Lived Experiences of Women with Co-existing BMI ≥ 30 and Gestational Diabetes Mellitus.

Abstract

Objective: To explore the lived experiences of women with co-existing maternal obesity (BMI ≥ 30) and Gestational Diabetes Mellitus (GDM) during pregnancy and the post-birth period (< 3 months post-birth).

Design: A qualitative, sociological design was utilised. Data were collected using a series of sequential in-depth narrative interviews during pregnancy and post-birth and fieldnotes. Cross sectional thematic analysis of the data set was undertaken, alongside the construction/analysis of in-depth biographical longitudinal case profiles of individual participants.

Setting: Participants were recruited from diabetic antenatal clinics at two NHS hospital trusts in the South West of England.

Participants: 27 women with co-existing BMI ≥ 30 and GDM. Participants were predominantly of low socio-economic status (SES).

Findings: Women were experiencing a number of social and economic stressors that compromised their ability to manage pregnancies complicated by maternal obesity and GDM, and make lifestyle changes. Women perceived themselves to be stigmatised by healthcare professionals and the general public due to their obese and gestational diabetic status.

Key Conclusions: Women of low SES with maternal obesity and GDM perceived healthcare professionals' recommendations with respect to lifestyle change as unrealistic given their constrained social/material circumstances. Frequent references to weight/lifestyle change by different HCPs were seen as stigmatising and may be counterproductive.

Implications for practice: Women would like more collaborative care which acknowledges/addresses their personal and financial circumstances. Multi-disciplinary teams should give consideration to how, by whom, and the frequency with which issues of weight/lifestyle change are being discussed in order to avoid women feeling stigmatised.

Keywords:

Obesity

Gestational Diabetes

Lifestyle

Socioeconomic status

Qualitative research

Introduction

Obesity in pregnancy (maternal obesity, BMI ≥ 30) confers a high risk of development of Gestational Diabetes Mellitus (GDM)(Cundy *et al.*, 2014; Ramsay *et al.*, 2006; Torloni *et al.*, 2009). Chu et al's (2007) meta-analysis showed an unadjusted odds ratio (OR) of 3.6 for GDM in obese women and 8.6 for severely obese (BMI ≥ 35) women. Evidence shows that prevalence of GDM is increasing in Europe (Buckley *et al.*, 2012) and internationally(Anna *et al.*, 2008; Lawrence, 2011), this is considered to be intrinsically linked to the increasing prevalence of obesity (Horrnes & Lauenborg, 2013; NICE, 2015) and to constitute a major public health issue, 'Following the obesity epidemic is a diabetes pandemic including growing numbers of women with GDM'(Simmons, 2011, p.28). The neologism 'maternal diabesity' is now sometimes used to refer to the co-existence of obesity and diabetes in pregnancy(Harder *et al.*, 2012).

Maternal obesity and GDM are independently associated with increased risk of adverse maternal and fetal/neonatal outcomes: hypertension, congenital abnormalites, macrosomia and increased instrumental interventions at birth(Simmons, 2011). Recent research indicates that obesity and diabetes have cumulative, synergistic effects on obstetric complications(Catalano *et al.*, 2012; Nolan, 2011; Roman *et al.*, 2011; Yessoufou *et al.*, 2011). Langer *et al's* (2005) large study (n = 4001) showed that obese women who developed GDM had a higher risk of adverse perinatal outcome than normal weight women with GDM. Evidence indicates that the combination of both 'obesity' and GDM has greater impact on macrosomia than either obesity or GDM alone(Sovio *et al.*, 2016; Wahabi *et al.*, 2014).

Maternal obesity and GDM are also associated with long-term maternal and child health consequences. Women with GDM have a dramatically increased risk of subsequently developing type 2 diabetes (T2DM)(Kim *et al.*, 2002; Meltzer, 2014; Nolan, 2011), particularly if they are obese(Löbner *et al.*, 2006). An obese and/or diabetic intrauterine environment is asserted to epigenetically programme the fetus to obesity and/or diabetes later in life, thus contributing to an intergenerational cycle of obesity and diabetes (Battista *et al.*, 2011; Dabelea & Crume, 2011)

Maternal obesity (CMACE, 2010; Heslehurst *et al.*, 2009; Sutherland *et al.*, 2013) and GDM (Abouzeid *et al.*, 2015; Anna *et al.*, 2008; Cullinan *et al.*, 2012) are shown to be strongly associated with low socioeconomic status (SES)/deprivation. This is likely to be the case for co-existing maternal obesity and GDM. As Sutherland *et al (2013)* note with respect to obesity in pregnancy, there is much evidence about the social distribution of maternal obesity, but social inequalities are not widely considered in the obstetric literature. Guidance vis-à-vis prevention and management of maternal obesity and GDM (CMACE/RCOG, 2010; NICE, 2010; NICE, 2015) is predominantly situated within the dominant, 'health behaviours paradigm'(Raphael *et al.*, 2003), focussing on lifestyle change, and taking little account of the social determinants of the incidence and management of obesity/diabetes. However, Furber and McGowan (2010a, p.224) assert that, '…sociological factors should be considered…when planning, and implementing, interventions that support obese women during pregnancy'.

