoming resistance to sexual health education	l. Resistance to condom use promotion
	d. Starting intervention early	m. Facilitators/teachers' resistance
	e. Delivering interventions as extra-curricular activities	n. Logistical challenges
	f. Participatory and novel teaching methods	
	g. Intensity of sessions	
	h. Ensuring fidelity of delivery	
	i. Ensuring sustainability	

6. Evaluation Plan

- | | |
|--------------------------------------|-----------------------------|
| a. Mixed method evaluation | d. Getting valid data |
| b. Process evaluation | e. Using biomedical markers |
| c. Improving data collection methods | f. Loss to follow-up |

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)

Three sub-themes that participants reported facilitate or challenge interventions design emerged, that is,

a. Address participants' needs

Participants unanimously recommended tailoring interventions according to needs of the target population:

“It has to be an intervention that is tailored to address the needs of the youths and then to address the gaps and challenges that they face in sexual and reproductive health ...” [Participant (P) 3]

b. Influencing policy advocating for funding

Funding was often a problem and some participants recommended continuous advocacy for funding SBSHE programmes in the region and discussed how to best communicate with policy-makers:

“Well, we begin to show evidence that interventions do work and it will require us to write a policy brief because... I do not know how many policy makers will read the article in the journal. They do not have the time. But if you develop a simple policy brief, use simple language and have dissemination where you target government officials, then your chance of getting funding is much higher.” (P. 17)

c. Tensions and benefits in a diverse research team

Some participants raised the issue of tension in multi-cultural teams, especially involving researchers from the global South and North. While some acknowledged the benefits of this collaboration in terms of knowledge and skills transfer, others saw it as a form of neo-colonialism:

“There were still some feelings... that they [global North researchers] were kind of telling us what to do. But the methodology... worked really well I thought. So the richness of it was that we were people... in different parts of the world that come together and could share and feed off each other... I thought it worked really well.” (P. 16)

“...for example, this guy [global North researcher] would come in with assumptions [about]... young people.... making their own decisions about sex. So fundamentally...from conceptual stage the assumptions that those who are supposed to give the technical support are coming with

[are] ...an imposition of their understanding of sexuality and not the local [understandings]" (P. 25)

Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change

Four sub-themes corresponded to this IM stage.

a. Theoretical underpinning

Participants recommended a solid theoretical foundation, or logic model, as key to effective intervention. Moreover, researchers emphasised that theorised mechanisms of change should reflect the complexity of sexual motivation and behaviour, including the cultural role of communities, rather than focusing on individual decision-making considered in isolation. This is especially relevant in sSA where young people sexual behaviours may be shaped by a variety of non-Western cultural beliefs and norms;

"Most HIV prevention interventions use a mix of theoretical frameworks as opposed to an independent single specific approach and that is present in the documentation of the actual curriculum. I think there needs to be a stronger theoretical framework from the beginning." (P. 2)

b. Contextual considerations

Several participants discussed the importance of cultural context to design and implementation, and most argued that tailoring to the cultural context was critical to effectiveness. Contextual considerations in sSA may include culturally-appropriate language used in curricula, including names of parts of body; social norms, such as gift giving in exchange for sexual favours and inter-generational sex; content of the programme; and available resources:

"I think that was a huge success...that it was quite culturally relevant, because amongst other things, it did address this very widespread practice of sex for gifts and money...." (P. 26)

c. *Differing expectations in intervention content or scope*

Participants experienced misunderstanding among teachers, parents and the public regarding sexual health education, including the concern that such education might promote sexual activity. Although, this is not peculiar to sSA, these concerns may be more marked because of conservative views across the region and taboos associated with young people's sexual relationships (Bastien, Kajula, and Muhwezi 2011):

"There was a particular belief that talking about sexuality with young people would incite them to have sexual relationships. So, there was a real demand just to focus on abstinence only messages ..." (P. 4)

d. *Open communication*

Researchers encountered lack of open communication on sexual issues with young people in many sSA countries due to conservative cultural and political contexts. This communication can be between adults (parents, teachers, family members) and young people or even between young people themselves:

"I remember...there was some resistance to having any discussions about sexuality... there was a tendency to say that, that is a topic that is taboo, we don't talk about sex and..." (P. 24)

Intervention Mapping Step 3: Programme Design

We identified two sub-themes relevant to designing interventions.

a. *Comprehensive sexuality education*

Participants regarded comprehensive interventions to be more effective than abstinence-only and those that focused only on disease prevention. They also recommended that programs focus on young people's understanding of sexuality, including understanding oneself, self-esteem

and sexual relationships and that this was more engaging for young people:

“I think that it [effectiveness] was about comprehensive sexuality education, it was not, for example, an abstinence only thing.” (P. 10)

“We helped them understand themselves, the kids, which had never been done before. ... So I think that was a big reason why we were successful.” (P. 15)

b. Holistic approach

Several researchers suggested that integrating school-based interventions into the social reality of the student and school was an essential element of effectiveness:

“it is very important in a developing country context...like KwaZulu-Natal, South Africa, Africa, that we not only look at sexuality in isolation from other developmental issues, so poverty is a big issue, the quality of education and the education infrastructure...” (P. 21)

Some participants argued that improving schools by ensuring safe environment that is free of violence is enough to make an impact on HIV epidemic in sSA. Although, changing school structures may be beyond the scope of SBSHE, participants suggested that intervention designers should ensure favourable conditions are present before implementing an intervention for optimum impact:

“...if the government were to improve the schools themselves so that people stayed in schools, they were safe environments, the violence was reduced in schools and teachers were better equipped to teach and be non-violent we would already be making an impact on the epidemic”. (P. 23)

Intervention Mapping Step 4: Programme Production

Two sub-themes emerged from discussions about the production and organisation of interventions.

a. *Biomedical preventive measures and other contemporary issues*

Participants recommended that interventions should provide information on present-time biomedical preventive measures such as Treatment as Prevention (TasP), Pre-exposure Prophylaxis (PrEP), Voluntary Medical Male Circumcision (VMMC) as well as adjusting information to accommodate AIDS orphans and address gender-based violence:

“So it is really difficult talking about behavioural interventions without also talking about the other things, like for example PrEP that might be important to biomedical interventions for this population. At the time we designed this intervention, it was not necessary to discuss these things, but now I think it is really important to educate young people on that...” (P. 18)

b. *Pretesting (pilot testing)*

Participants acknowledged the importance of improving programmes through pilot testing:

“We learned a lot from the pilot, so I think that really contributed and after the pilot, we rearranged the order of some lessons and whether we taught it ... you know the grades that we taught it. So that was...really important.” (P. 15)

Intervention Mapping Step 5: Programme Implementation Plan

We identified 14 sub-themes referring to factors that facilitated or hindered successful implementation of interventions.

a. *Stakeholders involvement*

Researchers found that involving relevant stakeholders including students, teachers, parents, school authorities and the public was key to successful implementation:

“Some of the things that made it more successful were of course, we carried along many people with interest...” (P. 1)

b. Training of facilitators

Participants also attributed success of their interventions to adequate training of teachers:

“...we put quite a lot of effort into the training of the teachers and then their supportive supervision.” (P. 10).

c. Overcoming resistance to sexual health education

Four lower-level sub-themes emerged from the transcripts depicting approaches adopted by researchers to overcome resistance to sexual health education and/or condom use promotion. These were, ‘training’, ‘careful negotiation’, ‘clarification and reassurance’ and ‘selecting teachers or facilitators who were motivated and interested’.

- i. **Training:** participants found training, including training workshops improved teachers/facilitators competencies in sexual health education and noted that greater confidence improved comfort and reduced resistance. This is relevant especially when contents are in conflict with facilitators’ beliefs and cultures as often observed in sSA:

“...we would provide them [teachers] with the skills and training around and how to manage delivering the programme and so they were comfortable with these things...” (P. 24)

- ii. **Careful negotiation:** researchers found that negotiations with stakeholders may reduce resistance to condom lessons and, thereby, potential rejection of programmes:

“...we argued that it’s just one component of a larger broad effort to help make young people make good decisions in their lives, so by making that argument that opposition to it basically dropped away”. (P. 6)

- iii. **Clarification and reassurance:** clarifying what interventions entail and reassuring stakeholders that evidence has shown SBSHE programmes do not encourage sexual activity may also help overcome resistance to sexual health education:

“...the same applied to the government departments of health and education, where they were concerned about the negative reaction and backlash from parents and the community... we had to spend a lot of time reassuring them before we got permission.” (P. 21)

- iv. **Selecting teachers or facilitators who were motivated and interested:** researchers found selecting facilitators with interest to deliver interventions overcame resistance and also discussed the use and utility of peer educators:

“...we found teachers who were more open to this conversation and they tended to be mostly female teachers because they recognised the need for protecting young girls...” (P. 24)

“...the peer educators are older and have an easier way of relating to kids and they can ask questions, and those peer educators were extremely successful. They were loved by the kids. The kids wanted more and more of them. They wanted to be able to ask questions of somebody older than them but still young. So that was extremely successful. But the in-school, similar aged peers did not work.” (P. 23)

d. Starting intervention early

Researchers mentioned starting interventions before sexual debut was critical to effectiveness:

“I think we raise these issues... we start when they are young. We do not start when they are already sexually active. We have got to start when they are young,” (P. 19)

e. Delivering interventions as extra-curricular activities

Participants emphasised extra-curricular activities for sexual health education, especially if there was not enough time in the curriculum:

“But we also knew that we could use this extra-curricular approach. Students do not need to necessarily learn reproductive health formally in classroom. They can learn it from their friends, from their peers.” (P. 17)

f. Participatory and novel teaching methods

Participants advocated for interactive participatory teaching methods that are less authoritative, encourage critical thinking and remove threats of corporal punishment as essential to SBSHE programmes:

“So we had very interactive teaching methods, which were very novel, in those schools, at that time, which made this an exciting subject, and one where, which helps to engage the students as much as possible.” (P. 27)

“I think in general it went very well and it was delivered really faithfully. Some individual peer educators, professional peer educators found for example discipline hard because the culture of disciplining children in schools in Zimbabwe is corporal punishment and they were explicitly forbidden from using that.” (P. 11)

g. Intensity of sessions

Having multiple well-spaced sessions of adequate frequency and duration as well as booster sessions was judged to contribute to effectiveness.

There was differing views on the length of lessons, while some advocated

for shorter more frequent lessons, others commented on the need for longer programmes to ensure meaningful learning:

“...the fact that it was implemented for one whole academic session...first term, second term and third terms. Many of the interventions that I read about were very short, some for one time, some for one month so our project is unique and has strength in those three areas.” (P. 17)

“Yeah, I would really have liked to go back to a shorter amount of curriculum content in a more frequent spacing. So that we could have done two hours, you know, multiple times instead of having to batch sessions up” (P. 2)

h. Ensuring fidelity of delivery

Researchers highlighted use of detailed lesson plans as well as training with monitoring and supportive supervisions as helpful in ensuring interventions were delivered as intended. Structured and instructive intervention manual is very useful in sSA where school teachers usually have limited trainings (Mulkeen 2007):

“... [Fidelity was enhanced by], giving detailed lesson plans” (P. 10)

i. Ensuring sustainability

We identified four lower-level sub-themes categorising measures taken by researchers to ensure sustainability of school-based sexual health programmes:

- i. Evidence of effectiveness as incentive to sustaining or scaling interventions: *“People could see that it was effective, that it was working and so the teachers... [and] the district education department, was keen for us to go back the second time...” (P. 9)*

- ii. Integrating programme into existing structures and curricula also facilitated sustainability: *“...we made sure that all of the curriculum objectives mapped on to the objectives of the federal mandate about what should be taught at that age... we carefully aligned the teaching objectives of our curriculum with the teaching objectives stated by the government.”* (P.6)
- iii. Involvement of relevant authorities also supported sustainability: *“We had already worked very closely during the trial phase with the district level and the ward level education and health officials ... that helped enormously.”* (P. 10)
 - iv. Minimising cost was another strategy adopted by researchers to promote sustainability: *“it was kept very low cost, so it would be cost effective.”* (P. 26)

j. Negotiating timetable space

Sometimes researchers found it difficult to negotiate adequate timetable space and for longer interventions, this could undermine fidelity:

“...the schools wanted the intervention ... to fill time in the curriculum or in the school day that they were not able to fill with other subjects. It is always very challenging to implement... because we had 14 sessions [so implementation was] very uneven across the schools.” (P. 18)

k. Resistance to sexual health education

Many forms of resistance to sexual health education were encountered:

“Sometimes ... especially for sexual health education, you may have a backlash from the community, parents or even the education officials.” (P. 5)

l. Resistance to condom use promotion

Resistance was particularly likely if the intervention promoted condom use:

“The teachers were not opposed to it... but... there was resistance to the condom lesson.” (P. 23)

m. Facilitators/teachers' resistance

While some teachers were supportive, others were strongly opposed to safe sex promotion:

“...part of the intervention was ...promotion of safe sex. And the teachers had very strong feelings [about this]... they did not want to teach it... they [either] reluctantly said they would teach it or they... said they would not teach it.” (P. 16)

n. Logistical challenges

Logistical challenges including delay in getting approval from authorities, staff and student absenteeism, staff turnover and challenging infrastructure, including poor roads around schools:

“...with school work I am doing in Kenya, one of the main things you have to consider is that things do not happen quickly because school ministry take some time to make decisions.” (P. 5)

Intervention Mapping Step 6: Evaluation Plan

We identified six sub-themes describing what facilitated or hindered successful evaluation of interventions.

a. Mixed methods evaluation

Researchers mentioned the importance of evaluating interventions utilising both quantitative and qualitative data:

“I mean it is just a lot of work to do that..., but I think that there was huge advantage to using both quantitative and qualitative approaches in the evaluations.” (P. 10)

b. Process evaluations

Participants also reported the importance of incorporating process, as well as impact, evaluations:

“it is more important to focus on how we can provide these programmes rather than trying always to measure their outcomes... quite a lot of these evaluation studies... the quality is often not very good... and... the programme may not have been properly implemented ...” (P. 4)

c. Improving data collection methods

Recommended enhanced data collection methods included use of computerised audio devices, provision of hybrid questionnaires, avoiding lengthy questionnaires, interviews, participants' observations and questionnaires translations into native languages:

“Now we have computer assisted technology for administering questionnaires... [Using] tablet computers... is probably the best way to go.” (P. 12)

d. Getting valid data

One of the major concerns raised by researchers is the difficulty in getting valid self-reported sexual behaviour data and participants emphasised on this a lot due to conflicting responses they get on young people sexual behaviours sSA:

“But that is a big problem because there is a lot of conflicting data which clearly is not valid...” (P. 23)

e. *Using biomedical markers*

Although participants acknowledged the importance of biomedical markers to support validity of self-reported data, they also identified many challenges including costs, low incidence of infections among adolescents and difficulty in getting consent:

“I guess we can include biological outcomes...where possible but that is difficult... for various reasons. Not only cost but also there are very few events, incidences” (P. 23)

f. *Loss to follow-up*

High attrition because of high student mobility was another challenge:

“So the challenges that we faced... were more logistical in terms of... follow up of the students and in terms of ensuring follow up from baseline to the follow-up period.” (P. 18)

Finally, it should be noted that all the sub-themes except ‘theoretical underpinning’, ‘starting intervention early’, and ‘tension and benefits in a diverse research team’ were supported by quotes from participants experienced in at least four of the nine countries, where all the researchers had experience. Tension in North-South research collaboration was supported mainly by researchers with interventions from South Africa, which may suggest that this factor is more relevant in that context. On the other hand, ‘contextual consideration’ was supported by quotes from all the nine sSA countries and hence, may be relevant to the entire sub-continent. See Supplementary File 4, for all the countries of experience of the researchers alongside their quotes.

5.5: Discussion

We conducted qualitative, thematic analyses of 27 interviews with intervention designers and researchers. Interviews explored designers' views of the facilitators and barriers to developing, implementing and evaluating SBSHE interventions in sSA. We identified six themes corresponding to IM steps with sub-themes specifying categories of facilitators and barriers. These findings endorse many of the characteristics of effective sex and HIV education interventions identified in Kirby, Laris, and Rolleri's (2007) widely-cited review and Denford et al.'s 2016 extension of these recommendations. However, our findings also emphasise features relevant to sSA that are not included in either. The sub-themes depicting these features include; "Influencing policy advocating funding"; "Tensions and benefits in a diverse research team"; "Biomedical preventive measures and other contemporary issues"; "Ensuring fidelity of delivery"; "Ensuring sustainability"; "Negotiating timetable space"; "Resistance to sexual health education"; "Resistance to condom use promotion"; "Facilitators/teachers' resistance"; "Improving data collection methods"; "Getting valid data" and "Loss to follow-up" (sub-themes 1b, 1c, 4a, 5h-5m, 6a, 6d, and 6f, respectively). To our knowledge, this is the first study integrating designers' insights into improving SBSHE in sSA.

Collectively, the six themes and their sub-themes viewed as generating 18 recommendations that are extensions Kirby, Laris, and Rolleri 2007 and Denford et al.'s (2016) work for future interventions in sSA. These are presented in Table 5.2 and discussed below in relation to previous research and the six steps of IM framework.

Table 5. 2: Recommendations for designing, implementing and evaluating school-based sexual health education in Sub-Saharan Africa

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)
<ol style="list-style-type: none"> 1. In addition to sexual and reproductive health needs of young people, other social factors such as poverty and school infrastructures and quality of teaching should be considered. (sub-themes 1a and 3b*) 2. Interventions should anticipate and plan for managing interpersonal relationships in culturally diverse teams. (sub-theme 1b) 3. Adequate funding should be ensured before planning interventions and this may involve evidence-based advocacy and lobbying of local and national governments. (sub-theme 1c)
Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change
<ol style="list-style-type: none"> 4. Theoretical models set within ecological framework that account for environmental influences are most appropriate in sub-Saharan Africa. (sub-theme 2a) 5. Interventions should be culturally sensitive in the language they use and in recognition of particular local cultural beliefs and practices (such as gift-giving and inter-generational sex). (sub-theme 2b) 6. Interventions should formulate objectives carefully to avoid misunderstandings that they are promoting sex or sexual immorality. (sub-theme 2c) 7. Interventions should promote open communication about sex between young people and between young people and their parents and advisors. (sub-theme 2d)
Intervention Mapping Step 3: Programme Design
<ol style="list-style-type: none"> 8. A broad, holistic approach addressing social and environmental factors that may influence sexual risk behaviours is recommended. This should include intimate partner violence and, for example, prejudice towards HIV positive people and so-called "AIDS orphans". (sub-themes 3b and 4a)
Intervention Mapping Step 4: Programme Production

9. Curricula should address relevant medical interventions such as Treatment as Prevention, Pre-exposure Prophylaxis and Voluntary Medical Male Circumcision. (sub-theme 4a)

Intervention Mapping Step 5: Programme Implementation Plan

10. Interventions should provide pre-intervention and ongoing training to facilitators/teachers. Training on participatory teaching techniques as well as on changing teachers' attitudes towards young people's sexuality is important. (sub-themes 5b and 5c)
11. Interventions should be prepared for opposition from teachers, parents, school authorities and the public. The following strategies may be useful in overcoming resistance: selection of teachers who are comfortable with sex education; training, including workshops for teachers to boost their confidence in delivering potentially sensitive sexually-related material; and negotiating with authorities about the specifics of programmes using clarification and reassurance and being prepared for delays in approval. (sub-themes 5c, 5j-5m)
12. Fidelity of delivery can be ensured by provision of structured, instructive and detailed lessons plans, which can easily be used by facilitators with minimal training. (sub-theme 5h)
13. Monitoring and supportive supervision can also promote fidelity. (sub-theme 5h)
14. Integrating programmes into ongoing curricula and aligning objectives with that of the curricula can enhance sustainability. (sub-theme 5i)
15. Due to scarcity of resources in sub-Saharan Africa, interventions are more sustainable if they can be maintained at minimal cost. (sub-theme 5i)

Intervention Mapping Step 6: Evaluation Plan

16. Computerised audio devices may facilitate data collection and improve the validity of sensitive sexual health information. (sub-theme 6c)
17. Qualitative interviews and participant observations may provide data that can be used to check and validate quantitative analyses. (sub-themes 6c and 6d)

18. Interventions should devote planning time to maximising follow-up capture. (sub-theme 6f)

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)

There was wide consensus on thorough needs assessment to inform intervention design. However, in sSA for optimum impact, these assessments should go beyond reproductive health needs to including other social and environmental factors (see recommendations 1 and 8). Poverty and quality of teaching in sub-Saharan African schools have significant effects on any school health intervention. In Southern Africa, having an ecological package to address the multiple environmental forces (sexual coercion, alcohol and substances use, gender norms and financial risks) alongside school-based curriculum interventions is argued to likely have more impact (Wood and Roller 2014).

Other factors identified in this study not previously identified, by Kirby and Denford's reviews, which interventions designers should be aware of include policy support for SBSHE including inadequate local funding for programmes, and tensions and benefits in a diverse research team particularly involving researchers from the global North and South (see recommendations 2 and 3). Researchers acknowledged the importance of North-South collaboration in skills transfer and ensuring financial support for quality research through international funding. This is, however, also associated with challenges such as differing cultural assumptions. Challenges in a multicultural North-South research collaboration were also observed in a Canadian-Nigerian HIV prevention project including differences in leadership models and cultures (Onokerhoraye, Maticka-Tyndale, and Team 2012). Therefore, future interventions should anticipate such tensions and have mechanisms in place for managing culturally diverse project teams.

Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change

In addition to employing behaviour change theory to inform SBSHE intervention development (Abraham and Sheeran 1993, Wight, Abraham, and Scott 1998), logic models should account for environmental influences that shape young people's sexual decisions (see recommendations 4 and 5). In sSA, these include use of culturally appropriate language in curricula, including names of parts of body; social norms, such as gift giving in exchange for sexual favours; and inter-generational sex i.e., sexual relationships between older men and young girls, which put the latter at greater risks of STIs/HIV. Moreover, content of the programme should be aligned with communities' realities and expectations. Available resources must also be carefully considered during planning (e.g., computer-based programmes in schools where computers are not readily available). This corroborates with findings in a process evaluation of school and community based adolescent reproductive health programme in Tanzania, where failure to fully address contextual factors (cultural beliefs and practices, economic situations, gender and social status) was found to explain its limited impact (Wight, Plummer, and Ross 2012).

Intervention Mapping Step 3: Programme Design

This study further emphasised on comprehensive sexuality approach, and approaching sexual health education holistically (with other developmental or environmental issues) as other facilitating factors already identified by Kirby et al. (2007) and Denford et al. (2016) (Recommendation 8). See also recommendation one.

Intervention Mapping Step 4: Programme Production

Researchers also reported that SBSHE programmes should provide information on recent advances in biomedical prevention of HIV including

TasP, PrEP, and VMMC. It should also address other social issues like stigma towards AIDs orphans and gender-based violence (see recommendation 9). This is necessary because all these are components of HIV prevention package that need attention in school-based interventions, at least by providing information. Gender-based violence is one of the human right and public health violation of our time, which increases victims' risk of negative sexual and reproductive health including STI/HIV infections, unwanted pregnancy and induced or unplanned abortion as elaborated in studies published in a special issue of Health Education Research (Aggleton et al. 2014).

Intervention Mapping Step 5: Programme Implementation Plan

Participants in our study also argued that fidelity of delivery was ensured by providing detailed lesson plans and supportive supervision of teachers (see recommendations 12 and 13). This may be especially important in sSA because of relatively poor teacher training (Mulkeen 2007). Provision of teaching manuals with detailed instructions was found to aid commitment of teachers to complete implementation of a school-based reproductive health programme in Tanzania and South Africa (Mukoma et al. 2009). The same study also found monitoring and supervision to promote fidelity of delivery. Similarly, researchers recommended integrating programmes into existing school curriculum and mapping objectives with overall objective of the curriculum, as well as providing low cost interventions (see recommendations 14 and 15). This is supported by a study in Tanzania that found integrating intervention into existing government structures and delivering low cost school-based component into carrier subjects facilitated programme scale up (Renju et al. 2010, Renju et al. 2011).

Misunderstandings about sexual health education including exposing young people to sexual relationships and lack of open communication on sexual issues with young people were some of the barriers reported by

researchers. These might have led to other challenges including teachers' resistance to teaching safe sex promotion, resistance to the intervention completely or some of its components especially condom use promotion (hence, recommendations 4, 5, 10 and 11). Several studies in sSA have identified such challenges. For instance, Wight, Plummer, and Ross (2012) experienced opposition by adults to discussing condoms with adolescents in their intervention as it may likely increase sexual activity or misunderstood the whole intervention as teaching immorality (Plummer et al. 2007). Similarly, in Southern Africa, teachers were anxious about safe sex promotion and openly discussing sexual issues with young ones (Wood and Rolleri 2014, Ahmed et al. 2006, Bhana 2007, Pattman and Bhana 2017). Other studies in Southern Africa and Canada (Vanwesenbeeck et al. 2015, Wood and Rolleri 2014, Rijdsdijk et al. 2014, Helleve et al. 2009, Cohen, Byers, and Sears 2012) reported teachers' resistance to teaching certain sexual health topics and the challenges faced by teachers delivering SBSHE, which may results in topics being missed out or shortened. Teachers/facilitators resistance could be overcome by interactive training that may improve their knowledge, skills and attitudes towards SBSHE as found in this study (see recommendation 10) and others (e.g., Wood and Rolleri 2014, Ahmed et al. 2006, Plummer et al. 2007, Helleve et al. 2009, Sarma, Islam, and Gazi 2013).

Intervention Mapping Step 6: Evaluation Plan

New methods may enhance the quality and validity of self-report data, including use of computer audio devices, hybrid questionnaires (into multiple languages in multi-lingual settings) and supplementing surveys with interviews and participants observations (see recommendations 16 and 17). In sSA, youths may be less likely to honestly disclose their sexual behaviours due to cultures disapproving of open discussion of sexual issues. In an assessment of validity of sexual health data among Tanzanian adolescents using five different methods, Plummer et al. (2004) found inconsistencies in self-reported data with in-depth interviews

more useful than self-completed and face-to-face questionnaires in eliciting valid response. Additionally, they found participants observation most useful in understanding adolescent real sexual behaviours in that setting. Therefore, future evaluations should complement surveys with interviews and participant observations. Rapid migrations in sSA, especially in rural areas where students often change school from one year to another lead to high attritions of SBSHE interventions. Future evaluations should have plans to follow students that might change schools to minimise attritions (see recommendation 18).

5.6: Limitations

Findings from this study should be interpreted in light of some limitations. In some cases, researchers were interviewed about interventions implemented some time ago; therefore, responses might be subject to recall bias. Although, collectively, participants had experience of developing, implementing or evaluating interventions in nine sub-Saharan African countries, findings may not be applicable to all countries in the sub-continent. Finally we report features that designers and researchers thought contributed to effectiveness, without rigorous process evaluation, we cannot confirm the importance of these features to intervention effectiveness. We used the IM approach to present our findings but we acknowledge that this is not the only way of structuring the quotes and themes identified in our analyses. Finally, although we provide what we think are important recommendations on the application of IM to SBSHE in sSA, we acknowledge that following the IM stages in detail requires significant time and resources, which may limit its application in resource-poor contexts.

5.7: Conclusions

By conducting interviews with researchers on their interventions, we have been able to identify factors that might facilitate development, implementation and evaluation of school-based sexual-health education in sub-Saharan Africa. In addition to endorsement of findings highlighted by previous literature (Kirby, Laris, and Rolleri 2007, Denford et al. 2016), we identified some that may be unique to sub-Saharan African setting. Although our initial aim was not to expand the Intervention Mapping approach, using it to present our findings enriches each step of the approach with recommendations that may be relevant to school-based sexual health education interventions in that setting. Finally, we provide some recommendations that may improve development, implementation and evaluation of school-based sexual health programmes in sub-Saharan Africa.

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Chapter 6: General Discussion

The doctoral research reported here aimed to determine how to promote young people's sexual health and relationships, and prevent transmission of sexually transmitted infections, especially in the sub-Saharan African context. School-based sexual health education is commonly used to promote young people's sexual health and well-being. If well designed and implemented, such education can promote protective attitudes and motivations, encourage safer sexual behaviour patterns and so potentially prevent transmission of STIs, including HIV. There is a need, therefore, for evidence-based recommendations on how to design, implement, and evaluate school-based sexual health interventions in order to maximise effectiveness. This need is especially great in sub-Saharan Africa (sSA), where young people are at the greatest risk of becoming infected with HIV.

This research investigated how effective school-based sexual health interventions are, what facilitates effective design, implementation, and evaluation of such interventions, and how can these lessons be implemented in sSA? Four empirical studies were conducted:

1. A systematic review and meta-analysis of school-based sexual health interventions in sub-Saharan Africa;
2. A single case study of a school-based sexual health intervention in sub-Saharan Africa;
3. A multiple case study of seven school-based sexual health interventions in sub-Saharan Africa;
4. A qualitative study of researchers' experiences of school-based sexual health interventions and their implementation in sub-Saharan Africa.

This chapter presents an overview of the studies and the findings, strengths and limitations, and implications for practice and research.

6.1: Overview of the studies

The systematic review and meta-analysis reported in Chapter 2 aimed to synthesise available evidence of the effectiveness of school-based sexual health education interventions in sSA. It also investigated the design, implementation, and evaluation procedures that characterise effective interventions. Sexual health education interventions implemented wholly or partially in schools, and evaluated using experimental study designs, were included in the review. The review addressed the following specific questions:

1. Are school-based sexual health education interventions effective in promoting condom use and preventing sexually transmitted infections in sub-Saharan Africa?
2. What are the characteristics of effective school-based sexual health education interventions in sub-Saharan Africa?
3. Are school-based sexual health education interventions implemented as intended in sub-Saharan Africa?

Thirty-one (31) interventions that evaluated school-based sexual health education compared with a control (no intervention, usual care, or minimal intervention), evaluated using a randomised controlled trial or quasi-experimental (before-and-after intervention with comparison group) design, were included. STIs were measured in only three interventions. No intervention reported beneficial or harmful effects on sexual transmission of HIV or HSV2. However, one intervention reported a significant reduction in curable STIs (Chlamydia, Gonorrhoea, and Trichomonas). Fifteen (15) of the 31 interventions reported a significant increase in self-reported condom use among intervention participants compared to controls. Meta-analyses showed beneficial effects of the interventions on condom use; odds ratios between intervention and control groups among randomised trials were 1.62, 1.40, and 1.22 (95% CIs [1.03, 2.55], [1.16, 1.68], and [0.99, 1.50]) at less than six, 6-10, and more than 10 months follow-up periods, respectively. For the quasi-

experimental studies, odds ratios of condom use were 2.88, 1.05, and 1.18 (95% CIs [1.41, 5.90], [0.65-1.71], and [0.92-1.52]) at less than six, 6-10, and more than 10 months follow-up periods, respectively. Features that were more frequently present in effective interventions were: theory informed intervention, adapting curricula from previous interventions, providing adolescent-friendly health services, including community activities beyond the school environment, and implementing activities as intended. This review highlights the deficiencies of evaluated school-based sexual health interventions that assessed impact on STIs in sSA, considering the burden of STI/HIV in the region. Moreover, there was little reporting of process evaluation in the included interventions.

While the systematic review provides an overview of the best quality evidence, it is limited in providing information on *how* and *why* the interventions work. Therefore, I attempted to build on the review findings with an in-depth case study. A case study of *MEMA kwa Vijana*, an adolescent sexual and reproductive health intervention, was reported in Chapter 3. This study aimed to identify factors that affected development and implementation of the intervention. It also explored reasons for success or failure of the intervention. The following main questions were addressed in this case study:

1. How was the *MEMA kwa Vijana* intervention designed to meet the sexual and reproductive health challenges of young people in Tanzania?
2. What were the challenges that hindered successful design, implementation, and roll out of the intervention?
3. What were the reasons for the limited impact of the intervention on STIs/HIV and unintended pregnancy?

The MkV was developed based on international recommendations for best practice and local guidelines for designing young people's sexual health interventions. It was designed and implemented through collaborations between local and international researchers and the local

government. This study highlights the importance of structural factors in schools or health facilities on the effectiveness of adolescent sexual health interventions. Some school policies that restrict implementation of evidence-based sexual health programmes such as condom lessons could reduce effectiveness of interventions. Infrastructure, including number of staff and quality of teaching in schools or quality of adolescent's health services in health facilities, could also have an impact on the effectiveness of a well-designed intervention. For a school-based intervention to have an impact on STIs/HIV and unintended pregnancy, a more holistic approach is required. This includes intensively targeting young people in schools, in addition to their immediate communities (out of school youth, parents, and other community members). Social and cultural contextual factors beyond schools and health facilities that influence young people sexual behaviours must also be addressed.

A range of cases that were more or less effective were explored further in Chapter 4 by conducting a multiple case study to have a broader picture, building on the single case study. This study aimed to identify features associated with the effectiveness of such interventions on self-reported condom use and/or transmission of STIs/HIV. We compared four effective interventions with three ineffective interventions implemented in five sub-Saharan African countries. We addressed the following research questions:

1. To what extent do school-based sexual health interventions in sub-Saharan Africa implement evidence-based features, and how is this related to effectiveness?
2. What features differentiate effective interventions from ineffective interventions?

In addition to demonstrating the usefulness of evidence-based features in ensuring effectiveness, this study identified features that differentiate effective interventions from ineffective interventions. This further highlights

the importance of addressing wider contextual factors that influence young people's sexual behaviour in sSA. During intervention design, ethnography, and development of sexual scripts could assist in identification of the contextual factors. Moreover, theoretical models set within an ecological framework could ensure that interventions address the wider environmental and psychosocial risk factors. Furthermore, during implementation, effectiveness could be improved by incorporating community activities in addition to school curricula, and a combination of peers and teachers as facilitators. Finally, optimum impact is more likely if the intervention is implemented and evaluated for a longer duration.

Finally, to have wider views beyond the systematic review and case studies, we conducted the qualitative study reported in Chapter 5. This aimed to explore facilitators and barriers to the design, implementation, and evaluation of school-based sexual health interventions in sSA. Researchers involved with interventions included and beyond those included in the systematic review and case studies were interviewed. The following question was addressed:

1. What facilitates or hinders the successful design, implementation, and evaluation of school-based sexual health education in sub-Saharan Africa?

We interviewed 27 researchers in relation to what contributes to the success or failure of their interventions, which led to formulation of effectiveness-enhancing features based on their experiences and opinions. During development, social factors such as poverty and school infrastructure, including quality of teaching, in addition to sexual health needs, should be addressed. School-based sexual health interventions should be culturally sensitive, address inter-generational and open communications on sexual issues, and clearly state aims to avoid any misunderstanding. Curricula should also address contemporary issues in HIV prevention (treatment as prevention, pre-exposure prophylaxis,

voluntary medical male circumcision, and gender-based violence). During implementation, sexual health interventions should be prepared for opposition at various levels, and we have identified effective approaches to overcome them. Due to limited teacher training in sSA, provisions of simple but detailed facilitators' manuals, together with supportive supervision, may be critical in ensuring fidelity. During evaluation, computerised audio devices and qualitative interviews with participant observations may facilitate collection and improve validity of adolescents' sexual behaviour data, respectively. This study extends previous work by generating a set of valuable recommendations based on researchers' experience that could improve future interventions in sSA.

6.2: Strengths and limitations

A key strength of this doctoral project is the triangulation of the four studies, which employed different methods to arrive at evidence of facilitating features for designing, implementing, and evaluating sexual health interventions in sSA. This evidence is based on the overlapping findings across the four studies as summarised in Table 6.1, which adds to the validity of our results. The systematic review provided an overview of the effectiveness of the interventions supported by the available highest quality of evidence. The case studies built on this with detailed social and cultural issues that are missing from the systematic review. The qualitative study provided further layer of evidence by providing insight into concerns of intervention designers, implementers or evaluators. Together, these studies provide the most comprehensive account of factors associated with effective school-based sexual health education in sSA, drawing on existing literature and empirical data. Specific strengths and limitations of the individual studies are discussed below.

Table 6. 1: Contributions of each study to the features associated with the effectiveness of school-based sexual health interventions

Intervention mapping steps	Systematic review	Single case study	Multiple case study	Qualitative study
<i>Needs assessment</i>		<p>Persistent advocacy with authorities to mobilise support for the programme.</p> <p>Compromises on evidence-based programme contents should be cautiously negotiated to avoid dilution of effectiveness.</p>	<p>Ethnography of young people’s sexual behaviours and other contextual factors could facilitate needs assessment.</p> <p>Sexual script research as part of needs assessment could inform intervention activities.</p>	<p>Needs assessment should consider social factors such as poverty and school infrastructures in addition to young people’s sexual and reproductive health needs.</p> <p>Anticipate and plan for managing interpersonal relationships in culturally diverse intervention teams.</p> <p>Ensuring adequate funding through evidence-based advocacy and lobbying of local and national governments.</p>
<i>Programme outcomes and objectives; logic model of change</i>	Theory-based programmes.	Socio-economic and cultural factors as well as structural factors in schools and health facilities should be addressed for optimum impact.	<p>Theoretical models set within ecological framework are most appropriate.</p> <p>Matching intervention activities with change techniques.</p>	<p>Theoretical models set within ecological framework that account for environmental influences are most appropriate.</p> <p>Interventions should be culturally sensitive in the</p>

				<p>language that they use and in recognition of particular local cultural beliefs and practices (such as gift-giving and inter-generational sex).</p> <p>Intervention objectives should be carefully formulated to avoid the misunderstanding that they are promoting sex or sexual immorality.</p> <p>Open communication about sex between young people and between adults, parents, and young people.</p>
<i>Programme design</i>	<p>Adapting from previous effective programmes.</p> <p>Include provision of health services.</p> <p>Include activities outside school environment.</p>	<p>Simple explanations and demonstration of programmes' content to authorities could remove or undermine resistance to intervention content.</p> <p>Community-wide activities targeting out of school young people and their families are more likely to be effective.</p>	School and community-based approach.	<p>A broad, holistic approach addressing social and environmental factors.</p>

<i>Programme production</i>		Alternative approaches may be required to overcome resistance to programme activities, e.g. condom demonstration in health facilities, if not possible in classes.		Curricula should provide information on relevant medical interventions, e.g. treatment as prevention, pre-exposure prophylaxis and voluntary medical male circumcision.
<i>Programme implementation plan</i>	Implement activities as planned.	<p>Participatory training of facilitators, and provision of detailed but simply worded teaching materials.</p> <p>Cascade of staff training can facilitate successful roll out of sexual health interventions in schools and health facilities.</p> <p>Involvement of authorities of systems through which an intervention is going to be roll out at all stages of intervention development could facilitate the process.</p>	<p>Combination of teachers and peers as facilitators.</p> <p>Implementation of activities for adequate duration (at least two academic sessions/years).</p>	<p>Pre-intervention and ongoing training to facilitators/teachers.</p> <p>Strategies to overcoming opposition from teachers, parents, school authorities, and public to sexual health interventions may include: selection of teachers who are comfortable with sex education; training, including workshops for teachers to boost their confidence in delivering potentially sensitive sexually-related material; negotiating with authorities about the specifics of programmes using clarification and reassurance and being prepared for delays in approval.</p>

				<p>Fidelity of delivery can be ensured by provision of structured, instructive, and detailed lessons plans, which can easily be used by facilitators with minimal training.</p> <p>Fidelity could also be promoted through monitoring and supportive supervision.</p> <p>Sustainability could be ensured by integrating programmes into ongoing curricula and aligning objectives with that of the curricula.</p> <p>Interventions could be more sustainable if they can be maintained at minimal cost.</p>
<i>Evaluation plan</i>		Trials should be adequately powered by undertaking population-appropriate power calculations to detect impact on STI/HIV or pregnancy.		<p>The validity of sexual health information could be improved by the use of computerised audio devices for data collection.</p> <p>Qualitative interviews and participant observations may</p>

				<p>provide data that can be used to check and validate quantitative analyses.</p> <p>Interventions should devote planning time to maximising follow-up capture.</p>
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The systematic review (Chapter 2), to our knowledge, is the first review of school-based sexual health interventions in sSA to assess the impact of interventions on STIs/HIV prevalence or incidence. It was conducted and reported according to the PRISMA statement (Moher, Liberati, Tetzlaff, Altman, & Group, 2009). To ensure the high quality of the evidence, only interventions evaluated using randomised trial or quasi-experimental with comparisons group designs were included in the review. Moreover, quality of included studies was assessed using the Cochrane Collaboration Tool for Assessing Risk of Bias (Higgins & Green, 2011). The GRADE approach was used to assess the overall quality of evidence of outcomes in the meta-analysis. This provided the level of confidence that is necessary for decision-making (Schünemann, Brozek & Oxman, 2009). The review also investigated the implementation processes of included interventions, and highlighted intervention characteristics that may be associated with effectiveness.

However, we did not consider the cost-effectiveness of the interventions in the review. This was beyond the scope of the present study. Nonetheless, several studies have established the cost-effectiveness of school-based sexual health interventions (Cohen, Wu & Farley, 2004; Hogan, Baltussen, Hayashi, Lauer & Salomon, 2005; Shepherd et al., 2010; Wang et al., 2000). Meta-regression would have been the best approach to identify intervention components associated with effectiveness in the review. However, this was prohibited by the small number of studies with identified features (likely covariates) included in the meta-analysis. Meta-regression is not a recommended option when the number of studies is small, especially with multiple covariates (Borenstein, Hedges, Higgins & Rothstein, 2009). It is possible that we missed some interventions in our review, particularly those that were not designed and evaluated by academics and published in peer-reviewed journals. However, such

interventions may not have been rigorously evaluated and so may not have provide the quality of evidence required for the review.

The single and multiple case studies (Chapters 3 and 4) provided a novel approach of evidence synthesis to school-based sexual health interventions in sSA. We employed standard case study methods (Hak & Dul, 2010b; Maassen, 2015; Yin, 2014) and this is to our knowledge the first time this approach has been applied to such interventions. This allowed us to utilise data from multiple sources, including published work, grey literature, and interviews with investigators. The triangulation of data from different sources ensures the validation of findings across all sources, which adds credibility to our conclusions (Flick, 2004). Moreover, in the multiple case study (Chapter 4), using recommendations from worldwide evidence synthesis studies as a basis for analyses ensured their validation and contextualisation in relation to the sSA setting. Furthermore, the single case study provided valuable recommendations for the successful roll-out of young people's sexual health interventions in sSA schools and health facilities.

The case studies would have been more robust if other stakeholders (such as implementers, teachers, participants, and school authorities) were interviewed in addition to investigators. However, some of the documents reviewed report on studies with such stakeholders (e.g. Ahmed, Flisher, Mathews, Mukoma & Jansen, 2009; Renju et al., 2010; Renju et al., 2011). To reduce errors and bias in the analyses of the documents, analyses should have been conducted independently by at least two researchers in the case studies. However, the resources available allowed second investigators to review the results of document analyses prior to interviews and the interpretation of transcripts.

The qualitative study (Chapter 5) provided insight into designing, implementing, and evaluating school-based sexual health interventions in sSA. The study focused on the experiences and opinions of facilitators and barriers to implementing such interventions from the perspectives of researchers, unlike other similar qualitative investigations. Our results, however, replicated other similar studies that included different participants, which confirmed the universality and validity of our findings. The findings of this qualitative study were used to formulate a set of recommendations that could provide practical guidance for intervention designers and implementers of school-based sexual health interventions.

Although a recent systematic review and suggestions by participants were used to identify researchers for the qualitative study, it is possible that we may have missed other key investigators. This may have been confounded by the fact that only the corresponding authors of articles in our review and others whose email addresses could be identified were contacted, and only those that responded were recruited. Forty (40) researchers were initially contacted and some of these referred us to other researchers. However, 27 researchers were finally interviewed in the qualitative study. Therefore, responses from the participants that could not participate may have differed from those interviewed. Furthermore, some of the sub-themes were supported by quotes from only three participants; thus, interviewing more participants would have led to richer data. It could also be argued that researchers would have expressed their opinions in their publications, and therefore, the qualitative study may not have added more to the systematic review and case studies. However, during the interviews, researchers were encouraged to discuss what they would not have reported in their publications.

6.3: Implications for practice

The studies reported in this thesis show that school-based sexual health interventions could assist in promoting self-reported condom use among participants, and thus have the potential to prevent STI/HIV. They also identify features that could optimise the design, implementation, and evaluation of the interventions to maximise effectiveness. The main implications for practice, therefore, are (i) we should continue to provide school-based sexual health interventions to improve young people's sexual health and relationships, and (ii) we should continue to consider wider approaches beyond sexual health education when designing and implementing such interventions. Below are more specific recommendations based on lessons learned from the research in this project. Although not all the recommendations can be said to be evidence-based, they can be argued to be the best for optimising practice based on insights from evaluated interventions.

For optimum impact of school-based sexual health interventions, wider contextual factors that influence young people's sexual health and relationships must be addressed. This is necessary for developing and implementing context-specific interventions. It is essential for intervention designers to be aware of these factors right from intervention inception for the entire lifespan of the project. We classified the specific implications for practice derived from this doctoral project into the three main stages of the intervention life cycle, namely, design, implementation, and evaluation. It should be noted that only implications that extend or complement previous work (Denford, Abraham, Campbell, & Busse, 2016; Kirby, Obasi, & Laris, 2006) are discussed.

Design

1. Needs assessment to identify contextual factors that influence young people's sexual health and relationships.

When developing behaviour change interventions, it is recommended that the needs of the target population be assessed (Eldredge, Markham, Kok, Ruiter & Parcel, 2016). For school-based sexual health interventions, designers should actively search for contextual factors during needs assessment to optimise intervention design. In sSA, these factors could include the school environment wherein such interventions will be delivered. Structural factors in schools such as a supportive environment, quality of teaching, teaching methods, school infrastructure, and school policy could prevent a well-designed school-based intervention from reaching its maximum potential (Vanwesenbeeck, Westeneng, de Boer, Reinders & van Zorge, 2015). Socio-economic factors that cause young people, particularly young girls, to engage in risky sexual behaviours such as transactional sex and intergenerational sex should be identified (Wood & Rollerj, 2014). Other cultural beliefs and practices that shape young people in the specific context could also be identified.