There is now a corpus of qualitative studies, which describe women's experiences of: being obese and pregnant(for example, DeJoy *et al.*, 2016; Furber & McGowan, 2010b; Heslehurst *et al.*, 2013; Mills *et al.*, 2013; Nyman *et al.*, 2010); having GDM(for example, Bandyopadhyay *et al.*, 2011; Carolan *et al.*, 2012; Evans & O'Brien, 2005; Persson *et al.*, 2010). However, a thorough search revealed no previous qualitative studies that have explored the experiences of women managing pregnancies complicated by co-existing maternal obesity and GDM. The study this article reports on addresses this lacuna. The aim of the study was to explore the lived experiences of women with co-existing maternal obesity (BMI ≥ 30) and GDM during pregnancy and the post-birth period (< 3 months post-birth). Prolonged engagement with participants through sequential narrative interviews elicited 'thick

description' (Geertz, 1973) of women's experiences, and enabled detailed consideration of the socio-cultural/material context of their lives.

Method

Ethical approval for the study was obtained from the relevant NHS Research Ethics Committee in 2011. Research complied with the British Sociological Association (BSA) Statement of Ethical Research(BSA, 2002).

Purposive sampling (based on selection of women meeting the inclusion criteria of being pregnant and having co-existing maternal obesity and GDM) was used to recruit participants via diabetic antenatal clinics at two NHS hospital trusts in the South West of England. Healthcare professionals (HCPs) screened for women meeting the inclusion criteria and asked if they were interested in taking part in the research. Women expressing an interest were introduced to the researcher (author), given written information detailing the study and informed that the aims of the research were to consider the pregnancy/post-birth experiences of women with BMI ≥ 30 and GDM. Use of the term 'obesity' was avoided, as evidence suggested that this may be deemed offensive(Heslehurst *et al.*, 2011; Wadden & Didie, 2003). Women were informed of the choice to take part in a series of three interviews (two during pregnancy and one post-birth), but assured that they did not have to remain in the study, and were free to choose not to participate in subsequent interviews. Thirty-seven women were initially recruited, but only 27 were interviewed. A number of authors have discussed difficulties in recruiting obese pregnant women into their studies(eg Furber & McGowan, 2010b; Tierney *et al.*, 2010). Tierney et al (2010) suggest that this may be due to concerns that researchers may view their physical status/behaviours negatively.

Twenty-seven women took part in a total of 63 interviews. Thirteen women undertook a series of three interviews, 10 a series of two interviews and four women were interviewed once. Women undertaking two interviews were recruited in the third trimester of pregnancy precluding scheduling of two antenatal interviews. Due to personal/adverse life circumstances four women asked to take part in one

interview only. Fieldwork took place from 2011- 2012 and women typically remained in the study over the course of 6 – 9 months. All participants provided written informed consent before each interview. Obtaining informed consent was an ongoing process, treated as provisional and renegotiated before each interview. The average duration of interview was 90 minutes. Interviews took place in women's homes, apart from a series of interviews in the home of one participant's mother-in-law, and one post-birth telephone interview. Interviews were recorded on a digital voice recorder, with participants' permission.

The use of 'loosely structured' in-depth narrative interviews enabled women to '…tell their own story' (Nyman *et al.*, 2010, p.424) as much as possible, and allowed the emergence of issues that were important to them(Rubin & Rubin, 2005). It has been demonstrated that the trajectory of pregnancy is amenable to encapsulation as a narrative(Miller, 2000; 2005; Sevon, 2005). Serial qualitative interviews allow narratives to unfold and can reveal the complexity of individual situations(Murray *et al.*, 2009). In the first interview a loosely structured 'interview guide' was utilised (see Figure 1). The second/third interview schedules were informed by issues/themes emerging from the first wave of interviews. The third interview reflected on women's pregnancy/childbirth/post-birth experiences, and discussed present and future considerations with respect to the medical conditions.

Interview data were supplemented by detailed, reflective fieldnotes written shortly after each interview and augmented over time. Fieldnotes included written observations of: non-verbal communication; setting; appearance of surroundings; circumstantial incidents; emergent codes/themes.

The Participants (See Table 1)

Participants' ages ranged from 19 – 43, with a mean age of 30. Seventeen women were married, 8 were co-habiting. Three participants reported living alone with their children.

A multi-dimensional approach was utilised to discern participants' SES (Ribbens McCarthy *et al.*, 2003) considering: participant's occupation and educational qualifications; partner's occupation; neighbourhood (using postcode to ascertain Index of Multiple Deprivation status); current social networks; housing tenure.

Participants were predominantly of low SES with fairly low levels of educational attainment (congruent with epidemiological data). Four women had undertaken higher education and worked part-time in professional occupations. Three women/families had an income derived solely from benefits and 7 reported being in receipt of Working Tax Credits.

Data Analysis

Interviews were transcribed verbatim by the author as soon as possible after the interview. All names were pseudonymised and geographical details removed. Interview transcripts were imported into QSR NVivo 9. Coding/data analysis happened contemporaneously with data collection. There were multiple readings of each participant's interview transcripts. Analytic readings considered participants':

- Lived experiences of co-existing maternal obesity and GDM
- Socio-cultural and material circumstances

Transcripts were also read inductively to discern frequent/significant themes arising from the raw data. The dataset was analysed cross-sectionally (synchronically) and longitudinally (diachronically). Diachronic analysis involved compiling a case profile for each participant which was updated after each interview and enabled analysis of the case through time. Cross sectional analysis continued after each wave of interviews, accompanied by the building of in-depth biographical longitudinal case profiles. This enabled a thematic 'chunking' of data as well as maintenance of the integrity of individual narratives.

Findings

This article reports on two clearly discernible and interrelated themes arising from the data: 1. social and economic stressors 2. stigma. These issues were significant inasmuch as they were discussed by many of the participants in both antenatal and post-birth interviews, and they pervasively affected women's experience and management of pregnancies complicated by maternal obesity and GDM.

Social and Economic Stressors

Many women in the study were experiencing acute and/or chronic stress during pregnancy and the post-birth period. Stressful events such as redundancy,

bereavement, relationship breakdown, eviction and cessation of benefit payments induced acute stress. Day-to-day stressors included financial worries, housing insecurities, overcrowded/poor quality housing, caring for sick/elderly relatives, isolation and coping with young children with little/no support. Social and economic stressors/constraints affected women's ability to: cope during pregnancy/post-birth; make lifestyle changes; attend antenatal appointments; manage their weight.

A few women, like Sherry, were experiencing considerable material deprivation. During her pregnancy she could not secure suitable accommodation and moved into a first floor privately rented flat which was overcrowded and in a state of disrepair. Her partner was wanted by the police and had absconded, leaving her caring for four children alone. She worried about the children's health due to damp bedrooms, loose tiles on the roof and petrol stored in the garden. She described her precarious situation:

> There's a massive crack in that window and I am worried about the kids falling out of it…When the landlord came round he said, 'Are you pregnant?'… He said he thought I only had two kids. I said, 'no four kids'. He weren't happy then. But I had to do it. The only way we could get anywhere was to go privately and lie.

Shortly after giving birth to twins Sherry's family were evicted from the flat and placed in temporary bed and breakfast accommodation. She was struggling to cope in overcrowded conditions with six children, and feeling depressed.

Over half of the study participants said they found eating healthily and observing a 'diabetic diet' challenging due to financial constraints. Some women felt that dietetic advice failed to take into account their material circumstances and the limitations that placed on 'healthy eating'.

> I found it more expensive because the stuff that you've got to have like the low fat yoghurts and all that low sugar stuff are more expensive than the stuff you would buy normally. Because of being on a budget anyway it was harder. [Shaynie]

> It's all very well saying you are not supposed to be having all this stuff that you are eating, but don't make everything that is healthy expensive. Because

> …if you go and buy a week's worth of fruit and veg and it's expensive. I mean it's madness. [Andrea]

Kylie said she had discussed the additional expense of dietary changes with other women at the diabetic antenatal clinic:

> It's a bit more expensive eating healthy I think anyway. Because you can buy cheap stuff to just chuck in the freezer and add some frozen veg to go with it. But instead of having breaded chicken from Birdseye you have to go out and get chicken fillets. It's expensive. I was speaking to some people up the hospital last time I was there and there was a couple of women there who seemed a bit better off shall we say, and they were saying it's not a problem, but there were a couple of us sat there saying, 'Well actually it is for us'.

Women spoke of the financial strain of having to buy recommended foods that were not to the taste/liking of the family:

> It's so difficult to buy different kinds of food for feeding the family. Like…my little one won't eat brown bread. He says, 'Mum can I have toast with proper bread please? I want the white bread'. So instead of just one loaf I am buying two. It won't work on my budget…If I buy pasta as well they won't eat the wholemeal one, they will have white, so I am the only one eating wholemeal. Milk, I have been buying the green one and my little one wants the blue one… [Bernice]

Joanne suggested that vouchers redeemable against appropriate foods should be available for women with GDM:

> If they gave you like, 'You have got gestational diabetes, you need to eat healthier, here are some vouchers and you can only have fruit and veg with that'. That would encourage you. I know they do offer that to teenagers or people that don't have a job, but people like me who's got to feed a family, who's…well I've actually been made redundant now…I mean it's easy to just live on frozen food.