Intervention designers should employ all methods appropriate to their intended population in the needs assessment. We found in this research that in sSA, ethnography could be the most suitable method for identifying young people's true sexual behaviours and influencing factors. Although ethnography may be time consuming and expensive (Gans, 1999; Pope, Ziebland & Mays, 2000), we suggest that intervention designers consider this method during needs assessment, where possible.

2. Intervention's underpinning theory that accounts for all the contextual factors.

Guidance for developing health promotion interventions recommends using theory and evidence to inform appropriate intervention techniques and activities, including delivery methods (Eldredge et al., 2016; Michie & Abraham, 2004; Michie, van Stralen & West, 2011). For school-based sexual health interventions in sSA, such theories should account for wider factors that influence young people's sexual health and relationships. Our research shows that theories with ecological components are more appropriate in that context. Selection of theory depends on the task at

hand during intervention planning (Eldredge et al., 2016). Examples of theories to use when understanding environmental conditions for promoting health may include 'social cognitive theory', 'theories of social support', and 'organisational development theory'. For describing both determinants of risk and protective behaviours and environments, the 'theory of planned behaviour', 'social cognitive theory', or the 'health belief model' may be used. The 'communication-persuasion matrix', 'organisational development theory', or 'conscientisation' may be used when finding methods to promote change in behaviours, determinants, and the environment. A combination of these theories may be necessary in school-based interventions, as seen in the conceptual framework of some interventions in sSA (e.g. Aarø et al., 2014). This research also highlights the usefulness of sexual scripts in understanding scenarios that could lead to risky sexual encounters. We recommend that such approaches be incorporated into school-based sexual health intervention planning in sSA.

3. Multi-component intervention approach.

The research reported here highlighted that broader, more structural approach may be needed to optimise the impact of sexual health interventions in sSA. In addition to sexual health education, interventions should address: (1) structural factors in schools; (2) economic dependence of young women on men; (3) cultural beliefs and practices; (4) open communication about sex between young people and between adults, parents, and young people; (5) out of school young people, their families, and immediate community; and (6) sexual health matters through youth-friendly health services.

Other studies have also recommended this multi-faceted approach to sexual and reproductive health interventions for young people in developing countries (Fonner, Armstrong, Kennedy, O'Reilly & Sweat, 2014; Harrison, Newell, Imrie & Hoddinott, 2010; Woog & Kågesten, 2017). It may be unrealistic for an intervention to address all these factors; therefore, we recommend designers to identify and address the ones

most relevant to their context. Recent interventions that have adopted this approach have shown some promising results. For instance, a multicomponent PREPARE (Promoting sexual and reproductive health among adolescents in southern and eastern Africa—mobilising schools, parents and communities) intervention that consists of teacher-delivered and peer-led interventions, and interventions delivered by health care providers during youth-friendly clinic visits in Dar es Salaam, Tanzania, showed some positive effects on condom use behaviour (Mmbaga et al., 2017). However, a variant of the intervention implemented in Cape Town, South Africa that addressed sexual health and intimate partner violence found no difference in sexual risk behaviours between the intervention and control arms of the study (Mathews et al., 2016). Other social and environmental factors that undermine young people's sexual health not addressed in the intervention could explain the lack of impact (Mathews et al., 2016). The importance of these environmental contextual factors is evidenced in SATZ where the same intervention showed different effects in three different settings. The best intervention effects were seen in Dar es Salaam, some effects on mediators in Limpopo, and limited effects in Cape Town (Mathews et al., 2012). Factors such as competing ongoing campaigns on HIV/AIDS might have diluted the controls in Cape Town and Limpopo, which could explain some of the differences. This underscores the importance of careful consideration of the most relevant factors during intervention development and evaluation.

Implementation

4. Facilitator training.

Guidance for the implementation of curriculum-based sexual health/HIV education programmes recommends training of educators as essential for successful implementation (Denford et al., 2016; Kirby et al., 2006). Such training should be participatory and boost educators' confidence in delivering potentially sensitive sexually-related materials. Pre-intervention and ongoing training are important in sSA, and could help with the rapid educator turnover observed in that context (Aarø et al., 2014; Renju et al.,

2010). This research has also shown how the cascade of staff training could assist in training a large number of educators for the successful roll out of sexual health interventions in sSA.

5. Combination of facilitators.

Effective sexual behaviour change must promote the participation and involvement of young people that includes peer education approaches (Aarø et al., 2014; Ahmed et al., 2006). This study indicated that the implementation of sexual health programmes in sSA may be more successful if both teachers and peer educators deliver activities. The peer support could be minimal as seen in the MkV intervention in Tanzania (Obasi et al., 2006).

6. Duration of implementation.

Repeated exposure to intervention activities is necessary for sustaining and maintaining sexual behaviour change (Ngugi, Wilson, Sebstad, Plummer & Moses, 1996; Orleans, 2000). We found that interventions delivered over at least two school sessions/academic years are more likely to be effective. We recommend intervention designers to spread activities over such a period to ensure repeated exposure to intervention activities.

7. Fidelity of implementation.

Implementation of all intervention activities with reasonable fidelity is one of the characteristics of effective sex and HIV prevention interventions (Kirby et al., 2006). In sSA, intervention designers could improve fidelity of implementation by providing simple, detailed, and structured lesson plans, which can be used by facilitators with minimal training. Furthermore, monitoring with supportive supervision could also help with the fidelity.

Evaluation

8. Survey techniques to improve the validity of young people's sexual behaviour data.

Several studies have raised concerns regarding the validity of young people's self-reported sexual behaviour data, and some have provided ways to overcome them (Plummer et al., 2004; Sheeran & Abraham, 1994). This study has shown that the validity of data obtained during surveys may be improved by the use of computerised audio devices for data collection. Other studies have found computer-assisted surveys to have increased completeness of questions and lower social desirability bias on reporting sexual behaviours than face-to-face paper and pen surveys (Beauclair et al., 2013; Langhaug, Sherr & Cowan, 2010; Spark et al., 2015). The method was also found to be cheaper, feasible, acceptable, and user-friendly, even in developing countries (Langhaug et al., 2010).

For example, in the Dominican Republic, where sexual activity is perceived as normative and socially acceptable for young adults, the interviewer-assisted methods (face-to-face interviews and computer-assisted telephone interview) were found to significantly increase reporting of sensitive questions over self-administered methods, including audio computer-assisted survey interviewing (Vivo et al., 2017).

Furthermore, another review found that face-to-face interviews are not necessarily inferior to non-face-to-face interviews in increasing reporting of sensitive sexual information. The review found variation in reporting to be associated with the population characteristics and the outcomes (Phillips, Gomez, Boily & Garnett, 2010). Therefore, intervention designers should carefully assess their participants in order to select the most appropriate survey method for data collection.

Evaluators should also consider qualitative interviews and ethnography to validate and complement quantitative surveys in sSA. This builds on Plummer et al.'s (2004) work, in which they compared five survey

methods on sexual and reproductive health information among young people in Tanzania. They concluded inconsistencies in young people's self-reported sexual behaviour data, and in-depth interviews seem to elicit more honest responses than face-to-face and assisted self-completion questionnaires. The complexity, nature, and depth of sexual behaviours could be explored further by participant observation methods (Plummer et al., 2004). Although participant observation and qualitative interviews may not be possible on a large scale, we suggest their use in evaluating school-based sexual health interventions, where possible.

6.4: Implications for research

This research has shown that school-based sexual health education can be effective in promoting self-reported condom use among young people in sSA. It has also identified a variety of features that may be associated with effectiveness. However, research questions remain. The implications for future research identified here relate to six research areas, namely: (1) designing experimental studies; (2) evaluating biomedical markers; (3) developing the best measures for self-reported condom use; (4) evaluating and/or reporting implementation processes; (5) developing school-based interventions together with other community interventions; and (6) researching structural factors that must be addressed in school-based interventions. These are described below.

1. Designing experimental studies.

Our systematic review highlighted a paucity of experimental studies on school-based sexual health interventions in sSA. With only 31 such evaluations identified in the entire sub-continent, future research must address this gap by designing and evaluating more experimental studies. This will provide further evidence for the effectiveness of such interventions and help identify which interventions are most effective in which contexts. Other researchers of young people's sexual health interventions have made similar calls (Mason-Jones et al., 2016;

Mavedzenge, Doyle & Ross, 2011; Michielsen et al., 2010; Paul-Ebhohimhen, Poobalan & Teijlingen, 2008). The studies should also include longer follow-up periods of at least 24 months, as sustaining safe sexual behaviour is more difficult than initiating it. In our review, 18 of the 31 interventions were followed-up for no longer than 12 months.

Many of the intervention trials identified used 'usual curriculum' as their control comparison but unfortunately did not document what type of sexual health education might have been delivered in these comparisons. Future trials need to provide details of the content of such usual curriculum comparisons to allow identification of the value-added components of the interventions. Future interventions should also assess effects based on gender and provide results aggregated by gender (Maticka-Tyndale, Wildish & Gichuru, 2010).

2. *Evaluating biomedical markers.*

The most objective way of assessing the impact of sexual health education interventions on STIs or pregnancy is the use of biomedical markers. However, only three of the 31 interventions included in the review measured STIs and/or pregnancy. Other studies in sSA and elsewhere also report lack of assessment of biomedical markers in young peoples' sexual health interventions, and recommend future interventions to report these (Harrison et al., 2010; Mason-Jones et al., 2016; Paul-Ebhohimhen et al., 2008). Further work is required to design and evaluate interventions that measure the effects on STI/HIV/pregnancy. Of course, an intervention may change beliefs, attitudes, motivations and even sexual behaviour patterns without impacting on STIs, for example, because rates of infection are too low for small effects to be detected. Nonetheless, if such interventions are to be supported by scarce public funds then assessment of their public health impact is needed.

Although there are many challenges in assessing biomedical markers in sSA regarding young people's sexual health studies, including lack of resources, cost, low incidence of HIV, and ethical issues, studies have demonstrated the feasibility of assessing the markers in resource-limited settings (Cowan et al., 2002; Everett et al., 2009). Moreover, one study has demonstrated the potential usefulness of other STIs such as HSV2 as a proxy for HIV, which has a relatively high incidence, and thus requires a smaller sample sizes than HIV (Behling, Chan, Zeh, Nekesa & Heinzerling, 2015). However, another review that evaluated HSV2 as a biomarker of sexual debut found it to have low transmission probabilities, and hence did not recommend its use (Bastien et al., 2012). Further resolution of these methodological issues is needed.

3. *Developing the best measures for self-reported condom use.*

Our review highlighted the heterogeneity in measures used to assess condom use in school-based sexual health interventions. Although most of the studies reported condom use at last sex, other studies reported consistent condom use in the last three or 12 months, or as a component of a sexual behaviour scale. There was a debate regarding the validity of condom use at last sex as a proxy for other condom use measures (Cantania et al., 2002; Rietmeijer, Lansky, Anderson & Fichtner, 2002) due to the absence of empirical evidence to support it. To the best of our knowledge, only one study attempted to validate the 'condom use at last sex' indicator empirically, and found it to be a valid proxy for longer period condom use behaviours (Younge et al., 2008). However, this study was conducted among African-American young women, making the applicability of its findings to other populations of young people questionable. Therefore, we suggest future endeavours in establishing a 'gold standard' measure of condom use (Sheeran & Abraham 1994). This will assist in establishing uniformity of the reporting of condom use measure, and facilitate comparison across school-based sexual health interventions.

4. *Evaluating and/or reporting implementation processes.*

Process evaluation studying the implementation context and mechanisms through which interventions may work is necessary to progress our knowledge of *how* an intervention works and *for whom* (Moore et al., 2015). This doctoral research found few interventions that conducted and/or reported their implementation processes, which made it difficult for us to understand ‘how’ and ‘why’ the interventions worked or did not work. The following areas of process evaluation are relevant to school-based sexual health interventions: understanding contextual factors that shape young people’s sexual behaviours and potential interactions with intervention activities; intervention delivery (how and who should deliver intervention) and interactions between participants and facilitators; and interactions between intervention activities and ecological (school or community-level) factors.

Potentially relevant social science approaches that could assist in addressing contextual issues and methodological difficulties are underutilised in process evaluations of behaviour change interventions (Morgan-Trimmer, 2015), including school-based sexual health interventions. The importance of some of these approaches has been highlighted in the case studies and qualitative study in this project. Mixed method evaluations utilising both quantitative and qualitative data would assist in understanding the processes of implementation of school-based sexual health interventions. Specific areas to explore could include: (i) issues regarding comfort/confidence of the facilitators with intervention content; (ii) students’ engagement with intervention activities; (iii) delivery methods, including teaching techniques and fidelity; (iv) structural factors in schools that could affect intervention delivery and sustainability; and (v) contextual social and cultural factors (e.g. facilitating or conflicting cultural beliefs and practices).

Qualitative interviews and participant observations can provide detailed understanding of how interventions may work. Interviews with teachers or facilitators and students would provide in-depth understanding of their engagement with the intervention activities. Observations of lessons and students' notebooks would provide information on teaching techniques and fidelity of implementation. Finally, ethnography can provide an understanding of structural factors in a school environment as well as other socio-cultural contextual factors that affect intervention implementation. Future evaluations of sexual health interventions should employ these approaches in their process evaluations.

5. *Developing school-based interventions together with other community interventions.*

The single and multiple case studies in this doctoral programme have shown that it may not be possible to change young people's sexual risks if they are targeted with sexual health education in isolation. A school-based intervention embedded in a more intensive community sexual health programme that addresses the risks and norms of out-of-school young adults and parents may be a more effective way to shape young people's sexual behaviours. Further work is required to determine how best to develop and provide school-based sexual health education as a component of community-wide programmes. Several researchers have made similar calls (e.g. Coates, Richter & Caceres, 2008; Hankins & de Zaluondo, 2010; Shackleton et al., 2016; Wight, Plummer & Ross, 2012).

6. *Researching structural factors that must be addressed in school-based interventions.*

This doctoral research and other previous studies (e.g., Aarø et al., 2014; Patton et al., 2016; Shackleton et al., 2016; Wight et al., 2012) have identified the need to address structural factors such as school policy, underlying poverty, gender power inequities, and other social norms for maximum impact of sexual health interventions on young people's sexual

health and well-being. Some of these factors have been addressed in isolation with variable impacts, including: addressing poverty through conditional cash transfer to girls (Baird, Garfein, McIntosh & Özler, 2012); an education subsidy programme in the form of free school uniforms (Duflo, Dupas & Kremer, 2015); school-based healthcare provision (Ethier et al., 2011; Kirby, Waszak & Ziegler, 1991; Kisker & Brown, 1996); incentives in the form of school fees and cash transfers (Baird, Chirwa, McIntosh & Özler, 2010); school support including fees, uniforms, exercise books, and other school supplies (Hallfors et al., 2011); and cash transfers to households under the agreement that children attend school and that family members obtain health care (Stecklov, Winters, Todd & Regalia, 2006).

In contrast, further studies have provided multicomponent interventions that address sexual health education with other structural interventions, with more promising results. These include: HIV education and education subsidy (Duflo et al., 2015); peer resources and school environment, school organisation, parent education, staff development (and curriculum organisation) and school community linkages (Basen-Engquist et al., 2001; Kirby et al., 2004; O'Donnell et al., 2002); classroom-based discussions of experiences, supervised community volunteering, and discussion/activities related to key social-developmental tasks of adolescence (Allen, Philliber, Herrling & Kuperminc, 1997); preschool education and teacher home visits (Berrueta-Clement, 1984); support for remaining in school (including an incentive), participation in informal education and livelihood training, and community engagement through 'community conversations' (Erulkar & Muthengi, 2009); and school-based HIV education and intimate partner violence (Mathews et al., 2016). Further research is needed to identify the most important structural factors to be prioritised in school-based sexual health interventions.

6.5: Conclusions

The research reported in this thesis shows that school-based sexual health education interventions can promote safer sexual behaviours and improve sexual health. School-based sexual health education can be an effective strategy for promoting self-reported condom use in sub-Saharan Africa. However, we found no evidence of beneficial or harmful effects of the interventions on incidence or prevalence of sexually transmitted infections, including HIV. This research highlights the influence of structural factors in schools, including school infrastructure, quality of teaching, staff turnover, and school policy, on the effectiveness of school-based sexual health interventions. The impact of social and cultural contextual factors on young people's sexual behaviours calls for a holistic approach beyond education and health sectors. Multicomponent interventions providing sexual health education and targeting other contextual factors are more likely to be effective. Some of these contextual factors include: structural factors in schools; economic dependence of young women on men; cultural beliefs and practices, including gender inequities; open communication about sex between young people and between adults, parents, and young people; out of school young people, their families, and immediate community; and sexual health matters through youth-friendly health services. The studies in this doctoral project collectively provide specific recommendations that could improve the design, implementation, and evaluation of sexual health interventions in sub-Saharan African schools. Intervention designers, implementers, and evaluators should consider these recommendations for future interventions, and assess the impacts on STI/HIV using biomedical markers.

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**Design, implementation, and evaluation of school-based sexual
health education interventions in sub-Saharan Africa**

(Appendices)

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Appendix 2. 1: Review protocol

School-based sexual health education interventions for prevention of sexually transmitted infections in sub-Saharan Africa

Background

Over one million cases of sexually transmitted infections (STIs) occur daily worldwide, with approximately 500 million people living with curable STIs including Chlamydia, Gonorrhoea, Syphilis and Trichomoniasis (WHO, 2013). STIs are the most common cause of health care visits and in developing countries, it causes significant loss of productivity to individuals and communities due to high prevalence (CDC, 2008). The burden is more in Africa where around 70% of world infections occur (Albini et al, 2013). Adolescents and young adults are among the high risk group with about half of new Human Immune Deficiency Virus (HIV) infections occurring in individuals aged 15-24 (Fonner, Armstrong, Kennedy, O'Reilly, & Sweat, 2014), more than 90% of which are acquired through sexual transmission. This is partly because adolescents are becoming sexually active at younger age worldwide with rapid change of partner which enhances the spread of STIs (Schaalma, Ph, Abraham, Gillmore, & Kok, 2004).

School-based sexual health education (SBSHE) is arguably the most comprehensive, uniform, universal and effective way of promoting sexual health among adolescents and young adults (Schaalma et al., 2004). It is also viewed as a necessary step in halting the spread of STIs to the general population (Gallant & Maticka-Tyndale, 2004). The interventions aim to increase knowledge and awareness about STIs, which subsequently increase healthier behaviours like self-efficacy, consistent use of condom and delay onset of sexual activity (Burazeri, Roshi, & Tavanxhi, 2004; Lindberg & Maddow-Zimet, 2012; Wellings et al., 2006). Several studies have reported efficacy of SBSHE in reducing risky sexual

behaviours among adolescents and young adults. Pual-Ebhohimhen et al (2008) found such interventions to increase knowledge but with least effect on actual behaviour change in sub-Saharan Africa. However, Napierala Mavedzenge et al (2010) found a clear reported evidence of decrease in risky sexual behaviours. Comprehensive SBSHE interventions with community component were found to be more effective than abstinence-only interventions in developing countries (Fonner et al, 2014).

Previous reviews of interventions to prevent STI/HIV among adolescents and young adults have been conducted in sub-Saharan Africa. While some of these reviews were not focused on school-based interventions or are restricted to HIV prevention only (Michielsen et al., 2010; Michielsen, Chersich, Temmerman, Dooms, & Van Rossem, 2012; Napierala Mavedzenge, Doyle, & Ross, 2011; & Wamoyi et al., 2014) , others are quite out of date (Medley et al, 2009; Ross et al, 2006; Paul-Ebhohimhen, Poobalan, & van Teijlingen, 2008). The reviews by Fonner et al (2014) and Amaugo et al (2014) are very recent and include only school-based interventions. However, the former include other developing countries outside sub-Saharan Africa and the latter focused only on one country (Nigeria). None of the reviews on SBSHE looked at the implementation factors that led to success or failure of the included interventions including fidelity of implementation.

There is clearly need for a review because Fonner's et al (2014) review 'missed' some potentially eligible articles which are in Amaugo's et al (2014) despite the fact that they were published within the same search year. Therefore, this makes the comprehensiveness and hence the generalizability of the findings questionable. In addition, the review by Paul-Ebhohimhen et al (2008) is somewhat out-dated. This review will be comprehensive and update previous reviews. It would also look at the

features that are associated with effective interventions and implementation processes including fidelity.

This review aim to answer the following questions:

1. How effective are school-based sexual health education interventions in sub-Saharan Africa in promoting condom use and preventing sexually transmitted infections?
2. What characterizes effective school-based sexual health education interventions implemented in sub-Saharan Africa?
3. Are school-based sexual health education interventions implemented with fidelity in sub-Saharan Africa?

Criteria for considering studies for this review

Study design: Randomised controlled trials including cluster-randomised trials (schools or classrooms) and crossover trials will be included. Quasi-experimental designs will also be considered. The comparison can be usual intervention or nothing. Systematic reviews and review of reviews will be used to identify other trials. Other study designs will be excluded because of their potential for bias, which may lead to misleading evidence (Cochrane, 2014).

Participants: Children, adolescents and young adults in sub-Saharan Africa between the ages of 4 and 24 without restriction to any sex, ethnicity or nationality; that range falls within World Health Organization (WHO) (2014) definition of young people. Interventions whose majority (80%) of the participants fall within this age range will also be included.

Interventions: Interventions that were delivered in school setting or had a component delivered in school aiming at preventing sexually transmitted infections including HIV and/or unwanted pregnancy will be included. The intervention can be peer or adult led and may use multifaceted approach involving family or community. Authors may be contacted for studies that met the inclusion criteria but do not report the implementation process or components of interventions.

Setting: Only studies that reported interventions that were conducted in sub-Saharan African primary or secondary schools will be included.

Outcomes: Studies will be included if STIs including HIV and/or condom use were the outcomes reported.

Search strategy

Electronic databases including Medline, PsycInfo, EMBASE, CINAHL, Web of Knowledge, The Cochrane Library, British Education Index/EBSCOhost, Australian Education Index/ProQuest, Education Research Complete/EBSCOhost and ERIC/ProQuest will be searched. Reference list of all included studies and identified similar reviews will be searched for additional studies that may be eligible. Google scholar and Science citation index will be used to identify more relevant citations from included studies. Contact with experts in the field will be made to ensure that all grey and unpublished studies are not missed. Hand searching of table of contents of relevant journals like Journal of Adolescent Health, Journal of Youth and Adolescence, AIDs and Behaviour, AIDS, AIDS Education and care, and AIDS care will be performed.

Search strategy will be developed using the population, intervention, outcome and design framework. To include as much articles as possible, no restriction on date of publication, however, only articles published in English will be included.

Study selection

The first reviewer will screen the title and abstract of the search results, and a second reviewer will check a randomly selected percentage. Full text of potential studies that met the inclusion criteria will be obtained. The first reviewer will assess full text of potentially eligible articles for inclusion and second reviewer will check another randomly selected percentage. A second reviewer will check all studies that met the inclusion criteria. *AC1* statistics introduced by Gwet (2002) and argued to be the most valuable and reliable tool for determining the extent of inter-rater agreement will be used to assess the inter-rater reliability. Any controversy between the two reviewers will be resolved by discussion or seeking opinion of a third reviewer. Those that are excluded at this stage will be provided in a table of excluded studies together with reason(s) for exclusion. Attempt will be made to contact authors of potentially eligible studies that are unclear for clarification.

Study quality

The Cochrane Collaboration Tool of Bias will be used to assess the quality of included trials, which is a domain-based evaluation that give critical assessment of each domain that bias may arise (Cochrane, 2011). This tool has the advantage of encouraging user to tailor to given scenario and adds to transparency in addition to emphasis on conduct rather that

report, unlike most scales and checklists. Each domain is judged as 'low' 'moderate' and 'high' of bias using the Cochrane tool.

Data management

Endnote reference manager will be used to sort, remove duplicates and store studies retrieved from the databases. This will make management of large number of articles easier and thus reduce mistakes.

Data extraction

Data will be extracted using a developed data extraction form, which will cover items that will help in answering the review questions. The first reviewer will extract data, which will be checked by a second reviewer to ensure accuracy. Data on the following will be extracted from the included studies: i) Author(s); ii) Setting; iii) characteristics of participants; iv) Detail of the intervention; v) implementation process of the intervention; vi) Duration and frequency of the intervention; vii) effectiveness of the intervention on outcome measures and period of follow-up; viii) makers of methodological quality; and ix) features of effectiveness. Attempts will be made to contact authors for missing or incomplete data.

Assessment of heterogeneity

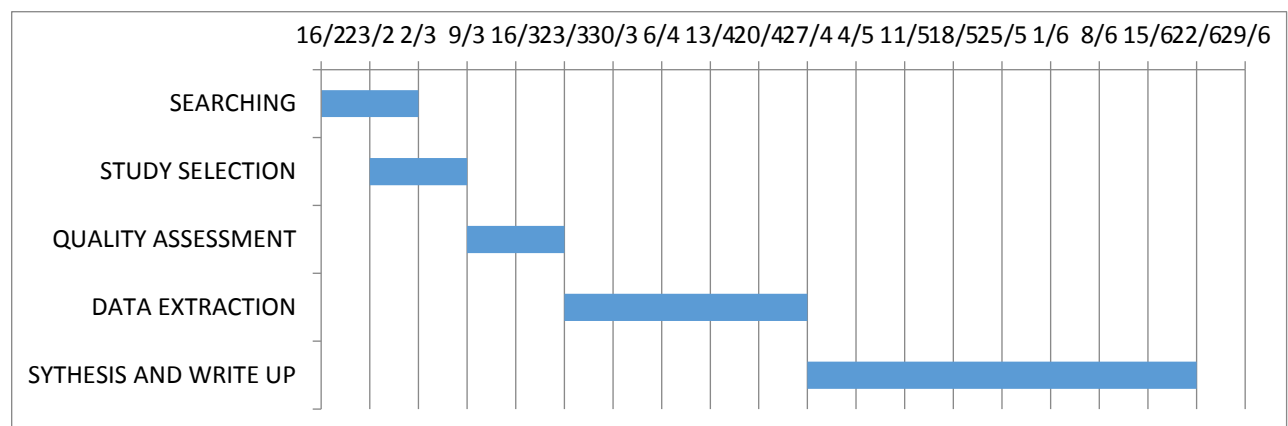
Random effect method instead of fixed effect method will be used to weight the studies if clinical and methodological diversity is found to be wide (Cochrane, 2011). Statistical heterogeneity will be tested using Chi² test with $P < 0.1$ and I² value of 25%, 50% and 75% as low, moderate and high heterogeneity respectively (Higgins et al, 2003). If high heterogeneity

is found, trials will not be statistically combined. Instead, attempts will be made to find possible clinical or methodological reasons for this variation.

Data synthesis

Meta-analysis may be performed with studies that report adequate information to enable the analysis. These analyses will be completed in Review manager 5.3 (Cochrane, 2014). For categorical or dichotomous data, odds ratios with 95% confidence intervals will be calculated. For continuous data, standardised mean differences and 95% confidence intervals will be calculated. Appropriate data conversions will be made if necessary. Studies that reported range and appear skewed will be excluded in the meta-analysis.

Project timetable



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Appendix 2. 2: Search strategy (for Medline which was modified and used in other databases)

Africa

1. "Africa" [MeSH]
2. Africa*[tw]
3. Algeria [tw]
4. Angola [tw]
5. Benin [tw]
6. Botswana [tw]
7. "Burkina Faso" [tw]
8. Burundi [tw]
9. Cameroon [tw]
10. "Canary Islands" [tw]
11. "Cape Verde" [tw]
12. "Central African Republic" [tw]
13. Chad [tw]
14. Comoros [tw]
15. Congo [tw]
16. "Democratic Republic of Congo" [tw]
17. Djibouti [tw]
18. Egypt [tw]
19. "Equatorial Guinea" [tw]
20. Eritrea [tw]
21. Ethiopia [tw]
22. Gabon [tw]
23. Gambia [tw]
24. Ghana [tw]
25. Guinea [tw]
26. "Guinea Bissau" [tw]
27. "Ivory Coast" [tw]
28. "Cote d'Ivoire" [tw]
29. Jamahiriya [tw]

30. Kenya [tw]
31. Lesotho [tw]
32. Liberia [tw]
33. Libya [tw]
34. Libya [tw]
35. Madagascar [tw]
36. Malawi [tw]
37. Mali [tw]
38. Mauritania [tw]
39. Mauritius [tw]
40. Mayotte [tw]
41. Morocco [tw]
42. Mozambique [tw]
43. Mozambique [tw]
44. Namibia [tw]
45. Niger [tw]
46. Nigeria [tw]
47. Principe [tw]
48. Reunion [tw]
49. Rwanda [tw]
50. "Sao Tome" [tw]
51. Senegal [tw]
52. Seychelles [tw]
53. "Sierra Leone" [tw]
54. Somalia [tw]
55. "South Africa" [tw]
56. "St Helena" [tw]
57. Sudan [tw]
58. Swaziland [tw]
59. Tanzania [tw]
60. Togo [tw]
61. Tunisia [tw]
62. Uganda [tw]

- 63. "Western Sahara"[tw]
- 64. Zaire[tw]
- 65. Zambia[tw]
- 66. Zimbabwe[tw]
- 67. "Central Africa**"[tw]
- 68. "West* Africa**"[tw]
- 69. "East* Africa**"[tw]
- 70. "North* Africa**"[tw]
- 71. "South* Africa**"[tw]
- 72. "sub Saharan Africa**"[tw]
- 73. "sub Saharan Africa**" [tw] or/ 1-74

Adolescent

- 74. Adolescent/
- 75. Adolescen\$.tw
- 76. Children/
- 77. Child*.tw
- 78. Teenager/
- 79. Teenager*.tw
- 80. Young Adults/
- 81. Young adult\$.tw
- 82. Young people.tw
- 83. Youth\$.tw
- 84. Student\$.tw
- 85. Pupil\$.tw
- 86. Schoolchildren.tw or /75-87

School, sex and education, sexually transmitted infection.

- 87. Schools/
- 88. Education/
- 89. Education.ti.
- 90. Teaching.ti.
- 91. Teach\$.tw

92. School\$.ti
93. School\$.ab.
94. Curricul\$.tw
95. (school\$ adj5 sex\$ adj5 (eduate\$ or promot\$ or intervene\$ or teach\$)).tw
96. Sexually transmitted diseases/
97. HIV/
98. Acquired immunodeficiency Syndrome/
99. Sexual behave*r/
100. Sex/
101. Chlamydia infections/
102. Gonorrhoea/
103. Chlamydia trachomatis/
104. Syphilis/
105. Trichomoniasis/
106. Health education/
107. Health risk behaviour.tw
108. life style/
109. Social education.tw
110. Intervention strategy\$.tw
111. Counsel\$.tw
112. Health intervention\$.tw
113. Social\$develop\$.tw
114. Education programme\$.tw
115. Lifeskill\$.tw
116. Resistance education.tw
117. Health education.tw
118. Multiple partner\$.ti,ab.
119. Condom\$.ti,ab. or condoms\$.ti,ab.
120. (sex\$ adj2 education\$).tw
121. (sex\$ adj3 transmit\$ adj (disease\$ or infection\$)).tw or/88-

#study design

122. Randomized controlled trials/
123. Controlled clinical trials/
124. Double-blind studies/
125. Single-blind studies/
126. Follow-up studies/
127. Comparative studies/
128. Evaluation studies/
129. Intervention studies/
130. Multicentre studies/
131. Program evaluation/
132. Case control studies/
133. Pilot studies/
134. Validation studies/
135. Random\$.tw Or/123-136.

Appendix 2. 3: Data extraction form

LEAD AUTHOR'S NAME	
DATE OF PUBLICATION	
TITLE OF ARTICLE	
TYPE OF PUBLICATION (Journal, conference abstracts etc.)	
JOURNAL TITLE	
COUNTRY OF INTERVENTION	
SOURCE OF FUNDING	
STUDY AIMS AND OBJECTIVES	
SCHOOL TYPE	
DEMORGRAHIC OF PARTICIPANTS (AGE, SEX , CLASS/GRADE)	
STUDY DESIGN	
DESCRIPTION OF INTERVENTION	
DETAILS OF INTERVENTION 1. Frequency/dose. 2. Duration. 3. Year(s) of intervention. 4. Theory or theories used.	
DETAILS OF CONTROL	

<p>DETAILS OF IMPLEMENTATION.</p> <ol style="list-style-type: none"> 1. Who delivered the intervention? 2. Was the instructor(s) trained? 3. Was the implementation monitored? 4. Was the intervention delivered as designed? 5. Challenges encountered during the implementation. 	
<p>OUTCOMES</p> <ol style="list-style-type: none"> 1. Primary outcomes <ul style="list-style-type: none"> • Condom use • Prevalence of STI/HIV/unwanted pregnancy. 2. Was the measurement objective or subjective (self-reported or investigator reported)? 3. Length of follow-up. 	

<p>RESULTS</p> <ol style="list-style-type: none"> 1. Statistical technique(s) used 2. Number of participants <ul style="list-style-type: none"> • Baseline/pre-intervention • Follow-up • Number of loss to follow-up/withdrawals 3. Summary of results. For each outcome reported, <ul style="list-style-type: none"> • Baseline • Follow-up 	
<p>AUTHOR'S KEY CONCLUSION</p>	

THE COCHRANE COLLABORATION'S TOOL FOR ASSESSING RISK OF BIAS

Domain	Evidence	Risk and score
<p>SELECTION BIAS</p> <ul style="list-style-type: none"> • Random sequence generation. • Allocation concealment. • Bias due to confounding 		
<p>PERFORMANCE BIAS</p> <ul style="list-style-type: none"> • Blinding of participants and personnel. 		

DETECTION BIAS <ul style="list-style-type: none"> • Blinding of outcome assessment 		
ATTRITION BIAS <ul style="list-style-type: none"> • Incomplete outcome data. 		
REPORTING BIAS <ul style="list-style-type: none"> • Selective reporting 		
OTHER SOURCES OF BIAS		

Overall score_____

Characteristics of effective interventions	Evidence
DESIGN RELATED <ul style="list-style-type: none"> • Need assessment and involvement of key stakeholders. • Adapting from other programs or curriculum that are found to be efficacious. • Theory-based. • Skilled-based. 	
IMPLEMENTATION RELATED <ul style="list-style-type: none"> • Provision of adolescents health services. • Distribution of condoms. • Activities outside school environment. • Training of facilitators. • Implementation of intervention with fidelity. 	

Appendix 2. 4: List of excluded studies with reasons for the exclusion

1. Aaro et al 2014: a study protocol.
2. Adeoam 2012: delivered in university.
3. Adam et al 2014: intervention delivered in university.
4. Adegbenro 2014: the participants are teachers (Conference abstract).
5. Adegbenro et al 2013: conference abstract and full article not obtained.
6. Adeomi et al 2014: outcome not of interest.
7. Adibe 2013: PhD thesis full text not available.
8. Agha 2001: setting not school.
9. Agha 2002: intervention reported in already included paper.
10. Agha 2002: the setting is not school.
11. Ahmed 2006: teachers training evaluated.
12. Ahmed et al 2007: educators' belief is assessed.
13. Ahmed et al 2009: teachers' survey.
14. Ajewole and Osagbane 2007: intervention in rural community not school.
15. Ajewole and Osagbemi 2007: The setting is youth centre (not school).
16. Akpabio et al 2009: outcome not of interest.
17. Amuago et al 2014: a systematic review.
18. Andrew 2001: intervention not delivered in school.
19. Arinze-onyia 2013: outcomes measured were knowledge and the use of emergency contraception.
20. Armistead et al 2014: intervention delivered at homes.
21. Baldo et al 2000: indicators developments only discussed in the paper.
22. Baptiste et al 2006: setting is not school.
23. Bastien et al 2008: the design is cross sectional.

24. Batist et al 2013: the setting is not school and participants are men who have sex with men (MSM).
25. Bekele and Ali 2008: pre and post-test study design.
26. Belle et al 2010: theory driven evaluation design article.
27. Bhana 2005: a power point presentation for conference.
28. Bing 2008: the participants were soldiers, and setting was a military base.
29. Bjorkman-Nyquist 2013: the setting is not school (conference poster).
30. Bogale et al, 2011: not in school setting.
31. Borgat et al 2011: setting is workplace, and participants are parents of adolescents.
32. Brown et al 2008: setting is university.
33. Buhari et al 2012: outcome not of interest.
34. Caldwell et al 2004: curriculum development, no outcome measured.
35. Cameron et al 2014: setting not schools.
36. Cameron Wolf et al 2000: not an intervention.
37. Cameronwolf et al 2002: measured number and characteristics of peer educators and their contacts.
38. Campbell and MacPhail, 2002: a longitudinal case study.
39. Card et al 2011: a description (not an intervention).
40. Chifunyise et al 2002: the intervention target school teachers.
41. Clark et al 2006: outcome not of interest.
42. Cluver et al 2013: a case-control study.
43. Cluver et al 2014: a prospective observational study.
44. Coffman et al: no control group (before and after intervention design).
45. Cowan et al 2002: evaluation studies.
46. Coyle et al 2012: setting not Africa.
47. Creese et al 2002: a cost effectiveness analysis.
48. Diane et al 2009: conference PowerPoint slides, and full text article not obtained.

49. DiClemente and Crosby 2009: a report (not evaluated intervention).
50. DiClemente et al 2014: setting not Africa.
51. Dilorio et al 2007: setting not Africa.
52. Doyles et al 2010: intervention reported in already included paper.
53. Duflo et al 2006: before and after intervention.
54. Dunbar et al 2010: setting not school.
55. Dunbar et al 2014: not in school setting.
56. Duong 2007: a cross sectional study.
57. Dupas et al 2012: conference abstract full text not accessible.
58. Ebersohn et al 2011: a longitudinal study.
59. Enah et al 2010: before and after study.
60. Epstein, et al 2010: a correspondence.
61. Erulka et al 2004: not in school setting.
62. Exner et al 2006: conference abstract and full text not obtained.
63. Fagen et al 2006: setting not Africa.
64. Feldman et al 1997: a cross sectional survey.
65. Fitzgerald et al 1999: outcome not of interest.
66. Foluso and odu 2010: intervention delivered in university.
67. Foss et al 2007: systematic review.
68. Fuller et al 2007: outcome measured not of interest.
69. Gallant and Maticka-Tyndale, 2004: systematic review.
70. Goesling et al 2014: systematic review.
71. Goeslins et al 2013: a systematic review.
72. Goldstein et al 2005: the setting not school.
73. Gudyanga et al 2013: a cross sectional survey.
74. Haglund 2008: setting is not Africa.
75. Hallman et al 2007: outcome not of interest.
76. Halfors et al 2015: Intervention not sex education.
77. Harrison 2004: intervention delivered during rural outreach.
78. Harrison et al 2010: a systematic review.

79. Hayes et al 2005: intervention reported in already included paper.
80. Hayes et al 2005: a description of intervention no outcome measured.
81. Heeren et al 2013: delivered in universities.
82. Helle et al 2013: intervention delivered in university.
83. Helleve et al 2011: a secondary data analysis.
84. Helpern et al 2008: outcome not of interest.
85. Hennin 2010: a cross sectional study.
86. Hermanns et al 2009: no control arm i.e. pre and post-test design.
87. Hervey et al 2000: the control group received a form of sex education.
88. Hogan et al 2005: a cost effectiveness analysis.
89. Hope 2010: the setting is workplace.
90. Horizon et al 2008: before and after design no comparison group.
91. Hosek, et al 2011: setting not Africa.
92. Irvin 2000: a discussion paper.
93. James Jacob et al 2007: a cross sectional secondary data analysis.
94. Jansen Van Rensburg 2007: the setting is not school.
95. Jemmott III et al 2010: setting not Africa.
96. Jemmott III et al, 2014: setting not school.
97. Jensen Van Rendurg 2007: outcome measured is gender based violence.
98. Jewkes et al 2006: rural communities (not school settings).
99. Jewkes et al 2008: intervention delivered in villages (not school setting).
100. Jewkes et al 2010: an opinion paper.
101. Jukes et al 2008: not an intervention.
102. Kaaya et al 2002: a systematic review.
103. Kafewo 2008: a description of an intervention.

104. Kajubi, et al 2005: setting not school.
105. Kalichman et al 2009: setting is not school.
106. Kamali et al 2002: not in school setting.
107. Katsinde et al 2011: a descriptive cross sectional survey.
108. Kaufman et al 2012: not in Africa.
109. Kaufman et al 2013: a conference poster and full article not obtained.
110. Kaufman et al 2013: a systematic review.
111. Keating et al 2006: intervention not in school.
112. Kellam et al 2008: the setting is Baltimore, USA.
113. Kennedy 2012: conferences abstract and the full article not obtained.
114. Kennedy et al 2012: reported only baseline data.
115. Kennedy et al 2014: a systematic review.
116. Kent et al 2005: intervention target health science students, and measure skills towards care for HIV patients.
117. Key et al 2008: setting not Africa.
118. Kim et al 2001: not in school setting.
119. Kimani et al 2012: before and after interventions.
120. Kinsman et al 2001: outcome not of interest.
121. Kirby et al 2008: a systematic review.
122. Klepp et al 1997: outcome not of interest.
123. Kuhn et al 1994: outcome not of interest.
124. Kumakech et al 2009: the outcome is psychological well-being.
125. Laneri 1996: intervention delivered in America.
126. Larke et al 2010: outcome measured is utilization of health services.
127. Lemma et al 2008: a cross sectional study.
128. Lightfoot et al 2007: not school setting.
129. Lupiwa et al 1996: a cross sectional survey.
130. Maclachlan et al 1997: outcome not of interest.
131. MacPhail et al 2013: outcome not of interest.

132. Madeni et al 2011: no comparison group in the study.
133. Magid et al 1998: delivered at homes or religious gatherings.
134. Magnani et al 2005: before and after intervention.
135. Mantell et al 2014: the control arm also receives a form of sex education
136. Maro et al 2009: outcome not of interest.
137. Maro et al 2009: setting is a youth centre though comparison group are in-school youths.
138. Mash et al 2012: setting is a church congregation.
139. Mason-Jones et al 2011: not an intervention.
140. Massey et al: outcome not of interest.
141. Mathews et al 1996: before and after intervention.
142. Maticka-Tyndale 2004: outcome not of interest.
143. Mbizo et al 1997: outcome not of interest.
144. Mbonye 2003: a cross sectional survey.
145. McCreary et al 2010: setting not school.
146. McCree-Hale et al 2012: a formative research and is a poster.
147. Meekers et al 2005: before and after intervention.
148. Michielsen et al 2012: a systematic review.
149. Michielsen et al 2010: a systematic review.
150. Miller et al 2008: pre and post-test, no control group.
151. Mitchell et al 2007: participants are out of school youths.
152. Mkumbo et al 2009: a description of intervention development.
153. Munodawafa et al 1995: outcome not of interest.
154. Muyinda et al 2004: setting not school.
155. Mwale 2008: a cross sectional survey.
156. Ndeki et al 1994: a cross sectional survey.
157. NIMS trial group 2010: the setting is not school.
158. Njau et al 2006: a descriptive cross sectional.
159. Njue et al 2009: pre and post, no control group.

160. Nyawasha et al 2013: setting not school.
161. O'donnell et al 2002: setting not Africa.
162. O'leary et al 2012: intervention already reported in another included study.
163. O'Donnell et al 1999: setting not Africa.
164. Odundo et al 2013: meeting abstract, and full text not obtained.
165. Okonkwo et al 2009: full article not obtained although request send to the author.
166. Ower et al 2004: an intervention description.
167. Paul-Ebhohimhen et al 2008: a systematic review.
168. Peltzer et al 2005: teachers' perspective studied.
169. Picot et al 2012: a systematic review.
170. Power et al 2004: no outcome measured (a description of intervention).
171. Quigley et al 2004: not in school setting.
172. Quirk et al 1993: intervention delivered in a health centre.
173. Reddy 2005: outcome not of interest.
174. Rotheram-Borus et al 2012: setting is a youth centre.
175. Saad et al 2012: delivered in universities.
176. Sabage et al 2014: a cross sectional survey.
177. Saca et al 2005: a cross sectional Survey.
178. Sacadura et al 2005: the article evaluates teachers' perception of the intervention.
179. sandøy et al 2012: setting not schools.
180. Scott-Sheldon et al 2013: a systematic review.
181. Sekoni et al: setting not school.
182. Sherman et al 1999: a cross sectional survey.
183. Shuey et al 1999: outcome not of interest.
184. Siegel et al 1995: intervention delivered in California, USA.
185. Siegel et al 1998: setting is not Africa.

186. Simonelli et al 2002: conference abstract and full text not obtained.
187. Small et al 2013: a systematic review.
188. Smit et al 2012: a conference poster, and full article not obtained.
189. Speizer et al 2001: intervention delivered in communities not in school setting.
190. Ssewamala et al 2010: outcome not of interest.
191. Stadler and Hlongwa 2002: setting not school.
192. Stigler et al 2006: outcome not of interest.
193. Stroeken et al 2012: a systematic review.
194. Sukati et al 2010: a descriptive study design.
195. Sweat et al 2011: setting not school.
196. Tindale et al 1997: health education not sex education delivered.
197. Todd et al 2013: a comparison of efficiency of different trial design.
198. Tortolero et al 2008: setting not Africa.
199. Townsend et al 2013: a systematic review.
200. Underwood et al 2005: setting not school.
201. Unicef Ghana 2002: setting not in school and no matched control.
202. Van der Straten et al 2010: setting not schools.
203. Van Reeuwijk 2009: not an intervention.
204. Van Rossem and Meekers 1999: setting not school.
205. Van-Velthoven et al 2013: a systematic review.
206. Visser 2005: before and after study.
207. Visser 2007: before and after study.
208. Visser et al 2004: before and after study.
209. Wanyama et al 2012: a clinic setting.
210. Wawer et al 1998: community setting (not school).
211. Wawer et al 1999: intervention not in school.

212. Wight et al 2012: intervention already included in another included study.
213. Wingood et al 2006: setting not Africa.
214. Wingood et al 2013: setting not schools.
215. Witte et al 1998: setting not schools.
216. Yankah et al 2008: a systematic review.
217. Ybarra et al 2013: the control group also received a form of sex education.
218. Yotebieng et al 2009: a cross-sectional secondary data analysis.
219. Zani et al 2011: a systematic review.
220. Zuch et al 2012: not an intervention.

Appendix 2. 5: Modified Cochrane Collaboration Tool for assessing risk of bias

Study	Selection Bias			Performance Bias	Detection Bias	Attrition Bias	Overall Score (Risk)
	Random Sequence Generation	Allocation Concealment	Bias Due to Confounding	Blinding of Participants and Personnel	Blinding of Outcome Assessment	Incomplete Outcome Data	
Aderibigbe and Araoye 2008	Not applicable	Not applicable	No statistically significant difference in the distribution between the study and the control group in age, sex, ethnic group or religion (Low) (0)	Not practical (Low)	Not practical (Low)	Number of loss to follow up was not reported (Unclear) (1)	1 (Low)
Agha & Rossem 2004	"...using a random generation process..." (Low) (0)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	The students missed at follow up do not resume in the term assessment was made and follow up rate is 86% (Low) (0)	0 (Low)

Ajuwon and Brieger 2007	Not applicable	Not applicable	There was statistically significant difference between the two arms of the study in age, baseline knowledge score for reproductive health which were not accounted for in the analysis (High) (2)	Not practical (Low)	Not practical (Low)	The number rose at follow up and explanation not given (unclear) (1)	3 (High)
Arnold et al 2012	The schools were randomly selected details not given (Unclear) (1)	Not reported (Low)	Not applicable	Not practical (Low)	Not practical (Low)	Number increased due to education reform in the state that encourage school enrolment (Low) (0)	1 (Low)
Atwood et al 2012	Randomisation mentioned but details not given (Unclear) (1)	Not practical (Low)	Not applicable	Not practical (Low)	Not practical (Low)	88% of the participants at baseline were reached at follow up (Low) (0)	1 (Low)

Brieger et al 2001	Not applicable	Not applicable	"...results showed gender differences in the total number of youth reached. Additional analysis was performed among the intervention youth at follow up to examine gender differences..." (Low) (0)	Not practical (Low)	Not practical (Low)	Loss to follow up not reported (Unclear) (1)	1 (Low)
Burnett et al 2011	Not reported (unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Loss to follow up is around 20% in each arm. Reason for attrition given which was statistically significantly different between the intervention and control group (Low) (0)	1 (Low)
Cowan et al 2010	Not reported (unclear) (1)	Not reported (Low)	Not applicable	Not practical (Low)	Not practical (Low)	Not reported (Unclear) (1)	2 (Moderate)
Cupp et al 2008	Not reported (unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Number lost to follow up not reported or accounted for in the analysis (Unclear) (1)	2 (Moderate)

Denison et al 2012	Not applicable	Not applicable	No statistically significant difference between the intervention and control group in age, gender, religion, current grade, orphan status and living situation (Low) (0)	Not practical (Low)	Not practical (Low)	Reason for attrition reported and loss to follow up is around 14% in both arm of the intervention (Low) (0)	0 (Low)
Esere 2008	Not applicable	Not applicable	Age, gender, and pre-test scores are used as covariates (Low) (0)	Not practical (Low)	Not practical (Low)	All participants retained at follow up (low) (0)	0 (Low)
Fawole et al 1999	Simple balloting used for randomisation (low) (0)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Reported but reason not given but loss to follow up is 3.8% in both arms (low) (0)	0 (Low)
James et al 2005	Not reported (unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	The dropout rate was 38.2% which was due to impending school examinations in both arms of the study. (High) (2)	3 (High)

James et al 2006	Not applicable	Not applicable	Age, gender, and language do not differ between the two arms but religion which was not included as an additional predictor in the design owing to the low count of non-Christians in certain schools. (Low) (0)	Not practical (Low)	Not practical (Low)	Dropout rate is 32.7%. (High) (2)	2 (Moderate)
Jemmott et al 2015	Computer generated number sequence used (Low) (0)	"...using concealment allocation techniques to minimizes bias ..." (Low)	Not applicable	Not practical (Low)	Not practical (Low)	Intention to treat analysis performed and loss to follow up is less than 10% in each arm of the study (Low) (0)	0 (Low)
Karnell et al 2006	Not applicable	Not applicable	Age was the only socio demographic factor found to differ between the two arms of the study and so controlled for in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Reported and accounted for in the analysis. Loss to follow up is less than 20% (Low) (0)	0 (Low)
Mason-Jones et al 2011	Not applicable	Not applicable	There was imbalance between the two arms of the study in socio-economic characteristics. Age, racially social group, baseline proportion and	Not practical (Low)	Not practical (Low)	Reason for loss to follow up given. Loss to follow up is 41.9% in the intervention arm and 36.4% in the	2 (Moderate)

			cluster were adjusted for in the analysis. (Low) (0)			control arm (High) (2)	
Mason-Jones et al 2013	Not applicable	Not applicable	Participants were fairly matched between the two arms on socio-economic characteristics. Baseline and clustering were adjusted in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Reason for attrition given and is equal for both intervention and control group. Loss to follow up is 30.6% (High) (2)	2 (Moderate)
Mathews et al 2012	"In Cape Town and Merkweng, one school in each pair was randomly allocated to the intervention arm of the study by putting the school names in a container, one pair at a time and drawing the one to be the intervention school" and random number table was	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Reason reported and the loss to follow up is less than 30% in each arm in all the three sites. (Low) (0)	0 (Low)

used in Dar es
slam (Low) (0)

Maticka-Tyndale et al 2007	Not applicable	Not applicable	Some demographic variables were different between the two arms of the study. However, all demographic variables, pre-post and control-intervention were controlled for in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Number seems to increase at follow up and reason not given (unclear) (1)	1 (Low)
Mba et al 2007	Schools were selected by basket methods of random sampling (Low) (0)	Not reported (unclear)	Not reported (Unclear)	Not practical (Low)	Not practical (Low)	Not reported (Unclear) (1)	1 (Low)
Menna et al 2015	Not applicable	Not applicable	Socio demographic characteristics like sex, age, religion and ethnicity were controlled for in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Loss to follow ups were 7.9% in the control group and zero percent in the intervention group (Low) (0)	0 (Low)

Michielsen et al 2012	Not applicable	Not applicable	Adjustment for propensity score was made and included in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Reason given and accounted for in the analysis. Retention rate is 71.8% at follow up (Low) (0)	0 (Low)
Okonofua et al 2003	Not reported (unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Not reported (Unclear) (1)	2 (Moderate)
Rijsdijk et al 2011	Not applicable	Not applicable	Age, gender, and control/intervention variables were used as covariates (low) (0)	Not practical (Low)	Not practical (Low)	Reason given and removed from the analysis. Loss to follow up is less than 30% in each arm of the study (Low) (0)	0 (Low)
Ross et al 2007	A computer programme was used for randomisation (Low) (0)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Reason for attrition given and appeared to be the same for both groups and more than 70% of participants were retained at follow up (Low) (0)	0 (Low)

Stanton et al 1998	"...randomly assigned using study identification number and a random numbers table" (low) (0)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Reason given and similar in each groups and 70% of the participants were retained at follow up (Low) (0)	0 (Low)
Taylor et al 2014	Not reported (unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Dropout rate is 16.6% and is more in the control group, details not given (Unclear) (1)	2 (Moderate)
Tibbits et al 2011	Randomly selected but no details (Unclear) (1)	Not reported (unclear)	Not applicable	Not practical (Low)	Not practical (Low)	Attrition was accounted for in the calculation. Attrition rate is about 38% at the final follow up (High) (2)	3 (High)
Van der Maas and Otte 2009	Not applicable	Not applicable	Age, sex, and residence are the confounders accounted for in the analysis (Low) (0)	Not practical (Low)	Not practical (Low)	Not reported (Unclear) (1)	1 (Low)

Ybarra et al 2013	"youth were then randomly selected by the research team using randomizer.org" (low) (0)	"Randomization to the intervention or control arm was executed using code embedded in the software program..." (low)	Not applicable	Not practical (Low)	Not practical (Low)	Retention rate is 93% at final follow up (Low) (0)	0 (Low)
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Note:

1. Selection bias due to confounding: A study was classified as 'low risk' of bias if it assessed the balance of confounders between the two arms of the study, and controlled for them in the analysis if not balanced.
2. Incomplete outcome data: We use an attrition rate of not more than 30% in each arm of the study at follow up to classify as 'low risk' of bias for the dimension of incomplete outcome data. Attrition rates of 30% and 40% are the cut off thresholds recommended for qualifying scientific rigour of effective and promising evidenced-based behavioural interventions respectively *.
3. All the remaining dimensions were assessed as described in The Cochrane Collaboration Tool for Assessing Risk of Bias.

*Amico KR. Percent total attrition: A poor metric for study rigor in hosted intervention designs. American Journal of Public Health. 2009; 99(9):1567.

Appendix 2. 6: Implementation details

Study	Implementer (s)	Training of instructors	Monitoring (including who did the monitoring and/or how it was done)	Fidelity	Challenges encountered during implementation
Aderibigbe and Araoye 2008	Not Reported (NR)	NR	NR	NR	NR
Agha and Rossem 2004	Peer educators	Yes (by professional peer educators)	NR	NR	NR
Ajuwon and Brieger 2007	Teachers and peer educators	Yes	Yes	NR	NR
Arnold et al 2012	Teachers, principals and peer educators	Yes (when funds are available)	NR	NR	NR
Atwood et al 2012	Health educators	NR	Yes (quality checklists were completed by co-facilitators to assess)	NR	NR

				fidelity and attendance).		
Brieger et al 2001	Peer educators	Yes		Yes (project monitored using a management information system and an organizational development and management checklist).	NR	NR
Burnett et al 2011	Teachers	NR		NR	NR	NR
Cowan et al 2010	School leavers as peer educators and nurse with other staff working in rural clinics.	Yes (peer educators were trained).		Yes (data on study and non-study activities were collected. Team of scientists made regular assessment of fidelity of implementation).	NR	It was initially intended for in-school and out of school youths but due to high school dropout and out migration it was shifted to the community.
Cupp et al 2008	Teachers and peer educators	Yes		NR	NR	NR

Denison et al 2012	Volunteer peer educators	Yes	NR	NR	NR
Eseré 2008	NR	NR	NR	NR	NR
Fawole et al 1999	A community physician and teachers.	Yes (teachers were trained)	NR	NR	NR
James et al 2005	NR	NR	NR	NR	NR
James et al 2006	Teachers	Yes	Yes	Not all schools delivered the whole intervention as designed.	NR
Jemmott et al 2015	Co-facilitators (who had worked as teachers or had previously taught HIV education)	Yes	NR	NR	NR
Karnell et al 2006	Teachers and peer educators	Yes	By periodic supervision by the research team and teachers were given forms to complete after each lesson.	Yes “although the pace of teachers’ implementation of programme varied, all teachers delivered the full curriculum in the prescribed time”.	NR
Mason-Jones et al 2011	Peer educators	Yes	NR	NR	NR

Mason-Jones et al 2013	NR	NR	NR	NR	NR
Mathews et al 2012	Teachers	Yes	Yes	Not all students received the whole lesson as designed, some teachers do not implement condom demonstrati on lessons and many of the teachers replaced the skills-based activities such as role plays and group work due to the large sizes of the class. However, other aspects of implementati on fidelity were judged as acceptable.	Some teachers were reluctant to implement lessons on condom use.
Maticka-Tyndale et al 2007	Teachers and peer supporters	Yes	Yes, done by quality assurance officers using 'teacher-	NR	NR

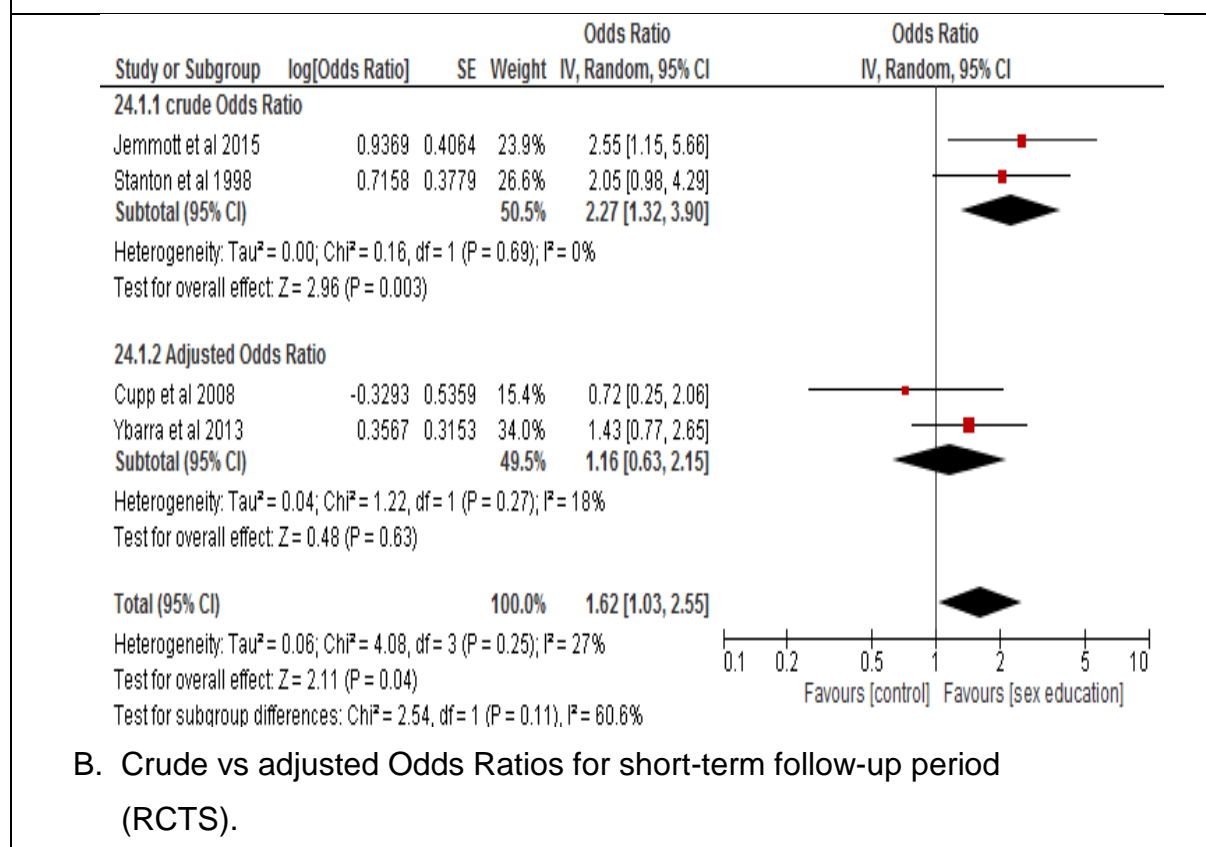
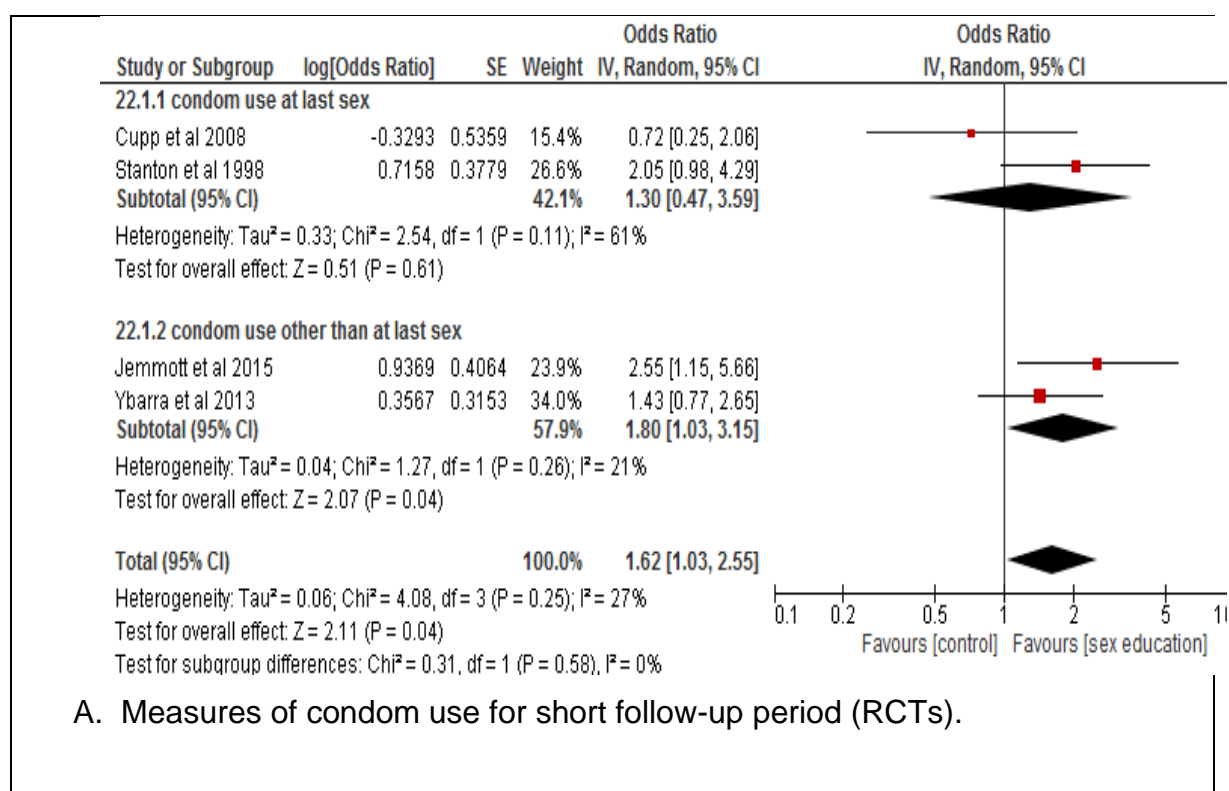
				implementation' and 'pupil implementation' scale.		
Mba et al 2007	Researcher	NR		NR	NR	NR
Menna et al 2015	Peer educators	Yes		Supportive supervision was done by the principal investigator in collaboration with the respective directors and/or deputy directors of the schools to monitor the effectiveness of the peer education programme.	NR	Nature of school programmes and scarcity of required resources; lack of free time and money; and lack of motivation among peer educators due to failure to positively address their request to pay for their transportation and refreshment were some of the challenges encountered.
Michielsen et al 2012	Peer educators	Yes		Yes, by coordinators from the organizers.	No	Internal problems in the organisation led to reduce training of peer educators at second half of the intervention and subsequently reduced activities.
Okonofua et al 2003	Peer educators delivered the school component of the intervention	Yes		NR	NR	NR

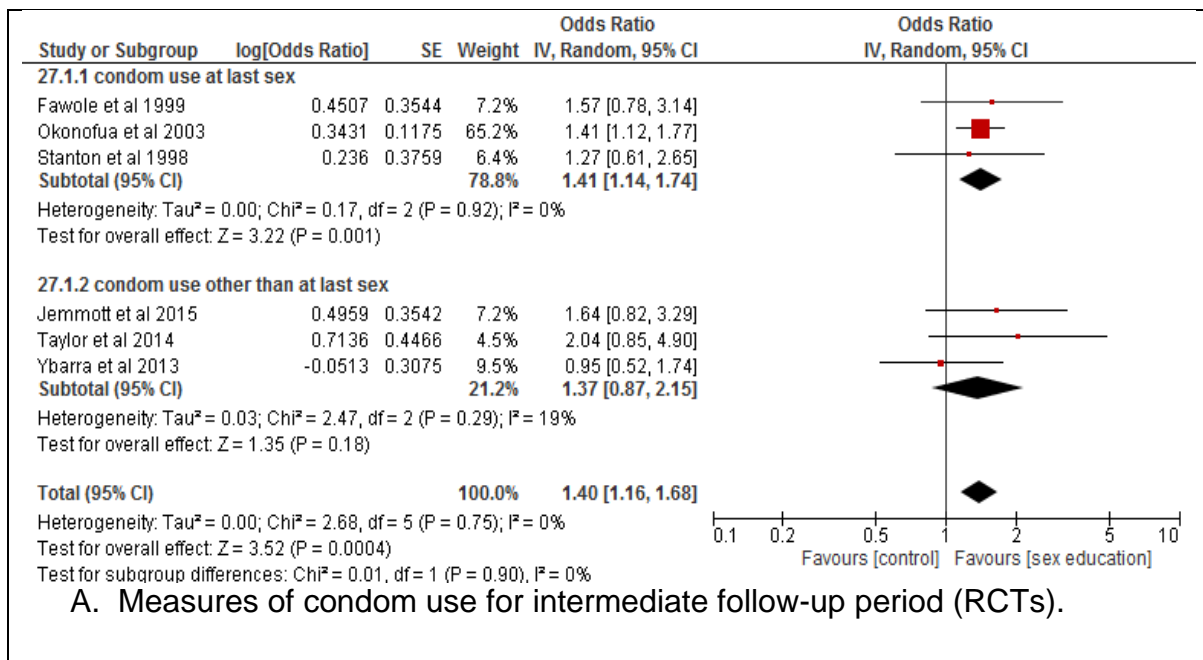
Rijsdijk et al 2011	Peer educators and teachers	Yes	Yes	Not all school delivered all the lessons or use manual as designed.	Poor availability of computers made some schools to deliver the intervention using printed materials.
Ross et al 2007	Teachers, peer educators, condom promoters/distributors	Yes	Yes (by government workers and staff member from African Medical Research Foundation).	Yes "...was implemented well and achieved high coverage."	NR
Stanton et al 1998	Volunteer teacher or out of school youth (student teacher or a youth who had completed grade 12)	Yes	Yes (facilitators complete evaluation questionnaire and observers visited class from time to time).	NR	NR
Taylor et al 2014	Trained young male and female facilitators	Yes	NR	NR	NR
Tibbits et al 2011	Teachers and youth development specialists.	Yes	NR	NR	NR
Van der Maas and Otte 2008	Trainers and peer educators	Yes	NR	NR	NR
Ybarra et al 2013	Self-administered but supervised by research assistants	NR	NR	Few modifications due to timing of the	NR

programme
were made.

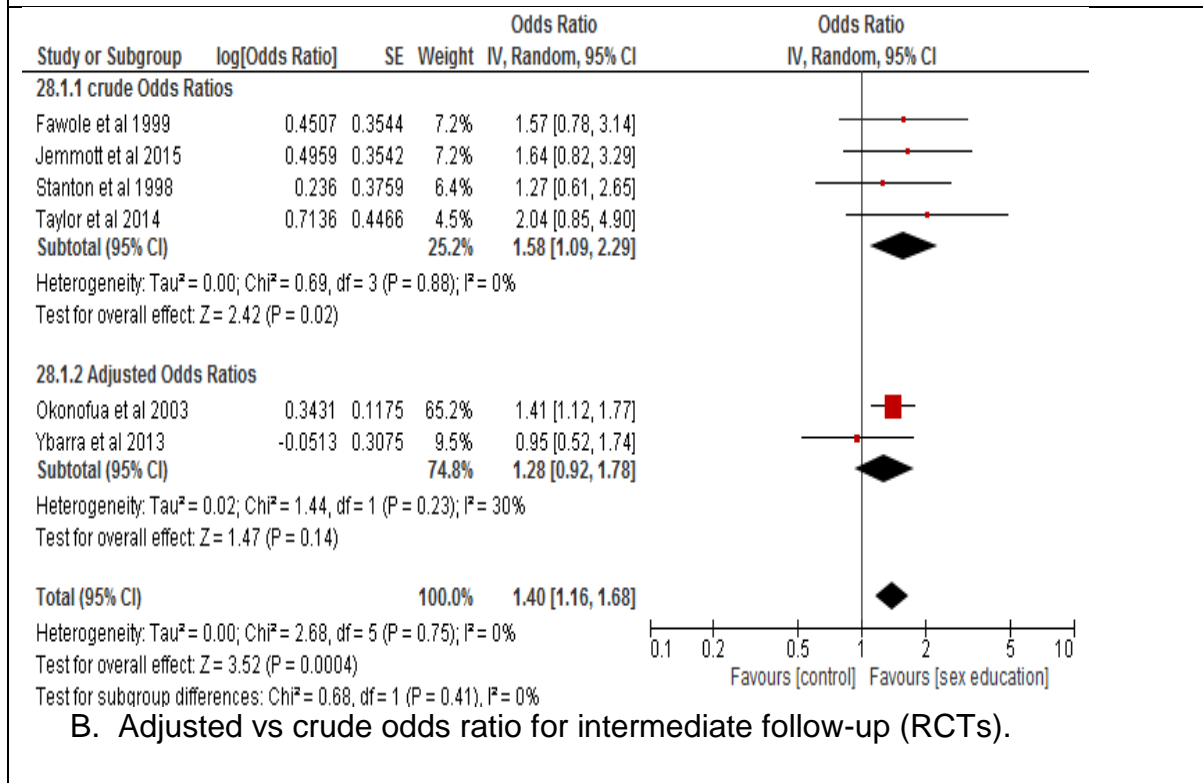
NR= Not reported.

Appendix 2. 7: Forest plots for sensitivity analyses

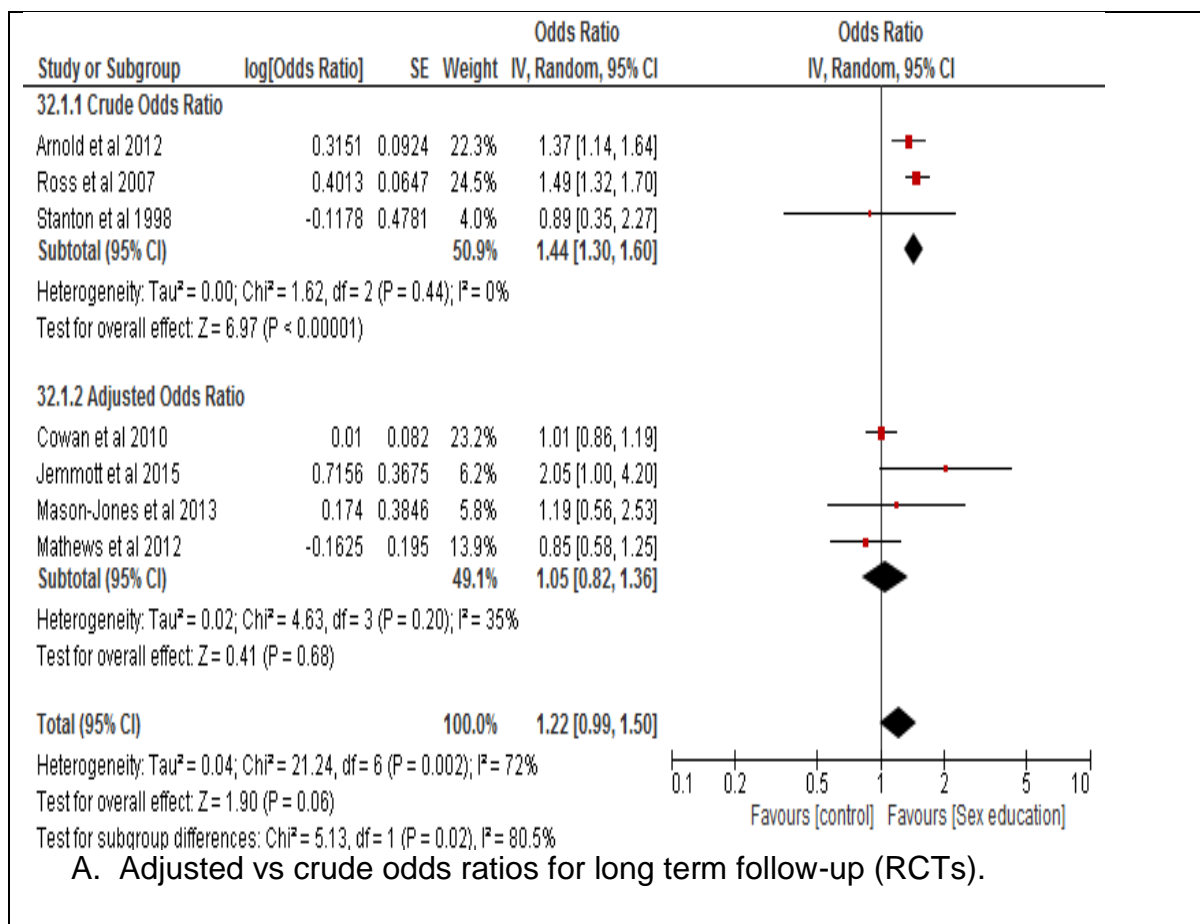




A. Measures of condom use for intermediate follow-up period (RCTs).



B. Adjusted vs crude odds ratio for intermediate follow-up (RCTs).



A. Adjusted vs crude odds ratios for long term follow-up (RCTs).

Appendix 3. 1: List of major actors and implementers

1. African Medical and Research Foundation (AMREF):

AMREF designed the intervention and in collaboration with the Tanzanian Ministry of Health (MoH) and Ministry of Education and Culture (MoEC), was responsible for its implementation. Key players include:

- a. Dr. Awene Gavyole (Programme coordinator)
- b. Ms. Bernadette Cleophas-Mazige (Intervention coordinator)
- c. Mr. Maende Makokha (Deputy intervention coordinator)
- d. Mr. Kenneth Chima (Health learning materials officer)
- e. Mr. Godwin Mmassy (Team leader for education)
- f. Ms. Rachel Alex (Youth intervention facilitator)
- g. Mr. Joseph Charles (Youth intervention facilitator)
- h. Mr. B. J. Mujaya (Regional education officer, Mwanza)
- i. Mr. Felix Mwinagwa (Zonal chief inspector for all schools in Lake Zone [four regions])
- j. Ms. Anna Mtani (Head teacher, Bugalama Primary School, Sengerema)
- k. Ms. Beatrice Venance (Teacher, Bugalama Primary School)
- l. Ms. Restituta Kasaka (Clinical officer, Inchange Katunguru Health Centre)
- m. Ms. Anastazia Mtebe (Public health nurse, Katunguru Health Centre)
- n. Mr. Shadrack Mrutu (Health worker)
- o. John Mulunga (Acting ward education coordinator and head teacher of Katunguru Primary School)

2. (Tanzanian) National Institute for Medical Research (NIMR):

NIMR was responsible for designing and implementing the impact, process, and cost-effectiveness evaluation of the programme. Key players include:

- a. Mr. John Chungalucha
- b. Dr. Joseph Chilongani
- c. Dr. Frank Moshia
- d. Ms. Rebecca Balira
- e. Dr. Gerry Mshana
- f. Dr. Joyce Wamoyi
- g. Mr. Zachayo Salamba Shigongo
- h. Ms. Kija Nyalali
- i. Dr. Jenny R. Renju
- j. Mr. Bahati Andrew
- k. Ms. Lemmy Medard
- l. Mr. Coleman Kishamawe
- m. Mr. B. Balthazar

3. London School of Hygiene and Tropical Medicine (LSHTM), Liverpool School of Tropical Medicine (LSTM) and Social and Public Health Sciences Unit, Medical Research Council, Glasgow:

These institutions secured the majority of funding for the programme and provided technical assistance to AMREF and NIMR. Key players include:

- a. Professor David Ross
- b. Dr Angela I.N. Obasi

- c. Professor Richard Hayes
- d. Professor Daniel Wight
- e. Dr. Mary Plummer
- f. Professor David C. Mabey
- g. Professor Heiner Grosskurth
- h. Mr. Jim Todd
- i. Ms. Alessandra Anemona
- j. Dr. Dean Everett
- k. Dr. Aoife Doyle
- l. Dr. Helen Weiss

Appendix 3. 2: Annotated timeline

DATE	EVENT	JUSTIFICATION FOR INCLUSION/RELEVANCE	REMARKS
Before 1996	Poor adolescent sexual and reproductive health	Increasing HIV/STIs prevalence among young people, increasing HIV-related deaths among youth aged 20-29 years, increasing prevalence of unintended pregnancy among girls with subsequent termination of their primary school education	Inflection point
1996-1997	Situation analysis and intervention framework development	<i>MEMA kwa Vijana</i> idea-generation and stakeholder collaboration with consensus of what went into the intervention	Innovation as a result of poor adolescent sexual and reproductive health
1996-1997	Resistance to condom demonstrations in the school education programme	Condom demonstrations in health centres on open day for youth and condom social marketing in communities	Inflection point/adaptation
1997-1998	Programme development and pilot testing	Modifications to the activities before trial	Feedback loop/adaptation
1999-2002	Implementation of trial (MkV1), process evaluation, impact evaluation	To assess impact of the programme on the anticipated outcomes and feasibility of implementation. Encouraging positive impacts on reproductive health	Feedback loop

	n within cluster randomised trial	knowledge and some reported behaviours	
1998-2002	Process evaluation	Further modifications because of the ongoing formative process evaluations	Adaptation
2003-2009	Scaling up implementation (MkV2)	Encouraging positive impacts on reproductive health knowledge and some reported behaviours	Facilitating factor
2005-2006	Government policy allowing condom demonstration in new school syllabus, and government launched a new youth-friendly service training manual	Condom demonstration included in school curriculum at the final year, and second phase of health care provider training was based on the new manual	Facilitating factor/adaptation
2004-2009	Process evaluation, formative research to expand community intervention and long-term impact evaluation with cross-sectional survey	Expansion of community activities	Adaptation

Appendix 3. 3: List of interviewees

<p>Professor David Ross</p>	<p>Professor of Epidemiology & International Public Health, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine.</p> <p>David Ross is also a Medical Officer working on adolescent health research and guidelines within the World Health Organization’s Maternal, Newborn, Child & Adolescent Health Department in Geneva. He led the preparation of the “Global Accelerated Action for the Health of Adolescents (AA-HA!): Guidance to Support Country Implementation”, which provides countries with detailed guidance on how to develop tailored, evidence-based, and coherent national plans for adolescent health.</p> <p>David Ross was one of the principal investigators in the development of the MkV intervention and the community randomised trials for impact evaluation of the project.</p>
<p>Professor Daniel Wight</p>	<p>Programme Leader (MRC/CSO Social and Public Health Sciences Unit) and Honorary Professor (Institute of Health and Wellbeing), University of Glasgow.</p> <p>Daniel Wight was a principal investigator for the HALIRA programme and led the qualitative process evaluation of the MkV intervention.</p>
<p>Professor Richard Hayes</p>	<p>Professor of Epidemiology & International Public Health, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine.</p>

	<p>Richard Hayes was one of the principal investigators and led the design of the MkV community-randomised trial.</p>
<p>Dr. Mary Plummer</p>	<p>Independent Consultant. Most recently, she completed a 10-month consultancy for the World Health Organization, working as the lead reviewer and writer for the “Global Accelerated Action for the Health of Adolescents (AA-HA!): Guidance to Support Country Implementation”.</p> <p>Mary Plummer was also the Social Science Coordinator for the MkV trial (1999-2002). In that capacity, she co-led quantitative impact evaluation and qualitative process evaluation of the MkV intervention.</p>

Note: It should be noted that effort was made to have the opinions of other project leaders and managers, but they were not able to participate in interviews. In addition, some of the documents reviewed in this case study were studies that included interviews with a wide range of stakeholders involved in the MkV intervention including:

1. District trainers and supervisors, regional and local government officials (Renju, Makokha et al., 2010)
2. ASRH-trained teachers (Renju et al., 2011)
3. Health workers and trainers (Renju, Andrew et al., 2010)
4. Class peer educators and pupils that participated in the MkV intervention (Plummer et al., 2007; Wamoyi et al. 2013)

Appendix 3. 4: List of project documents and publications

Books/Chapters

1. McIntyre P. Peer Educators Put Life Skills to the Test. pp24-27 in McIntyre P. Growing in Confidence: Programming for Adolescent Health and Development – Lessons from Eight Countries. Geneva; World Health Organization, 2002. (WHO/FCH/CAH/02.13 :).
2. AMREF, LSHTM and NIMR: MEMA kwa Vijana Program. Pp153-171 in Education and HIV/AIDS: a Sourcebook of HIV/AIDS Prevention Programme. New York; The World Bank, 2003.
3. Obasi AIN, Chima K, Cleophas-Frisch B, Mmassy G, Makokha M, Plummer ML, Kudrati M, Ross DA. 2004. MEMA kwa Vijana: Elimu ya Afya ya Uzazi kwa Schule Msingi. Kiongozi cha Mwalimu, Darasa la Tano. (Good Things for Young People: Reproductive Health Education in Primary Schools: Teacher's Guide for Standard 5). Dar es Salaam: Ben and Company, 80pp.
4. Obasi AIN, Chima K, Cleophas-Frisch B, Mmassy G, Makokha M, Plummer ML, Kudrati M, Ross DA. 2004. MEMA kwa Vijana: Elimu ya Afya ya Uzazi kwa Schule Msingi. Kiongozi cha Mwalimu, Darasa la Sita. (Good Things for Young People: Reproductive Health Education in Primary Schools: Teacher's Guide for Standard 6). Dar es Salaam: Ben and Company, 78pp.
5. Obasi AIN, Chima K, Cleophas-Frisch B, Mmassy G, Makokha M, Plummer ML, Kudrati M, Ross DA. 2004. MEMA kwa Vijana: Elimu ya Afya ya Uzazi kwa Schule Msingi. Kiongozi cha Mwalimu, Darasa la Saba. (Good Things for Young People: Reproductive Health Education in Primary Schools: Teacher's Guide for Standard 7). Dar es Salaam: Ben and Company, 84pp.
6. Obasi AIN, Chima K, Cleophas-Frisch B, Mmassy G, Makokha M, Plummer ML, Kudrati M, Ross DA. 2004. MEMA kwa Vijana: Elimu ya Afya ya Uzazi kwa Schule Msingi. Vielelezo vya Ziada kwa Ajili ya

Walimu, Darasa la Tano hada Saba. (Good Things for Young People: Reproductive Health Education in Primary Schools: Teacher's Resource Book for Standards 5 to 7). Dar es Salaam: Ben and Company, 42pp.

7. Plummer ML, Wight D. Young People's Lives and Sexual Relationships in Rural Africa: Findings from a Large Qualitative Study in Tanzania. Lexington Books, 2011.
8. Plummer ML. Promoting Abstinence, Being Faithful, and Condom Use with Young Africans: Qualitative Findings from an Intervention Trial in Rural Tanzania. Lexington Books, 2012.

Note: The 4 teacher's guides and resource books (Nos. 3-6 above) are also available as unpublished documents in English. Please contact David Ross at dross.rbridge@gmail.com).

Articles in refereed scientific journals

1. Obasi AI, Balira R, Todd J, Ross DA, Changalucha J, Mosha F, Grosskurth H, Peeling R, Mabey DCW, Hayes RJ. Prevalence of HIV and Chlamydia trachomatis infection in 15 to 19 year olds in rural Tanzania. *Trop Med Internat Hlth* 2001; 6:517-525.
2. Todd J, Changalucha J, Ross DA, Mosha F, Obasi AIN, Plummer M, Balira R, Grosskurth H, Mabey DCW, Hayes, R. The sexual health of pupils in years 4 to 6 of primary schools in rural Tanzania. *Sex Transm Infect* 2004; 80:35-42.
3. Crucitti T, Abdellati S, Ross DA, Changalucha J, Van Dyck E, Buve A. Detection of Pentatrichomonas hominis DNA in biological specimens by PCR. *Letters in Applied Microbiology* 2004; 38:510-516.
4. Plummer ML, Wight D, Ross DA, Balira R, Anemona A, Todd J, Salamba Z, Obasi AIN, Grosskurth H, Changlucha J, Hayes RJ.

- Asking semi-literate adolescents about sexual behaviour: the validity of assisted self-completion questionnaire (ASCQ) data in rural Tanzania. *Trop Med Internat Hlth* 2004; 9:737-754.
5. Plummer M L, Ross DA, Wight D, Chagalucha J, Mshana G, Wamoyi J, Todd J, Anemona A, Mosha FF, Obasi AIN, Hayes RJ. "A bit more truthful": the validity of adolescent sexual behaviour data collected in rural northern Tanzania using five methods. *Sex Transm Infect* 2004; 80 (Suppl II):ii49-ii56.
 6. Hayes R, Chagalucha J, Ross DA, Gavyole A, Todd J, Obasi AIN, Plummer ML, Wight D, Mabey DC, Grosskurth H. The MEMA kwa Vijana Project: Design of a community-randomised trial of an innovative adolescent sexual health intervention in rural Tanzania. *Contemporary Clinical Trials* 2005;26:430-442.
 7. Obasi AI, Cleophas B, Ross DA, Chima KL, Gavyole A, Plummer ML, Makokha M, Grosskurth H, Mabey DC, Hayes RJ. Rationale and design of an adolescent reproductive health intervention in Mwanza Region, Tanzania. *AIDS Care* 2006; 18(4):311-322.
 8. Plummer ML, Mshana G, Wight D, Wamoyi J, Salamba Z, Hayes RJ, Ross DA. 'The man who believed he had AIDS was cured': Treatment-seeking behaviour for general illness, sexually-transmitted infection, and AIDS in rural Mwanza, Tanzania. *AIDS Care* 2006; 18(5):460-466.
 9. Wight D, Plummer M, Mshana G, Wamoyi J, Salamba Z, Ross D. Contradictory sexual norms and expectations for young people in rural northern Tanzania. *Soc Sci Med* 2006; 62:987-997.
 10. Mshana G, Plummer ML, Wight D, Wamoyi J, Salamba Z, Ross DA. 'She was bewitched and caught an illness similar to AIDS': AIDS and sexually transmitted infection causation beliefs in rural Mwanza, Tanzania. *Culture, Health and Sexuality* 2006; 8:45-58.
 11. Plummer ML, Ingall T, Wamoyi J, Wight D, Mshana G, Nyalali K, Obasi AIN, Makokha M, Hayes RJ, Ross DA. Farming with your hoe

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**Policy Briefing Papers (see MEMA kwa Vijana Website
www.memakwavijana.org)**

1. Challenges and opportunities for the integration of lessons from MEMA kwa Vijana into the national level policy processes (Policy Briefing Paper: No. 1, March 2008)
2. Review of the National Multi-sectoral Strategic Framework for HIV/AIDS (Policy Briefing Paper: No. 2, March 2008)
3. Simulated Patient study to assess youth friendly service delivery in Mwanza region, Tanzania (Policy Briefing Paper: No. 3, March 2008)
4. School level baseline study (prior to MEMA kwa Vijana phase 2 implementation) (Policy Briefing Paper: No. 4, March 2008)

**Technical Briefing Papers (see MEMA kwa Vijana Website
www.memakwavijana.org)**

1. MEMA kwa Vijana: The whole picture (Technical Briefing Paper: No. 1, March 2008)
2. MEMA kwa Vijana 2 Proposal Summary (Technical Briefing Paper: No. 2, March 2008)
3. MEMA kwa Vijana Further Survey: Measuring the long term impact (Technical Briefing Paper: No. 3, March 2008)
4. Designing and developing community interventions (Technical Briefing Paper: No. 4, March 2008)

**Lessons from Mwanza (see MEMA kwa Vijana Website
www.memakwavijana.org)**

1. Screening trial participants for HIV and eligibility for ART (Lessons from Mwanza No.1, November 2007)

2. Use of personal digital assistants (PDA) for data collection in rural Mwanza, Tanzania (Lessons from Mwanza No.2, April 2008)

Other

1. Fox R. 2000. Tanzanian AIDS project works towards “good things for young people”. Lancet 355: 1703.
2. Good Things for Young People: MEMA kwa Vijana, Mwanza, Tanzania. EU Newshabari: Newsletter of the delegation of the European Commission to The United Republic of Tanzania 2002:4-5.

Appendix 3. 5: Interview topic guide (single case study)

I am interested in your views, as a stakeholder in *MEMA kwa Vijana* (MkV) intervention on factors that affect the success of implementation and sustainability of the programme. I have read and analysed documents of the intervention and based on my analysis, I have come up with some understanding of your intervention and I would like you to clarify, expand and/or elaborate where necessary.

Therefore, this interview will include two parts. The first part (part A) will involve clarification of my understanding of your intervention from the documents I have read, if necessary. The second part (part B) will be general questions on your views of 'what worked' in relation to your intervention and how we can generally improve effectiveness of school-based sexual health programmes in sub-Saharan Africa.

General questions – to be confirmed by participant

1. Respondent name, title, and affiliation?
2. What role did you play in the *MEMA Kwa Vijana* intervention?
3. What is the main purpose of the intervention?
4. What dates the intervention was introduced or implemented?
5. What was the target population (age group, grade level, rural or urban population)?

PART A:

Documents analysis results

PART B:

Questions related to implementation of the intervention

1. Were there any systemic factors that persistently affected the implementation of the MkV programme?
2. What were some of the barriers, if any, encountered during implementation? (e.g., lack of key support? Lack of technical assistance? Lack of evidence?)
3. When did [this challenge] first emerge? When this challenge emerged, were you surprised?
4. What risks were flagged at the design stage for this intervention, and what were the mitigation measures?
5. How did you first realize that this challenge posed a problem for your project?
6. What changes did you make to address this problem? How were the barrier(s) overcome?
7. How long did it take to implement measures to adjust course and address this problem?
8. Do you remember what key stakeholders argued for and against this adjustment? What were their reasons for doing so?
9. Of the challenges that we have discussed, which do you see as having emerged from local context beyond your control?

10. In retrospect, how do you think [this challenge or problem] might have been avoided?
11. In retrospect, what could have made [this implementation] even more successful?
12. What incentives influenced the behaviour of stakeholders?
13. Did some stakeholders change their position on the intervention (switching from championing it to opposing it, or vice versa)? Do you know why they did this?
14. What do you think explains your success in implementing the intervention, or otherwise?

Questions related to scaling up and sustainability of the intervention.

1. What or who are the drivers expected to push the scaling up process ahead? (Including local leaders or champions, external catalysts and incentives or community demand). How did the intervention develop or support the relevant drivers?
2. What barriers had to be removed or spaces created to allow the intervention to achieve the desired intermediate or final scale? How did the intervention aim to do this?
3. Was there an intermediating institution that facilitated the scaling up implementation process and, if yes, how effectively did it carry out this function? If not, would an intermediating institution have been useful?
4. What were the other challenges (if any) encountered during scaling up of the intervention? How did you overcome the challenges?
5. What is the present state of the MkV intervention? If sustained, what are the key factors ensuring the sustainability?

6. In your opinion, how do think we can generally improve the implementation and sustainability of school-based sexual and reproductive health interventions?

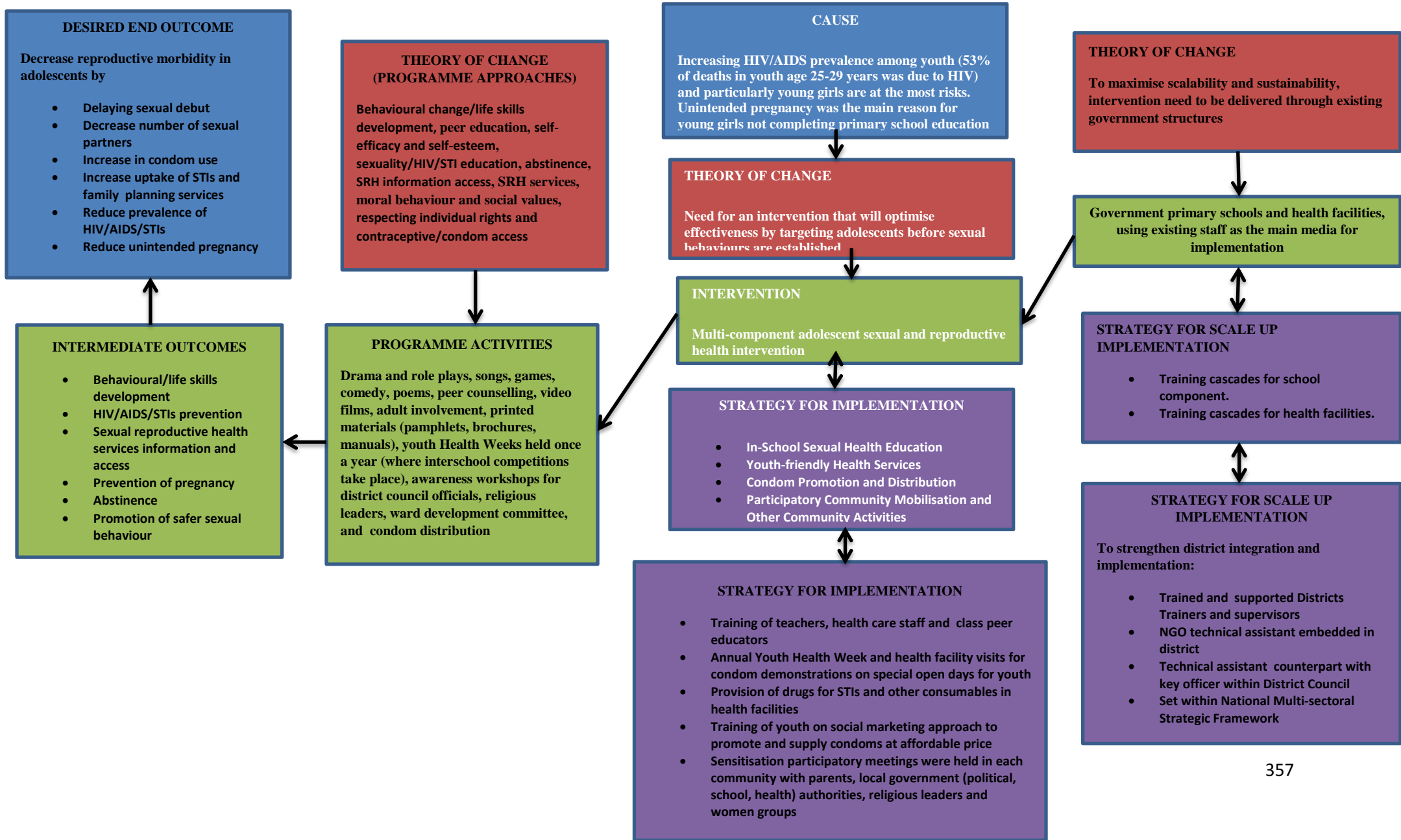
In addition, the following number of useful follow-up questions may be used across questions above:

- a. Can you give me some more detail about that?
- b. Can you tell me how you did that?
- c. Can you tell me what you did/was done next?
- d. What worked well/wrong? Please elaborate.
- e. What would you do differently next time? Why?
- f. Can you give me an example of that kind of action?
- g. Can you explain more about your/the reasons for arriving at that decision/conclusion?
- h. What were the impacts of that action or decision?

Thank you for your time today, is there anything you want to add before we finish? Who else do you suggest I should contact to get some more information on the intervention?

Finally, would you be happy for me to send you transcript of this conversation to receive your comments on its accuracy and identify any quotes you would wished to be attributed to you personally.

Appendix 3. 6: Process mapping of the *MEMA kwa Vijana* intervention



Appendix 4. 1: List of documents

Primary School Action for Better Health (PSABH)

A. Peer-reviewed articles

1. Maticka-Tyndale, E., Wildish, J. and Gichuru, M., 2007. Quasi-experimental evaluation of a national primary school HIV intervention in Kenya. *Evaluation and program planning*, 30(2), pp.172-186.
2. Maticka-Tyndale, E., Wildish, J. and Gichuru, M., 2010. Thirty-month quasi-experimental evaluation follow-up of a national primary school HIV intervention in Kenya. *Sex Education*, 10(2), pp.113-130.
3. Maticka-Tyndale, E., 2010. Sustainability of gains made in a primary school HIV prevention programme in Kenya into the secondary school years. *Journal of adolescence*, 33(4), pp.563-573.
4. Maticka-Tyndale, E., Mungwete, R., & Jayeoba, O. (2014). Replicating impact of a primary school HIV prevention programme: primary school action for better health, Kenya. *Health Education Research*, 29(4), 611-623.
5. Maticka-Tyndale, E., Gallant, M., Brouillard-Coyle, C., Holland, D., Metcalfe, K., Wildish, J., et al. (2005). The sexual scripts of Kenyan young people and HIV prevention. *Culture Health & Sexuality*, 7(1), 27-41.

B. Other project materials

1. Eleanor Maticka-Tyndale, PhD, Chris Brouillard-Coyle, MDiv, MA, Melanie Gallant, MA, Dan Holland, MA, Karen Metcalfe, MA. *Primary School Action for Better Health III: 12-18 Month Evaluation Volume I of II*. April 2004.

2. School Health Activity Guide. By Republic of Kenya Ministry of Education, Science, & Technology.
3. PSABH Course A&B: School and Community Training Notes.

C. Unpublished articles

1. Matthew Jukes, D.Phil., Stephanie Simmons Zuilkowski, Ed.M. Primary School Action for Better Health (PSABH) Case Study Part A.
2. Matthew Jukes. Questions on PSABH to Facilitate Preparation of Case Study.
3. PSABH Project Summary Excel Spread Sheet from Eleanor Maticka-Tyndale.

D. Others

1. Health Dialogue, Issue no. 1.
2. Health Dialogue, Issue no. 2.
3. Health Dialogue, Issue no. 3.
4. Heath Dialogue, Issue no. 4.
5. Health Dialogue, Issue no 5.
6. Believe in yourself: a song on HIV/AIDS awareness.
7. Ukimwi tuvute chini, "let us bring down aids": a poem.

School- And Community-Based HIV Prevention Interventions with Junior Secondary School Students in Edo State, Nigeria (HP4RY)

A. Peer reviewed articles

1. Maticka-Tyndale, Eleanor, and HP4RY Team. "Bridging theory and practice in HIV prevention for rural youth, Nigeria." *African Journal of Reproductive Health* 16.2 (2012): 39-53.
2. Dlamini, S. Nombuso, et al. "What does a decolonizing/decentralizing methodology in examining sexual lives entail?" *African Journal of Reproductive Health* 16.2 (2012): 55-70.
3. Dlamini, Nombuso, et al. "Empowering teachers to change youth practices: Evaluating teacher delivery and responses to the FLHE programme in Edo State, Nigeria." *African Journal of Reproductive Health* 16.2 (2012): 87-102.
4. Onokerhoraye, Andrew G., Eleanor Maticka-Tyndale, and HP4RY Team. "Meeting the challenges of North-South collaboration: The case of HIV prevention for rural youth, Edo State, Nigeria." *African Journal of Reproductive Health* 16.2 (2012): 127-146.
5. Omorodion, Francisca, et al. "The use of National Youth Service Corp members to build AIDS competent communities in rural Edo State Nigeria." *African Journal of Reproductive Health* 16.2 (2012): 71-86.
6. Arnold, Robert, et al. "Evaluation of school-and community-based HIV prevention interventions with junior secondary school students in Edo State, Nigeria." *African Journal of Reproductive Health* 16.2 (2012): 103-125.
7. Barnett, Jessica Penwell, Eleanor Maticka-Tyndale, and the HP4RY Team¹. "The gift of agency: Sexual exchange scripts

among Nigerian youth." *Journal of Sex Research* 48.4 (2011): 349-359.

B. Other project materials

1. Janet Wildish, May, 2012. Final Process Evaluation Report; Evaluation of HIV Prevention for Rural Youth, Nigeria HP4RY FINAL (One Volume Only) Process Evaluation Report.
2. Association for Reproductive and Family Health (ARFH), March 2013. Report of Global Fund Supported Phase I FLHE Implementation in Nigeria.

C. Others

1. HIV Prevention for Rural Youth (HP4RY) Nigeria. Power point presentation slides.
2. NERDC, March 2003. National Family Life and HIV Education Curriculum for Junior Secondary School in Nigeria.

MEMA Kwa Vijana Intervention (MKV)

Same as Appendix 3.4.

Health Wise South Africa (Healthwise)

A. Peer reviewed articles

1. Caldwell, Linda, et al. "Health wise South Africa: development of a life skills curriculum for young adults." *World Leisure Journal* 46.3 (2004): 4-17.

2. Smith, Edward A., et al. "Substance use and sexual risk prevention in Cape Town, South Africa: an evaluation of the HealthWise program." *Prevention Science* 9.4 (2008): 311-321.
3. Wegner, Lisa, et al. "Healthwise South Africa: cultural adaptation of a school-based risk prevention programme." *Health Education Research* 23.6 (2008): 1085-1096.
4. Tibbits, Melissa K., et al. "Impact of HealthWise South Africa on polydrug use and high-risk sexual behavior." *Health Education Research* (2011): cyr024.
5. Caldwell, Linda L., et al. "Understanding leisure-related program effects by using process data in the HealthWise South Africa project." *Journal of Park and Recreation Administration* 26.2 (2008): 146.
6. Caldwell, Linda L., et al. "Influencing adolescent leisure motivation: Intervention effects of HealthWise South Africa." *Journal of Leisure Research* 42.2 (2010): 203
7. Caldwell, Linda L., et al. "Translational research in South Africa: evaluating implementation quality using a factorial design." *Child & youth care forum*. Vol. 41. No. 2. Springer US, 2012.
8. Coffman, Donna L., et al. "Effects of HealthWise South Africa on condom use self-efficacy." *Prevention Science* 12.2 (2011): 162-172.
9. Miller, Jacqueline A., et al. "Was Bob Seger right? Relation between boredom in leisure and [risky] sex." *Leisure Sciences* 36.1 (2014): 52-67.
10. Patrick, Megan E., et al. "A qualitative assessment of South African adolescents' motivations for and against substance use and sexual behavior." *Journal of Research on Adolescence* 20.2 (2010): 456-481.

Promoting Sexual and Reproductive Health, School-Based HIV/AIDS Intervention in Sub-Saharan Africa (SATZ)

A. Peer reviewed articles

1. Flisher, Alan J., and Knut-Inge Klepp. "School-based HIV/AIDS prevention in sub-Saharan Africa." *Scandinavian Journal of Public Health* 37.2 (2009): 4.
2. Mukoma, Wanjirũ, et al. "Process evaluation of a school-based HIV/AIDS intervention in South Africa." *Scandinavian Journal of Public Health* 37.2 suppl (2009): 37-47.
3. Aarø, Leif Edvard, et al. "Promoting sexual and reproductive health in early adolescence in South Africa and Tanzania: Development of a theory-and evidence-based intervention programme." *Scandinavian Journal of Public Health* 34.2 (2006): 150-158.
4. Ahmed, Nazeema, et al. "Process evaluation of the teacher training for an AIDS prevention programme." *Health Education Research* 21.5 (2006): 621-632.
5. Mathews, Catherine, et al. "Predictors of early first sexual intercourse among adolescents in Cape Town, South Africa." *Health Education Research* 24.1 (2009): 1-10.
6. Ahmed, Nazeema, et al. "HIV education in South African schools: the dilemma and conflicts of educators." *Scandinavian Journal of Public Health* 37.2 suppl (2009): 48-54.
7. Mũkoma, Wanjirũ, et al. "Development and test—retest reliability of a research instrument designed to evaluate school-based HIV/AIDS interventions in South Africa and Tanzania." *Scandinavian Journal of Public Health* 37.2 suppl (2009): 7-15.
8. Mathews, C., et al. "Effects of the SATZ teacher-led school HIV prevention programmes on adolescent sexual behaviour: cluster randomised controlled trials in three sub-Saharan African sites." *International Health* 4.2 (2012): 111-122.

B. Others

1. "Promoting sexual and reproductive health. School-based HIV/AIDS intervention in Sub-Saharan Africa" A Research proposal.
2. Student-Workbook-Cape-Town.
3. Student-Workbook-Dar-es-Salaam.
4. Student-Workbook-Limpopo.
5. Teachers-Manual-Cape-Town.
6. Teachers-Manual-Dar-es-Salaam.
7. Teachers-Manual-pt.-1-Limpopo.
8. Teachers-Manual-pt.-2-Limpopo.

The *Regai Dzive Shiri* Project (RDSP)

A. Peer reviewed articles

1. Cowan, Frances M., et al. "The Regai Dzive Shiri Project: a cluster randomised controlled trial to determine the effectiveness of a multi-component community-based HIV prevention intervention for rural youth in Zimbabwe—study design and baseline results." *Tropical Medicine & International Health* 13.10 (2008): 1235-1244.
2. Cowan, Frances M., et al. "The Regai Dzive Shiri Project: results of a randomised trial of an HIV prevention intervention for Zimbabwean youth." *AIDS (London, England)* 24.16 (2010): 2541.
3. Cowan, Frances M., et al. "School based HIV prevention in Zimbabwe: feasibility and acceptability of evaluation trials using biological outcomes." *Aids* 16.12 (2002): 1673-1678.
4. Power, R., et al. "Developing complex interventions for rigorous evaluation—a case study from rural Zimbabwe." *Health Education Research* 19.5 (2004): 570-575.

School-Based Reproductive Health Education Program in Rural South Western, Nigeria (SBRHE)

A. Peer review articles

1. Ajuwon, Ademola J., and William R. Brieger. "Evaluation of a school-based reproductive health education program in rural South Western, Nigeria." *African Journal of Reproductive Health* 11.2 (2008): 47-59.

B. Other

1. Chapter four, results. Thesis Chapter.

Appendix 4. 2: Interview topic guide (multiple case study)

I am interested in your views, as a stakeholder in [name of the intervention] on factors that affect the success of the design, implementation and evaluation of the programme. I have read and analysed documents of the intervention and based on my analysis, I have come up with some understanding of your intervention and I would like you to clarify, expand and/or elaborate where necessary.

Therefore, this interview will include two parts. The first part (part A) will involve clarification of my understanding of your intervention from the documents I have read, if necessary. The second part (part B) will be general questions on your views of 'what worked' in relation to your intervention, and how we can generally improve effectiveness of school-based sexual health programmes in sub-Saharan Africa.

General questions – to be confirmed by participant

1. Respondent name, title, and affiliation?
2. What role did you play in the intervention?
3. What is the main purpose of the intervention?
4. What dates the intervention was introduced or implemented?
5. What was the target population (age group, grade level, rural or urban population)?

Part A:

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)

1. To what extent the curriculum was based on assessment of needs and asset of the target participants?

Intervention Mapping Step 2: Programme Outcomes and Objectives;
Logic Model of Change

2. To what extent did the curriculum focus on one of the reproductive health goals (prevention of STI, prevention of HIV and/or pregnancy)?
3. To what extent did the curriculum address specific behaviours that would lead to the reproductive goal(s)?
4. To what extent did the curriculum use a logic model?

Intervention Mapping Step 3: Programme Design;

5. To what extent did the curriculum identify and address psychosocial risk and protective factors?
6. To what extent did the activities are consistent with community values and available resources?
7. To what extent did health goals and teaching activities were adapted to the developmental age and sexual experience of the target participants?
8. To what extent was the intervention adopted from previous effective programmes?

Intervention Mapping Step 4: Programme Production;

9. To what extent did the process of developing or adapting the curriculum involve people from different backgrounds in behaviour change theory, adolescent and young adults' sexual behaviour, STI/HIV education, intervention design and evaluation?
10. To what extent did the curriculum include multiple activities matching specified mechanism to behaviour change technique?
11. To what extent did the curriculum include combination of teaching activities that are instructionally sound?

12. To what extent did the curriculum not address only abstinence?
13. To what extent did the curriculum address HIV/STI Knowledge?
14. To what extent did the curriculum include attitudinal or motivational arguments?
15. To what extent did the curriculum address behavioural skills for condom use?
16. To what extent did the curriculum address condom negotiation skills training?
17. To what extent did the curriculum do not induce HIV/STI fear?
18. To what extent condoms were distributed as part of the intervention activities?
19. To what extent did the activities include school-based or school linked adolescent friendly health centres?
20. To what extent the programme include activities outside the school environment?
21. To what extent were the activities of adequate intensity and duration?

Intervention Mapping Step 5: Programme Implementation Plan;

22. To what extent consultation was made with school staff and parents prior to implementation?
23. To what extent the intervention had support from appropriate authorities?
24. Was the programme pilot-tested and to what extent?
25. To what extent the goals of the programme were aligned with that of the school?
26. To what extent were the educators trained, supervised and supported?
27. To what extent did the programme engage the students?

28. To what extent leadership of the intervention was addressed?
29. To what extent students and teachers feel benefit from participating in the programme?
30. To what extent the intervention was implemented as planned?
31. To what extent the intervention was sustained through continuous monitoring, and emotional and practical supports to the implementers?

Intervention Mapping Step 6: Evaluation Plan

32. To what extent the intervention was evaluated using different methods?
33. To what extent short-and-long term outcomes including health outcomes were measured?
34. To what extent the evaluation involved students, teachers or parents, and other external research agency?
35. To what extent was the programme implemented and evaluated for a long-term to detect long-term outcome?

Part B:

Questions related to development and/or implementation of the intervention

1. Could you please, highlight the strengths of [name of the intervention] (regarding the development and implementation of the programme)?
2. With the advances in the area of adolescent sexual and reproductive health, what additions (if any) would you make if you were given another chance to reintroduce similar programme?
3. What do you think explains your success in the design of the intervention? (or: what do you think prevented this intervention from being as successful as you would have liked this to be?)

4. What are main factors that made the implementation of your intervention successful?
5. How can we generally improve development and content of school-based sexual health education interventions to maximise effectiveness?
6. In your opinion, how can we generally improve the implementation of school-based sexual health education interventions in sub-Saharan Africa?

Questions related to evaluation

1. What were the challenges or obstacles (if any) you encountered in evaluating the intervention? How did you overcome them?
2. In retrospect, how do think this challenges or obstacles might have been avoided?
3. In retrospect, what could have made the evaluation more successful or what would you have done differently to ensure successful evaluation?
4. In your opinion, how do you think we can improve the extent to which school-based sexual health interventions in sub-Saharan Africa are successfully evaluated?

Thank you for your time today, is there anything you want to add before we finish? Who else do you suggest I meet to get some more information on the intervention?

Finally, would you be happy for me to send you transcript of this conversation to receive your comments on its accuracy.

Appendix 4. 3: Analysis spreadsheets

Appendix 4.3a: Analysis spreadsheet

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)

Case	Evidence	1. Needs and asset assessment of the target participants (Kirby, Laris, and Roller 2006, Denford et al. 2016, Sani et al. 2016): This may involves review of survey data (STI/HIV data, pregnancy data, adolescent sexual behaviour data etc.). Focus groups or interviews with adolescents and adults working in areas of reproductive health may also be conducted. This would provide information on prevalence of sexual behaviours and factors affecting those behaviours in the population.
PSABH	Documents	PSABH was based on field experience and baseline research (interviews with teachers, community leaders and focus groups with youths), which generates information on cultural beliefs regarding adolescent sexual issues, gendered structure of relationships and scripting of youths sexual encounters (Eleanor Maticka-Tyndale, 2010; E Maticka-Tyndale, Mungwete, & Jayeoba, 2013; Eleanor Maticka-Tyndale, Wildish, & Gichuru, 2007, 2010). The urgency with which the programme was needed was demonstrated by research conducted for the government of Kenya and UNICEF (Maticka-Tyndale et al., 2013).
	Interviews	<i>“The sexual scripts threw light onto issues of expectations during dating, the economic context around sex, the complicity of families in early sex and the inability of both genders to create alternative dialogues and outcomes around dating and sex. This enabled the programme to engage at a very honest level with the risk environment faced by young people. Following the sexual scripts we were able to include material that addressed the actual scenarios that young people had described”</i> (Participant [P], PSABH)
	Score	1
HP4RY	Documents	HP4RY adopted the Family Life and HIV Education (FLHE) approved by the Nigerian Government for junior secondary schools. The curriculum was modified using baseline data including focus groups, interviews, surveys, and ethnographies conducted prior to intervention development. The additions were only about local vulnerabilities and sexual scripts (Eleanor Maticka-Tyndale & Team, 2012; Omorodion et al., 2012; Weldish, 2012).
	Interviews	
	Score	1
MkV	Documents	Baseline studies conducted between 1994 and 1998 revealed that young people in their early twenties were at most risk of contracting HIV (Valerio & Bundy, 2004). Also, initial needs assessment surveys found age of sexual debut to be 13 or 14 for most youths in the area, 5% of girls and 1% of boys age 19 were already infected with HIV, girls were enticed by wealthier older men to have unprotected sex for small gifts. In addition, limited number of condom vendors, confidentiality regarding obtaining condoms, and price of condoms were also found to be potential factors that may affect condom use (Obasi et al., 2006).
	Interviews	

	Score	1
HeathWise	Documents	Data on HIV prevalence among South African youths were reviewed. This revealed the highest rate in the world with about 60% of new infections occurring among youths age 15-25 (Caldwell et al., 2004). Youth risk behaviour survey also revealed that 41% of school going adolescents had engaged in sexual intercourse with more than half had two or more sexual partners (Caldwell et al., 2004). Furthermore, focus groups with teachers and students were carried out during the adaptation process of the HealthWise Curriculum and data generated were used to revise the curriculum (Caldwell et al., 2004).
	Interviews	<i>"I think, again as I said in the beginning, if you can work with what their needs are, if you can get buy-in right from grassroots, from teachers themselves or whoever you are doing the intervention with, whether it is nursing sister in a clinic or whatever, it is school-based so you are working with teachers right? If you can get them to acknowledge what the problems are and involve them, as well as of course the principal as I said, in developing the intervention. If they can see, this is something that meets their needs, then I think you will get teachers who will be motivated to implement an intervention. It has to be needs based and they have to see the relevance of what you are doing."</i> (P, HealthWise)
	Score	1
SATZ	Documents	Needs assessment based on WHO "coming of age" guidelines for adolescents sexual and reproductive health and rights situation analysis was conducted. Data from intended students, teachers and principals as well the settings from the situation analysis informed the curriculum development (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009; Mathews et al., 2009; Mükoma et al., 2009).
	Interviews	
	Score	1
RDSP	Documents	Formative research involving focus groups and in-depth interviews with pupils, teachers, parents, head teachers, regional education officials, healthcare providers and community stakeholders was carried out following a feasibility study. This led to substantial modification in content and delivery of the intervention (Power et al., 2004).
	Interviews	<i>"The formative research which is described here..., essentially we tested locally developed programmes that have been developed in Zimbabwe. One of which was developed by UNICEF in conjunction with the ministry of education and one of which was a locally developed participatory programme. We delivered them with teachers. We found that the UNICEF program did not direct – it was so watered down by the time it become acceptable as a national programme that it did not really address – we could do the whole programme, four years of the programme and not know what session the course was."</i> (P. RDSP)
	Score	1
SBRHE	Documents	Focus groups discussion was carried out with students on their reproductive health needs and whom they can confide on reproductive health issues. A baseline questionnaire survey was also conducted among sample of students. These results informed the design of content of the programme (Ademola, 2004; Ajuwon & Brieger, 2007)
	Interviews	
	Score	1

Appendix 4.3b: Analysis Spreadsheet contd.

Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change

Case	Evidence	2. Concentrate on clear health goals (Kirby, Laris, and Rolleri 2006) or tactically communicate aims as health goals to avoid unending debate on the legitimacy of the intervention (Paul-Ebhohimhen, Poobalan, and Teijlingen 2008): The aim of the curriculum should address at least one of these reproductive health goals; prevention of STI, prevention of HIV and/or pregnancy.	3. Focused on specific behaviours that would lead to health goals (Kirby, Laris, and Rolleri 2006) and specify multiple measurable behavioural targets/outcomes (Denford et al. 2016): This involves selecting a specific behaviour that lead to the health goal(s) above and giving specific information on what might lead to it and how to avoid it. Specific behaviours that would lead to STI/HIV prevention for example include; abstinence, reduced frequency of sex, reduced number of partners, condom use, STI testing and treatment, HIV testing and treatment.	4. It used a logic model approach (Kirby, Laris, and Rolleri 2006, Denford et al. 2016) or theory-based (Sani et al. 2016, Gallant and Maticka-Tyndale 2004, Kaaya et al. 2002): The use of model that clearly show links between the health goal(s), behaviours, determinants of the behaviours and intervention activities that would lead to desired change in the determinants. Some developers may not use a formal model but a discussion on the four components of a logic model (goals, behaviours, determinants, activities) is enough to suggest it was used.
PSABH	Documents	The primary objective of PSABH was to reduce HIV infection risks by delaying sexual debut, reducing sexual activity and increasing condom use for sexual active youths (Maticka-Tyndale, Wildish, & Gichuru, 2007)	The PSABH addressed the following behaviours: first sexual debut; frequency of sexual activity; condom use; communication with parents and teachers about sexuality and HIV/AIDS; self-efficacy to abstain from sex; normative support for condom use; and helping students to assist each other in avoiding sex (Maticka-Tyndale et al., 2007; Maticka-Tyndale, Wildish, & Gichuru, 2010)	Bandura's theory set within ecological model was used in the PSABH intervention, although, it was initially based on the assumption that knowledge is central to influencing behaviour (Knowledge, Attitude, Skills, Motivation, and Practice).
	Interviews	<i>"PSABH purposely set out to deliver a programme to the core group of school-going primary-aged pupils between 12 and 16. By 'core group' we meant those children who, with access to knowledge, skills and some adult support, stood a fair</i>		<i>"Given the sexual context of HIV infection, we knew we had to work with the communities as well as the schools and parents. Bandura's theory set within an ecological framework seemed the best model to explain our expectations, as opposed to models such as Health Belief</i>

		<i>chance of avoiding HIV infection. We knew that in a school-based programme we could not hope to address other socio-economic factors that would undermine a young person's ability to manage their sexual risks, such as a child who was already engaged with high risk behaviours to earn money for a living or whose parents/guardians could not afford to feed them or those who were in abusive situations. We intended, therefore, to target a mainstream core of school going children whose basic needs were being met by their families or communities.” (P. PSABH)</i>		<i>Models or other Learning Models which tended to focus on the individual and their ability to manage their behaviour in isolation from community norms and influences.” (P. PSABH)</i>
	Score	1	1	1
HP4RY	Documents	The main goal of HP4RY is to reduce youth vulnerabilities to HIV infection (Arnold et al., 2012).	HP4RY addressed knowledge, attitudes and sexual behaviours. It also includes understanding of gender role in context of Nigeria, cultural beliefs and dominant traditions that influence sexuality (Arnold et al., 2012; Maticka-Tyndale & Team, 2012).	Multi-level ecological framework that specifically used Sexual Scripting Theory and AIDs Competent Community Theoretical Framework was used in HP4RY (Maticka-Tyndale & Team, 2012)
	Interviews			
	Score	1	1	1
MkV	Documents	The primary objective of MkV intervention was to improve adolescent reproductive health knowledge, decrease rate of transmission of STIs and HIV infections, and unwanted pregnancies (Valerio & Bundy, 2004; Wight, Plummer, & Ross, 2012).	The key target behaviours of MkV were: delay onset of sexual intercourse among youths that were not sexually active; decrease number of sexual partners for sexually active youths; promote correct and consistent condom use for sexually active youths; and increase utilisation of STIs and family planning services (Hayes et al., 2005; Obasi et al., 2006).	Evidence of use of logic model can be seen in the following statement, “The idea is that if young people receive correct information and are taught behavioural and life skills before they engage in sex, they will be more likely to practice safer sex (e.g., using condoms, choosing safe partners, limiting the number of partners, seeking sexual and reproductive health services, etc.), once they become sexually active” (Valerio & Bundy, 2004).

	Interviews			
	Score	1	1	1
HeathWise	Documents	One of the overall aims of HealthWise was to reduce transmission of HIV/AIDs and other STIs (Caldwell et al., 2004; Tibbits, Smith, Caldwell, & Flisher, 2011).	The sexual risks behaviours addressed by HealthWise intervention were delaying sexual debut and increasing perception to access to condom for youth that have not yet engage in sexual intercourse. Among sexual active youths, decreasing frequency of sexual intercourse, increasing condom use and reducing current lifetime sexual partners (Tibbits et al., 2011; Wegner, Flisher, Caldwell, Vergnani, & Smith, 2008).	HealthWise model included several elements linking personal, interpersonal and environmental factors with empirical and/or theoretical prevention of risky sexual behaviours. The core of the model depicted ecological approach linking multiple protective and coactional risk factors. These factors were linked with the intervention approaches including provision of factual knowledge, self-reflective exercises, learning and practise of specific skills and opportunity to interact with the wider community (Caldwell et al., 2004).
	Interviews	<i>"I would not say we were trying to reduce transmission of HIV. That is a whole next level. I would say what we were trying to do was to reduce sexual risk behaviours. It is a slight clarification but or a slight difference but we never sought to reduce the transmission of HIV."</i> (P. HealthWise)	<i>"We do not just focus on the problem behaviour, so sexual risk and the other one is substance use. HealthWise has a whole component that focuses on leisure time and free time and helping young people to make healthy choices in their free time. Instead of going out and smoking a dokha cigarette or getting drunk, maybe think about joining a dance group or if there is nothing happening in your area, what can you do to start having fun in your free time, fun that is healthy and not dangerous. That is what makes HealthWise different from other programmes. It is not just a life skills programme, it is not just a sexual risk or substance use programme, and it is actually got this whole leisure component."</i> (P. HealthWise)	
	Score	1	1	1
SATZ	Documents	The overall aim of SATZ is to prevent HIV infection among adolescents as	SATZ aimed to delay onset of sexual activity for virgins and use of condom for	SATZ intervention design was based on theoretical framework or model, which included social cognitions specified by

		well as other STIs and unwanted pregnancy (Flisher & Klepp, 2009)	those already sexually active (Flisher & Klepp, 2009).	Ajzen's Theory of Planned Behavior and Bandura's Social Cognitive Theory. This model proposed sexual behaviours are largely influenced by intentions with skills and environment as important moderators (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009).
	Interviews			
	Score	1	1	1
RDSP	Documents	The main aim of the intervention was to prevent HIV infection among young people in rural Zimbabwe (Cowan et al., 2008).	Since <i>MEMA Kwa Vijana</i> (MkV) curriculum was adopted, the following behaviours were addressed; delay onset of sexual intercourse among youths that were not sexually active; decrease number of sexual partners for sexually active youths; promote correct and consistent condom use for sexually active youths; and increase utilization of STIs and family planning services. Additionally, sessions on self-awareness, communication, self-belief and gender issues were added (Cowan et al., 2008).	MkV curriculum that was adopted for this intervention used a logic model.
	Interviews			
	Score	1	1	1
SBRHE	Documents	The aim of the intervention was to improve reproductive health knowledge, attitude, perceived self-efficacy and sexual practises among secondary school students (Ajuwon & Brieger, 2007).	From the evaluation questions, it can be depicted that the intervention addressed reproductive health knowledge, attitude towards contraceptives, self-efficacy for safer sex and sexual practices (condom use and number of sexual partners) (Ajuwon, 2004)	No evidence from the documents reviewed of specific model clearly showing links between health goals, behaviours, determinants of behaviours and intervention activities that would lead to desired change
	Interviews			"If you read the paper closely you will see that there was a particular school where we used the peer education only. That is modelled after the self-efficacy which was developed by Bandura in which he tried to say that students can learn from each other

				<p><i>by modelling their behaviour so that was the model that we used that if their peer educators can serve as role models and can recommend the appropriate behaviour for their colleagues. In two schools we used this approach where we used peer educators only and in another school we used both peer educators and teachers. So we also used the PRECEDE model. I do not know whether you are familiar with it? The PRECEDE model talks about three contributory factors to a behaviour, the antecedent factors. This model was propagated by Lawrence Green and colleagues and he said that behaviour can be explained by three antecedent factors: one is the predisposing factor, the enabling factor and the enforcing factors okay. So we used those two models to develop our intervention.” (P. SBRHE)</i></p>
	Score	0	1	1

Appendix 4.3c: Analysis spreadsheet contd.

Intervention Mapping Step 3: Programme Design

Case	Evidence	5. Intervention identifies and addresses multiple risks factors that can lead to behaviours (Kirby, Laris, and Rolleri 2006, Denford et al. 2016): Effective programme identify psychosocial risk and protective factors, and develop activities to address them. Effective curriculum addresses one or more of the following factors: Knowledge including methods of prevention of STIs, HIV and pregnancy; perception of STI/HIV risks; personal norms about sex and abstinence; attitudes and perceived barriers towards condom use; perception of peer norms about sex and sexual behaviours; self-efficacy to use condom, refuse sex, avoid STI/HIV risk; intention to avoid sex, use condom, reduce number of partners and reduce frequency of sex; communication about sex, condoms and contraception with parents and other adults; avoidance of places and conditions that may lead to sex etc.	6. Activities are designed to be consistent with community values and available resources (Kirby, Laris, and Rolleri 2006, Denford et al. 2016, Gallant and Maticka-Tyndale 2004). Community norms may include beliefs about sex, condom use or abstinence. Organizational capacity may include teachers' skills, time, equipment or funding.	7. Activities employed are appropriate to youth's developmental age and sexual experience (Kirby, Laris, and Rolleri 2006, Denford et al. 2016).	8. Adopting from previous effective programmes, where appropriate (Sani et al. 2016)
PSABH	Documents	The content and activities of PSABH were informed by knowledge from baseline research including cultural beliefs, scripting of youths sexual encounters, and structure of gender and sexual relationships. It included challenges to male sexual drives that were believed to be irrepressible, the impossibility of abstinence and other alternative pathways to dominant sexual scripts including guide to risk reduction decision making (Maticka-Tyndale, 2010; Maticka-Tyndale, Wildish, & Gichuru, 2007).	The PSABH was designed to be delivered through the local infrastructures within the capacity of the education system and to fit with the Kenyan national HIV/AIDS guidelines (Maticka-Tyndale et al., 2007). It was also designed based on	The PSABH goals and activities were in line with sexual experience and culture of the participants (Maticka-Tyndale et al., 2007, 2010).	No evidence that the programme was adopted from other pre-existing programmes from documents reviewed.

		<p>“In many cases, gifts or money were exchanged. One boy said, “She knows what you mean when you buy her chips,” while another said, “If a boy has given a girl money, then they can have sex and they will love each other very much” (Maticka-Tyndale et al., 2005). These scripts were an incredibly important feature to define at this stage of project development, because they were responsible for creating “a sense of inevitability and a lack of personal responsibility among young people for the sexual act that ultimately resulted” (Maticka-Tyndale et al., 2005). Once the first part of the script was enacted, the rest would surely follow. In order for students to accept condom use, abstinence, and other protective behaviours, these sexual scripts would need to be altered or become more flexible. Boys believed that their sexual desires were not within their control: “When he is in puberty stage it forces him beyond control... He cannot be patient to wait or stop to play sex because when he has reached that age it forces him” (Maticka-Tyndale et al., 2005). Dr. Maticka-Tyndale and colleagues found that it was rare for a boy to mention alternatives to sexual activity when he felt strong sexual urges. One boy did suggest, “Just get hold of a jembe [a hoe] and dig hard. By the time you are through with digging the sex feelings will have disappeared” (Maticka-Tyndale et al., 2005). However, there was also some evidence that young people were willing to revise the sexual scripts predominant in their communities. In a focus group, girls asserted that “Boyfriends and sex are not like air. They are not necessary to life” (Maticka-Tyndale et al., 2005).” (Mathews case study).</p>	<p>surveys and interviews that identified misinformation as well as lack information on HIV/AIDs, adult-child sex communication taboos, and contradictory beliefs about youth sexuality and condoms (Maticka-Tyndale, Wildish, & Gichuru, 2010).</p> <p>“The information from the sexual scripts research was used in a number of ways. Role playing using the patterns described by youth allowed students to practice avoiding situations where a script might begin to play out, and also how to alter scripts. The vocabulary that youth used were worked into songs and drama activities. Teachers also used the scripts when counselling students and working with school health clubs. The accuracy with which teachers and the programme in general treated the local sexual scripts</p>		
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			increased students' respect for the programme, according to the developers." (Mathews case study).		
Interviews	<p><i>"The sexual scripts threw light onto issues of expectations during dating, the economic context around sex, the complicity of families in early sex and the inability of both genders to create alternative dialogues and outcomes around dating and sex. This enabled the programme to engage at a very honest level with the risk environment faced by young people. Following the sexual scripts we were able to include material that addressed the actual scenarios that young people had described. This also opened the door to the peer educator component as the Ministry saw that young people needed to be supporting each other in order for change to happen."</i> (P. PSABH)</p>	<p><i>"Within schools, the overarching goal was to change the way that schools, where children spend large amounts of time, addressed HIV through the school managers and teachers. The aim was then, in the first instance, to enable and strengthen those in school to deal with the needs of children around HIV risk in a more informed and responsible manner. The approach was to intervene across all the aspects of the school week and calendar. That involved many things from information to role modelling as well as becoming better listening, better responses to children's questions, changes in responses to crises (e.g., referral or counselling rather than punishment if love letters, condoms etc. are found). As far as</i></p>	<p><i>"Another aspect that was very helpful in these discussions was to differentiate between those young people who were already sexually active before the programme began and those who were still virgins. We found that teachers could deal better with the condom messaging if they differentiated between these two groups."</i> (P. PSABH)</p>	<p><i>"Initially PSABH was designed based on best-practice and the lessons learned from the delivery of the large-scale programmes mentioned above, plus thinking based on marketing approaches to motivation and uptake of new behaviours"</i> (P. PSABH)</p>	

			<p><i>the children were concerned, initially we thought we had to deal with knowledge, attitude and skills but soon learned that we had to take the social context into account (social context is reflected in the sexual scripts described later).” (P. PSABH)</i></p> <p><i>“On the other hand, PSABH was designed by people who knew how Kenyan schools ran. We intentionally designed the strategies to build on what was either already being done at school, or what the MoE had instructed should be happening in the delivery of the curriculum, so we made it very possible for people to respond to the implementation strategies of the training” (P. PSABH)</i></p> <p><i>“This programme was designed with the vision that it needed to be rolled out across the country. So it needed to be designed in such a way that it</i></p>	
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			<i>would be acceptable to the diverse of religious and ethnic communities across the country. It would be able to be delivered not only in well-resourced schools but in the poorest of the poor schools with minimal resources and it needed to be able to be delivered not only by the best of teachers who were trained to a relatively high degree in how to deliver a programme on HIV and sexuality and address gender based violence but by all teachers. Some of whom were very skilled and some of whom were not so well skilled. All of that was thought about and was incorporated into how the curriculum was planned and how the teacher training was planned.” (P. PSABH)</i>		
	Score	1	1	1	1
HP4RY	Documents	The HP4RY used Social Ecological model, which in addition to behavioural approach, accounts for cultures, norms, relationship, expectation, social and structural environment in which sexual relationships that carry risk of transmitting HIV	The HP4RY was developed based on the principle of using local resources and infrastructures to	The HP4RY curriculum covers age-appropriate knowledge, attitudes and skills (Maticka-	No evidence from the documents reviewed that programmes were adapted from pre-

		<p>occur. Scripting Theory was used to reach an in-depth understanding of sexual relationships of young people. Power structure and gender relations encouraged and reinforced double standard that perpetuates HIV transmission. Men are normally expected to have multiple relationships and sexual partners, while women do not have the right to negotiate sexual relationships, particularly if married. HIV was also perceived as “not real” and often associated with witchcraft or “night disease”. Use of condom was not common because of the belief that it does not fit well and hence, stuck in the vagina. There was lack of comfort in discussing sex, sexuality and HIV among young people, despite the fact that some youths were already sexually active. Other common sexual beliefs and taboos include view of sex as having negative effect on the body or serve as food for the penis or vagina. Sex was seen as rite of passage for adulthood, especially in young men. Teenage pregnancy is common and may be seen as a misfortune or triumph. Misfortune when it is seen as unfortunate to the teenage mother and her family. Triumph as it proved the girls fertility and may even provide economic gain for the girl and her family, especially if the father is wealthy. Sexual exchange was common, with men expected to provide gifts for sex. Women were also expected to exchange sex for material goods. Males were usually dominant and aggressive while females were disempowered to be passive. Therefore, female not usually consented for sex but coerced or forced. Sex was seen as a way of showing intimacy without which, girls may risk to loose boyfriends (Barnett, Maticka-Tyndale, & Team1, 2011; Maticka-Tyndale & Team, 2012; Omorodion et al., 2012). All these factors contribute to the</p>	<p>design programme to enhance sustainability and large-scale implementation. Due to the limited resources, HP4RY was ‘low-tech’ intervention, with teachers, Youth Corpers and peer leaders trained to use their available resources, imagination and local creativity to deliver the intervention (Arnold et al., 2012).</p>	<p>Tyndale & Team, 2012).</p>	<p>existing programmes.</p>
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		vulnerability of youths to HIV infection in the community.			
	Interviews	“(So if I am to ask you now, what were the critical things in those interventions that made them successful, what would you say?) Education; which also involved raising awareness of the communities and the youths themselves and then in some areas we had them training youth to have a quality of income, livelihood; so that they do not rely on exchanging sex for cash.” (P. HP4RY)	“We also had public role play, drama, which was presented in the community halls; we had invited all the elders and older people in the communities, parent, elders and other residents that were interested in coming there. We also used locally-based, social events like soccer; when youths played soccer we had tables at the soccer field where we had on HIV, where at the end we talked about HIV/AIDS to the community” (P. HP4RY)		
	Score	1	1	1	0
MkV	Documents	<p>The MkV curriculum was designed to discuss and challenge some social norms like gender stereotypes, for instance, the wide belief that once girls receive gift they cannot refuse sex, or when a teacher or older community members requested for sex (Hayes et al., 2005).</p> <p>Some factors that could explain limited effectiveness of MkV intervention were identified in a process evaluation (Wight, Plummer, & Ross, 2012). These factors, which are intertwined, were culture (systems beliefs and practices), social status, economic situations and gender. Briefly,</p>	The curriculum was designed to be delivered with only one textbook per class (teacher manual) because needs assessment showed limited resources in a typical Tanzanian school, in that only one text each is usually available for major subjects per class	The curriculum contains simple messages for grade 5 introducing more complex information through grades 6 and 7 (Valerio & Bundy, 2004).	Reviews of surveys and intervention studies in Mwanza region and elsewhere in Africa informed the design of the MkV. In addition, the school curriculum included modified exercises from various programmes including

		<p>the economic related barriers included economic dependence of women on men and low women social status; sex as economic source for women (transactional sex for cash or kinds); and poor quality of health and education system. Low social status related barriers included low status of adolescents (serving as barrier to interventions targeting youth); and masculinity and sexuality (perpetuating sexual powers of men with consequent risky behaviours). Cultural barriers included sexual norms that are contradictory, multiple and concurrent sexual partnerships, and secrecy; negative attitudes and beliefs towards condoms; low perceived and salience to HIV/AIDs; and short term decision-making and limited agency.</p>	<p>(Obasi et al., 2006). Positive social norms like abstinence until marriage were also reinforced in the MKV intervention (Valerio & Bundy, 2004)</p>		<p>WHO/UNESCO guides, UK SHARE project, and other programmes from Southern and East Africa (Obasi et al., 2006).</p>
	Interviews	<p><i>“I think that was a huge success actually, and that it was quite culturally relevant, because amongst other things, it did address this very widespread practice of sex for gifts and money, which was not just with older men, it was also the norm - when a boy asks a girl out, essentially he gives her something, or it would be disrespectful if he did not, and in exchange he expects to get sex. So, it is so deeply imbedded that we had to address that, particularly because girls did not have other sources of income or a second dress..., so it was a big deal for that to be an offer from a boy, and it was relatively easy for a girl to give a sexual encounter in exchange, so that is one thing.” (P. MkV)</i></p> <p><i>“We have to consider the wider community influences, such as cultural norms and economic factors that make it very difficult for young people, and especially adolescent girls, to choose their behaviour. There were cultural and social barriers to young people engaging in safer behaviour. For instance, girls typically received money or gifts in</i></p>			

		<i>exchange for sexual encounters, and this was a major consideration for them growing up in a very resource constrained setting with few other ways to meet their basic needs. But it was not only a case of such economic pressures; complex cultural norms and expectations also played an important role. For example, early sexual activity was generally frowned upon by adults, but nonetheless it seemed to be widely expected and accepted, if young people were discreet. So, looking forward, it would be useful to explore how to better combine interventions for adolescents with wider interventions in the community aimed at changing such contradictory norms and expectations.” (P. MkV)</i>			
	Score	1	1	1	1
HeathWise	Documents	The HealthWise curriculum was adapted from successful curriculums from the US. Although the risk factors (e.g., knowledge of risk behaviours, peer pressure, normative belief, access to condom, self-image and communication skills) identified for South African Adolescents were similar to that of the US, certain psycho-cultural meanings specific to South Africans were addressed in the HealthWise curriculum. For instance, peer pressure operates differently in South Africa with boys experiencing pressures from peers to express masculinity through unprotected sexual intercourse and to show female affection by demanding sex. Peers stigmatised boys who insist on condom use and do not have record of sexual exploitations. Girls experience pressure from boys to engage in unprotected sex and to a lesser extent from other girls. One of the adapted curriculums (TimeWise) was built on notion of self-regulation and autonomy. However, South African culture is more collectivist than individualistic compared to the US. Therefore, the concept of self-regulation	The HealthWise curriculum was modified on three main areas (timing, language and leisure) based on the findings from the pilot study. The curriculum was split to be delivered in two years instead of the planned one year because it was found that it took longer than anticipated to deliver the intervention during the pilot study. Group activities were also modified or removed from the curriculum because it will be difficult to be delivered due to large number of students per class.	HealthWise was said to be culturally sensitive and developmentally appropriate (Caldwell et al., 2004). The core content was examined to see whether it was relevant to the participants' need, age and stage of development by examining their understanding of and responses to the programme content during the adaptation process (Smith et al., 2008). Areas of time, language and leisure were some of the cultural and contextual factors modified as highlighted in 6 above,	The HealthWise curriculum was adopted from successful curriculums from the US (Caldwell et al., 2004).

		<p>and autonomy was promoted by involving family and friends in the decision-making (Caldwell et al., 2004; Tibbits, Smith, Caldwell, & Flisher, 2011; Wegner, Flisher, Caldwell, Vergnani, & Smith, 2008). Other factors addressed by the HealthWise Curriculum include:</p> <p>a. Knowledge: of HIV, risk behaviours including ABCD model and community services (sexual health, recreational and counselling).</p> <p>b. Attitude and self-efficacy: positive attitudes towards condom use, perceived self-efficacy to refuse sex without condoms, and more accurate perception of risks of substance use and sexual intercourse.</p> <p>c. Interpreting and understanding social norms with emphasis on relational aspects of sexual behaviours e.g., partner and peer pressures.</p> <p>d. Skills development such as socio-emotional skills e.g., decision-making and stress management.</p>	<p>Language was modified by ensuring wordings were replaced with local ones and removing excess details (Caldwell et al., 2004; Smith et al., 2008).</p>	<p>to have a better fit between programme and situation of the participants (Caldwell et al., 2004). The comprehensive nature of HealthWise accommodate needs of most at risk youths such as sexually active youths. Further modifications were made in areas of sexual relations (e.g., peer pressures), and other personal, interpersonal and environmental factors influencing sexual behaviours in the context of South Africa (Wegner et al., 2008).</p>	
	Interviews	<p><i>"I think that needing to say is that because the lessons were grounded in healthy leisure, it resonated more. It was treated in a very positive way. It was a very positive use development programme. We did not go in and just say "Here is about sex and here is about drugs and do not do it and this is bad". What we did was we helped them understand themselves, the kids, which had never been done before. So it was a very positive use development and "What are you going to do in your leisure time or your free time?", "What do you like to do?" "How do you overcome boredom in your free time?" You know, "What happens when you are bored?" Things can turn risky. I think that, the teachers really loved that approach in the students liked that approach a lot. So I think</i></p>			<p><i>"There is a curriculum called TimeWise and we use that. We also used Gill Botvin life skills intervention, we drew on that. We then developed HealthWise, it had not been used anywhere else before, but we developed it based on evidence-based programmes that were existing in the</i></p>

		<i>that is a big reason why were successful."</i> (P. HealthWise)			<i>United States."</i> (P. HealthWise)
	Score	1	1	1	1
SATZ	Documents	The SATZ addressed Knowledge, attitudes, social norms and self-efficacy for safe sexual practices. It is also addressed other risk factors including myths and misconception regarding sex, which differentiate between truth and fiction. Examples include: pregnancy cannot occur after having sex once; blood will run in the head (madness) if one do not engage in sex; a person that do not engage in sex is abnormal; taking too much coke can prevent from pregnancy and STIs; lying on the abdomen after sexual intercourse can prevent from having pregnancy; oral contraception can protect from STIs; and condom use always provides protection from HIV and other STIs (Flisher & Klepp, 2009; Mūkoma et al., 2009).	The SATZ was based on needs assessment, situation analysis and utilisation of existing infrastructures (Flisher & Klepp, 2009; Mūkoma et al., 2009).	Education advisor ensured that SATZ curriculum was age-appropriate and culturally sensitive (Catherine Mathews et al., 2009).	The SATZ intervention was said to be developed using a systematic method including, behavioural change theory, empirical evidence and formative research (Mathews et al., 2012). Therefore, no evidence to suggest that the programme was adapted from existing programmes.
	Interviews	<i>"I would say that a lot of the emphasis in the programme was around the actual issues around sexual behaviour and making decisions and I think there is a bigger issue around people's self-esteem and how they feel about themselves, how they respect their bodies, how they respect themselves as human beings and their boundaries between themselves and other people. So I think a broader life skills kind of programme intervention is much more helpful than just focussing on sexual behaviour."</i> (P. SATZ) <i>"But I can just answer in more general because of my experience subsequently when I did observe this in our PREPARE programme is that, at that age it is all about relationships, sexual relationships. It is not about HIV prevention, and</i>			

		<i>pregnancy prevention is much more important to them than HIV prevention. But relationships are very exciting for them to discuss. So I feel that a programme should be built around relationships and sexuality of ...” (P. SATZ)</i>			
	Score	1	1	1	0
RDSP	Documents	Certain factors that may interfere with intervention delivery or its impact were identified. Communication between adults (teachers) and youths (students) is a taboo in the community and hence unacceptable. Teachers were also not in support of safe sex education except if is for promoting abstinence and sometimes, in attempt to discourage sexual activities; teachers give wrong information that condoms are ineffective. The didactic method of teaching where corporal punishment was the norm in Zimbabwe and was not permissive of environment that will facilitate participatory method required for effective sex education. Sexual abuse by teachers in exchange for favours such as good grades or extra lessons create mistrust in teachers delivering sexual health education. Exchange of sex for money and other services such as food, school fees or accommodation is common among adolescents due economic pressures in Zimbabwe. For these reasons, teachers were replaced with trained young school leavers to deliver the intervention (Power et al., 2004).	Logistic and contextual reasons including lack of morale, difficulty about teaching sensitive sexual issues, lack of support and/or competing priorities from the school, switching from the traditional teaching roles and lack of trust between teachers and students made teachers unsuitable to deliver the intervention. Additionally, other factors in the community and higher vulnerability of out of school youth to HIV infections made it apparent that school-based intervention is unlikely to be effective, hence, the community component of the intervention aiming at parents to improve parent-child communication on adolescent issues (Power et al., 2004).	No statement in the documents suggests age of the participants or sexual experience was considered.	The RDSP adopted the MkV curriculum.

	Interviews			<p><i>“Essentially we tested locally developed programmes that have been developed in Zimbabwe. One of which was developed by UNICEF in conjunction with the ministry of education and one of which was a locally developed participatory programme. We delivered them with teachers. We actually took a programme that was running in Tanzania, the MkV programme and we modified that to make it applicable locally. We added additional sessions that we felt that they had missed out and we changed the names from Swahili to locally appropriate names and we developed three years of material.”</i></p> <p><i>(P. RDSP)</i></p>
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	Score	1	1	0	1
SBRHE	Documents	Some of the drivers to sexual intercourse identified for girls were peer pressure, poor parental care and at times parental pressure to engage in sex for material gains or favours. For boys, the factors differed, and include belief that abstaining from sex for a long time will lead to accumulation of sperm, which can lead to health consequences like abdominal cramp. Boys also see sex as a way to show masculinity and dominate the girls (Ademola, 2004).	Needs assessment informed the curriculum development (Ademola, 2004). However, no evidence in the documents reviewed to suggest consideration was given to the community values, available resources, philosophy and organizational capacity of the school.	No evidence to suggest that the teaching activities were adapted to the age, sexual experience and culture of the students	No evidence seen
	Interviews			<i>“There are those who have never had sex, there are those who have had sex, so we made sure that the message fitted into whatever situation the students find themselves. For those who have had sex we said ‘Well, it is okay, you can still practise secondary abstinence.’”</i> (P. SBRHE)	
	Score	1	0	1	0

Appendix 4.3d: Analysis spreadsheet contd.

Intervention Mapping Step 4: Programme production

Case	Evidence	9. It involved key stakeholders (Kirby, Laris, and Rolleri 2006, Denford et al. 2016, Sani et al. 2016, Paul-Ebhohimhen, Poobalan, and Teijlingen 2008) and negotiated content where necessary (Pearson et al. 2015). People from different backgrounds and expertise particularly in areas of behaviour change theory, adolescent and young adults' sexual behaviour, STI/HIV education, intervention design and evaluation, and cultural norms.	10. It involved multiple activities matching specified mechanism with behaviour change techniques (Kirby, Laris, and Rolleri 2006, Denford et al. 2016). Effective intervention include multiple activities to address each of the factors mentioned in (5) above.	11. It employed multiple teaching methods that address each factors, make youth personalise the information and employed teaching methods aiming to change the target risks (Kirby, Laris, and Rolleri 2006, Denford et al. 2016). Effective intervention includes a combination of activities appropriate in the community that involve the youth and help them personalise the information. These activities may include short lectures, class discussion, small group works, role plays, stories, condom demonstrations, problem-solving activities etc.	12. It does not include abstinence only content (Denford et al. 2016).	13. It includes education to increase HIV/STI knowledge (Denford et al. 2016).
PSABH	Documents	The development and delivery of PSABH was collaborative effort of Kenyan Institute of Education and Centre for British Teachers Kenya, Ministries of Health and Education and Dr Eloaner Maticka-tyndale who is a behavioural change	Teachers were trained to teach HIV education (transmission, prevention and progression) including skills and strategies training to resist drives to engage in sexual	The PSABH used combination of activities including classroom lessons, anonymous questions boxes, school health clubs, information corners, and other activities such as assemblies, literary performances, music and	The PSABH promote condom use to sexually active youths in addition to abstinence.	The PSABH trained teachers to teach HIV education including transmission, prevention and progression of HIV/AIDS (Maticka-Tyndale et al., 2007).

		<p>scientist (Maticka-Tyndale, 2010). <i>“Some of the Kenya-based staff who had designed and lead PRISM [Primary schools management project in Kenya], designed PSABH”</i> (teaching case study interviews).</p> <p><i>“The strength of the research component of PSABH allowed the programme managers to negotiate with the involved government ministries around sensitive topics. Movement was at times slow, as discussed by the programme developers: “We addressed this by taking all those involved in PSABH one step at a time from where they were in their thinking towards a more comprehensive, objective and responsible position. This was not a speedy, linear, or predictable process. It took time for trainers to engage with their own issues around HIV infection and their own levels of risk and exposure before they became strong advocates for more complete</i></p>	<p>intercourse and to stop HIV/AIDs stigma in classroom lessons, anonymous questions boxes, information corners, school health club and other school activities (Maticka-Tyndale, Wildish, & Gichuru, 2007, 2010).</p>	<p>drama (Maticka-Tyndale et al., 2010)</p>		
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		<i>information for children.”” (Mathews case study)</i>				
	Interviews	<p><i>“Within CfBT a range of distinctive skills were brought together in the three person team who designed PSABH. These skills encompassed the management of large scale programmes, intimate knowledge of the Kenyan education system and cultural diversity, experience of establishing and managing large training teams and events, further experience on working in partnership with the Ministry of Education and developing capacity at a field level and knowledge of marketing approaches to behaviour patterns. This combination of skills and experience, plus relative freedom in terms of programme design, had a positive impact on the responsiveness of the proposal that was put forward” (P. PSABH)</i></p> <p><i>“We invited representatives from other NGOs active in the field of HIV prevention, some of whom were working with commercial sex workers</i></p>				<p><i>“You cannot really say that PSABH promoted condom use. This was a very difficult point for the ministry of education. What PSABH was allowed to do was to provide accurate information about how condoms could prevent the spread of HIV. So that was done not through classroom teaching but through having a question box in each school and through directions from the ministry to teachers that they needed to answer every question that students posed in the question box factually. But they were</i></p>

		<p><i>and other high risk groups. We also included representatives from the Ministry of Education curriculum development body, KIE.” (P. PSABH)</i></p> <p><i>“Over time, the training material was developed and refined by trainers, facilitators who came in and resource persons. For example, the material around Guidance and Counselling and the technical information about HIV and AIDS went through various transformations during the life of the programme.” (P. PSABH)</i></p>			<p><i>not permitted to promote condom use” (P. PSABH)</i></p>	
	Score	1	1	1	1	1
HP4RY	Documents	<p>The HP4RY team consisted of Canadians and Nigerians with expertise in developing and testing HIV prevention interventions that were research-based in Kenya and Thailand, social issues related to HIV, research experience with young people in sub-Saharan Africa, facilitating health and development work in rural communities in southern Nigeria, and advancing young people sexual health and rights in</p>	<p>In the community component of HP4RY, strategies for increasing knowledge and awareness were seminars, group presentations, drama, poems and songs, and house-to-house visits. Critical thinking to change local belief and normative belief that negatively affects sexual behaviours were</p>	<p>Seminars, group presentations, dramas, poems and songs, debates and dance were some of the teaching activities employed in the HP4RY (Omorodion et al., 2012).</p>	<p>From the FLHE curriculum, it seems only abstinence was addressed without condom use (Maticka-Tyndale & Team, 2012). However, qualitative research confirmed some teachers mentioned condom use as</p>	<p>FLHE curriculum addresses STIs and HIV/AIDs knowledge (Maticka-Tyndale & Team, 2012).</p>

		<p>Nigeria (Maticka-Tyndale & Team, 2012). Family Life and HIV (FLHE) Curriculum that was adopted for the school component of the HP4RY involved wide range of stakeholders from different organisations with varying expertise. Some of the organisations include Action Health Incorporated, Federal ministry of Education, National Action Committee on AIDs, International Women Health Coalition, United Nations Population Fund, The World Bank and The David and Lucile Packard Foundation. All the Federation states' review panel that lead to further modification also reviewed the curriculum. Individuals and groups at state levels also contributed to the design of the curriculum. These include states ministries of education, civil society organisations, religious groups and academics (Dlamini et al., 2012; Maticka-Tyndale & Team, 2012).</p>	<p>addressed using drama, debate and moonlight dance (Arnold et al., 2012).</p>		<p>a preventive method.</p>	
	Interviews	<p><i>"There have been multiple stakeholders on the project, which helped the</i></p>				

		<p><i>project to be more sustainable, basically, so to be more sustainable; to be relevant, and to be culture specific in its own way and it gave commitment to the project, because if they were not involved in the initial work, they might not actually identify with the work ethic, and they may not be able to carry that project to the intervention level. So, what we did basically was to have the youth, in terms of ... as I told you, the ethnographic study, we had youths who were involved in data gathering, and because these youths were recommended by their communities, but when we are recruiting them, we got to the local communities to send out names, giving them the criteria for people we want to be involved – and they are to be graduates and they have to be youths also, and so they give us their names and then we took them out of the data, we selected 'we want that one to work on the project'. So, that gives them at least some understanding of what we</i></p>				
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		<i>have been doing, and to participate in what we are doing.” (P. HP4RY)</i>				
	Score	1	1	1	1	1
MkV	Documents	Stakeholders involved in developing the MkV curriculum include education authorities, teachers, ward co-ordinators, village or ward executive officer, health care workers and community members (Valerio & Bundy, 2004; Wight, Plummer, & Ross, 2012). Design and development was also co-ordinated by a team consisting of local NGO, the African Medical Research Foundation (AMREF), officials from the Ministry of Education and Culture (MoEC) and the Ministry of Health (MoH) and the London School of Hygiene and Tropical Medicine (LSHTM) (Obasi et al., 2006). A situation analysis funded by World Health Organization (WHO) to ascertain needs and appropriateness of the curriculum was conducted. This included interviews with senior officials from all the relevant Government	Class explanation, discussions and stories were used to address knowledge and perceived risk. Reflective exercises were used to encourage students to set goals and anticipate behavioural outcomes for themselves. Negotiation skills were enforced through role plays and serial dramas by peer educators that were expected to model behaviours. Self-efficacy and condom use skills were address by condom demonstration in the health centres. Barrier to condom was addressed through class clinic visits where condoms are freely available, and condom promotion and distribution to out of school youth	Multiple activities including question and answer, guided discussions, story reading ,flip chart illustrations, role-plays and a scripted drama serial performed by class peer educators (Plummer et al., 2007). It also include: games; poems; comedy; video films; peer counselling; adult involvement; printed materials (pamphlets, brochures, manuals); awareness workshops for district council officials, religious leaders and ward development committee; condom distribution; and Youth Health Weeks held once a year, where interschool competitions took place (Valerio & Bundy, 2004).	The MKV intervention in addition to delaying sexual debut, it also aimed to reduce number of sexual partners, and promote consistent and correct use of condom for sexually active students (Hayes et al., 2005).	One of the objectives of MKV is to enhance youth sexual and reproductive health knowledge (Valerio & Bundy, 2004).

		Ministries; with the programme directors of UNICEF, UNFPA, UMATI (the leading family planning organization), Population Services International (PSI) (the lead condom social marketing organization in Tanzania); and with senior social scientists at the Muhimbili University Centre for Health Sciences; head teachers, curriculum development teachers, teacher guardians, pupils, lead health workers and staff in charge of family planning services (Obasi et al., 2006).	(Plummer et al., 2007; Wight et al., 2012).			
	Interviews	<p><i>"I think that it was a generally, quite representative composition of stakeholders, meeting many different kinds of stakeholders needs and participation"</i> (P. MkV)</p> <p><i>"Yeah, no, that is a good question. So, right from the start, actually, while we were planning the study, we were very keen to make sure that there was close involvement from all the relevant stakeholders. So, I</i></p>				

		<i>remember, this was in, I think it must have been around 1996 or 1997, we have held workshops to plan the study and that was not just, like, researchers we had lots of stakeholders present, representatives of the, you know, the Ministry of Education, the Ministry of Health, so both the education and health sectors, as well as HIV researchers and community based organisations.” (P. MkV)</i>				
	Score	1	1	1	1	1
HeathWise	Documents	The development HealthWise curriculum involved input from researchers (from US and Cape Town), educators, school administrators, life orientation curriculum specialist for the school district, the HIV/AIDS Life Skills Co-ordinator, staff from Education and Management Development Centre (EMDC), South Metropole, and the Head of Education Support Services for the EMDC and data from focus groups with students (Caldwell et al., 2004; Smith et al., 2008).	Lessons were linked to short-term outcomes, which were in turn linked to theorised protective and risk processes (Caldwell et al., 2004).	Lessons were delivered sequentially including classroom activities such as group work, role-plays, discussions and work sheets (Caldwell et al., 2004).	Information on condom use was provided to sexually active youth (Caldwell et al., 2004).	HealthWise aimed to increase learners’ knowledge of HIV/STI as well as the ABCD model (Caldwell et al., 2004).

	Interviews	<p><i>“We had a multidisciplinary team, which comprised myself as an occupational therapist, we then had an educational psychologist, we had somebody who is involved in recreational therapy, we had – and all of this people are also researchers, but we had an expert in prevention research. That was sort of the research team. Then we had a psychiatrist as well who was involved and somebody from public health. Then apart from that we also worked with people from the education department. The ministry of education is here in Cape Town. We worked with the curriculum advisor for a subject area called life orientation. We worked with the, I suppose you could call them a district support team which was part of the district educational department. Then we worked with teachers as well we had a group of teachers who were, you know, currently teaching at the time. So it was quite a big group of</i></p>				
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		<p><i>stakeholders.” (P. HealthWise)</i></p> <p><i>“I really think it helps strengthen any intervention if it is a multi-disciplinary effort. You have to have education, you have to have health, you have to have researchers, and you really need to have the whole range of disciplines. Then of course to have people who are working right within the high schools as well, I think is vital, because they are the ones who really know what the problems and the issues” (P. HealthWise)</i></p>				
	Score	1	1	1	1	1
SATZ	Documents	The SATZ curriculum development involved collaboration between education and health sectors. It also involved community leaders including religious leaders and parents. Panel experts or advisory committees included teachers, curriculum developer, schools HIV/AIDS co-ordinators, representatives of education board, students and representative of non-governmental	It involved multiple activities (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009) but no explicit linkage between the activities and mechanism of change.	All the three sites of SATZ utilised teaching approaches that include active participation, skill training, role playing and small group activities (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009). Student workbooks, teachers manuals as well as other ancillary teaching materials such as condoms, condom demonstrators (dildos) and human reproductive system charts were used to aid teaching (Mathews et al., 2009).	The SATZ promoted condom use among sexually active youths (Mathews et al., 2012).	The curriculum included knowledge on HIV/AIDs and opportunistic infections (Mũkoma et al., 2009).

		organization. Teachers were involved in piloting the original curriculum, which led to useful modifications (Mathews et al., 2009; Mukoma et al., 2009).				
	Interviews	<i>“Well, for the teachers to be involved, we had somebody who was from the University of the Western Cape who had been involved in curriculum development for life orientation for the schools. So she had intimate knowledge of what works and what does not work. So she reviewed the programme and she had a very practical approach. We had a much more academic approach. So she could tell us because it was to high level. So that was very useful to have her on an advisory board. So somebody who had been in schools and had designed curriculum. Then the students who we had on an advisory board, it just was not the right atmosphere for them to contribute. They could have made a better role in telling us what excited them and what was</i>				

		<i>boring. But it was a bit stilted the involvement in it. They were self-conscious and we did not make it such a youth friendly way for them to be involved, so that was my impression but I was not involved in all levels of getting students involved. But I would say we could do much better there.” (P. SATZ)</i>				
	Score	1	0.5	1	1	1
RDSP	Documents	Head teachers, regional education officials, healthcare providers and community stakeholders were involved (Power et al., 2004). However, details of the expertise of the stakeholders were not provided.	MkV curriculum was adopted.	MkV curriculum was adopted.	MkV curriculum was adopted.	MkV curriculum was adopted.
	Interviews	<i>“Ministry of health whom we worked very closely with and an NGO called ESPWs in Zimbabwe which give education in the schools” (P. RDSP)</i> <i>“Yeah as I said the ministry of health kicked us out to schools. Because of the political situation in Zimbabwe they stopped all non-ministry of health employees working in schools. They basically</i>		<i>“Well I think it is all about political leadership to be honest. In Zimbabwe there were lots of possibilities for a good curriculum, but the ministry was very conservative. They were very concerned about talking about sex in schools. They were absolutely adamant you could not show condoms in schools. They were not supportive of interventions that improved self-efficacy or empowered youth, because they saw</i>		

		<i>were worried about international NGOs or international projects politicising young people. The only people who are allowed access to pupils were teachers.” (P. RDSP)</i>		<i>that as a threat. You know, if you become empowered about your sexual rights, you became empowered about other rights.” (P. RDSP)</i>		
	Score	1	1	1	1	1
SBRHE	Documents	Details of stakeholders involved in the developing or adapting the curriculum is not present in the documents reviewed.	Multiple activities including teachers’ instructions, rotational presentations, film show drama presentations, counselling, condom distribution and quiz competitions (Ademola, 2004; Ajuwon & William, 2007). However, no specific links matching these activities to mechanisms of behaviour change techniques.	Interactive activities including drama, quiz competition, film show and rotational presentations where among the intervention activities (Ademola, 2004; Ajuwon & Brieger, 2007)	Information on contraception, condom use in addition to abstinence was addressed in the curriculum (Ademola, 2004; Ajuwon & Brieger, 2007).	Issues on STD/HIV/AIDS were addressed in the curriculum (Ademola, 2004).
	Interviews					
	Score	0	0.5	1	1	1

Intervention Mapping Step 4: Programme production contd.

Case	Evidence	14. It includes attitudinal and motivational arguments that encourage positive outcomes e.g., HIV testing (Denford et al. 2016, Kaaya et al. 2002).	15. It includes behavioural skills training for condom use including ability to get and use condoms (Denford et al. 2016, Sani et al. 2016, Paul-Ebhohimhen, Poobalan, and Teijlingen 2008, Kaaya et al. 2002).	16. It includes negotiation skills training for condom targeting condom communication and use (Denford et al. 2016).	17. It does not induce HIV/STI fear (Denford et al. 2016).	18. Topics and activities are covered in a logical sequence (first, basic information on HIV/STD/Pregnancy, followed by discussion of behaviours to reduce vulnerability/knowledge, values, attitudes, barriers, and finally provide protective skills) (Denford	19. It includes school-based or school linked adolescent-friendly health centres (Denford et al. 2016, Sani et al. 2016)	20. It involves community activities outside school environment (Sani et al. 2016).	21. It is of adequate intensity and duration (Denford et al. 2016, Paul-Ebhohimhen, Poobalan, and Teijlingen 2008).

						et al. 2016, Kirby, Laris, and Rolleri 2006)			
PSABH	Documents	Attitudinal and motivational arguments to stay focus in life and plan for the future can be seen in the music played during festivals (Believe in yourself: a song on HIV/AIDS awareness). Another motivational argument to help girls resist pressure from boys to engage in sex can also be seen in a poem called 'Ukimwi tuvute chini, "let us bring down aids":	Condoms were not included in the lesson plans but teachers were able to respond to students' questions with factual information and sometimes health workers were invited to schools to discuss condoms (Maticka-Tyndale, Wildish, & Gichuru, 2007, 2010).	No statement in the documents reviewed to suggest the PSABH provided condom negotiation skills training to the pupils. This is probably because condoms were not included in the lesson plans.	No statement in the document reviewed that showed the curriculum induces fear of HIV.	The following were addressed in the following order: knowledge; communication and pursuing information; and main modes of prevention (abstinence) (Eleanor Maticka-Tyndale, 2004)	The PSABH does not include school-based or school linked adolescent friendly health centers. However, the schools invited health workers to train teachers on how to handle issues on sexuality and condoms with factual information.	The PSABH activities extent outside the school environment, for instance during festivals music and songs were played by students in their communities (Maticka-Tyndale et al., 2007).	The PSABH was designed to be on-going component of a school curriculum and delivered in the last three years of primary schools (Maticka-Tyndale et al., 2010).
	Interviews							<i>"PSABH was not designed to</i>	

								<i>mobilize communities as such but included them in order to make it possible for schools to implement the programme, i.e. so that communities would not create barriers to implementation. Therefore, the potential to mobilize communities further, was not realized by PSABH.” (P. PSABH)</i>	
	Score	1	0.5	0	1	1	0	1	1
HP4RY	Documents	Attitudinal and motivational arguments to practise abstinence until marriage are obvious in the FLHE curriculum (NERDC in collaboration with the Universal Basic	Condom use as a prevention mechanism was not officially included in the FLHE curriculum. However, teachers were equipped with necessary information	Condom skills negotiations were provided in the community component of the HP4RY.	The FLHE curriculum contains a component that showed some people might choose to avoid sex because of fear of STD/HIV (NERDC in	Topics were covered in the following order: puberty; body image; values; self-esteem; goal setting;	No evidence in the documents reviewed.	Community-based programme based on AIDs ACC was delivered in the communities as part of the HP4RY (Arnold et al., 2012).	The School component of the HP4RY was delivered over the first three years of junior secondary schools (Arnold et al., 2012).

		Education & Incorporated, 2003)).	on condom during training to enable them tackle questions asked by students with factual information (Arnold et al., 2012). However, skills training on condom use were provided in the community component of the HP4RY.		collaboration with the Universal Basic Education & Incorporated, 2003).	decision making; communication; assertiveness; negotiation; finding help; sexually transmitted infections ; abstinence; body abuse; families; friendship; love; relationship within the larger society; Humanity and society; gender roles; and humanity and law/religion/diversity/the arts/the media. (NERDC			
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						in collaboration with the Universal Basic Education & Incorporated, 2003)			
	Interviews						<p><i>“And then we also had to work with local chemists, meds in labs you know, who are selling medication and drugs to see ... to monitor the sales of condoms, you know, our qualitative data, one of the things we got out of that, people were not actually coming to buy condoms, condoms for a while in their store and the ended-up being damaged. So</i></p>	<p><i>“We had two major interventions though. One was at the school level, and one was at the community level. Mine were at the community level...” (P. HP4RY)</i></p> <p><i>“We also engaged the non-school youth because the essence of that community-based programme was to involve both school and non-school in the programme because we</i></p>	

						<p><i>you see, from their wellness and knowledge and health, whether more members of the community were now coming to these places to buy more condoms. So these types of people were also talked to in the communities where they were present.”</i> (P. HP4RY)</p>	<p><i>believe that the in-school youth are not in isolation from the community – plus of the school that are not going to residential school; they go to school in the morning and they go back home to their communities. So for you to have a more successful, inclusive intervention, we need to have it at this multi-level – both the school and the community environment.”</i> (P. HP4RY)</p> <p><i>“We also had public role play, drama that was presented in the community halls; we had invited all the elders and older people in the communities,</i></p>	
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								<i>parent, elders and other residents that were interested in coming there. We also used locally-based, social events like soccer; when youths played soccer we had tables at the soccer field where we had on HIV, where at the end we talked about HIV ... HIV and AIDS to the community.” (P. HP4RY)</i>	
	Score	1	1	1	0.5	1	0.5	1	1
MkV	Documents	The MkV intervention challenged commonly held gender stereotypes such as girls cannot refuse sex when given gifts. Misconceptions such as young people cannot transmit HIV/STI or	Condom demonstration happened only in the health centres (Plummer et al., 2007) because it was not permitted in primary schools in Tanzania (Obasi et al., 2006).	No evidence in the documents reviewed. However, MKV was said to have provided participants with sexual negotiation skills, which may perhaps include condom negotiation skills.	No statements in any of the documents that suggest the curriculum induce HIV/STI fears.	Topics on information and knowledge, then behavioural and skills and then safer practice were covered as depicted	Health staff were trained to provide youth-friendly health services with emphasis on friendly non-judgemental approach to youths with sexual health issues, confidentiality, privacy and syndromic management	The MkV include activities in the community to encourage acceptance of the programme. It involved meetings with parents, community leaders and health authorities to inform them about the	Teachers deliver 10-15 lessons per year, one hour per week and over the last three years of primary school (Hayes et al., 2005; Valerio & Bundy, 2004).

		<p>cause pregnancy and pregnancy cannot occur after having sex once (Hayes et al., 2005; Obasi et al., 2006).</p>				<p>in the following statement: <i>“The idea is that if young people receive correct information and are taught behavioral and life skills before they engage in sex, they will be more likely to practice safer sex (e.g., using condoms, choosing safe partners, limiting the number of partners, seeking</i></p>	<p>of STIs. STI drugs and other supplies were also provided (Hayes et al., 2005).</p>	<p>intervention. Annual health week where adolescent reproductive health issues were discussed in the community including condom demonstration, sports activities and competitions were also part of the activities (Hayes et al., 2005; Plumer et al., 2010).</p>	
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						SRH services, etc.) once they become sexually active.”(Valerio & Bundy, 2004)			
	Interviews						“So, through our youth friendly health service programme, we helped to address those barriers, and the data we collected suggested that, that was successful, so I think that is an important secondary component of the intervention.” (P. MkV)	“which is, they think it would have been more successful if its school based components programme were embedded in a wider community programme, that also involved older age groups, particularly young adults and, because I think that without addressing the issue of community norms, it is going to be difficult to just shift the	

								<p><i>behaviour of this single age group in isolation. So, that was the single most important thing that I think, you know, you would need to do differently” (P. MkV)</i></p> <p><i>“But then really the main point, I think, here, is what I have already emphasised, which is I think, there needed to be a third major part of the programme, which was focused on community wide activities, and although we had a limited amount of work with the communities, if you read the paper - this was, like the fourth component, that is really</i></p>	
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								<p><i>very limited and it was mostly to do with just getting buy in for the programme to go ahead. What it needed to be, was a much more intensive, broad programme, aimed at changing sexual norms amongst young adults, more generally. So, promoting safer behaviour, discouraging, you know, unprotected sex with young women or men and, you know, other important behavioural messages, and really addressing some of the economic, social factors that were highlighted by our social science work.”</i> (P. MkV)</p>	
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	Score	1	0.5	0.5	1	1	1	1	1
HeathWise	Documents	Positive attitudes towards condom use, decision-making and anger management were addressed (Caldwell et al., 2004; Smith et al., 2008).	Participants were shown how to use condom properly (Smith et al., 2008)	Participants were taught skills for sex refusal without condoms (Caldwell et al., 2004).	No statement in the documents analysed to suggest the curriculum induce HIV/STI fear.	The following lessons were covered in the following order: self-awareness; skill development; community integration; and Knowledge, analysis and synthesis (Caldwell et al., 2004)	The programme was designed to link youth with providers of reproductive health, recreational and mental health services (Caldwell et al., 2004).	The programme was said to be designed to extend beyond the confines of classroom but further details not given (Caldwell et al., 2004).	HealthWise consisted of 17, 50-minutes lessons each, delivered over two years of high school (grades 8 and 9) (Tibbits, Smith, Caldwell, & Flisher, 2011).
	Interviews						<i>"The original idea was to have students get to know their communities. And get to know where they could get additional sexual information so</i>	<i>"The original idea was to have students get to know their communities. And get to know where they could get additional sexual information so</i>	

							<i>clinics and basically where clinics were in their areas. As well as where to do recreational activities. So what we had them do is look at maps of the community, find where things were and then go out into the community and try to interact with those. I do not know how successful that was to be honest, it was challenging to do in that environment, but that was the intention” (P. HealthWise)</i>	<i>clinics and basically where clinics were in their areas. As well as where to do recreational activities. So what we had them do is look at maps of the community, find where things were and then go out into the community and try to interact with those. I do not know how successful that was to be honest, it was challenging to do in that environment, but that was the intention” (P. HealthWise)</i>	
	Score	1	1	1	1	1	1	1	1
SATZ	Documents	The SATZ curriculum included sexual value clarification, dimensions of	Role-play for condom use including how to obtain condoms was included in	The SATZ curriculum highlighted some possible reasons for resistance to	No statement in the documents read to suggest the	The following topics were covered in the	Although the SATZ did not include school-based or school linked	The SATZ activities seem not to have extended beyond the school	The SATZ intervention was delivered over one school semester of

		sexuality, gender and sexuality (cultural and social aspects), the reproductive system, sexual decision-making (assertiveness, self-esteem, communication and negotiation skills), sexual coercion and violence in relationships, sexual risks, abstinence from sexual intercourse, condom use, contraception and sexual risk-taking and substance abuse (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009).	the SATZ curriculum (Flisher & Klepp, 2009).	condom use and provided some alternative ways to deal with them (Student-Workbook-Limpopo).	curriculum induced HIV/STI fear.	following order in the curriculum: Self-image and values Clarification; Personal, social and physical development, sexuality and reproduction; HIV, AIDS, STIs and substance use; Condom use; Gender roles; Skills for protection and Safety; Intimate partner violence; Contraception; Sexual	adolescent-friendly health services, students were encouraged to utilise health services for counselling and other reproductive and sexual issues (Mūkoma et al., 2009).	environment. However, community leaders including religious leaders were encouraged to contribute to the community dialogue on advantages of safe sexual practises and delaying sexual debut (Mūkoma et al., 2009).	approximately 5 months duration and 15-20 school hours (Mūkoma et al., 2009).
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						decision-making and sexual risk behaviour; Sexual risk assessment; Myths and misconceptions; Healthy lifestyles; and Reproductive health rights. (Mathews et al., 2012)			
	Interviews								
	Score	1	1	1	1	1	0.5	0.5	0
RDSP	Documents	The MKV curriculum was adopted	The MKV curriculum was adopted.	Evidence of negotiation skills training can be seen in the statement "all the materials relating to development of negotiation skills or on emotional	No evidence from the documents to suggest the curriculum induced HIV/STI fear.	The MKV curriculum was adopted.	Training was provided to nurses and other clinic staff to ensure accessibility of services by youths (Cowan et al., 2010).	The intervention included (i) out of school programmes targeting both in school and out of school youth with community outreach to families and	The intervention was implemented for up to 4 years. However, the school component was delivered for one year.

				issues will be in indigenous language” (Power et al., 2004).				young people affected by HIV. (ii) A community-based programme for parents and community stakeholders, to improve reproductive health knowledge, parents-children communication on reproductive health issues and community support for youth reproductive health (Cowan et al., 2008; Cowan et al., 2010).	
	Interviews							“So the intervention changed over time because the government stopped us working in secondary schools. We only worked in schools for the first year and it came out of	“For each class one lesson a week.” (P. RDSP)

								<p><i>school based. It was not in school for very much of the time.” (P. RDSP)</i></p> <p><i>“In the second year. We then moved the whole delivery of the programme to the community. We tried to teach in-school children in the school holidays in community venues and that worked moderately well, but not brilliantly. Then we developed a separate out of school curriculum and delivered that in the communities without school youth.” (P. RDSP)</i></p>	
	Score	1	0.5	0.5	1	1	1	1	1
SBRHE	Documents	No evidence seen in the documents read.	No evidence seen in the documents reviewed.	No evidence seen in the documents read.	No evidence seen in the documents	Although knowledge, attitudes/	Not at all	Not at all	Teachers provided about 68-200hrs of

					reviewed that the curriculum induces HIV/STI fears.	skills and safer sex practice were addressed, no report on the order in which the topic were delivered was not seen.			instructions and 10 rotational presentations (Ademola 2004; Ajuwon & Brieger, 2007).
	Interviews	<i>“So for the training of the peer educators, we taught them all different kinds of skills with skills on how they can set goals, skills how they can resist peer pressure and during the training we taught them how they can transfer these same skills to their colleagues. So we did several role plays,</i>							<i>“...and maybe I can add some – the fact that it was implemented for one whole academic session because this thing of three terms - first term, second term and third terms. Many of the interventions that I read about were very short, some for one time, some for one month so our project is unique and</i>

		<p><i>practise scenarios. From those scenarios, by demonstrating them, they were able to come up with skills on what they need to do to resist peer pressure. So that was what we did as far as skills acquisition was concerned. We also taught them skills for communication – how can they stand in front of the assembly and deliver a short presentation on reproductive health? How can they be comfortable discussing sensitive issues such as sexuality in front of their</i></p>							<p><i>has strength in those three areas” (P. SBRHE)</i></p>
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		<i>colleagues? So we gave them all these skills because the training programme was for – if I can recall – almost five days so we were able to cover this skills component.” (P. SBRHE)</i>							
	Score	1	0	0	1	0	0	0	1

Appendix 4.3e: Analysis Spreadsheet contd.

Intervention Mapping Step 5: Programme Implementation Plan

Case	Evidence	22. Pre-delivery consultation with school staff and parents (Pearson et al. 2015).	23. Secured at least some support from appropriate authorities such as ministries of health and education, school authorities and community leaders (Kirby, Laris, and Rolleri 2006, Denford et al. 2016, Pearson et al. 2015).	24. Piloting the programme (Kirby, Laris, and Rolleri 2006, Denford et al. 2016) to test the feasibility of the programme and make necessary adjustments before formal implementation.	25. Policy and institutional anchoring (Pearson et al. 2015). Inclusion of the programme into school policy documents and aligning the goals of the intervention to the overall goal of the school is necessary for successful implementation.	26. Training of educators, and providing monitoring supervision and support (Kirby, Laris, and Rolleri 2006, Sani et al. 2016, Gallant and Maticka-Tyndale 2004): Selecting educators particularly those with background in health education and having plan in place to monitor, supervise and support them.
PSABH	Documents	Community sensitisation on the need for HIV prevention programme in primary school was done in the community. Head teachers, senior classroom teachers and community representatives were also trained (Maticka-Tyndale, Wildish, & Gichuru, 2010).	The Ministry of Education, Science and Technology (MoEST) in Kenya made one AIDS lesson per week as mandatory and included HIV/AIDS questions in the national primary school examination (Maticka-Tyndale, Wildish, & Gichuru, 2007; Maticka-Tyndale et al., 2010).	The PSABH was first delivered in Nyanza Province to test the feasibility of programme delivery (Maticka-Tyndale et al., 2007).	The PSABH was designed to fit with the national guidelines on HIV/AIDS education and optimized components that are already present in the school curriculum (Maticka-Tyndale et al., 2007, 2010).	Teachers and peer supporters were trained, monitored and supported by the Ministries of Education and Health (MoEST and MoH) (Eleanor Maticka-Tyndale, 2004; Maticka-Tyndale et al., 2007, 2010).

	Interviews	<p><i>"We included the concerns of teachers, preferences of the community and needs of children in our research study and worked hard to bring these different voices together. We did not criticize teachers for their fear of talking to children about prevention in a sexual context, but tried to find solutions to their very rational dilemmas." (P. PSABH)</i></p> <p><i>"First we had to promote the programme at different levels, e.g. community leaders, church leaders, education officers at district level and health workers, all of whom" (P. PSABH)</i></p> <p><i>"By having three teachers from any school at a time, and a parent representative, we prepared the ground for a collective response at school and community level" (P. PSABH)</i></p>	<p><i>"KIE is the official curriculum and materials developed by the Ministry of Education. As such they are important gatekeepers for any initiative that one might wish to introduce at school level. Staff at KIE were included at all stages of programme content planning and design. In honesty, they were not necessarily the most progressive of thinkers. However, by including them at every stage, by providing them with access to more information and materials than they had had before and by constantly reinforcing their leadership of curriculum and materials matters we managed to strengthen their understanding of the issues and avoided conflict on the most sensitive issues, such as the condom as a preventative measure</i></p>		<p><i>"On the other hand, the PSABH was designed by people who knew how Kenyan schools ran. We intentionally designed the strategies to build on what was either already being done at school, or what the MoE had instructed should be happening in the delivery of the curriculum, so we made it very possible for people to respond to the implementation strategies of the training" (P. PSABH)</i></p> <p><i>"As the MoE introduced one HIV lesson per week during the lifespan of PSABH, this provided an opportunity for trained teachers to incorporate much of the PSABH training at school level." (P. PSABH)</i></p>	
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		<p><i>"I think the key strength which is not so much the curriculum and its content but the fact that PSABH worked with the teachers and also with the communities. And also had full support of the ministry of education." (P. PSABH)</i></p> <p><i>"So I would say community support for the intervention despite the fact that it dealt with very difficult topics, sexuality with upper primary school children is not something that parents, religious leaders, communities, teachers are really keen on but they were enough so that there was enthusiasm among the teachers, among the parents, among religious leaders, among everyone and this became an intervention that was owned by communities and I think that was what</i></p>	<p><i>in HIV infection reduction." (P. PSABH)</i></p> <p><i>"We invited these two officers to provide members of staff to work with the programme and, throughout all selection of trainers of trainers and trainers, the programme afforded the Provincial and District offices the freedom to select whichever members of staff they saw fit. This meant that the programme needed to be able to build the capacity of MoE and MoH staff in many different ways, but the advantage was that the government officers retained their ownership of the programme and invested their time and energy in it" (P. PSABH)</i></p>			
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		<i>contributed to its success more than precisely than what was taught.” (P. PSABH)</i>				
	Score	1	1	1	1	1
HP4RY	Documents	Research staff visited each school explaining the project to teachers, principals and community members to ensure their agreement to the programme (Maticka-Tyndale & Team, 2012).	The FLHE has been approved by the Federal Ministry of Education to be delivered across all junior secondary schools in Nigeria. The HP4RY worked closely with Edo state ministry of education to ensure delivery of the programme in the 30 participating schools (Arnold et al., 2012; Dlamini, Anucha, Lowik, Maticka-Tyndale, & Omorodion, 2012).	No evidence in the documents reviewed.	The FLHE curriculum was designed to be integrated into carrier subjects namely English, Integrated Science and Social Studies (Weldish, 2012).	Teachers were trained in two stages including training of master trainers that in turn trained principals, guidance and counselling teachers and peer educators (Dlamini et al., 2012). Youth Corpers and other facilitators were selected and trained in the communities to deliver the community component of HP4RY. A field coordinator monitor provided support through telephone and visits (Omorodion et al., 2012).
	Interviews			<i>“In South Africa. Our model is along that, making people look at it more as competent communities, but trying to implement a So, what happened was that we were kind of implementing trial to do that with communities, and rare communities</i>	<i>“Family life HIV education, was already being implemented in the school, it was a government policy” (P. HP4RY)</i>	<i>“So our submitted research sort of did that and we found that the teachers who were supposed to be implementing is a family like an education were not as comfortable in talking about HIV per se. And so, before retraining the</i>

				<i>introduced .(So, in other words you just used this intervention because it was pilot tested elsewhere.)” (P. HP4RY)</i>		<i>teachers, and so we organised training sections where the child came out into a place like a hotel, and spent about I think two weeks, or 10 days there. We developed models of research intervention training. So, it made you want ... being able to talk about sexuality, HIV among teachers.” (P. HP4RY)</i>
	Score	1	1	0	1	1
MkV	Documents	Community mobilization which consists of visits to teachers, parents and establishing community advisory committee in each ward mainly to reduce opposition was done in the initial phase of the MKV implementation (Renju et al., 2011).	The MkV programme received approval by MoEC, MoH, and regional and district authorities, community leaders and government officials (Valerio & Bundy, 2004). To affirm its legitimacy and importance due to controversial nature of the content, regional education authorities formally confirmed approval in writing to the districts authorities (Obasi et al., 2006).	The intervention was developed and piloted over two years (Wight, Plummer, & Ross, 2012) and youth friendly health services and condom promotion components were also piloted between 1998 and 1999 (Obasi et al., 2006).	The MkV intervention was embedded within the school curriculum and taught in biology or civic subjects during school hours (Valerio & Bundy, 2004).	Teachers, peer-educators and health care providers were trained and annual workshops were also conducted for exchange of experiences (Hayes et al., 2005; Renju et al., 2011).
	Interviews	<i>“It is a really difficult question that is. How participatory and</i>	<i>“I think Angela Obasi was very careful negotiation with the</i>	<i>“...the other changes happened in the programme to try and</i>	<i>“One has to negotiate for the space on the timetable through the</i>	<i>“Thirdly, that we put quite a lot of effort into the training of the</i>

		<p><i>culturally sensitive –do you make your intervention? When you know that the culture you are dealing with has fundamental contradictions between local cultural values and what you are trying to encourage and I think it is always a balance how far you can go with that. And whether you can find within Islam and within Christian denominations. There are more and less conservative, more progressive people. And if you could find those who are more open to these ideas and work with them, then there is much greater chance of the intervention being sustainable. Because if you try and get round them –And ... or sort of maybe you get the authority from the education department, but the religious leaders are still opposed to it. In the long term the ...</i></p>	<p><i>education authorities, with the local health authorities, with the village leaders, the community mobilisation, all of these things were really important, building on what AMREF, the local NGO that had already been working on sexual health issues, building on their understanding and knowledge of local culture” (P. MkV)</i></p> <p><i>“The main institutions were the ministry of education and the ministry of health. And then at regional level... I mean within Tanzania you have the government ministries and then regions, districts. And at each level you need to have the buy-in from the officials at each level and Jenny Renju and Angela Obasi lead a programme of scaling up MEMA kwa Vijana for the whole of Mwanza Region by</i></p>	<p><i>make it ... to improve it in the light of discussions with other people and our pre-testing of it in various schools. But the main, if you like, compromise we needed to make was related to kind of teaching.” (P. MkV)</i></p> <p><i>“The importance of the ... doing a proper pre-test, which we did at the start which greatly changed the content and some of the approaches of the interventions. In the light of the pre-testing.” (P. MkV)</i></p> <p><i>“ I am not sure that spending an extra six or 12 months on that, would have resulted in a very different intervention, because I think the, you know, the findings from the social science study, they took quite a long time to obtain, you know, and unless you have done a really, well really, quite long term, systematic study on those, you know, that kind of qualitative</i></p>	<p><i>Ministry of Education. They actually were fine on it because it fitted within the overall syllabus of what was supposed to be being taught and gave a mechanism for doing that.” (P. MkV)</i></p> <p><i>“Implementation is much easier if you can embed an intervention into the school programme, and make it an examinable topic, so that it is taken seriously by both the teachers and the students, and design it well.” (P. MkV)</i></p>	<p><i>teachers and then their supportive supervision” (P. MkV)</i></p> <p><i>“That had to be done through very participatory training sessions with the teachers where they were able to really reflect on their own beliefs and their own knowledge and attitudes towards many of the issues. Continuing supportive supervision of them, the work that we did in terms of distances and so forth, that was by trying to ... you know you work very closely with the existing district inspectors of schools and the equivalents in the health sector, for example.” (P. MkV)</i></p>
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		<p><i>there will be contradictions and resistance to the programme” (P. MkV)</i></p> <p><i>“I do think religious leaders were involved to an extent from the very beginning, so that would be a misconception to say they were not. Again, like I said in the email, Angela Obasi is the expert, she was the one who did all of this work, right from the start, and really was on the ground talking to people, and advocating for the intervention, and was, really did, I think, an excellent job in difficult circumstances, conveying the importance of it, even though it was somewhat controversial.” (P. MkV)</i></p>	<p><i>working at each level at the ministry level and at the regional level with those officials.” (P. MkV)</i></p> <p><i>“The Regional Educational Officer, I believe was a born again Christian, and he did engage, I mean, Angela and her team I think they really did a tremendous job, because they could have met 100% resistance, and they advocated very passionately, and very persistently, and he ended up being a co-author on the final curriculum and, you know, authorising it in many ways, that made it something that was part of the actual institution of the school system in Mwanza, but his condition was basically, no depiction or description of condoms in schools, except very, very basic simple concepts, like condoms do not pass</i></p>	<p><i>research, looking at those factors, I think it would have been quite difficult in practice for that to have contributed to the design of the intervention. I suppose it is possible, you know, if you had spent a couple of years doing formative qualitative research, you may have realised and found out, even at that early stage, that there were, like, overwhelming factors that needed to be addressed, if you were going to change behaviour in young people, and that therefore, you needed a wider intervention. So it is worth mentioning that, I think, although I do believe, in practice, we did a pretty good job of the fourth stage of this programme.” (P. MkV)</i></p>		
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			<p><i>on HIV, you know, which was a common misperception or myth” (P. MkV)</i></p> <p><i>“Then, in terms of implementing the study, again we had very close interactions there with, both with the ministries, because we were delivering the intervention through, you know, government primary schools, so we worked closely with our colleagues in the Ministry of Health, including at district level and regional level.” (P. MkV)</i></p>			
	Score	1	1	1	1	1
HeathWise	Documents	Teachers and other school staff were involved in the adaptation process, but no evidence from the documents reviewed to suggest pre-delivery consultation was made with parents.	Although the school authorities and educational board were involved in adapting the HealthWise curriculum, no information that explicitly implied there support of the programme.	HealthWise was pilot-tested for 3 years (Tibbits, Smith, Caldwell, & Fliisher, 2011).	HealthWise intervention was nested in the Life Orientation curriculum approved by the South African Education Board as a general education curriculum (Tibbits et al., 2011).	Workshop training was organised for teachers and principals and training manuals given to the teachers (Smith et al., 2008).

	Interviews	<p><i>"I think we really worked hard at getting people to buy-in to what we were doing and getting people to feel that they owned, that they were part of something important, they were a part of something meaningful. We worked very hard at creating that team, where everybody felt valued and that they were contributing. We ran a lot of workshops. We spent a lot of time talking with people, being with people, being within the school situation, being within the district education department and working hands on with people. We did not want a top-down approach of coming in with an intervention and saying, "Here it is, this works, you must now implement it." That would not have worked, so it took us a lot of time, but we really had to work in partnership with people." (P. HealthWise)</i></p>	<p><i>"We always find that working with principal's works very well. If you can get the principal or the head teacher to buy into your programme and to support the program, that is very important. Without the principal's backing, you can forget doing any intervention in the school. Once you have got the principal's support, you then can work with a small group of teachers, either that the principal identifies or in some way you work with a small group of teachers who are prepared to work with you to implement the program." (P. HealthWise)</i></p> <p><i>"Well we have got a lot of teacher buy in and principal support, I think those were the critical issues that the teachers were very enthusiastic about the programme" (P. HealthWise)</i></p>	<p><i>"I mean they worked very hard and I think we learned a lot from the pilot so I think that really contributed and we ... after the pilot, we rearranged the order of some lessons and whether we taught it ... you know the grades that we taught it. So that was ... that was you know really important" (P. HealthWise)</i></p>		
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		<p><i>"I think when we go in and we do an intervention, it is not just doing the intervention with let us say the learners or the pupils, you actually are working with a much broader group of people. You are working with teachers, adults, you are working possibly with parents and you are changing their mindsets as well as working with the learner. The learners are the easy ones. It is the adults that we have to work with and if you are not going to work with them or if you are going to ignore them, you are not going to be successful, you are going to get resistance. I think that was really important."</i> (P. HealthWise)</p> <p><i>"(So I was just wondering have you involved parents in any of this process. Yeah ... no. It was very difficult to engage</i></p>	<p><i>"We would not have been in the schools unless they agreed. We work very closely with very different levels of the school authorities. The school work with the HIV/AIDS programme director, the principals that we were very deliberate and it was a long term relationship development with these authorities"</i> (P. HealthWise)</p>			
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		parents.” (P. HealthWise)				
	Score	0.5	1	1	1	0.5
SATZ	Documents	Teachers were consulted and involved in the implementation. However, no evidence of that with parents.	No evidence	Four teachers piloted the SATZ curriculum in their Life Orientation lessons in schools not included in the main trial (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009).	The SATZ curriculum was compatible with the outcome-based-education approach in South Africa and fitted into the Life Orientation Curriculum. This was one of the factors that facilitated the implementation as argued by the authors (Mukoma et al., 2009). Similarly, in Tanzania, the curriculum was linked with existing curricula (Ahmed et al., 2009).	Teachers were trained and project team provided ongoing support during implementation (Mukoma et al., 2009).
	Interviews	<i>“I know we had students come in to our advisory group. But I do not remember if we had parents. But that would be better to</i>	<i>“From the Department of Education and that again would have to be Wanjiru because you see my role was</i>			

		<i>get from Wanjiru...” (P. SATZ)</i>	<i>overall not in depth on the development of the interventions.” (P. SATZ)</i>			
	Score	0.5	0.5	1	1	1
RDSP	Documents	A feasibility study involving teachers and parents was conducted (Cowan et al., 2008).	Zimbabwe Ministry for Health and Child Welfare and the National AIDS Council approved and supported the intervention. Additionally, community advisory board (CAB) members who are trained members of the community played a vital role in community sensitization and recruitment of participants (Cowan et al., 2008).	A feasibility study was conducted before the main trial (Cowan et al., 2008).	No statement in the documents to suggest the intervention was aligned with the goals of the school or fit into an ongoing school curriculum.	Youth that delivered in and out of school youth programme were carefully selected, trained and supervised. Youth-friendly clinic staff training as well as refresher training was provided to nurses and other clinic staff. Similarly, community facilitators that delivered the community programme where carefully selected, trained, supported and supervised (Cowan et al., 2008).
	Interviews				<i>“Our curriculum was a new curriculum, but it was delivered within the school timetable by our professional peer educators. The professional peer educators went and stayed at the schools. They were accommodated in teacher’s accommodation and they delivered just</i>	<i>“In Zimbabwe it was very difficult to get teachers to – well it was difficult to get teachers to prioritise sexuality education and it was also difficult for them to talk it about it explicitly. They turned into miss out sessions that they felt uncomfortable doing. They turned it to a – it</i>

					<i>these lessons across the school.” (P. RDSP)</i>	<i>was always the one that got missed. Often in schools if you talk to teachers they would send returns to the ministry of health that said they delivered all their sessions, but in reality they had not. It was a non-examinable subject. People concentrated on the things that were examinable and did not do that. We engaged what we call professional peer educators, who were school leavers, so many of them were as qualified as temporary teachers in the school. We did a six-week training with them, five to six week training. They actually became very skilled facilitators and then they delivered the intervention” (P. RDSP)</i>
	Score	1	1	1	0	1
SBRHE	Documents	School principals approved to the programme. Parents also approved to the programme after meeting with the	One of the challenges mentioned by the peer educators or teachers was lack of adequate supports from the school	No such evidence seen in the documents reviewed.	Teachers suggested that the curriculum ought to be taught as a stand-alone subject and have a slot on the	Teachers and peer educators were trained for 5 days on the programme. Monthly supportive supervision meeting

		investigator during a parent-teachers association meeting and all doubts regarding the programme cleared (Ademola, 2004).	authorities (Ademola, 2004).		timetable (Ademola, 2004)	were held in each of the intervention schools (Ademola, 2004; Ajuwon & Brieger, 2007).
	Interviews	<i>“The first stakeholders that were involved were the school authorities because without the support and approval of the administrators in the school you would not have access to the students in the first place. Secondly, we also involved the parents... So we have the administrators in the school, the teachers themselves and parents. Those are the people that we involved in implementing the intervention.” (P. SBRHE)</i>		<i>“We first of all pilot tested the questionnaire that we used, that is one. And two, we based our intervention on the previous experience that other people have had so peer education in the school setting is not new so prior to my own study there have been many interventions that have been done so we did not have to go pilot testing all over. What is new is whether it is possible for teachers and students to work collaboratively. And that was what we wanted to trial. We also wanted to trial whether teachers can be trained and they can deliver interventions in the school even using extra-curricular approaches so we did not have to go and</i>		

				<i>pilot test since peer education had already been well tested and the results have been found to be positive.”</i> (P. SBRHE)		
	Score	1	0.5	0	0	1

Intervention Mapping Step 5: Programme implementation plan contd.

Case	Evidence	27. Trained educators as facilitators instead of peers (Denford et al. 2016, Paul-Ebhohimhen, Poobalan, and Teijlingen 2008).	28. Students' engagement to ensure programme is appealing to them as well as stretching their understanding of health issues that may be beyond their experience (Pearson et al. 2015).	29. Teachers and students should feel a benefit from participating in the programme e.g., transferrable skills (Pearson et al. 2015).	30. Leadership (Pearson et al. 2015): appointment of project co-ordinator, leader or co-ordination team to ensure successful implementation.	31. Implementation of all activities as planned (fidelity) (Kirby, Laris, and Rolleri 2006, Denford et al. 2016, Sani et al. 2016)
PSABH	Documents	Delivered by both teachers and peer supporters.	Most of the PSABH activities for example literary performance, music and drama engaged the students actively (Maticka-Tyndale, Wildish, & Gichuru, 2007).	No evidence on this from the documents reviewed.	The MoE Quality Assurance and Standard Officers (QASO) were trained to monitor activities in the PSABH schools (Maticka-Tyndale, Wildish, & Gichuru, 2010).	No statement in the documents reviewed that suggests the PSABH was delivered as designed. However, it was noted that the model of fidelity followed by PSABH was not the usual understanding of programme fidelity (i.e., adherence to specific manual and schedule of programmes). Teachers were encouraged to adapt the programme relevant to their context as well as to use avenues where they know they have strength.
	Interviews	<i>"PSABH advised that students should select</i>	<i>"[one of the strategies of PSABH was]</i>	<i>"Also, the [training] sessions are</i>		<i>"In summary, for PSABH, there was no</i>

		<p><i>their own peer supporters, free from teacher influence.” (P. PSABH)</i></p>	<p><i>providing increased opportunities for children to ask questions without repercussions” (P. PSABH)</i></p>	<p><i>designed to build on what the audience establishes as their entry point. Some sessions are really facilitations of the participants setting their own agendas for action. So, the content could vary from region to region. In some areas the participants would show more concern for self-protection and in others for the impact of HIV on vulnerable children. The design of some sessions allows participants to determine the areas they feel are most urgent to address. The sessions were designed to keep bringing the focus back on to the needs of young people.” (P. PSABH)</i></p>		<p><i>way to insure fidelity; but fidelity was measured during both the monitoring and evaluation data collection. Fidelity was assessed to be higher in schools where information about HIV and AIDS was more regularly included in a larger number of classroom subjects and in schools that had a functioning question box, club where attention was focused on HIV and AIDS, regularly updated information corners that included information about HIV and AIDS, school health plan and teacher lesson plans that included HIV and AIDS, specific texts that addressed HIV and AIDS were present in the school and there was evidence that they were used by both teachers and pupils, and PSABH trained teachers were holding sessions to train their colleagues.” (P. PSABH)</i></p>
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	Score	1	0.5	1	1	0.5
HP4RY	Documents	Delivered by teachers and trained young people that just completed graduate education.	Participatory delivery activities like drama, role-plays and debates engaged the student (Omorodion et al., 2012).	No evidence on this from the documents reviewed.	The HP4RY project was divided into segments with sub-groups of team members that had designated leaders (Dlamini, Anucha, Lowik, Maticka-Tyndale, & Omorodion, 2012).	No evidence of information on this.
	Interviews				<i>"Our community workers were better to keep journals, and submit their journals every week. So, that gave us an idea, I was there most of the time, and I also visited these communities without prior notice that I am coming basically to ensure that they were onsite, and to also see what they were doing, and to observe some of the things that they were doing."</i> (P. HP4RY)	
	Score	1	0.5	0	1	0
MkV	Documents	Delivered by teachers and peer supporters.	Students enjoyed drama and role plays because they were involved actively and had the opportunity to show their skills	No evidence on this from the documents reviewed.	A ward co-ordinator that supervised schools three times a month to ensure the MkV topics are taught as planned was appointed (Wight,	The school component of the MkV was largely delivered as intended (Wight et al., 2012). However, the condom distribution was not

			(Valerio & Bundy, 2004).		Plummer, & Ross, 2012).	sustained due lack of demand and cost of running that component of the intervention (Wight et al., 2012).
	Interviews		<p><i>“The fourth thing was that we included ... we tried to go beyond just giving information to trying to help the young people to actually reflect and internalise how that information and the things that they were learning might relate to their own lives and their own sexual reproductive health.”</i> (P. MkV)</p> <p><i>“Well I think at the most general level changing the relationship between the teachers and the pupils was really really important. I imagine it’s the same in Nigeria that in ... in most countries that I know of in sub Saharan Africa –In general primary school teachers have a very authoritarian relationship with their pupils. And ... and</i></p>	<p><i>“I think a lot of teachers were very grateful to just get a good training, and to feel empowered in how to talk to young people about these risks, and to feel empowered in their own personal lives, to better manage their own risk, because, again, most of these teachers have extremely rudimentary trainings and, like I said, had failed secondary school themselves, in a very low quality secondary school environment. So, to be given a very good training and basic information like this, was something that, they sometimes seemed almost hungry to get, so they were motivated just to learn and to improve their own skills. Often they were motivated, I think, because they</i></p>		<p><i>“Well I guess a fifth thing would be that we put ... that we gave the teachers basically fairly detailed lesson plans. So we did not just tell them “you have got to teach this and you have got to teach that”, so it was not just if you like a syllabus, it was actual detailed lesson plans with the involvement of ... for example, short dramas acted by peer ... class peer educators. Role plays, looking at pictures and discussing them to illustrate various points, stories. So there were, there was a lot more ... you know the teachers basically had to just understand the lesson plans and use them rather than having to make stuff up themselves, which also helped we</i></p>

		<p><i>it's what ... what we call a very didactic form of teaching where you expect them to learn things by rote, not to develop critical thinking" (P. MkV)</i></p> <p><i>"Yeah, so and of course at primary school level in rural Tanzania, part of that relationship is a ... it can be very ... not only authoritarian but very harsh and so pupils who forget ... who forget what they should have learnt or can't get the answer right can be beaten. And so part of MEMA kwa Vijana was to change that sort of relationship and make the ... encourage the teachers to be much less formal ... less harsh, less hierarchical and make the classes fun. And interesting and try and encourage the young people to play an active part in their learning. So it's active learning and I think ... I think that was one of</i></p>	<p><i>came to understand how at risk young people were." (P. MkV)</i></p>	<p><i>thought with the ... the validity or ... well the fidelity of the intervention so that it was delivered as planned, much better than if we had just you know, told them "teach this, here is a few ideas" we actually had detailed lesson plans." (P. MkV)</i></p> <p><i>"When we say that it was largely delivered as intended. The focus there is very much on the teacher delivered curriculum. And this was the core part of the programme. So it is the most important part of the programme and that bit was ... I think we are fairly confident that it was delivered well. And it was ... there was a ... now again I think you've read them ... the articles more recently than me so you will probably remember more clearly, but I think there was a structure of inspections, observation of lessons</i></p>
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			<p><i>the ... one of the most important elements of the programme for the pupils to get engaged with it" (P. MkV)</i></p> <p><i>"So we had very interactive teaching methods, which were very novel, actually in those schools, at that time, which made this an exciting subject, and one where, which helps to engage the students as much as possible. So, I think I would stay with that main approach, I still think that's a good approach. It should really focus on the realities of the lives of these young people living in these resource poor settings in Tanzania" (P. MkV)</i></p>			<p><i>and visits to the schools to interview the teachers and the head teachers about how much they delivered and also teachers self-completing. I think they were providing data themselves on what they were delivering. So there was a structure of monitoring how that was being delivered" (P. MkV)</i></p> <p><i>"Well, the curriculum itself, I think during the first year, or during the years of the trial, was intimated, was implemented very closely following the guiding document, the books that the teachers had, the teachers resource guide and curricular, so the - and the thing about them is, that they were written in very simple, and very directive ways so that teachers could be, pretty much walked through how to do participatory activities, and different</i></p>
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						<i>techniques, which they were unfamiliar with, because they had not previously had training with them, even though they had gone through those kinds of participatory methods with the MEMA kwa Vijana training. So, even if they, you know, had very rudimentary training, they could follow it pretty much line by line, and - with fidelity, and not just the content but the methods, and all of the monitoring evaluation, there was a lot of monitoring evaluation, suggest that, that was done quite well across, you know, at a large scale, the large scale of the trial overall' (P. MkV)</i>
	Score	1	0.5	1	1	1
HeathWise	Documents	Trained teachers were the facilitators.	Learners were engaged and many expressed that they "felt like someone was listening to them" or "made me feel like a person." (Smith et al., 2008).	No evidence on this from the documents reviewed.	No evidence from the documents reviewed that there was a named leader in the schools looking over the programme implementation.	It is reported in that teachers were committed to delivering the intervention as planned (Smith et al., 2008). However, whether that actually

						happened was not reported.
	Interviews			<p><i>"In more recent years in South Africa and Cape Town, the education system it was very tricky at the moment, it was very challenging context to work in for teachers. Because there is a lot of, what shall I say? There is a lot of stress. Teachers feel very overworked. They feel really undervalued in that they feel that they were not paid sufficiently. They were working with large classes, many kids, overcrowding." (P. HealthWise)</i></p> <p><i>"This is the context that many teachers are teaching in. So now you come along as a researcher with a program and you want the teachers to implement this program. They are just going to tell you, "Sorry I do not have the time. I do not have the motivation. I do not have the space.</i></p>	<p><i>"We hired two people we called Youth Development Officers. They were from the local neighbourhoods. They interacted with the teachers who were teaching Healthwise and they did a lot of support and help. The Principals of course were very much informed. There was one school principal who did provide leadership, he was very good. The other three principals were interested but I do not think that they provided the type of leadership. So it was really our staff. Who provided that leadership. It was and efficacy trial and an effectiveness trial." (P. HealthWise)</i></p>	<p><i>"Well that is a good question and that is what I was just referring to, is we have one school who did a very good job with fidelity and we have documented that and there is a paper ... one or two papers out on that. The other teachers I do not think taught with as great fidelity as they could have and that was why we done Healthwise 2 study" (P. HealthWise)</i></p>

				<i>So please just forget it. I cannot do it.” (P. HealthWise)</i>		
	Score	1	0.5	0	1	0.5
SATZ	Documents	Trained teachers delivered the intervention.	Students participated well and enjoyed the lessons, particularly those on self-esteem, assertiveness, values and the reproductive system (Mukoma et al., 2009).	No evidence on this from the documents reviewed.	No evidence in the documents reviewed.	The implementation varied across schools and classes due to contextual differences with teachers attempted to deliver the 14 to 16 lessons as planned. However, it was found, that most of the teachers did implement the interventions as intended (Mukoma et al., 2009).
	Interviews				<i>“It was the teachers who were going to be implementing were the ones who took it forward. Obviously we always go through the Principal of the school and the Principal usually guides us as to whether we go through the school governing body or he does it for us. So there was a school governing body which involved parents as well as teachers... community members. So all of those would have been involved in the process but actually leading</i>	

					<i>intervention was the teachers who were trained to deliver it.” (P. SATZ)</i>	
	Score	1	0.5	0	1	1
RDSP	Documents	Trained educators delivered the intervention.	Participatory methods of teaching where employed to ensure both knowledge and skills acquisition (Cowan et al., 2010).	No evidence on this from the documents reviewed.	No specific evidence of programme leader or co-ordinator for implementation was found in the documents read.	The school component was not sustained for the entire trial period due to high students drop out rate because of worsening economic situation in Zimbabwe (Power et al., 2004).
	Interviews					<p><i>“Yeah we were because it was our curriculum and we did participant observation and we trained everybody first, so they knew exactly what they were meant to do. So we were able to deliver as intended.” (P. RDSP)</i></p> <p><i>“I think in general it went very well and it was delivered really faithfully. Some individual peer educators, professional peer educators found for example discipline hard because the culture of disciplining children in schools in Zimbabwe is corporal</i></p>

						<i>punishment and they were explicitly forbidden from using that. We said, "That is not acceptable." A few people struggled with how you got people to – how you could manage a class without hitting people, but we did additional training around that and that worked well."</i> (P. RDSP)
	Score	1	0.5	0	0	0.5
SBRHE	Documents	Delivered by teachers, peers or teachers and peers.	Quiz competition, drama, film show, literary and debate were engaging (Ademola, 2004; Ajuwon & Brieger, 2007).	No evidence from the documents reviewed.	Project supervisors (research staff and teachers) supported the peer educators (Ademola, 2004).	No evidence of this in the documents reviewed.
	Interviews	<i>"And of course our results show that it is better you have an intervention where the teachers and the peer educators work in synergy and the results show that that is the best form of intervention."</i> (P. SBRHE)		<i>"The other experience is that some teachers were asking us to give them some incentive because they said this is extra work for us so what is in it for us? So I had to develop a package of incentives and that incentive included giving them Bic biro. It had a lot of value at that time, not at this time and they felt that their time was being productively used."</i> (P. SBRHE)		

				<p><i>“So the teachers were carried along because we had a training session for them so teachers, having participated in the training, appreciated the need to have the project and felt that they could make a difference by participating so they did not have any concern” (P. SBRHE)</i></p> <p><i>“I also heard was the fact that during the training I think I gave transport allowance to the teachers for coming to the venue and they also benefited from the training, they had personal benefit from the training and you find that every month I went to the school to hold meetings with them and that stands also as probably incentive” (P. SBRHE)</i></p>		
	Score	1	0.5	1	1	0

Appendix 4.3f: Analysis spreadsheet contd.

Intervention Mapping Step 6: Evaluation Plan

Case	Evidence	32. Multiple methods (Mūkoma and Flisher 2004): Quantitative and qualitative methods of evaluation that evaluate processes and outcomes should be employed.	33. Short- and-long term outcomes including health outcomes (Denford et al. 2016, Kaaya et al. 2002) and contextual outcomes should be measured (Mūkoma and Flisher 2004).	34. Combination of people directly involved in the programme (e.g., Students, teachers and parents) together with external evaluators in evaluation (Mūkoma and Flisher 2004).	35. Long-term implementation and evaluation is necessary to detect long-term outcome (Mūkoma and Flisher 2004).	Total Score (Out of 35)
PSABH	Documents	The PSABH was evaluated using quasi-experimental method utilising data from students' self-administered surveys and focus groups with pupils, interviews with teachers and education officers monitoring reports (Eleanor Maticka-Tyndale, Wildish, & Gichuru, 2007, 2010).	Behavioural outcomes were measured for both short- and long-term period (12-14 months after PSABH training) (Maticka-Tyndale, Mungwete, & Jayeoba, 2013). However, health outcomes like prevalence of sexually transmitted infections were not measured.	The PSABH was monitored using QASOs reports, teachers self-report of delivery of activities and students self-report of participation in activities (Maticka-Tyndale, 2004; Maticka-Tyndale et al., 2010). Steadman Research Services Incorporated (external research agency) conducted the data. This included surveys with teachers, pupils and community representatives (Maticka-Tyndale, 2004). <i>“Beginning with the baseline data from Nyanza province, data were used to support changes that PSABH</i>	The PSABH was implemented as on-going school curriculum and evaluated 10 and 22 months after PSABH training (Maticka-Tyndale et al., 2013).	

				<i>managers and the research team felt were needed. Dr. Maticka-Tyndale's position as an external, independent researcher gave power to her reports." (Mathews case study)</i>		
	Interviews	<i>"We not only had young people completing surveys but we also ran focus groups and in the focus groups we had them talking about their understanding of some of the concepts that were in the survey so that helped us gain confidence or helped us understand which questions were problematic" (P. PSABH)</i>		<i>"Sharing the research findings in their entirety but also through the respectful and independent voice of our lead researcher, Eleanor, was critical. We were able to engage Ministry of Education staff as data collectors and this also helped to keep the Ministry of Education engaged and confident that the data being collected was necessary and reliable." (P. PSABH)</i>	<i>"This is an investment in the long term not in the short term. And yet it is almost impossible to do that research to track over a very long period of time. If we look at research that has tracked over many, many years not that we do not have any really at hand with respect to school based programmes and HIV but we have on other health conditions and what we find is it takes many, many years of collecting data before we can say okay this is the effect, this is what is going on and we have not done that with HIV." (P. PSABH)</i>	
	Score	1	0.5	1	1	31
HP4RY	Documents	The HP4RY was evaluated using action-oriented mixed method. Forms for monitoring and evaluation were used to record monthly	Short and long term behavioural outcomes were measured (Arnold et al., 2012). However, long-term	Teachers and youth Corps members recorded their activities as part of the monitoring and evaluation of the HP4RY intervention.	The programme was evaluated after 18 months of initiation in schools (Arnold et al., 2012) and one year after.	

		activity log. The youth Corpers conducted ethnographies. Interviews were conducted with community leaders and adult and youth community members to evaluate the programme and obtain feedback. Impact evaluation of the community programme was evaluated using questionnaires and focus groups from junior secondary school students. In summary, both the school and community programmes were evaluated using clustered randomised trial and qualitative-quantitative mixed methods (Arnold et al., 2012; Omorodion et al., 2012).	health outcomes were not assessed.			
	Interviews					
	Score	1	0.5	0.5	1	28.5
MkV	Documents	Various methods were used to evaluate the MkV including participants observation, impact evaluation using randomised controlled trials, qualitative and quantitative process	Both short-and-long term impacts of the MkV interventions were measured and biological outcomes including HIV and other STIs were also measured (Doyle et	Some evidence as seen in the following statements "...external evaluations of the intervention by national and international experts. Qualitative research on adolescent sexual behaviour in the study	The MKV was evaluated for up to 8 years to detect long-term outcomes (Doyle et al., 2010).	

		evaluation etc (Hayes et al., 2005; Larke et al., 2010; Plumer et al., 2010; Plummer et al., 2007; Renju et al., 2011; Valerio & Bundy, 2004; Wight, Plummer, & Ross, 2012).	al., 2010; Ross et al., 2007)	communities was conducted by a semi-independent team of social scientists, and included participant observation, in-depth interviews and focus groups” (Hayes et al., 2005). “...implementation by intervention staff, the MkV qualitative research programme (HALIRA), and external evaluators” (Obasi et al., 2006)		
	Interviews	“And then secondly in terms of the qualitative research, you know the links between that and the so called Halira programme and MkV and people have often ignored if you like the importance of that qualitative research both in terms of how it helped to improve and shape the intervention by knowing a lot about, you know, young people sexual and reproductive health and their attitudes to those kind of issues, the health and lifestyles. So I just wanted to clarify that.” (P. MkV)	“I think given the problem of validity of the data, reported data I think biological outcomes are ... should always try in the long term try and evaluate using biological outcomes and of course there was a big problem there because they are so expensive, but just focussing on pregnancy would not be so expensive. It would not require a lot of lab tests and so on, which you need for sexually transmitted infections. And I think that would make for much more rigorous evaluation to have	“Yeah, so, as I explained, we ran the evaluation component completely independently from the intervention component, and I think that is a methodological strength, which I would always advise other people to do, if they were planning studies, because I think it is not good practice really for you to evaluate yourself, it is much better to have an independent team, as we did, doing the evaluation and, you know, evaluating the impact of the intervention, which was implemented by a separate team, so, I think that was a strength.” (P. MkV)		

			<i>those kind of outcomes.” (P. MkV)</i>			
	Score	1	1	1	1	33.5
HeathWise	Documents	The HealthWise was evaluated for both impact and processes utilising data from focus groups with teachers and students, lessons evaluations forms completed by teachers, lesson observations (Caldwell et al., 2004; Smith et al., 2008).	Short-and-long term behavioural outcomes were measured. However, long-term health outcomes such as incidence of STIs were not assessed.	Teachers and students were involved in the evaluation (Tibbits, Smith, Caldwell, & Flisher, 2011). However, no evidence to suggest independent or external evaluator was involved in the evaluation.	HealthWise was evaluated for up to wave 5 (Wegner, Flisher, Caldwell, Vergnani, & Smith, 2008).	
	Interviews	<i>“We did a process evaluation and an outcome evaluation. We monitor the learners twice a year, over from grade eight until this year they’re in grade 12 so we have monitored them” (P. HealthWise)</i>		<i>“Otherwise the qualitative, the focus groups, that always works if you meet the teachers or the principals in a convenient place and you bring along some food. That works very well, if you have got lunch or tea or cake or something. You run a focus group, but usually you get some teachers not all of them” (P. HealthWise)</i>		
	Score	1	0.5	0.5	1	31
SATZ	Documents	Both impact and processes were evaluated using quantitative and qualitative methods. Teachers completed a	Behavioural outcomes were measured. Health outcomes such as STIs or HIV infections were not assessed.	Teachers and students were involved in the evaluation. However, no evidence of involvement of parents or external research agency.	The SATZ was implemented for one school semester (about six months).	

		dairy-like document lesson log after each lesson. Researchers (participant observation) observed class lessons. Teachers were interviewed using semi-structured interviews and focus groups were conducted among student (Ahmed, Flisher, Mathews, Mukoma, & Jansen, 2009; Mathews et al., 2012; Mukoma et al., 2009; Mūkoma et al., 2009).				
	Interviews		<i>"I guess we can include biological outcomes where possible but that is difficult of course for various reasons. Not only cost but also there are very few events, incidences. So that impacts the cost. How else can we improve it? Ultimately we do need to have some more objective outcomes. So I think we have to get very creative about that"</i> (P. SATZ)			
	Score	1	0.5	0.5	0.5	27.5
RDSP	Documents	Impact was evaluated using clustered	Both behavioural and long-term health	Students and parents were involved in the	The programme was implemented and	

		randomised trial. Processes were evaluated utilising both qualitative and quantitative data of study and non-study activities (Cowan et al., 2008; Cowan et al., 2010; Power et al., 2004).	outcomes were assessed (Cowan et al., 2002). Biomedical markers (HIV and STIs) were measured.	process of obtaining consent for the evaluation and the feasibility of assessing biological outcomes (Cowan et al., 2002). However, no evidence of involvement of external research agency was found from the documents read.	evaluated for up to 4 years.	
	Interviews					
	Score	1	1	0.5	1	28.5
SBRHE	Documents	Impact of the programme was evaluated using randomised controlled trial and activities were monitored using a form given to teachers and peer educators to document their activities (Ademola, 2004; Ajuwon & Brieger, 2007).	Knowledge and behavioural outcomes were measured (Ajuwon & Brieger, 2007). However, long-term outcomes such as sexually transmitted infections were not measured.	Research staffs, teachers and peer educators were involved in the evaluation (Ademola, 2004). However, no evidence to suggest students and external evaluators were involved in the evaluation.	The intervention was implemented for one academic session (from January 1997 to March 1998) (Ajuwon & Brieger, 2007)	
	Interviews	<i>"In my own project I used both quantitative and qualitative approaches. So we conducted focused group discussion with students – could learn from what has been their experience."</i> (P. SBRHE)				
	Score	1	0.5	0.5	0.5	20

Appendix 5. 1: Characteristics of participants and their interventions

Participant	Number of School-Based Interventions Implemented in sub-Saharan Africa	Number of Years of Experience in Adolescent Sexual Health	Sub-Saharan African Country (ies) of Experience	Location of Participant	Position(s)	Year intervention was implemented or evaluated	Year Intervention was published	Summary of Intervention Impact
1.	One	5	Nigeria*	Nigeria	Consultant Public Health Physician/HIV adviser for an international non-governmental organisation (NGO)	-	2014	Effective in improving Knowledge, attitudes and some preventive behaviours towards HIV/AIDS
2.	One	11	Kenya*	USA	Researcher/Director of Maternal New Born Community Health project	-	2014	Effective in promoting abstinence, condom attitudes, HIV testing and sex refusal skills
3.	Two or more	9	Nigeria*, Niger	USA	Senior Epidemiologist and Reproductive Health Advisor, Office of Population and Reproductive Health of an International NGO	2007	2012	Effective in improving knowledge, attitudes and reducing risky sexual behaviours
4.	Two	10	Rwanda*, Uganda	Belgium	Senior Researcher, International Centre for Reproductive Health	2007-2010	2012	Not effective in changing knowledge,

								perceived severity or susceptibility and sexual behaviours (frequency of sexual activity and condom use). However, effective in reducing HIV stigma
5.	One or more	21	South Africa*, Tanzania*, Kenya	Kenya	HIV prevention Advisor, Reproductive Health and HIV prevention NGO/ Researcher or implementer, Adolescent Health Research Institute, University of Cape Town, South Africa	2002-2003	2012	Effective only in delaying sexual debut in Tanzania. No impact (on condom use and delaying sexual debut) in South Africa
6.	Two	35	South Africa*, Zambia	USA	Research Professor, The Pennsylvania State University University Park, USA	2003-2005	2011	Effective in reducing risky sexual behaviours at last sex for virgins at baseline. However, not on condomless sex refusal and lifetime sexual activity
7.	Four	30+	South Africa*	USA	Professor and Research Scientist, HIV Center for Clinical and Behavioral Studies, New York State Psychiatric Institute and Columbia University	2008-2010	2015	Effective in reducing unprotected vaginal intercourse

8.	One	5	Tanzania*	Tanzania	Researcher, University of Dar es Salaam, Tanzania	-	2008	Effective in promoting HIV prevention knowledge, cognitions and protective behaviours
9.	Two	15	South Africa*, Zambia	South Africa	Associate Professor, Faculty of Community and Health, University of Western Cape, South Africa	2003-2005	2011	Effective in reducing risky sexual behaviours at last sex for virgins at baseline. However, not on condomless sex refusal and lifetime sexual activity
10.	One	20	Tanzania*	UK/Switzerland	Professor of Epidemiology & International Public Health, London School of Hygiene and Tropical Medicine, UK/ World Health Organization Maternal, Newborn, Child & Adolescent Health Department in Geneva	1998-2004	2007	Effective in improving sexual health knowledge, desirable reported attitudes, fewer reported sexual partners and reported condom use. However not effective on biological outcomes (HIV infection, HSV2 infection and pregnancy)
11.	One	28	Zimbabwe*	UK/Zimbabwe	Professor of International Sexual Health and HIV	2003-2008	2010	Effective in improving

					Research, University College London and Centre for Sexual Health and HIV/AIDS Research Zimbabwe			knowledge, some attitudes, reported safe sex behaviours and reported pregnancy. However, not effective on prevalence of HIV, HSV2 and current pregnancy
12.	Two	20	Tanzania*, Uganda	UK	Professor, Institute of Health and Wellbeing, MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, UK	1998-2004	2007	Effective in improving sexual health knowledge, desirable reported attitudes, fewer reported sexual partners and reported condom use. However not effective on biological outcomes (HIV infection, HSV2 infection and pregnancy)
13.	One or more	13	South Africa*, Zimbabwe, Zambia	USA	Director of Curriculum and Research, An International NGO	2003-2005	2010	Effective in improving knowledge, attitude, and self-efficacy regarding HIV prevention
14.	One	8	Uganda*	Netherlands	Researcher, Windesheim University of Applied	2008	2011	Effective in improving

					Sciences The Netherlands			attitudes, self-efficacy and intention towards condom use and self-efficacy in dealing with sexual violence, perceived social norm towards delaying sexual intercourse, and the intention to delay sexual intercourse
15.	One	13	South Africa*, Kenya	USA	Professor, The Pennsylvania State University University Park, USA	2003-2005	2011	Effective in reducing risky sexual behaviours at last sex for virgins at baseline. However, not on condomless sex refusal and lifetime sexual activity
16.	One	2	South Africa*	South Africa	Implementer/Researcher, Adolescent Health Research Institute, University of Cape Town	2002-2003	2012	Effective only in delaying sexual debut in Tanzania. No impact (on condom use and delaying sexual debut) in South Africa
17.	One or more	15	Nigeria*	Nigeria	Lecturer/ researcher, Department of Health Promotion and Education,	1997-1998	2007	Effective in improving sexual health

					College of Medicine, University of Ibadan, Nigeria,			knowledge, attitudes towards contraceptives and condom use
18.	One or more	15	South Africa*	USA	Assistant Professor (Research) of Behavioural and Social Sciences, School of Public Health, Brown University and Population Studies and Training Center, USA	-	2016	Increase self- efficacy for unsafe sex refusal, partner communication, condom use and knowledge of HIV testing opportunities
19.	Seven	17	South Africa*	South Africa	Professor (Research) Discipline of Public Health Medicine, University of KwaZulu- Natal, South Africa	2009-2010	2014	Effective in improving intentions to abstain from sex, communication with partners about teenage pregnancy, and reported condom use
20.	Two	29	South Africa*	South Africa	Researcher, Maternal, Adolescent & Child Health (MatCH), University of the Witwatersrand, Durban, South Africa	2009-2013	2016	Increase self- efficacy for unsafe sex refusal, partner communication, condom use and knowledge of HIV testing opportunities
21.	Seven	13	South Africa*	South Africa	Professor, Faculty of Health Sciences, Durban University of Technology, South Africa	2009-2010	2014	Effective in improving intentions to abstain from

								sex, communication with partners about teenage pregnancy, and reported condom use
22.	Two or more	42	Kenya*, Nigeria	Canada	Professor, Department of Sociology and Anthropology, University of Windsor, Windsor, Canada	1999-2006	2007	Increase HIV-related knowledge, communication with parents and teachers about HIV and sexuality; assistance to fellow pupils to avoid sexual activity, self-efficacy related to abstinence and condom use, decrease exposure to HIV through delayed first intercourse, decreased sexual activity and increased condom
23.	Four	20	South Africa*, Tanzania*	South Africa	Associate Professor, University of Cape Town/ South African Medical Research Council, South Africa	2002-2003	2012	Effective only in delaying sexual debut in Tanzania. No impact (on condom use and delaying sexual debut) in South Africa

24.	Five	20	South Africa*	South Africa	Professor, South African Medical Research Council, South Africa	2002-2003	2008	Effective in promoting sexual refusal self-efficacy, intentions to have sex, attitudes about sex and initiation of sex
25.	One	5	South Africa*	South Africa	Researcher/implementer, University of Western Cape, South Africa	2002-2005	2012	Effective only in delaying sexual debut in Tanzania. No impact (on condom use and delaying sexual debut) in South Africa
26.	Four or more	28	Tanzania*	Tanzania	Researcher/independent consultant, World Health Organization, Tanzania	1998-2004	2007	Effective in improving sexual health knowledge, desirable reported attitudes, fewer reported sexual partners and reported condom use. However not effective on biological outcomes (HIV infection, HSV2 infection and pregnancy)
27.	Two	2	Tanzania*, Zimbabwe	UK	Professor of Epidemiology and International Health,	1998-2004	2007	Effective in improving sexual health

London School of
Hygiene and Tropical
Medicine, UK

knowledge,
desirable
reported
attitudes, fewer
reported sexual
partners and
reported
condom use.
However not
effective on
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outcomes (HIV
infection, HSV2
infection and
pregnancy)

Appendix 5. 2: Interview topic guide (qualitative study)

We are interested in your views, as an intervention developer/researcher on factors that may be associated with effectiveness in development, implementation and evaluation of school-based sexual health education interventions in sub-Saharan Africa. Usually the interview will involve exploring your experience with designing, implementing and/or evaluating a school-based sexual or reproductive health intervention. The interview will be conducted referring to an intervention you were involved in to guide the discussion. For you, I would like to be referring to your intervention “[name or title of article of the intervention].”

General questions:

1. Respondent name, title, and affiliation?
2. How many school-based sexual health education programmes in sub-Saharan Africa were you involved in designing/implementing/evaluating?
3. How many years have you been working in the area of sexual and reproductive health?

Questions related to the development of the intervention:

1. Tell me about how the intervention was developed. (Prompt) Was the intervention originally developed for the participants or was it adapted from other setting?
2. Was any form of guidance used in developing or adapting your intervention? If so, what? was it useful?
3. How do you think the composition of the stakeholders group involved in the project affect the design process?
4. Were particular actors opposed to the intervention?
5. What were some of the barriers, if any, encountered?

6. What risks were flagged at the design stage for this intervention, and what were the mitigation measures?
7. What do you think explains your success in the design of the intervention? (or: what do you think prevented this intervention from being as successful as you would have liked this to be?)
8. How can we generally improve development and content of school-based sexual health education interventions to maximise effectiveness?

Questions related to implementation of the intervention.

1. Tell me about the implementation of the intervention. The following may be used as prompts,
 - a. How was the intervention adopted by the schools?
 - b. What are main factors that made the implementation of your intervention successful e.g. measures taken by the school; school climate characteristics; roles played by teachers, parents, school administrators, students and outside agencies etc.?
2. If you were given another chance to reintroduce your intervention into the school, what would you do differently to ensure successful implementation?
3. How do you think we could generally improve successful implementation of sexual health interventions in schools?
4. Did the design of the intervention involve scaling up of a previously tested programme, or was it a pilot with explicit ultimate scaling goal, or was it one-off intervention without a scale goal?

Follow-up questions for interventions scaled up or with ultimate scale up goal

- a. What or who are the drivers expected to push the scaling up process ahead? How did the intervention develop or support the relevant drivers?
- b. What barriers had to be removed or spaces created to allow the intervention to achieve the desired intermediate or final scale? How did the intervention aim to do this?
- c. Was there an intermediating institution that facilitated the scaling up implementation process and, if yes, how effectively did it carry out this function? If not, would an intermediating institution have been useful?

Questions related to evaluation:

1. Tell me how your intervention was evaluated?
2. Was there any method you wanted to use for the evaluation but could not and why (explain please)?
3. What challenges or obstacles (if any) did you encounter while evaluating your intervention?
4. Was any form of guidance used in the evaluation? If so, which one? Was it useful?
5. How do you think we can improve the extent to which school-based sexual health interventions are successfully evaluated?

Thank you for your time today, is there anything you want to add before we finish?

Appendix 5. 3: NVivo summary reports of each interview transcript

Participant	Total Words in Source	Total Paragraphs in Source	Number of Nodes Coding Source	Coded Percentage of Source	Number of Text References
1	3709	95	26	0.5627	39
2	2670	146	17	0.7658	22
3	3516	148	28	0.5469	43
4	4182	80	19	0.5461	24
5	2728	156	16	0.7620	30
6	3883	209	17	0.7173	21
7	1931	141	6	0.4876	9
8	3802	197	21	0.4019	25
9	5110	178	29	0.7883	47
10	5666	290	41	0.8516	69
11	3283	217	33	0.7333	50
12	7757	607	40	0.8351	53
13	3894	205	29	0.4955	60
14	3143	247	21	0.4912	25
15	5667	334	29	0.7047	39
16	3931	219	23	0.7922	33
17	5322	168	23	0.6710	26
18	3197	100	28	0.7150	32
19	4016	157	23	0.5168	28
20	3322	106	10	0.5272	10
21	3417	101	17	0.5801	20
22	7915	223	20	0.7871	30
23	5684	279	29	0.7546	42
24	6272	139	32	0.6063	60
25	5735	136	10	0.7552	13
26	6570	199	24	0.7255	50
27	7548	187	25	0.7044	41

Total Words in Source: total number of words in a transcript

Total Paragraphs in Source: total number of paragraphs in a transcript

Number of Nodes Coding Source: number codes derived from a transcript

Coded Percentage of Source: percentage of a transcript coded

Number of Text References: number of supporting quotes in a transcript

Appendix 5. 4: Themes and supporting quotes

This document contains themes with all the supporting quotes from the data set.

Intervention Mapping Step 1: Logic Model of the Problem (needs assessment)

a. Address participants' need

“Like right now we are in Zambia with this intervention and it looks different because their needs are different. I mean we are doing a similar thing in Malaysia right now and the needs are different there. So it really depends ...” (Participant [P] 15, South Africa and Kenya)

“Well let me see, so it must be needs based, it must be relevant, it must be culturally acceptable. This is where you really have to work at adapting an intervention....” (P. 9, South Africa and Zimbabwe)

“It has to be an intervention that is tailored to address the needs of the youths and then to address the gaps and challenges that they face in sexual and reproductive health ...” (P. 3, Nigeria and Niger)

“So I am not sure about your context but if the context is one where people are simply unaware, uninformed and that it seems to be leading to the problem of early sexual debut, with attendant issues related to sexually transmitted infections and including HIV then that is a problem that needs to be dealt with” (P. 24, South Africa)

“I think, again as I said in the beginning, if you can work with what their needs are... If they can see, this is something that meets their needs, then

I think you will get teachers who will be motivated to implement an intervention.” (P. 9, South Africa and Zimbabwe)

“...So students now find that [below] type of approach comfortable because we didn't just recommend one course of action. We recommended that they should take whichever one most appropriate for their situation because we recognised the fact that this group of students are not homogeneous. There are those who have never had sex, there are those who have had sex, so we made sure that the message fitted into whatever situation the students find themselves.” (P. 17, Nigeria)

“What is it that these kids are in these situations? Is it because they lack information? Is it because there is no a supportive environment in the school that provides them with a place of or a sense of safety and that there is an opportunity for social, emotional and cognitive development so you need to look broader than just an intervention programme. Intervention is a very targeted way of dealing with a particular issue” (P. 24, South Africa)

“... then importantly is to understand the needs of the adolescent and youth individuals in those countries or in those schools or wherever the intervention will be implemented are also very key and ...” (P.3, Nigeria and Niger)

“It has to be needs based and they have to see the relevance of what you're doing.” (P. 9, South Africa and Zimbabwe)

b. Influencing policy advocating for funding

“(How do you think we can encourage the government [in sub-Saharan Africa] to do more [funding school-based sexual health education interventions] as you said?) Well, we begin to show evidence that interventions do work and it will require us to write a policy brief because the paper that I am referring to now I don't know how many policy makers will read the article in the journal. They don't have the time. But if you develop a simple policy brief, use simple language and have dissemination where you target government or officials, then your chance of getting funding is much higher.” (P. 17, Nigeria)

“I assume the only thing is advocacy and to back the advocacy with scientific based studies like this one to present to the government officials this is what happened. So these are ways by which you can really as a public health people by which you can really influence our policy. The culture of advocacy which should come from a scientific based evidence.” (P. 1, Nigeria)

“Well one never has enough money to do everything you want to do, but we were lucky in that the ... yeah the ... we had ... you know this was a research project. Well the initial trial you know, was a research project and we managed to get a second large grant for the ... for more detailed, that's in an ethnographic research on adolescence sexual and reproductive health. The Halera programme, which ran in parallel with and we got lots and lots of useful insights, you know from that work. So yeah I mean ... as I say one never had enough resources, one never does” (P. 10, Tanzania)

"I think in my opinion may be Public health people should be in the government. when a public health person somebody that would appreciate the value of such interventions, maybe we should start to be involved in the politics because sometimes the people in the government to not get to appreciates the important of these public health interventions that may be one part. The second part is active advocacy, we need to really you ...you know...individuals and bodies of the public health people in the university in our research institutes, we need to pay advocacy to government and see how much we can influence not only school health interventions but also how we impact positively on the public health in the lung rum." (P.1, Nigeria)

"Well I think ... I mean one part of the battle is to make sure that the government understands that science is important and science costs money. I mean we battle that in the United States too. It's like there are a lot of people who don't think science is important and you have to make the case that in order to do really ... to really understand what's going on, you need to put money into it to do a very strong scientific study and if the government officials just don't understand that then you've already lost the battle. So they have to get them to understand how important that is first and then to be willing to figure out ways to fund." (P. 15, South Africa and Kenya)

"(Generally, in your opinion, how do you think we can improve funding for such programs, getting funds for such programs in Sub-Saharan Africa?) Well I think evidence cost effectiveness would help. I think the problem is that if you look at the HIV budget, it's going on treatment. There is a big push by UNAIDs at the moment to deal with quarter for prevention, so to try and strengthen that" (P. 11, Zimbabwe)

“...thirdly the policy and administrators’ policy engagement ... engagement with the policy makers – that’s what I wanted to see. It’s really important because you don’t want to do an intervention that ... it’s not participatory. So every ... every level of policy makers, I think they need to know what you are doing and how you intend to do that and get their buy-in, so that whenever there is any proven evidence that the intervention works it’s important to give that intervention into the policy as well and you may want to also influence policy change as well” (P. 3, Nigeria and Niger)

“But generally I must say we hardly get fund [for sexual and reproductive health programmes] from Nigeria. Even senior colleagues if they get fund is usually from outside the country which comes ones in a while...but you hardly see fund from the Nigerian organisations....” (P. 1, Nigeria)

“having the resources that they really required for their existing work and so needing to ... you know to then add some additional work in if they thought it was important, was problematic for them and so, you know, their ... the agreement was that the additional work would effectively be paid for by the project in the first year and then there would be a reducing amount of money each year with the plan that the district finances would gradually take from the money that they were getting for health and HIV prevention and so forth would gradually take over the funding of the activities.” (P. 10, Tanzania)

“I think the barrier is the funding for the training of the peer leaders. They need some motivation. They need some trips with their big team to play some away games. They need some equipment. They need some balls for the peer leaders who are training on themselves. Now when they train the young kids, they use paper balls, but when they are playing their own matches, they need some equipment. So funding is, kind of, the barrier.

It's, kind of, a requirement to sustain the program over a long period.” (P. 8, Tanzania)

“... I think the national governments of countries in sub-Saharan Africa, it's time for them to take responsibilities and start to fund innovative ways of preventing diseases and ensuring that proven interventions are tested ... and evidence generated, and if interventions are proven to be effective in adolescent or youth sexual reproductive health, to scale those interventions.” (P. 3, Nigeria and Niger)

c. Tensions and benefits in a diverse research team

“You need those principal investigators [global north researchers], those people who are really knowledgeable about the research. And it is not about what colour they are or what creed they are. The point is that they have the skills. However, what I would do differently is that I will facilitate that open and explicit dealing with the diversities: the issues of race, the issues of class, the issues of power between the people who are part of the same project. So when you run a research project you must have a way of an in-house system whereby you look after the inter-personal relationships between people” (P. 25, South Africa)

“I'll tell you what happened in the actual project. Is that we spoke about the north, south issues. Okay, so what happened was that a lot of the expertise, in terms of the methodology was coming from Maastricht in Holland. So it was Herman Scomer and Leif Onro was in Norway. They were in the ... heading up the project. And the methodology that we were using was coming from Holland. So we felt at some point that were like the worker bees. So we were doing all the work. And we were taking advice and guidance from people in the north and so we spoke about that in terms of that tension between the collecting of data here in Africa, but actually it kind of ... things get published and everything else happens up

north. Yeah, so there was a bit of tension but it was the kind of project where we actually spoke quite openly about it. The way it was really helpful is that it was really helpful to have a methodology that I felt was quite sensitive culturally to what was happening.” (P. 16, South Africa)

“You see what I also noticed, sexuality is loaded. It is a huge issue of ethics, deep values of people. Now what I have noticed people from the north who come with their own ethics around seeing themselves as individuals... so they understand that sexuality happens because of your choice and it’s kind of a cognitive component or you make a choice and you decide on your own, and for me nothing could be further from the way local people understand their own sexuality”. (P. 25, South Africa)

“I think that the developed world is doing a great job of making funding available in the developing world. I’ll give you one example, the UK seeing as you’re from the UK, the UK MRC we applied for funding at the start of this year, for the Zambia project, but we weren’t successful unfortunately. All I can say is that I love this model and I think it works very well where we work in partnerships, north-south partnerships or the developed world working with the developing world, where researchers from both of those different contexts work together. That was the model we used with HealthWise. I think it works because you’re getting money in pounds or Euros or dollars which you can use in Africa to really implement very good quality research. I think it helps Africa because we can’t do it without that money” (P. 9, South Africa and Zambia)

You have a cultural identity and you have your ... you are still an individual, so for example, this guy would come in with assumptions around that young people at 14 you know that they were that age they make their own decisions about sex and I’m like, ‘Huh, really? Hello?’ So fundamentally just in terms of from conceptual stage the kind of

assumptions that people make about the intervention that feeds into what that intervention... it's nullified because the assumptions that those who are supposed to give the technical support are coming with, it's again an imposition of their understanding of sexuality and not the local." (P. 25, South Africa)

"So what happened was the people from Maastricht came to Cape Town and ran workshops here. They also had workshops in Dar es Salaam, in Mogadishu, where we also had workshops there and then we went to Norway for workshops as well and the issues really was around, are the people from the north really able to understand and grasp what the issues are here on the ground? In Africa. Do they actually understand how our systems work? And the difficulty that ... the other issue where it came up and I will be very honest with you about this, is that there were issues around publication. So it really was about who owns the knowledge. I would ... it even happened ... it's even happened for us just not in north/south issues, just even in the south around the fact that we were doing all the work, but the money ... the funding came via one particular person or some other person was heading up the project and it became that there was a bit of a battle around kind of the string of authors and who comes first, second or third" (P. 16, South Africa)

"It's those power dynamics, the fact that all the ... for example the simple thing that must just be said out loud and allow people to speak that all the researchers were these white men and all the people the implementers were like I think we were all black women or something like that and there were some males also but they weren't ... had much power and the fact that they were ... the north/south power differentials affected some people from the north were ... are rich or highly intellectual or regarded as the more powerful and we were here in Africa and we were the implementers and so there was a ... it was a continuation for me of the north/south conflicts that goes into the research context but it is not spoken about, it is

not workshopped, it is not clarified, you see and then it is not just that it is not done what I find is that when I wanted to go the ... you feel like ... like you get shot ... shot down.” (p. 25, South Africa)

Intervention Mapping Step 2: Programme Outcomes and Objectives; Logic Model of Change

a. Theoretical underpinning

“Most behavioural interventions like this particular one used a variety of theoretical processes and because I was working within I Choose Life we didn’t have a single specific theoretical framework that was exclusive and I think a stronger theoretical framework gives you a better foundation for measurement...” (P. 2, Kenya)

“Well I think it is important for any intervention to be grounded in proven theories, intervention theories that really have been proven to work on adolescent individuals...” (P. 3, Nigeria and Niger)

“Our initial model of behaviour change was derived more from thinking in education around the role of knowledge in influencing behaviour. (Knowledge, Attitude, Skills, Motivation, Practice.... Given the sexual context of HIV infection, we knew we had to work with the communities as well as the schools and parents. Bandura’s theory set within an ecological framework seemed the best model to explain our expectations, as opposed to models such as Health Belief Models or other Learning Models which tended to focus on the individual and their ability to manage their behaviour in isolation from community norms and influences.” (P. 22, Kenya and Nigeria)

“Well that particular work was a project where I was working with a HIV prevention group that had been doing an iterative type development of

their actual intervention. So we took what they had existing, I helped them form and understand the theoretical framing underneath it. Most HIV prevention interventions use a mix of theoretical frameworks as opposed to an independent single specific approach and that is present in the documentation of the actual curriculum. I think there needs to be a stronger theoretical framework from the beginning.” (P.2, Kenya)

“...and also its [intervention] premised on a proven theory and is well-grounded in that theory, it was really helpful” (P. 3, Nigeria and Niger)

b. Contextual considerations

“I would say that was one of the most successful parts of the project was the way that group was formed and worked together and they had a lot of influence... it took a lot of input from the local level in terms of what went in to the intervention, including at the end that some of the exercises and the other pieces of the intervention we delivered in the schools....” (P. 18, South Africa)

“You know when you talk about sexual health; you have to look at culture and religion. You understand what I am saying...so that we are not going beyond the boundary of what the culture or religion can accommodate based on the reality of our society.” (P. 1, Nigeria)

“We actually took a programme that was running in Tanzania, the MEMA kwa Vijana programme and we modified that to make it applicable locally. We added additional sessions that we felt that they had missed out and we changed the names from Swahili to locally appropriate names and we developed three years of material.” (P. 11, Zimbabwe)

“...building on what AMREF, the local NGO that had already been working on sexual health issues, building on their understanding and knowledge of local culture. These were all critical.” (P.12, Tanzania and Uganda)

“I only think it is not realistic to implement a computer based programme in rural Uganda, where nobody has access to computers. There were really no computers in the schools at all and if there was a computer then the Director of the school was sitting on it.” (P. 14, Uganda)

“Well I think that’s context dependent. Like right now we are in Zambia. With this intervention and it looks different because their needs are different. I mean we’re doing a similar thing in Malaysia right now and the needs are different there. So it really depends ... I cannot answer that. I mean I think the basics of what we do are great, but it depends on the context.” (P. 15, South Africa and Kenya)

“There are a couple of things that I think are worth considering, alright. There is quite a strong move that says they like to adapt interventions that work in one setting to another. For example, if they have actually done a full on efficacy trial of a study in the US they have looked at ways they could adapt to that for use in sub-Saharan Africa. And yet parts of the context in which those interventions are implemented are so dramatically different that the ability to lose effectiveness and the contextual adaptations is a huge risk” (P. 2, Kenya)

“I think the number of contextual factors... the one broad category would be what we call understanding what are considered to be the social norms and behavioural characteristics.” (P. 21, South Africa)

“the problem is not so much the intervention the problem is really the context in which they are buried so from the level of teacher attitudes, community attitudes and to the extent to which the school is well led, organised, those become important factors in determining how successful your intervention is going to be.” (P. 24, South Africa)

“I think that was a huge success actually and that it was quite culturally relevant, because amongst other things, it did address this very widespread practice of sex for gifts and money....” (P. 26, Tanzania)

“But it is really important to look at the social cultural context and have a clear understanding on how things are great, and the language of the intervention really matters. Things that you may say openly somewhere in certain communities may not really apply to sub-Saharan Africa and even within countries...” (P. 3, Nigeria and Niger)

“(Yeah, from those excellent standards, was there any modification you had to do that you think was helpful in that context) yes, the thing is that the standards...So that was an important modification and also as I said there are some topics that are just not possible to talk about in the context that we are working in Uganda like homosexuality. It is just impossible... it is illegal... we cannot even mention it in the curriculum.” (P. 4, Rwanda and Uganda)

“I think that one of the things that they need to do in sub-Saharan Africa in general is to develop local content. I mean many times as you know, since you are doing this more recently, a lot of adaptation of interventions that have been done elsewhere for schools in our region. And I think that is not necessarily a bad thing but we need to develop more local intervention...”

but you do need to develop a locally appropriate intervention.” (P. 5, South Africa, Tanzania, and Kenya)

“In the design part, I think consideration of the settings of where the implementation begins to happen and tend to put in the design.” (P.8, Tanzania)

“... if you can work with a person, if one of your partners in the team is a local a person from that, if you’re not from that country or that context, a local person who will help to get buy-in. I think that’s really important and that you negotiate these sensitivities and talk about them.” (P. 9, South Africa and Zimbabwe)

“One example we wanted to include messaging on voluntary medical male circumcision and we found through the field testing that there was no problem to talk about in Haiti, in Soweto Alex. There was some more resistance in Cape Town and Khayelitsha and the surrounding areas because of the issues of traditional circumcision and then out in Port Elizabeth, we found that even bringing that up in schools could even put our coaches at risk and we only found that by trying it out in PE and trying it out in Cape Town and getting their feedback and we realised that we needed to modify it and make it locally relevant for each of those three contexts. If we had just gone nationwide with that, it could have been really bad for Grassroots Soccer and really bad for our coaches.” (P. 13, South Africa, Zimbabwe, and Zambia)

“(Okay, what were the specific modifications made relevant to those contexts?) In some cases we just had to talk, we had to change the way we talk about circumcision. We could not even say the word circumcision, we just had to say removal of the foreskin because that was sensitive to

... even saying traditional circumcision or medical circumcision could be offensive to people who traditionally circumcised, so by saying removal of the foreskin, it seemed to work. In other areas even that was too much we just had to take that activity out completely.” (P. 13, South Africa, Zimbabwe, and Zambia)

“...the intervention mapping methodology suggests that you go into the community that you speak to the people on the ground and the part of the work, which I did... speak to the principals, speak to people and get a sense of your context.” (P. 16, South Africa)

c. Differing expectations in intervention content or scope

“People see it as they get the wrong information, that is when you exposed them to sexual health education is like you are predisposing them to be promiscuous... so you rather keep quiet and do not talk about it at all.....” (P. 1, Nigeria)

“The problem with sexuality education is that there are too many opponents so if you say you want to do sexuality programme they say ‘Ah you are teaching students bad things,’ or ‘Why should we be giving money to teach them about sex?’” (P. 17, Nigeria)

“Teachers are concerned that if they learn about condoms students will want to try them out, becoming sexually active rather than continuing to abstain, or that teaching about condoms encourages sexual activity rather than abstinence.” (P. 22, Kenya and Nigeria)

“So for example, in some communities some of the religious leaders misunderstood what we were trying to do early on in the programme ...

misunderstanding that we were teaching young people how to have sex and were encouraging them to have sex.” (P. 10, Tanzania)

“It was really life skills and relationships education without going in to any of the biology because they were very nervous about talking about sex explicitly. Because there had been concerns that if you do that you’ll encourage young people to have sex.” (P. 11, Zimbabwe)

“I think back at the beginning of the century there was still a lot of concern about condoms and whether condoms would encourage sexual activity and so it was very important to persuade the officials that this wouldn’t encourage sexual activity and show them the evidence of that...” (P. 12, Tanzania and Kenya)

“...they said as they were about to start, word got to parents that we are teaching their children ‘Ishikushe’ which means in Yoruba you are teaching them bad things.” (P. 17, Nigeria)

“But certainly at that time, attitudes towards what you should be telling young people in school, and remember these were primary school students, were quite conservative. And there were fears that if you, for example, demonstrated condoms, this would almost be encouraging the students to engage in early sexual activity.” (P. 27, Tanzania and Zimbabwe)

“Well originally you know wherever you mentioned sexual and reproductive health, I think people step a little bit back. What do you really mean? Are you going to be talking about sex openly or teaching our young individuals how to engage in the sexual activities or things like that.” (P. 3, Nigeria and Niger)

“There was a particular believe that talking about sexuality with young people would incite them to have sexual relationships. So, that was a real demand just to focus on abstinence only messages ...” (P. 4, Rwanda and Uganda)

d. Open communication

“So from some of the other qualitative research that we’ve done in that area, we know that sexuality is very stigmatised for young people. So we were working with grade two to ten students who are approximately aged 14 to 17 and what we found in our formative work... our qualitative research is that a lot of those stigmas really struggle to be open in terms of seeking the services or even discussing with someone and whether it was a peer or family member or someone in the school, they really struggled to find support and acceptance for their relationships and for developing a sense of positive sexuality..” (P. 18, South Africa)

“I think the most critical thing is to persuade teachers that it’s legitimate to talk about sex education and talk explicitly about sexual issues with young people and of course that really runs up against the belief that you shouldn’t talk about these things across the generations.” (P. 12, Tanzania and Uganda).

“...to communicate effectively about prevention more broadly, about sexuality more broadly and self-efficacy within relationships, particularly for girls. I think those are really important outcomes.” (P. 18, South Africa)

“...there is very little discussion about sexuality between parents and children and this is a cultural thing, so people don’t feel comfortable. The people teaching the schools are mostly parents. So they don’t like to talk

about it with their own children, they won't talk to other people's children either." (P. 19, South Africa)

"I remember at that point in time there was some resistance to having any discussions about sexuality. So there was a tendency to say that that is a topic that is taboo, we don't talk about sex and..." (P. 24, South Africa)

"Much more specifically related to this, it's a conservative setting, obviously in almost any context there's going to be some controversy about explicitly talking about sexual reproductive health with children, even if they are adolescents. There was a lot of ignorance about this extent of risk among adolescents, and risk behaviours." (P. 26, Tanzania)

"In Sub-Saharan Africa there are different cultures and the cultural issues. There is different learning's to things related to sexuality and taboos. You know there is taboos, like I told you there is taboo for a man, like a father, to talk to a daughter about sexual issues completely, so its taboo. These are things we have to consider in designing or implementing these programmes." (P. 18, South Africa)

"I can still see it today, for instance in Zambia, I've told you about the Zambia project we've started this year. We have had exactly the same problem where we have run a workshop with teachers and teachers have said to us that its taboo. They use that word, its taboo. Teachers we should not be talking to young people about sex and so how do you expect us to do that? So that's the opposition." (P. 9, South Africa and Zimbabwe)

"The second group of stakeholders, the parents and the community, who... and as you know certainly in South Africa both sexuality, sexual

education and HIV, TB are very stigmatised in this country so there was a lot of reluctance in businesses from them talking openly about sexuality, sex and HIV and..." (P. 21, South Africa)

"the representatives from the funding group and representatives from the Ministry of Education told us that it was much too specific about sexuality and reproductive health and it would have to be scaled back, we have to take a less direct approach to talking about body parts and sex which we didn't want to at first because, you know, we try to talk about things and be very direct but as a very practical feedback from the implementers, if we wanted to go to scale, we wanted to work in that area, we had to work within those confines, so we did." (P. 13, South Africa, Zimbabwe, and Zambia)

Intervention Mapping Step 3: Programme Design

a. Comprehensive sexuality education

(What do you think might have contributed to the effectiveness of the programme?) I think the fact that it was about comprehensive sexuality education, it wasn't for example an abstinence only thing." (P. 10, Tanzania)

"... You know they are a little bit fed up about messages about HIV, AIDs and this kind of you know things. So it's also good to have a more comprehensive programme so we didn't focus on diseases. Why ... you know did you get pregnant and that was a part of their ... the programme, but the programme was much more than that." (P. 14, Uganda)

“I would say that a lot of the emphasis in the programme was around the actual issues around sexual behaviour and making decisions and I think there’s a bigger issue around people’s self-esteem and how they feel about themselves, how they respect their bodies, how they respect themselves as human beings and their boundaries between themselves and other people. So I think a broader life skills kind of programme intervention is much more helpful than just focussing on sexual behaviour because that particular behaviour is ... it’s almost ... it’s only one part of the bigger picture of the human being.” (P. 16, South Africa)

“So the future plans and from science ... from research we know that if you build a programme like this, this way it is more effective than saying no to sex. That doesn’t work. We all know that ...” (P. 14, Uganda)

“But I can just answer in more general because of my experience subsequently when I did observe this in our PREPARE programme is that, at that age it’s all about relationships, sexual relationships. It’s not about HIV prevention, and pregnancy prevention is much more important to them than HIV prevention. But relationships are very exciting for them to discuss. So I feel that a programme should be built around relationships and sexuality of course and partners and... but the actual HIV prevention should come in to a programme” (P. 23, South Africa and Tanzania)

“I think the other thing that you didn’t really ask, but I think that needing to say is that because it was a lesson on ... because the lessons were grounded in healthy leisure. People ... it resonated more. It was very... treated in a very positive way. It’s a very positive use development programme. It wasn’t ... we didn’t go in and just say “Here’s about sex and here’s about drugs and don’t do it and this is bad”. What we did was we helped them understand themselves, the kids, which had never been done before. .. So I think that’s a big reason why we’re successful. It’s

successful enough. I mean, you know, nothing is successful.” (P. 15, South Africa and Kenya)

“If I were to look at what might be the gold standard, I would think one would have to look very comprehensively at sexual and reproductive health, but not just focus on infection and risk and those sorts of things...” (P. 20, South Africa)

“Well it was really developed according to best practices of sexuality education and that means in young people they are of course experimenting and they are busy with relationships and with getting to know themselves and etc. And so the first few lessons were about who am I? What are my values? What do I find important? How is my body changing? What does hormones do to my ... you know my mood? And things like that. So things that they read and relate to and it is really about them. And the next part of the programme was about love and friendship and social environment. Also about group norms and how you are influenced by your friends and by your parents etcetera and then there was a section on ... yeah that you can get pregnant and if you have to you know, protect yourself and about STDs and HIV and AIDS and these kind of things but also what is violence in relationships. You know you have the right ... the right to say no if you don't want, you know things to do and then the final section was about their future. So the future plans and from science ... from research we know that if you build a programme like this, this way it is more effective...” (P. 14, Uganda)

“(So you are suggesting that we shouldn't focus mainly on HIV or STD preventions in the interventions? We should bring in relationships, sexual relationships?) Yes it has to be done in the context of a whole lot of issues that they're excited about within relationships. They're excited about those. They're excited about starting relationships and how to end them

and what's a good partner. That excites them a lot and when is the relationship potentially dangerous and when should you think about ending it and how can you end it safely. Those are all things that excite them.” (P. 23, South Africa and Tanzania)

b. Holistic approach

“I think another whole issue relates to the fact that if you just put in sexual reproductive health education into schools. It would be much better if there was ... that was in the context of a much broader if you like, health ... health promoting schools type of approach as opposed to just as a stand-alone single intervention.” (P. 10, Tanzania)

“No. No I think that my biggest feeling of the project was that it felt like we were trying to focus on one thing. And trying to fix it and not ... we were losing sight of the bigger picture of what ... what a human being actually is, what a young teenage schoolboy is and we were not kind of thinking more broadly about that person and I do think that a lot more if it can be ... can be ... a lot more input can be put into developing the whole of the person.” (P. 16, South Africa)

“You see, what we know now after many years of working, we can improve the personal attribute. We can improve the knowledge, we can improve their self-efficacy, we can improve the attitudes. But the ecological conditions outside the school... our interventions are very limited to one group of children in a school. We're not dealing with the whole school; we're not dealing with the whole community.” (P. 19, South Africa)

“it's very important in a developing country context in research context environment like KwaZulu-Natal, South Africa, Africa, that we not only

look at sexuality in isolation from other developmental issues so poverty is a big issue, the quality of education and the education infrastructure..” (P. 21, South Africa)

“For me in the design, there was problem... that it was the idea or objective was HIV prevention so it focused a lot on condom use, reduction of number of sexual partners and the classical indicators in that perspective. But, I think we should have seen it in much broader holistic sexuality way and not just focus on HIV, but focus on sexual health and well-being, body image, self-esteem, gender equality and try to address more of the structural aspects and more I would say more external determinants of sexual health and sexual behaviours rather than just focusing on trying to change condom use behaviour. I think it is more useful.” (P. 4, Rwanda and Uganda)

“...and so what they saw with us and the reason that they ended up seeing that what we were doing was more positive was that we – we argued that sexuality was just part of a young person’s life and only part of what they deal with and we can’t deny it but we if we include it as part of a bigger picture then we think it’s more focused on the entire views and not just this one aspect of their lives.” (P. 6, South Africa and Zambia)

“I think in the future because now their understanding is higher. They know now all these ABCs prevention and so on. Now the content should be more of the risk factors or things that can put them at risk of engaging in unsafe sexual practises like use of drugs, use of alcohol, peer pressure and things that like those that increases the risk in engaging in unsafe sexual practises.” (P. 8, Tanzania)

“You see what makes HealthWise successful is that it’s a comprehensive program. We do not just focus on the problem behaviour, so sexual risk and the other one is substance use. HealthWise has a whole component that focuses on leisure time and free time and helping young people to make healthy choices in their free time” (P. 9, South Africa and Zambia)

Intervention Mapping Step 4: Programme Production

a. Biomedical preventive measures and other contemporary issues

- i. Adjustment of message in curriculum to accommodate AIDS orphans

“There needs to be more that deals with the situation of AIDS orphans. And they are in a unique position. One of the things we found was by the time we were towards the final years when we were still rolling it out across the country and continuing to track it and maintain at least a pre post kind of scenario for data collection that more and more schools well there were increasing proportions of children in the schools who had been directly affected by HIV through the loss of parents, at least one parent. And the tone at times, the tone of how the teachers were teaching which was very assertively saying you can stay safe, you can prevent this by doing the following things was switched in the minds of these children that my parents didn’t take enough care and it’s my parents own fault for having become infected and having died which is really the wrong kind of message and it’s so hurtful to a young person to have to struggle with those kind of feelings and those kind of thoughts. But when we initiated the intervention that wasn’t as big an issue so it wasn’t paid careful attention to. So I would say that the messaging around prevention needs to be re-crafted or adjusted so that it takes account of the fact that many of the people in the schools have seen their parents or older siblings or people that they’re very close to die of AIDS and we can inadvertently be sending a message that blames the victim in a sense and we have to, so that has to be re thought. That is what I would do.” (P. 22, Kenya and Nigeria)

ii. Gender issues in the curriculum.

"...although we had quite a substantial component on gender norms, gender issues, gender balance. I think I would increase that component as well within the teaching." (P. 10, Tanzania)

"Also in the intervention we focused on gender issues and gender based violence and negotiations to avoid those things from happening. So it was pretty comprehensive in terms of sexual and reproductive training programme." (P. 20, South Africa)

"Gender based violence was addressed in this curriculum but indirectly. You could increase that. It was addressed mostly rather than calling it gender based violence there were sections on relationships between men and women, girls and boys, young men and young woman rather than speaking directly of violence per se it was spoken of in terms of respect for each other, autonomy so it was approached from the positive angle.."
(P. 22, Kenya and Nigeria)

iii. Information on living with HIV, and biomedical prevention
(Treatment as Prevention, Pre-Exposure Prophylaxis, Voluntary Male Circumcision)

"But now, there would be young people who had grown up with HIV, so prevention is a whole... especially a general prevention, intervention like this, a general curriculum. It has to focus more broadly and this kind of discrimination stigma, discrimination... living with HIV and then the biomedical prevention." (P. 18, South Africa)

“So it’s really difficult talking about behavioural interventions without also talking about the other things, like for example PrEP that might be important to biomedical interventions for this population. At the time we designed this intervention, it wasn’t necessary to discuss these things, but now I think it’s really important to educate young people at that...” (P. 18, South Africa)

“So I think that one of ... well there’s various things related to the content. At that time ... so this was 1999 to 2002 and then the expansion phase 2005/06. There was very little treatment testing, counselling and treatment available in the local area and now any similar teaching would have to include that in a much bigger way. Also issues of male circumcision and its importance for prevention of HIV were not known at that time so that would have to be changed in any programme.” (P. 10, South Africa)

b. Pretesting (pilot testing)

“Like to emphasise the importance of the process evaluation because we were able to and did modify the intervention. Improve it as we went along. The importance of doing a proper pre-test, which we did at the start which greatly changed the content and some of the approaches of the interventions. In the light of the pre-testing.” (P. 10, Tanzania)

“So I think those are some of the, you know, challenges to expect when you are doing this kind of work so you may have to revise your content and language of intervention based on the feedback that you get during implementation” (P. 5, South Africa, Tanzania, and Kenya)

“We learned a lot from the pilot so I think that really contributed and after the pilot, we rearranged the order of some lessons and whether we taught

it ... you know the grades that we taught it. So that was you know really important.” (P. 15, South Africa and Kenya)

“then the next step is field testing, so once we have a pretty good grasp of the base of knowledge and once we have talked to the experts we ... we develop an intervention and we ... and we field test that and field testing is really just getting out and trying with youths than doing something formed and evaluation. Did they learn something? Did they have fun? Is it practical? And so probably nine out of ten curriculum ideas that I have fail and to find that one, you really need to do that field testing. So ... so we do that and then once we find something that works we do a more formal pilot, where we can do a pre-post survey, which I do, perhaps an RCT if that’s important, and ... and so we can get a process evaluation and then we can get some outcome evaluation so we can say, for example, we are not just going out and saying, the same topic of multiple concurrent partners, we can see the change in knowledge on that topic, but then we can also see any change in self-reported behaviour, but then due to the process evaluation and the quality of the methods we can see...” (P. 13, South Africa, Zimbabwe and Zambia)

Intervention Mapping Step 5: Programme Implementation Plan

a. Stakeholders involvement

“(Were there any factors that you could remember that made the implementation of your intervention successful?) Some the things that made it more successful were of course, we carried along many people with interest...” (P. 1, Nigeria)

“I also think working with the teachers and the way the teachers engage with the students is also quite a helpful thing. Parents often get forgotten about, I think kind of reaching out a little bit more to the parents, I think would also be helpful.” (P. 16, South Africa)

“Then, in terms of implementing the study, again we had very close interactions there with, both with the ministries, because we were delivering the intervention through, you know, government primary schools, so we worked closely with our colleagues in the Ministry of Health, including at district level and regional level.” (P. 27, Tanzania and Zimbabwe).

“(So what did you think really worked in ensuring success of the implementation of that intervention)? Yeah, I think authorities, making sure that is the student affairs division and the ... including the guidance and counselling unit are carried on board – the deans of the faculties of the institutions also were really involved...” (P. 3, Nigeria and Niger)

“So in every high school the principals have been involved and the teachers have been involved in all of the administration for the school system for the city of Cape Town, so there’s been a lot of colleagues, a lot of stakeholders, throughout, including all of the school systems that we have worked with.” (P. 6, South Africa and Zambia)

“I think, again as I said in the beginning, if you can work with what their needs are, if you can get buy-in from right from grass roots, from teachers themselves or whoever you’re doing the intervention with, whether its nursing sisters in a clinic or whatever, its school based so you’re working with teachers right...” (P. 9, South Africa and Zambia)

“It’s a crucial balance to get the right people at the table, at the right time. So I think, you know, without ... without engaging those stakeholders it doesn’t matter how good your intervention or how good your research is if ... if the relevant decision makers aren’t at the table you’ll never get the opportunity to implement” (P. 13, South Africa, Zimbabwe, and Zambia)

b. Training of facilitators

“well some of the things that made it more successful were of course, we carried along many people with interest, but most especially I think was training part because we made the training like an interactive forum...we give this people the right information because these are the people that will now go back and talk to their colleagues about it. So I think the training was the key part that was very important.” (P. 1, Nigeria)

“(What do you think might have contributed to the effectiveness of the programme?)... that we put quite a lot of effort into the training of the teachers and then their supportive supervision.” (P. 10, Tanzania)

(In your opinion what are the other factors in the process of developing your intervention that might have had effect on the effectiveness of the program?)... We did a six-week training with them, five to six week training. They actually became very skilled facilitators and then they delivered the intervention.” (P. 11, Zimbabwe)

“(Thank you very much for your time. Is there anything else you want to add before we finish regarding on how we can improve any aspect of sexuality education design, implementation or evaluation in Sub-Saharan Africa?) Well I think I already said that, I think put more effort on the implementation context and the implementation process, train teachers and put less effort in developing the programme itself because there are a lot of nice programmes already.” (P. 14, Uganda)

“(Okay so what can we do in terms of mitigation measures?) Plenty of training for educators. There are some examples and I can give you an example of that one.” (P. 19, South Africa)

“I was saying that identifying the students that have the capacity and train them to have the potential – not really the capacity - because you have to build their capacity to deliver the intervention...” (P. 3, Nigeria and Niger)

“I think if I’m about to implement the same program in the same communities with the same environment, I think I will – in addition to that, I will train, I will lengthen the training of the peer leaders...” (P. 8, Tanzania)

c. Overcoming resistance to sexual health education

i. Training

“I mean I think in British secondary schools, teachers find it difficult to talk about sex. I mean I think it is a universal thing. I don’t think its specific to Africa, but I think if you have a good, well designed curriculum and you have people who are properly trained to deliver it, you can get over those things...” (P. 11, Zimbabwe)

“That had to be done through very participatory training sessions with the teachers where they were able to really reflect on their own beliefs and their own knowledge and attitudes towards many of the issues.” (P. 10, Tanzania)

“Without clear support or endorsement from the Ministry of Education, teachers were reluctant to incorporate teaching about condoms into their regular lessons. The ‘best’ that could be obtained after PSABH training was that teachers would answer questions raised by students” (P. 22, Kenya and Nigeria)

“I’m sure it’s about training, but I think this also the whole issue of prioritising it. So MEMA Kwa Vijana made some aspects of their course examinable in order to get teachers to take it seriously. I think when they go through their training they do not have it, well they didn’t then. I think it is improved a bit. They didn’t have much training about how to deal with this.” (P. 11, Zimbabwe)

“Well you can see, if you can train them. So give them the skills and the motivation, it is possible. We need to teach as an example.” (P. 19, South Africa)

“So, we found teachers who were more open to this conversation ... and so then we would provide them with the skills and training around and how to ... how to manage the stuff in delivering the programme and so they were comfortable with these things...” (P. 24, South Africa)

“We spent a lot of time in workshops talking through these issues. Talking about why people feel this way and then actually talking about what are

the problems that young people are experiencing..." (P. 9, South Africa and Zambia)

ii. Careful negotiation

"There was a lot of resistance and the key person developing the programme spent a lot of time negotiating with the Ministry of Education. To get permission to even mention condoms in the programme..." (P. 12, Tanzania and Uganda)

"So the best of programmes just about everyone would say is you have to promote condom use, you have to convince young people that using condoms is necessary and doable for them but when the ministry and the teachers combined said no, no we can't do that in our schools those of us working on PSABH knew that we had to step back a bit and rethink this and figure out what could we get into the schools about condoms that would be acceptable to the teachers and to the ministry and to the community as a whole because if we pushed this issue it wouldn't go into the schools anyway and that we knew from other research in other programmes." (P. 22, Kenya and Nigeria)

"...some concern from a couple of the principals about the content of the programme, things like condom demonstrations, and – but when we argued right from the beginning is that this is a positive use element programme, not just sex education and we argued that it's just one component of a larger broad effort to help make young people make good decisions in their lives, so by making that argument that opposition to it basically dropped away". (P. 6, South Africa and Zambia)

iii. Clarification and reassurance

“...when we met with the religious leaders of those places and explained exactly what we were going to do. Showed them, gave them a copy of the curriculum and so forth, they actually became supporters of it...”

(P.10, Tanzania)

“So as a result of this we had to convene a parent/teachers association. I was invited to address parents and clarify their concerns and answer questions. It was only when they were comfortable, they understood what the project was all about and that it was going to be beneficial to their children that they allowed us to implement the project.” (P. 17, Nigeria)

“...then the same applied from the government departments of health and education, where they were concerned of the negative reaction and backlash from parents and the community and we had to spend a lot of time reassuring them before we got permission.” (P. 21, South Africa)

“At the same time, teachers revealed that they did want to protect children from HIV and did understand the role that condoms could play. However, they faced an internal dilemma as they also truly believed that if a child knew that HIV infection could be prevented by using a condom, that they would have sex earlier or more frequently. These two rational thoughts were in conflict. We did our utmost to provide the research evidence that disputes this.” (P. 22, Kenya and Nigeria)

“Initially parents were very sceptical about the intervention and that was why they didn't allow teachers to implement it. But after we attended one of these parent/teachers association meetings all their concerns were clarified and we were able to overcome the resistance that parents had so

we were able to implement the project after the clarification.” (P. 17, Nigeria)

- iv. Selecting teachers or facilitators who were motivated and interested

“We selected them [facilitators]... part of the selection process was to get them to do a demonstration to us to demonstrate how comfortable they were and there might have been another task for them around sexuality and sexual health in the interview when we were selecting them. So we only selected people that had that level of comfort.” (P. 23, South Africa and Tanzania)

“. So, we found teachers who were more open to this conversation and they tended to be mostly female teachers because they recognised the need for protecting young girls...” (P. 24, South Africa)

“It doesn’t work with all teachers because, let’s face it, we’re working with humans here in a real situation, a reality situation. If it’s not going to work with some teachers, they’re not going to do it, well there is nothing you can do about that. You work with the ones who are prepared to go the extra mile and try to implement the intervention.” (P. 9, South Africa and Tanzania)

“You see I think ... I think it’s not fair to expect someone to be teaching something that they don’t believe in. It’s really not fair...So I think that it’s really about saying that if a teacher can be honest with that I don’t want to teach it, they can then get another teacher in or another person in to teach that material..” (P. 16, South Africa)

“Without clear support or endorsement from the Ministry of Education, teachers were reluctant to incorporate teaching about condoms into their regular lessons....schools would invite local health workers into the school to talk about condoms.” (P. 22, Kenya and Nigeria)

“...what we ended up doing with one teacher was we had somebody else come in to do those particular lessons that that teacher found that was difficult for her to do.” (P. 15, South Africa and Kenya)

“Well I think the decision not to deliver it through teachers was really important. In Zimbabwe it was very difficult to get teachers to – well it was difficult to get teachers to prioritize sexuality education and it was also difficult for them to talk it about it explicitly... We engaged what we call professional peer educators, who were school leavers, so many of them were as qualified as temporary teachers in the school.” (P. 11, Zimbabwe)

“...the peer educators are older and have an easier way of relating to kids and they can ask questions, and those peer educators were extremely successful. They were loved by the kids. The kids wanted more and more of them. They wanted to be able to ask questions of somebody older than them but still young. So that was extremely successful. But the in-school, similar aged peers didn't work.” (P. 23, South Africa and Tanzania)

d. Starting intervention early

“Yeah, yes I think so...like I said earlier, we did this intervention among senior secondary schools students. If I am going to do it again, it would have being good to carry along everybody, that is including junior secondary school students” (P. 1, Nigeria)

“I think this needs to start right at the very beginning with the little ones, with the – You know, I think addressing this at high school is a little bit too late and I think working with the small ones at the beginning is a good thing in terms of choice that they make, how they feel about themselves.”
(P. 16, South Africa)

“I think there are lots of things we can do. I think we raise these issues... we start when they are young. We do not start when they are already sexually active. We have got to start when they’re young, Grade 4, Grade 5, Grade 6.” (P. 19, South Africa)

e. Delivering interventions as extra-curricular activities

“But we also know that we could use this extra-curricular approach. Students do not need to necessarily learn reproductive health formally in classroom. They can learn it from their friends, from their peers. So those are the essential things that we should need to know.” (P. 17, Nigeria)

“So I think it’s really important to make it broader than life orientation if you want to make it in the curriculum of other subjects and also extracurricular activities as well.” (P. 23, South Africa and Tanzania)

“Yes, students they usually finish classes at around 3:00 and therefore 4 o’clock to 5 o’clock they start the program and also Saturdays. Because it was organised around football, so children like football so there were massive join the teams. During the teams before they start the usual football drill, they would practice some of these life skill games to get the knowledge and then they can continue to play football as usual. When they close they can use some of the games for, kind of, cool down exercises and they get also the message. Also in order to be in the team, they knew that they had to learn a little bit about the program. Therefore,

we thought it was effective because they were relaxed and it was after school.” (P. 8, Tanzania)

“What I think we need to do more of is – but this is costly, is help teachers and schools to be setting up after school programs. Where young people can come in the afternoons and have a safe place at the school to be able to do after school activities. Whether its sports or hiking or dancing or drumming or creative arts or performing arts whatever it might be, I think I would love to be doing more of that.” (P. 9, South Africa and Zimbabwe)

“You know that is a really good question and that’s something we are trying to answer. We believe that it is really hard to work in a life orientation class because that’s generally only 45 minutes and in that setting you lose the first five minutes where kids are coming in and they leave five minutes early so then you are down to 35 minutes. To have a meaningful programme related to HIV and to teach knowledge then 35 minutes is really hard, but then on the other hand if you work after school where you have more time” (P. 13, South Africa, Zimbabwe and Zambia)

f. Participatory and novel teaching methods

i. Avoiding corporal punishment in teaching sexual health education

“So I would try to make it an intervention that dealt with you know more, if you like, the ways of teaching within the school. So in our classes for example, teachers agreed not to beat the students during the classes, but that was not the case generally, you know in the other classes, but I would want to think more, if you like, integrating it within the health promoting schools kind of intervention.” (P. 10, Tanzania)

“I think in general it went very well and it was delivered really faithfully. Some individual peer educators, professional peer educators found for

example discipline hard because the culture of disciplining children in schools in Zimbabwe is corporal punishment and they were explicitly forbidden from using that.” (P. 11, Zimbabwe)

“...who forget what they should have learnt or can't get the answer right can be beaten. And so part of MEMA kwa Vijana was to change that sort of relationship and make encourage the teachers to be much less formal ... less harsh, less hierarchical and make the classes fun. And interesting and try and encourage the young people to play an active part in their learning” (P. 12, Tanzania and Uganda)

ii. Interactive way of teaching

“(Ok, that's fine. Regarding the content of the intervention or the curriculum, what do you think might have contributed to the effectiveness of the programme)... Secondly that it was very interactive and the way of teaching was very interactive. Much more interactive than was the usual case for teaching in primary schools in that area.” (P. 10, Tanzania)

“...and interesting and try and encourage the young people to play an active part in their learning. So it was active learning and I think that was one of the most important elements of the programme for the pupils to get engaged with it.” (P. 12, Tanzania and Uganda)

“So we had very interactive teaching methods, which were very novel, actually in those schools, at that time, which made this an exciting subject, and one where, which helps to engage the students as much as possible.” (P. 27, Tanzania and Zimbabwe)

iii. Methods of delivering appealing to participants

“It was also very, again, the thing is that kids must find it attractive and acceptable. So what does having a fancy programme and nobody likes it. So you have a programme that’s important that kids can connect to it and that’s one of the things that you have to figure out.” (P. 24, South Africa)

“...then some incentives in terms of having role plays, games and things that are really appealing to young individuals based on advice from the youth themselves plays role in success of the implementation” (P. 3, Nigeria and Niger)

“then secondly, getting the students to participate and get the attention to stay in place so you need to provide some incentives such as maybe providing games around the place where they play and participant in the games and, yeah, to maintain, to keep their attention in place...” (P. 3, Nigeria and Niger)

iv. Relationship between teachers and students

“Well I think at the most general level changing the relationship between the teachers and the pupils was really really important. I imagine it’s the same in Nigeria that in ... in most countries that I know of in sub Saharan Africa –In general primary school teachers have a very authoritarian relationship with their pupils.” (P. 12, Tanzania and Uganda)

“They are relatively young, who are able to relate to the young people that they are working with. The young people are... they feel that they can ask them any questions. So it’s a sort of open relationship and they now are high skilled so they’re able to use any opportunities to reinforce the points from previous sessions.” (P. 19, South Africa)

g. Intensity of sessions

“Most of the interventions they do not consider booster sessions. You get what I mean you just .The continuous engagement, you can’t just have one intervention, let the participants wander on their own way after a while and then you come back and get details so we thought it was really important to introduce a certain point in time to be able booster sessions just to refresh their memories, to refresh their information and ... and strengthen their learning process and let then have a better understanding at that point in time...” (P. 3, Nigeria and Niger)

“Yeah, I would really have liked to go back to a shorter amount of curriculum content in a more frequent spacing. So that we could have done two hours, you know, multiple times instead of having to batch sessions up” (P. 2, Kenya)

“The fact that it was implemented for one whole academic session because this thing of three terms - first term, second term and third terms. Many of the interventions that I read about were very short, some for one time, some for one month so our project is unique and has strength in those three areas.” (P. 17, Nigeria)

“You know that is a really good question and that’s something we are trying to answer. We believe that it is really hard to work in a life orientation class because that’s generally only 45 minutes and in that setting you lose the first five minutes where kids are coming in and they leave five minutes early so then you are down to 35 minutes. To have a meaningful programme related to HIV and to teach knowledge then 35 minutes is really hard...” (P. 13, South Africa, Zimbabwe and Zambia)

h. Ensuring fidelity of delivery

i. Detailed lessons plan to ensure fidelity of delivery

“Well I guess a fifth thing would be that we put ... that we gave the teachers basically fairly detailed lesson plans. So we didn’t just tell them “you’ve got to teach this and you’ve got to teach that”, so it wasn’t just if you like a syllabus, it was actual detailed lesson plans with the involvement of ... for example, short dramas acted by peer ... class peer educators. Role-plays, looking at pictures and discussing them to illustrate various points, stories. So there were, there was a lot more ... you know the teachers basically had to just understand the lesson plans and use them rather than having to make stuff up themselves, which also helped we thought with the fidelity of the intervention so that it was delivered as planned, much better than if we had just you know, told them “teach this, here’s a few ideas” we actually had detailed lesson plans.” (P. 10, Tanzania)

“(I was just wondering whether there was any specific measure taken to ensure that this programme was delivered with fidelity.) Yeah, well I mentioned one of them, which was giving detailed lesson plans” (P. 10, Tanzania)

“(How did the intervention achieve implementation with fidelity?) We developed a list of the features of a responsive school, i.e. a school that was most fully implementing the programme, and shared those with the participants during training, making it very clear what was expected, with the provision that schools should build on their strengths. These represented features of implementation that the participants had been introduced to during the training such as running an anonymous question box, school health club etc.” (P. 22, Kenya and Nigeria)

“When we first started life orientation was a subject matter that was mandatory in South Africa and one of the other reasons why everybody loved the programme because it gave them a manualised curriculum that they could use and it was easy to use...” (P. 15, South Africa and Kenya)

“(How did the intervention achieve implementation with fidelity?) Well, the curriculum itself, I think during the first year, or during the years of the trial, was implemented very closely following the guiding document, the books that the teachers had, the teachers resource guide and curricular, so the - and the thing about them is, that they were written in very simple, and very directive ways so that teachers could be, pretty much walked through how to do participatory activities, and different techniques, which they were unfamiliar with...” (P. 26, Tanzania)

ii. Training, monitoring and supervision to ensure fidelity

“(I was just wondering whether there were any specific measures taken to ensure that this programme was delivered with fidelity.) ... Second was the training of the teachers. I guess a third was the supervision so that there was quarterly visits as was supposed to happen by the District Education Authorities but often did not happen and so within the programme, yeah we made sure that it did happen. The District Inspectors did visit every quarter.” (P. 10, Tanzania)

“(I was just wondering, were you able to assess whether the intervention, the school curriculum was delivered as intended?) Yeah we were because it was our curriculum and we did participant observation and we trained everybody first, so they knew exactly what they were meant to do. So we were able to deliver as intended.” (P. 11, Zimbabwe)

“I think we are fairly confident that it was delivered well. And it was ... there was a ... now again I think you’ve read them ... the articles more recently than me so you’ll probably remember more clearly, but I think there was a structure of inspections, observation of lessons and visits to the schools to interview the teachers and the head teachers about how much they delivered and also teachers self-completing. I think they were providing data themselves on what they were delivering. So there was a structure of monitoring how that was being delivered. And by and large ... and also we had information from the pupils themselves about how much they had received. Questionnaire’s with pupils and they clearly ...” (P. 12, Tanzania and Uganda)

i. Ensuring sustainability

i. Evidence of effectiveness as incentive for sustainability

“...the impression from the Ministry of Education staff was “Wow, you know this is fantastic results”, so you’ve improved knowledge, changed reported attitudes, you’ve changed self-reported behaviours, which may just be knowledge in fact because they know what they’re supposed to be doing and so they tell you that, but this is what the education sector does. You know it gives people knowledge, skills, ways of thinking about things. So they were very very positive about that and I think that was a huge influencer on being able to scale up the interventions.” (P. 10, Tanzania)

“(So why do you think the scaling up of the SATZ [SBSHE] failed? Yes, it did not continue. Well I think we could not promote it because it was not effective. So we showed no difference. So from a Cape Town perspective, we couldn’t go out there to the Department of Health and say we’ve got an effective programme, take it and we’ll help you. So we didn’t put energy in to scaling up.” (P. 23, South Africa and Tanzania)

“People could see that it was effective, that it was working and so the teachers were keen for us to go back or the education, the district education department, was keen for us to go back the second time...” (P. 9, South Africa and Zambia)

ii. Integration

“... in this country, anything that’s going to be scaled up to a national level has to deal with the fact that the existing programme in government schools – well in all schools really.” (P. 18, South Africa)

“It was done with the goal of scaling up. The community, we have two aspects to our community intervention. One was with young people and one was with adults in the community who were, kind of, seen to be their parents. In fact, the community-based intervention was scaled up nationally across Zimbabwe as part of the national behaviour change program. It was called something different and some of the emphasis was changed, but basically we have an 11 session community intervention for adults around more open communication around sexuality, around HIV, around contraception, around communication with your partner and your children. That got adapted and incorporated into national behaviour change program. Over half a million adults Zimbabweans completed that course.” (P. 11, Zimbabwe)

“...the point was to develop something that could work in this incredibly limited setting, and could sustain itself for this incredibly limited setting through, you know, the government schools, the government health sector.” (P. 26, Tanzania)

“It involved working with existing government institutions, and in the existing infrastructure, so the only way you could really reach adolescents on a large scale, was through primary schools in rural Mwanza at that time. So, it used, the existing staff, it - there was a small, very small team of trainers, to get everything started and to monitor it over time, but the whole point was that the teachers would have the capacity and the resource, meaning these books, to be able to continue teaching this indefinitely, and that hopefully each new teacher who came through, would be trained in the same...” (P. 26, Tanzania)

“... in terms of the intervention itself, I feel like you have to tap in to existing staff positions to do it. So the problem is if there are not existing staff positions how do you do it? Because otherwise these research interventions including mine stay on the shelf; they don't get sustained and they never get sustained so you have to do everything that you can to integrate it into existing structures which means working with the existing staff of whatever organisation or institution you are working with...” (P. 7, South Africa)

“One has to negotiate for the space on the ... you know on the ... well on the timetable through the Ministry of Education. They actually were fine on it because it fitted within the overall syllabus of what was supposed to be being taught ...” (P. 10, Tanzania)

“I think we've done this in South Africa but immersing it into the curriculum a bit more. That is something that happens on the side, but actually it gets thrown about in biology classes, it gets written about in art classes, it gets written about in drama classes. That we can have a thread going through around” (P. 16, South Africa)

“Well I guess it’s mapping it on to the life orientation curriculum but then the life orientation is not given much priority in schools by the school structures. So it would mean considering that if you want to roll it out. If you were going to map it on to life orientation, many life orientation lessons won’t be taught because they’ll be given over to other things that are regarded as more important in the school. So I think it’s really important to make it broader than life orientation if you want to make it in the curriculum of other subjects and also extracurricular activities as well. So that would support it.” (P. 23, South Africa and Tanzania)

“What I mean by when you embed some intervention within a school curriculum it has to be sensitive to what the curriculum is trying to do overall. If your stuff is merely added and putting on more hours in the system, unlikely to be actually acceptable, right, because people are going to be saying, ‘Why am I doing this? Why am I adding all this nonsense to ... I don’t have time for this.’ So you have a problem, so that’s what I am saying: that scalability has to carefully look at the issues around embedding the intervention. The first thing you have to do is that the intervention has to prove that it actually has merit and that’s why if you are going to be doing this on the basis of scalability you have to have serious discussions about how this can be embedded. First of all that it’s an idea that they accept. What’s the format in which it should be embedded? So is this intervention something that should be run in specialised classes or should it be part of everyday classes, or should it be part of...? Those are the questions that you have to ask and how long should it be run?” (P. 24, South Africa)

“Sometime if it’s outside of the school curriculum it might take back seat for when there are other things to be done before such programmes.” (P. 5, South Africa, Tanzania and Kenya)

“...and then on top of that we made sure that all of the curriculum objectives mapped on to the objectives of the federal mandate about what should be taught at that age and so we carefully aligned the objectives – the teaching objectives of our curriculum with the teaching objectives stated by the government.” (P. 6, South Africa and Zambia)

“But if they’re integrated into the school curriculum and the school system, then that’s much more sustainable. For example, in our interventions in South Africa we developed a curriculum and then we integrated it to be delivered as part of the of the Life orientation programme. Now in that way, even if our programme is not adopted then, you know, the section of it can be integrated into already existing subject, it is already allocated teachers, it is already allocated time within the school programme.” (P. 5, South Africa, Tanzania and Kenya)

“We were six years on, I said that HealthWise started at 2003. There was a need for life orientation, as I said, right from the beginning at that point and for training the life orientation. Six or seven years later the life orientation curriculum was established and it started to deviate from the HealthWise curriculum. We experienced quite a lot of difficulty around sustainability in HealthWise because there wasn’t that much synergy or overlap in HealthWise and the life orientation curriculum.” (P. 9, South Africa and Tanzania)

“(How do you think we can ensure this sustainability?) I think your programs have to be very in line with the curriculum that’s being offered in schools, especially if it’s going to be part of the curriculum. It has to really meet the learning objectives, the outcomes, the needs of their curriculum. So the teachers are not doing something in addition to their normal work. They have to be, when they teach the intervention it should be meeting the curriculum needs, if you know what I am saying, it should be aligned.

The moment you bring something in addition then teachers will see it as an extra burden and they will not want to do it. My answer is it has to be aligned, whatever the intervention it should be aligned with what the needs are and what the curriculum is teaching.” (P. 9, South Africa and Tanzania)

iii. Involvement of relevant authorities

“(Okay so let’s say if you are going to scale it up to a national level, what factors do you need to be addressing to make sure that the process goes smoothly? What are the factors or who are the drivers you think you’re going to involve to ensure that this process is successful) ... I think if we’re talking about South Africa especially, then what’s important is that it would be a joint effort between departments of health and the department of education so if you’re talking about school based interventions, it’s that process that’s really important.” (P. 18, South Africa)

“We had already worked very closely during the trial phase with the district level and the ward level education and health officials, so I think that helped enormously.” (P. 10, Tanzania)

“(What or who are the drivers that you were expecting to push or to push the scaling up process?) We work very closely with ministry and the National AIDS Council and when the National AIDS Council – Zimbabwe was one of the first countries to develop a national behaviour change strategy. Then that led to a programme and we worked with both the funders and that, around the program development.” (P. 11, Zimbabwe)

“(So what or who are the drivers expected to push this kind of process ahead and how did the intervention develop or support these relevant drivers?) The main groups were the ... well the main institutions were the

ministry of education and the ministry of health. Then at regional level... I mean within Tanzania you have the government ministries and then regions and within regions, districts. And at each level you need to have the buy-in from the officials at each level..." (P. 12, Tanzania and Uganda)

"(Yeah, what do you think can help us push the intervention forward?) I mean involvement in government I think ... I think buy in from government would be really important. Which ... in South Africa wouldn't be a difficult thing to get because I think that they have supportive of this and also the local kind of education departments, I think in ... buy in from them as well would be helpful." (P. 16, South Africa)

"(Great, so what were the factors you were expecting to push your intervention in the process of scaling up... what were the factors? It has to be to do with the Education Department and in South Africa, it was the support of the trade union. The South African Democratic Teachers Union is a very powerful body and it is political. It has to be something that the people in power want to do." (P. 19, South Africa)

"Then the other group that are very powerful and important are the NGO sector. There's a very large NGO sector and community based, CBO sector in South Africa which are also involved in intervention programmes and they are very effective. For example, the hospice network in South Africa and people living with HIV, the TAC network, association of them, they have a very important role to play also. So they would have been brought in to take proper care." (P. 21, South Africa)

"...and that we knew from other research in other programmes. So the fact that we had full ministry of education support and full support of the teachers and the communities meant that everyone rallied round and that

this programme would go forward and that was illustrated in some unexpected ways and ways that really messed up the evaluation design so in a couple of the places we published about the fact that we lost several control sites, we lost quite a few control sites.” (P. 22, Kenya and Nigeria)

“...Of course, getting everybody in the school on board, relating to the importance of it from the top down... and endorsement by the education department.” (P. 23, South Africa and Tanzania)

“One of the things that have ... because when you start talking scaling up you are talking about systems. And ... and the scaling up in this instance is your educational system. So if your ... if your initial programming was done in a way that essentially didn't include the policy makers or was done in a way that essentially you did a research project and you finished it and you gave of a report, that is absolutely the wrong way of trying to get scalability so the issue of scalability has to be that, okay, when you are working with this programme you ...” (P. 24, South Africa)

“A second phase of MEMA kwa Vijana called MkV-2, which was all about larger scale implementation. So, this was using the same general approaches, it was more embedded in routine application, so there was less involvement of the study team, who played more of a supervisory, and advisory role, and it was more, you know, the implementation was more delegated to members of the local health and education services. And that, you know, I think really turned out to be quite successful...” (P. 27, Tanzania and Zimbabwe)

“And in terms of the policy buy in, I think we benefited from the very close relations we had already built, with the Tanzanian and regional, you know,

health and education authorities, who felt we're really partners in the MEMA kwa Vijana programme from the start.” (P. 27, Tanzania and Zimbabwe)

“Then of course the ministry themselves. There is a Grassroots Soccer South Africa specifically. You can talk to them more about their agreements and that type of stuff. I generally don't know too much about but they are obviously a critical stakeholder. The ministry can permit you to come in, which is great, they can forbid you to come in, which has happened to a lot of organisations, or they can actually fully endorse you which is the best, and they facilitate you with open arm.” (P. 13, South Africa, Zimbabwe, and Zambia)

iv. Low cost programme to ensure sustainability

“I think one thing is to keep the budget of whatever intervention to a minimum so in my own case I was a student so I didn't have much money so whatever it is that is in the intervention try to use local resources and by that I mean if there are trainers within the environment that you could bring in then also the fact that you are empowering teachers and students from the school is also part of the strategy to bring in sustainability and there must be a way by which the training can be sustained so that is students or teachers drop out you have the means to replace them.” (P. 17, Nigeria)

“(Did you take any measures [to ensure sustainability] during the development of the intervention?) Well, it was kept very low cost, so it would be cost effective.” (P. 26, Tanzania)

“There was no cost involved in keeping the program going.” (P. 8, Tanzania)

“This programme was designed with the vision that it needed to be rolled out across the country. So it needed to be designed in such a way that it would be acceptable to be diverse of religious and ethnic communities across the country. It would be able to be delivered not only in well-resourced schools but in the poorest of the poor schools with minimal resources and it needed to be able to be delivered not only by the best of teachers who were trained to a relatively high degree in how to deliver a programme on HIV and sexuality and address gender based violence but by all teachers. Some of whom were very skilled and some of whom were not so well skilled” (P. 22, Kenya and Nigeria)

j. Negotiating space for programmes

“...the schools wanted the intervention in a way to fill time or fill space in the curriculum or in the school day that they were not able to fill with other subjects. It is always very challenging to implement at that level and because we had 14 sessions to implement, it can be very uneven across the schools they select and that’s certainly what happened to us.” (P. 18, South Africa)

“...and the moment we went to the school.....we have to put our lectures in the evenings so this are just the major challenges.....there was not really any challenge regarding the scientific implementation per se just the logistic issues.” (P. 1, Nigeria)

“Putting the programme together ... so I would say one of the ... and it’s a lot of work to design a whole new curriculum. One has to negotiate for the space on the ... you know on the ... well on the timetable through the Ministry of Education.” (P. 10, Tanzania)

“Another barrier was that it was an extra-curricular programme and teachers had to teach it for free in their own time. Well that doesn’t work in a rich country like the Netherlands, so why should it work in a poor country like Uganda. it’s not realistic. So that was a big barrier.” (P. 14, Uganda)

k. Resistance to sexual health education

“well not so much cultural but community limitations in that the teachers for example and that health workers themselves often did not fully ... well they didn’t start by believing in some of the stuff that one was trying to teach. You know because the local setting there or anywhere else in the world, you know does not necessarily completely reflect you know all of the things that one is trying to say in the programme” (P. 10, Tanzania)

“Yeah as I said the ministry of health kicked us out to schools. Because of the political situation in Zimbabwe, they stopped all non-ministries of health employees working in schools. They basically were worried about international NGOs or international projects politicising young people. The only people who are allowed access to pupils were teachers.” (P. 11, Zimbabwe)

“The second group of stakeholders, the parents and the community, who... and as you know certainly in South Africa both sexuality, sexual education and HIV, TB are very stigmatised in this country so there was a lot of reluctance in businesses from them talking openly about sexuality, sex and HIV and then the same applied from the government departments of health and education, where they were concerned of the negative reaction and backlash from parents and the community ...” (P. 21, South Africa)

“Sometimes, depending on the language, especially for sexual health education, you may have a backlash from the community, parents or even the education officials. So I think those are some of the, you know, challenges to expect when you’re doing this kind of work...” (P. 5, South Africa, Tanzania, and Kenya)

I. Resistance to condom use promotion

“I guess another ... they didn’t object to it at all but there were a continuous if you like, tensions related to the content on condom use. Even with the ministry of education ... some of the ministry of education officials, where although the official policy of the ministry of education was that it was fine to explicitly talk about condoms and explain how condoms were used and even to show condoms, that was not allowed by the regional education authorities under the rationale that it was them that would get the flack from the parents if there was going to be any flack.” (P. 10, Tanzania)

“Condoms proved to be a difficult topic in all schools, even after PSABH training. At baseline data collection the majority of teachers expressed the views that teaching about condoms encouraged young people to engage in sex by removing the fear of AIDS and that teaching about condoms was against their own moral values (and the values taught by churches in their communities)” (P. 22, Kenya and Nigeria)

“Well I think it’s all about political leadership to be honest. In Zimbabwe there were lots of possibilities for a good curriculum, but the ministry was very conservative. They were very concerned about talking about sex in schools. They were absolutely adamant you couldn’t show condoms in schools.” (P. 11, Zimbabwe)

“Well the school system ... the education system were very conservative about the discussion of condoms. And demonstration of condoms. I think you’ll know that from your reading.” (P. 12, Tanzania and Uganda)

“and then challenges around some of the ... we had one very ... well two but one school was highly populated by Muslim students and the teachers there were very ... some of the teachers were resistant to teaching about condom use ...” (P. 15, South Africa and Kenya)

“But they were not permitted to promote condom use. So please, at the minute it’s a very touchy point with the ministry. And it was just providing the information but not saying and therefore you should use them.” (P. 22, Kenya and Nigeria)

“Well the teachers weren’t opposed to it and they were volunteers but I guess there was resistance because it was hard for them to complete it and there was resistance of course to the condoms, to some people, resistance to the condom lesson.” (P. 23, South Africa and Tanzania)

“I think the biggest constraint on the curriculum, and the biggest weakness of the final intervention is that, we couldn’t implement what we knew, what we believed would be best practice, which would have been comprehensive condom education, condom use education and, you know, including, in school settings, detailed information about how condoms work and myths, we counteracted some of the myths, but there was very little - even by the end of the trial, which is when it was at its optimal level, there was very little about condom - explaining how to use a condom properly. We were never, at any point, allowed to show a condom in the primary schools, or even a drawing of a condom in the primary schools, and even the Peer Educators themselves who were an important part of

the intervention, we couldn't show them that during their trainings" (P. 26, Tanzania)

"Well early on there was some concern. So the first stage of this we conducted a pilot study and during the pilot there was some concern from a couple of the principal's about the content of the – about the content of the things, like condom demonstrations," (P. 6, South Africa and Zambia)

"Yeah, you know what? I wish I had an answer for you because I can tell you in our HealthWise program one of the lessons is a condom demonstration. I can tell you now, I don't think those teachers are going to do the condom demonstration. I really don't think, but I'll tell you at the end of this year, if you ask me again." (P. 9, South Africa and Zambia)

m. Facilitators/teachers' resistance

"Well I think the decision not to deliver it through teachers was really important. In Zimbabwe it was very difficult to get teachers to – well it was difficult to get teachers to prioritize sexuality education and it was also difficult for them to talk about it explicitly. They turned into miss out sessions that they felt uncomfortable doing." (P. 11, Zimbabwe)

"Design I don't know but the implementation that came out of my research, one big barrier is that teachers. They have a ... they have a strong norm about sex for young people, they say they shouldn't have it. So for them it's difficult to teach a comprehensive education programme. Because they were opposed their value and norms level. So that's a barrier" (P. 14, Uganda)

“...part of the intervention was the promotion of abstinence and it was the promotion of safe sex. And the teachers had very strong feelings about the sex promotion. So they did not want to teach it and had quite strong responses to doing that...They reluctantly said they would teach it or they actually said they would not teach it.” (P. 16, South Africa)

“I think at the moment teachers are doing a lot of the delivery of these programmes. Perhaps they don't have enough training themselves or comfort with the topic.” (P. 20, South Africa)

“...and a lot of the teachers had the greatest difficulty in actually broaching the subject or topic. They say themselves that they are completely uncomfortable with it. So the resistance was more in relation to their own cultural contexts. And cultural attitudes. They represented in their sense the community attitudes to discussion of sex in ... in classrooms with the ... with the result that many of them would not want to participate or would not want to or would skip these ... those sessions that basically had to do with talking about sex, so yeah, that's the resistance you would get.” (P. 24, South Africa)

“In the development, It may have beingthere some resistance from...so we organise the training of trainers and among the trainers that are to be trained....there was some cultural resistance in talking about certain topics...hmm...For example in terms of sexuality among young people about condom use. We may have under estimated the time that was needed to change these attitudes.” (P. 4, Rwanda and Uganda)

“You can imagine that there was opposition from many of the teachers because they felt A, they didn't know how to talk, how to teach young people about this issues. Many of them felt that this was against their,

either their own belief system or their religious beliefs, their cultural beliefs. That they should not be teaching young people about, for instance how to use condoms or how to be faithful to a partner in a sexual relationship.” (P. 9, South Africa and Zambia)

n. Logistical challenges

i. Difficulty in getting approval from authorities

“...again it took a while even before the education board could agree to something like that. Just like I said because of the culture and religion in the society, so it took a while...those were the major challenges...” (P. 1, Nigeria)

“...with school work I am doing in Kenya, one of the main things you have to consider is that things do not happen quickly because school ministry take some time to make decisions. So you have to be conscious of how long the ministry may take to respond to your request.” (P. 5, South Africa, Tanzania, and Kenya)

ii. Teachers' absenteeism and turnover

“So we had that problem and then just also the school environment itself, we worked with teachers intentionally so we would be really embedded in the school. But there is a lot of absenteeism amongst teachers, and there would be... there are certainly days when classes are not held.” (P. 18, South Africa)

“The normal limitations of the ... both like the education and the health sector that it would affect any programme so the fact ... you know the limitations of the quality of the teaching, the fact that on any given day

about one third of teachers are absent and on any given day about one third of registered students are absent from school.” (P. 10, Tanzania)

“I think that the other ... a huge issue is that there’s very major turnover of staff in schools in most sub-Saharan African countries and so that does not become a major problem if you had a complete national programme so every school was trained ... you know every teacher basically was trained to ... or in every school there were trained throughout the entire country, but it is a major problem during ... when you’ve only got a programme working in certain communities the way that we had because teachers get transferred out, go on maternity leave, retire, whatever and so you’re forever having to replace those teachers.” (P. 10, Tanzania)

iii. Poor environmental conditions within and outside school

“In more recent years in South Africa and Cape Town, the education system it’s very tricky at the moment, it’s very challenging context to work in for teachers. Because there is a lot of, what shall I say? There is a lot of stress. Teachers feel very overworked. They feel really undervalued in that they feel that they’re not paid sufficiently. They are working with large classes, many kids, overcrowding. Then they are working with difficult kids, kids who are illiterate, they are in high school and they are illiterate, kids who are on drugs. So there is many times where teachers have to deal with violent behaviour, even to the point of having to defend themselves or defend other learners against violent learners or aggressive learners.” (P. 9, South Africa and Zambia)

“And then you know there are the issues of just transport and you know, the bad roads and the long distances and etc.” (P. 10, Tanzania)

“Well I can’t speak to the daily challenges, because like I said that was our South African friends who did that, but you know just getting people together and people forgetting the appointments and something else came up that they have to do so it would just ...” (P. 15, South Africa and Kenya)

“We’ve got all sorts of issues outside of the school. So I think certainly, they develop skills but social conditions are very important and they don’t work in favour of such individuals.” (P. 19, South Africa)

“There are always logistic challenges for rural areas. Always. We travel for hours and hours and hours to get to some of these rural areas. The school closes down because the Department have decided it is a small school. The department does not decide at the beginning of the year when it would be logical, they decide half way through the year. All sorts of logistic problems I think.” (P. 19, South Africa)

“Actual implementation of the coursework and sections for this particular study turned out to be exceptionally difficult because of post-election violence that delayed the start of our intervention cycle and required us to adapt our roll out in ways we had not anticipated.” (P. 2, Kenya)

Intervention Mapping Step 6: Evaluation Plan

a. Mixed method evaluation

“I think we should be as rigorous as possible. I think that’s one of the lessons that we learnt from the studies that have been done to date, being as rigorous as possible doesn’t always mean doing a large scale cluster randomised trial, in fact that design has maybe show itself to not be the most effective for this kind of programme, but I think evaluating it on all

levels using mixed methods, methodologies to evaluate and making sure there is process evaluation,” (P. 18, South Africa)

“I mean it’s just a hell of a lot of work to do that and the workload of doing it, but on the other hand I think that there was huge advantage to using both quantitative and qualitative approaches in the evaluations.” (P. 10, Tanzania)

“I think that we have ... well I think that more programmes need to combine, if you like, rigorous evaluation of outcomes with qualitative research on why things are working or not working, how their working or not working and what needs to be done. What should the content be, what should be the methods, etc.” (P. 10, Tanzania)

“And we should not use quantitative methods alone in collecting data for the evaluation. In my own project I used both quantitative and qualitative approaches. So we conducted focused group discussion with students – could learn from what has been their experience - so I think we should combine both qualitative and quantitative methods in carrying out our evaluation. So those would be my suggestions.” (P. 17, Nigeria)

“You must use mixed methods as much as possible but you know the problem being sometimes people just go either all quantitative or qualitative in their data and I disagree with that, it’s a mistake. I think that the qualitative stuff, you know, do it properly, intelligently and do it in a way that actually gets you good quality data. Explanatory data that helps you understand your quantitative data.” (P. 24, South Africa)

“The other thing is that, I think we just need to do it more rigorously, in all the ways that are already acknowledged as rigorous evaluation, and that

means having independent parties do the evaluation, it means using best practice evaluation methods, and triangulating different sources of data, because we're concerned about validity of data so, checking it as we go". (P. 26, Tanzania)

"So, all I can say here I think, is that given the limitations in our data, we need to triangulate across them, so we need to use as many methods as we can, together, in a study so, you know, different methods of interview administration, for example. Use of ACASI, use of qualitative methods, which were so valuable in the MkV study, in helping to explain why the intervention didn't reduce HIV..." (P. 27, Tanzania and Zimbabwe)

"Yeah I think we design – because now we've run the HealthWise three times and we're now in Zambia. Again we're starting in Zambia with the process evaluation, as well as the outcome evaluation. I think it is a good design and its mixed methods. I think that works very well. Obviously you always want to do more." (P. 9, South Africa and Zambia)

"I would do more quality of evaluation. At this point, we are getting change in knowledge, attitude and self-reported behaviours which I think are interesting, you know, it shows that we are teaching people and we are helping change their lives but the more interesting findings come out of the qualitative aspects. You know what we have observed in practices, what do we get from focus groups and then that they are never used so I probably, you know, if we could go back in time I would probably set that up, right from the beginning. I think we are doing better now but I think we have an opportunity to learn a whole lot more if we had paid attention to that better." (P. 13, South Africa, Zimbabwe and Zambia)

b. Process evaluation

“Like to emphasise the importance of the process evaluation because we were able to and did modify the intervention. Improve it as we went along.” (P. 10, Tanzania)

“Well I think I already said that, I think put more effort on the implementation context and the implementation process, train teachers and put less effort in developing the programme itself because there are a lot of nice programmes already.” (P. 14, Uganda)

“But of course doing a trial to see how it can be implemented. I have been involved in another project where we designed an intervention, evaluated it. It was effect on some outcomes and then we designed another trial to see how it would be best to implement it on a wide scale...” (P. 23, South Africa and Tanzania)

“If I want to do it again I would focus much more on the process and how the intervention was implemented rather than on measuring the outcomes. There was something I also found with the literature study that we did. So we found very little results of such interventions in sub-Saharan Africa and in these meta-analysis and I think a large part could be explained by poor implementation of the many of the projects. So in other to understand the result is essential to understand how they are implemented and how they were design. Otherwise, it is just not make any sense you cannot interpret your results. So that I think I would have done differently in the evaluation I would have focus more on monitoring the process rather than the actual effectiveness.” (P. 4, Rwanda and Uganda)

“So I think is more important to focus on how we can provide these programmes rather than trying always to measure their outcomes

because I don't know what your experience is? But I just know quite a lot of these evaluation studies and I think the quality is often not very good not very good that is one thing and even if the evaluation quality is good then the programme may not have being properly implemented ..." (P. 4, Rwanda and Uganda)

c. Improving data collection methods

i. Computerised audio devices

"Now we have computer assisted technology for administering questionnaires and you could have the whole thing in a programme that they listen to with headphones. And put it into a tablet computers and I think that's probably the best way to go now." (P. 12, Tanzania and Uganda)

"..I mean they did all the evaluations and we got all of the data and it worked out very well. They did them on personal digital assistants, you know like Palm Pilot kind of things. That worked out really well, the students were fine with that so that was all fine..." (P. 15, South Africa and Kenya)

"Then to directly answer your question, how can we improve, I think cell phone technology is the way to go. There is a lot of potential within e-technologies, questionnaire designs, involving the youth in that, making them answer things on the internet or the cell phone or whatever and that will really speed up trials and studies and evaluation." (P. 21, South Africa)

"It is [computerised audio devices] excellent, really excellent because firstly it makes them in this little private bubble and they feel that it's a confidential process because the content is private. And secondly, it

overcomes any problems with literacy because you can always see... most kids finish the questionnaire in half an hour to 45 minutes, but there are some that really struggle and clearly some things haven't been understood well. So the audio can overcome that, because even though they're in high school, their levels of literacy are always quite varied and some are quite blurry." (P. 23, South Africa and Tanzania)

"So I think the best way is the audio component but it is of course expensive. To overcome the literacy it's... I mean there are all sorts of exciting things people have used in Africa, not necessarily in schools – ballot boxes to make it confidential and overcome..." (P. 23, South Africa and Tanzania)

"The other thing that it was good at was ... was using technology. We use PDAs. You know, palm held data collecting devices. One of the things that we found was that if your language is critically the way in which you ... you know you either administrator measures and stuff to determine or evaluate your intervention so you do baseline and you do a post baseline after the intervention then paper and pencil types of instruments are very boring to kids because they do that all the time and so they ... they react very differently if you show them something with a screen and they can press buttons. That's ... you know, that's the new sort of you know the electronic era so kids love that stuff. So if you deliver your programme using technology they will react and respond to that very positively and that's, you know acceptable." (P. 24, South Africa)

"...most of the evaluation process was based on self-reporting and we know the difficulties in self-reporting for instance of condom use among these individuals, even youth or older individuals. Self-reporting maybe biased by social desirability issues and where we are unable to use any bio markers, or to use better technology such as the ACASI method - I

don't know if you are familiar with that method - that is called audio computer assistance method.” (P. 3, Nigeria and Niger)

“No because I think we've done a pretty good job of it, you know, we've evaluated pretty extensively and using, you know, contemporary strategies and we use – we started out using hand held computers for kids to respond to surveys but now we've gone to netbooks and so I think the technology has worked out very well and our partners have worked out how to do it very well so I think the evaluation system that we worked on was very good.” (P. 6, South Africa and Tanzania)

ii. Validity of data

“To my mind the most valid data comes through qualitative methods. From in-depth interviews, but you can't do that on a large scale.” (P. 12, Tanzania and Uganda)

“So, all I can say here I think, is that given the limitations in our data, we need to triangulate across them, so we need to use as many methods as we can, together, in a study so, you know, different methods of interview administration, for example. Use of ACASI, use of qualitative methods, which were so valuable in the MkV study, in helping to explain why the intervention didn't reduce HIV...” (P. 27, Tanzania and Zimbabwe)

“When you're administering questionnaires you need to explain at length to the pupils or the young people why this is ... why it's important that they give the true answer and establish a really good rapport with them. So say you had a class of 40 pupils in the classroom, a typical primary school in Tanzania. Then to spend an hour perhaps explaining what it's all about, maybe playing games with them, establishing that you're a friendly person and you have a sense of humour and you ... and you want ... you are

wanting to help them and improve their services for them. And then ask them the questions, there's a better chance of getting valid responses.”
(P. 12, Tanzania and Uganda)

“One is that young people should be the ones to conduct the interviews. If a fellow young person is interviewing you then you are comfortable that you are talking to a fellow young person. Some people have also suggested that maybe we should use a computer based platform where people can just log in and write something about their behaviour in a way that is completely anonymous. But I think young people need to develop the trust and confidence in researchers before they can open up when it comes to their sexual behaviour.” (P. 17, Nigeria)

“The second one was with regard to particularly the pupils themselves, the high school pupils. What we did was we used field workers who were fluent, who were the same age group and who were also fluent and had the same sort of world view and shared the same sort of life experience as the pupils themselves so that we were able to build sympathy and rapport between the people who were collecting the data and youth themselves.” (P. 21, South Africa)

“... One of the things we found is that when you use paper and pencil people sat looking over other people's answers. And they answer as the other person so it becomes almost like a group response. Which is not what you want. But when you use tablets people tend to actually just use their own, you know, they loved doing that stuff and they fill in and they feel fairly comfortable with that so it helped the quality of the data” (P. 24, South Africa)

“So we use some of that stuff and we also manage to programme into those things, we use voice activated, they could press a button and a voice would speak in the language of their choice. Because they could ... if the person spoke Zulu. And ... but wanted to reply in English he could do so or she could do so. So some and that ... that took account of the fact that literacy, reading and writing literacy is something that is important to take account of because some of these kids didn't have the type of literacy you needed for them to be able to answer the types of questions you were asking them but when you gave them the opportunity to switch between languages, because sometimes they understood the question better in English than they did in Zulu. So they could switch this way and that way and what we think was we had people of the same age read out the questions and we recorded those so then they would be able to listen to that and you know it wouldn't be like an old man talking, like me, talking to ... talking to young kids. They listened to a young kid talking to them. And then, you know and so these are all sort of important things that you have to take account of in ... in approaching young people.” (P. 24, South Africa)

“So, one of the things we did extremely well, I think, is our quite, in depth participant observation research, which at the beginning of the trial we didn't actually plan to do so much in depth, but it became pretty clear quickly early on, that we seemed to be getting much more truthful information from the participant observation research, than from any kind of formal interviews, whether qualitative or quantitative, so we put more of our time and effort into getting good quality participant observation data from a representative sample of villages....” (P. 26, Tanzania)

“So, that is a real limitation and that is the reason, I think, there is really no alternative but to seek biomedical outcomes that you can look at, to see whether - to have a more objective measure of whether you've actually had an impact, and so, that's why we incorporated such outcomes in both

the MEMA kwa Vijana and Regai Dzive Shiri studies.” (P. 27, Tanzania and Zimbabwe)

“There’s so many pieces to that I could talk about. I think that biomedical evaluation has some value, because it does get past this validity and self-reported data issue.” (P. 26, Tanzania)

“...and finally, I think you have to build in the biomedical markers and, you know, HIV is probably the single most important outcome that we’re trying to influence, but we have shown that HSV2 serology is really a very useful marker, particularly in young people, because that’s when most people acquire their first HSV2 infection. So, if you’re following up a young age group and doing serological measurements over time, that has to be, I think, a very useful biomarker that you could use for this” (P. 27, Tanzania and Zimbabwe)

iii. Improving questionnaires

“...the younger adolescent tend to like to talk for more than to read. So a lengthy questionnaires are not really enjoyable for them but when you put them in a group discussion, you know you discuss topics, they find it much more enjoyable.” (P. 5, South Africa, Tanzania, and Kenya)

“The questionnaires were translated. I actually think that in terms of the fieldwork, both at the level of intervention delivery and in terms of measurement and valuation, one of the strengths of the programme was that we had very, very strong field work and a small number of schools. We were only working in four schools as opposed to 20 or more like some larger studies. So I think that those aspects of the study were handled very well. The questionnaires were translated. They were accessible both

in English and in Zulu and I think that... those pieces of it worked quite well.” (P. 18, South Africa)

“... We created what we called a hybrid questionnaire, where each person had a questionnaire in front of them and the researcher went through each question and read it out so if they were not literate. If they were unfamiliar with reading. They would say now go to question seven, they knew their numbers. They’d say go to question seven, now what this says ‘In Swahili it says this this this this’ and in Sukuma, if you are Sukuma ... if you find Sukuma easier than Swahili ‘this is what it means in Sukuma’ and then translate it into Sukuma. And then they put down the answer themselves on the bit of paper. So it was a self-complete but the question was read out to them by the researcher...” (P. 12, Tanzania and Uganda)

“That is an important issue. The way we’ve been doing it, we’ve been looking and translating. So we’ve been translating and requesting Zulu and we would often collect the data in Zulu, but the responses in Zulu and then we would try and translate that in to English. Then there’s a danger of course losing some sensitive information there. We have to be careful.” (P. 21, South Africa)

“It depends on the students. If they are fluent in English we keep it in English because some of the terms there might not be a character multiple concurrent partners in Setswana or something. So sometimes it remains in English but then, you know like in Khayelitsha English is, the proficiency is pretty low and people are more comfortable in Xhosa and in that example we also provide a translation to the local language.” (P. 13, South Africa, Zimbabwe, and Zambia)

“ I don't think the evaluation has to be exhausted, you know, a lot of things that come out of academia are 20, 30, 40 pages of survey questions and you know, you are not going to get anything out of there. But if it is really simple related to the outcomes you want to see I think ... I think it can be effective.” (P. 13, South Africa, Zimbabwe, and Zambia)

“And that I think there a lot going on in schools and sometimes evaluation so I think good evaluation depends on good intervention as well and I think for you is better to focus on how to develop or improve the evaluation methods. Not to depend on the traditional questionnaire but to do something that is more visual, more graphic or even observatory sort of thing” (P. 5, South Africa, Tanzania, and Kenya)

d. Getting valid data

“The biggest challenge is to get valid data on sexual behaviour. In terms of evaluation. Because young people ... we learn quite early on, young people are very reluctant to report honestly on their sexual behaviour because they're worried about the confidentiality and what the motives are of the people doing the research.” (P. 12, Tanzania and Uganda)

“We will always encounter this problem [invalid response] because young people will not want to give a normative answer because society has begged them at this stage not to have sexual activity at all so they are always struggling when they are asked questions about their sexual behaviour – whether they should tell the truth or they should lie? So whichever course of action they chose will be a function of whether they can trust the person they are giving that information to.” (P. 17, Nigeria)

“But that's a big problem because there's a lot of conflicting data which clearly is not valid. We have looked at a proportion of responses that are

valid for some questions and it is a concern. So those are some of the difficulties.” (P. 23, South Africa and Tanzania)

“But in terms of the, kind of, meaningful evaluation of the, on the social science side, the behavioural side, which is what I mainly focused on, it just, collecting valid data, collecting truthful and honest, and accurate data, in a setting where young people have many, many reasons to lie about their sexual behaviour, any sexual behaviour, and that might even be compounded when they’ve participated in an intervention, and they know what the desired behaviours are, the target behaviours are.” (P. 26, Tanzania)

“In terms of limitations, so the single greatest limitation in evaluating any of these programmes, whether it’s MEMA kwa Vijana, Regai Dzive Shiri, or any of the other programmes, which have been tried out in Africa or elsewhere, is the problem of reporting bias. And this is to do with inaccurate reporting of risk behaviour, particularly sexual behaviour, and particularly by young people. And I think it’s very clear from the results in our study, and actually from many other studies that have been carried out, that reported data on sexual behaviour can’t be relied on, particularly in this age group, and to be honest, I think particularly in young women, girls and young women, for whom the, you know, the social constraints and fears about norms, and so on, are so strong, that they are very unlikely to give you accurate data about their sexual behaviour.” (P. 27, Tanzania and Zimbabwe)

“(What were the challenges or obstacles, if any, you encountered in evaluating the intervention?) Well, I think one of the biggest challenges is that, is the culture of secrecy around adolescent sexual behaviour”. (P. 26, Tanzania)

e. Using biomedical markers

“The main difficulty was, again the ministry of education were very reluctant to allow testing of pupils for HIV. We had to run all our base line survey out of school hours and we had to run our end line surveys in the community, so that was a challenge yeah.” (P. 11, Zimbabwe)

“I think given the problem of validity of the data, reported data I think biological outcomes are ... should always try in the long term try and evaluate using biological outcomes and of course there’s a big problem there because they’re so expensive, but just focussing on pregnancy would not be so expensive. It wouldn’t require a lot of lab tests and so on, which you need for sexually transmitted infections.” (P. 12, Tanzania and Uganda)

“(What other ways do you think we can improve the evaluations of such interventions) I guess we can include biological outcomes where possible but that’s difficult of course for various reasons. Not only cost but also there are very few events, incidences” (P. 23, South Africa and Tanzania)

“But of course biomedical research is very complex and expensive and so, it’s not an option, although there’s just not enough of it, without a doubt, everything I’ve read there’s so, so little data on adolescent sexually transmitted infections, which has been undermine my advocacy to, you know, put in a comprehensive sexual health education in schools.” (P. 26, Tanzania)

“I think it’s one of the limitations of things I could have done better if we had worked with had the opportunity. And you could have also get ten bio markers to do a HIV screening, but sometimes the issues surrounding ethics, surrounding the handling of body fluid and tissues and things like

that, we think we might not have the energy and the time constraint and the resources to go through that process of getting the clearance to have a biologic markers.” (P. 3, Nigeria and Niger)

“Biomedical outcomes we have used are HIV testing. And, as you know, to measure change in incidence is very hard and especially with our population. You know, a control group you would only expect, at this age, a very few to become infected so you wouldn’t see a changeover ... you are not likely to see a big change over one or two years but, you know, it might be over 15 years and we don’t really have the ability to run ... to run that kind of evaluation, though we are seeing really encouraging results on using male circumcision as a biomedical indicator, and then, yeah, we have seen clinic attendance among youths who are HIV positive increase so” (P. 13, South Africa, Zimbabwe, and Zambia)

f. Loss to follow-up

“Yes, there were certainly challenges. I would say the main challenges or barriers came at the level of implementation in the schools and again, this is a finding that has occurred across other studies, especially across South Africa... following up students in schools is very hard, particularly in the rural areas, particularly in KwaZulu-Natal. There is a lot of out migration; there is a lot of mobility. Students... a large proportion of students move from schools one year to the next.” (P. 18, South Africa)

“So the challenges that we faced I would say were more logistical in terms of follow up, in terms of follow up of the students and in terms of ensuring follow up from baseline to the follow-up period.” (P. 18, South Africa)

“...How well trained are those who are doing the face to face delivery. How well is your research sat, do they really find all the people back so

you don't have loss of subjects due to, you know, drop out and attrition that you could have captured. We leveraged a lot of volunteer work effort and actually physically called people back three times to try and find them, even if they dropped out of school that semester to be able to track them..." (P. 2, Kenya)

"Okay, evaluating it, yes. It is hard to find the places in the school to get the kids together. Absentee rates are high so you have to go back quite a few times. Then people drop out and so more recently, in SATZ, we didn't follow them up in to their new schools or wherever they were, in their homes. But in the new trial we did, we managed to get about 80% retention. That's difficult." (P. 23, South Africa and Tanzania)

"Probably the only downfall which we had in our evaluation, which is true in most evaluations of this type, are problems that kids drop out of school and then you can't follow them, so in to our designs, you know, we were trying to follow kids and we were trying to pick them up a year to six months in the high school that they were in and the biggest challenge with that is that, as you probably know, there's a high dropout rate from school systems, and so it's almost impossible to follow kids once they've left high school. And that's not unique to us, I think that's a problem that every evaluation programme – every evaluation that's done on school based programmes." (P. 6, South Africa and Zambia)

"Not really nothing in terms of evaluating the intervention, it was much more to ensure that people didn't drop out so low attrition can affect your statistics, but the actual evaluation wasn't a challenge." (P. 7, South Africa)