Many participants emphasised the expenditure required to attend additional antenatal appointments due to obesity/diabetes. Women/families on benefits/low

incomes struggled to meet transportation and hospital parking costs. Working women worried about employers not being favourable to time off. Some women paid for additional childcare to avoid being accompanied by young children to lengthy clinic appointments. Some women questioned the necessity for such frequent attendance at hospital diabetic antenatal clinics, and expressed a desire for more of their care to be carried out in the community/by their community midwife/over the telephone.

> I don't think I needed to go to hospital as much as I did…A trip to [hospital 20 miles away], it's not cheap. And I was having to take time off work as well. I don't think I needed to go as much as it was. To be honest with you I think you should see your midwife and check the readings [blood glucose levels (BGLs)] and if it's higher then sending you to hospital is all that's really needed. [Fiona]

Many participants felt stressed about their ability to manage their weight post-birth. It is recommended that women who are obese should be offered a postnatal structured weight-loss programme(NICE, 2010). None of the women in the study said they had been offered this. Some said they would like to join/re-join commercial weight loss programmes, but costs were prohibitive. Some, like Emese, felt despondent due to previously failing to lose weight despite concerted effort:

> I know I am overweight. I was reading about diets and I tried losing weight before the second baby come…but I couldn't really. I put on three stone with the first pregnancy. I just could not lose it after. It was hard. I want to go to Weight Watchers and stuff, but it is so expensive.

Sapphire's view that expense of undertaking exercise, and lack of child-care as a barrier to weight loss was typical:

> I have got more of a chance of getting it [T2DM] later in life, so…I can't afford the gym, they should do some sort of reduced price gym cards or something like that…there isn't any help for that…Surely it's cheaper for them to prevent it next time? They say you're high risk because your BMI's high and you've got pregnancy diabetes…The whole losing weight thing and all the rest of it. I have no childcare, if I went to the gym it's like six pound for half an hour for

> both of them [children] in the crèche…I am a single mum and I haven't got time to go and do stuff, or I can't afford to.

Stigma

Some participants were affronted when, during pregnancy, they were informed of their obese status. Participants, like Lorraine, saw obesity as a stigmatising term, ''Obese' does sound awful. It's a horrible word…It's probably the stigma that goes with the word.'

Joanne, believed her BMI had been miscalculated by her midwife and sought reassurance from friends and family that it was erroneous. She, like a number of women, distanced herself from a 'grotesque', and stigmatised, 'other':

> I just think there are people out there that are fatter than me. Like big, big people who are pregnant and waddling about…and I think, 'If I'm obese, then they have got to be dead'. [Joanne]

Women felt they were being stigmatised if high BMI was perceived to be the sole reason they were asked to take the Glucose Tolerance Test (for GDM). Some argued the test should be universal in pregnancy:

> I don't think they should immediately look at you and say well 'because you are like 3 stone overweight, you are more likely to have diabetes than somebody else…They look at you and say 'you're overweight', bang you're in. They make assumptions….I think in some ways that is a little bit of discrimination you know?...I think the test [GTT] should be standard. [Andrea]

This corroborates findings from Furness et al(2011, p.5), where a participant described feeling penalised because she had to take, 'the fat girls' test'. Judith alluded to more widespread resistance to diagnosis of GDM by women whose sole risk factor was high BMI:

> I have spoken to three people now who've had to have it [GTT] because of their BMI and they actually went to the toilet and made themselves sick. It's

> another way of almost defrauding the system so you don't have to go through with it.

A number of women reported being informed by HCPs that GDM was directly attributable to their weight. Some accepted this, others felt unjustly blamed:

> It's like, 'this [GDM] is pretty much your fault because you are overweight'. It all comes down to weight, not, 'Oh it could be just that your body doesn't sort out sugar enough'. I mean anybody could have it. [Gemma]

Women expressed concerns that people generally were judging them due to the assumption that overweight/obesity was the cause of GDM. Sarah was offended when her mother's response to her GDM diagnosis was, 'I'm not surprised you're like a tank'. Some participants cited seeing 'thin' pregnant women at diabetic antenatal clinics, thus enabling them to reject what they had been informed about obesity and diabetes causation. GDM was often attributed instead to misfortune, for instance, Melanie said, 'I know someone who is very, very slim who has it, so it's pot luck'.

Some women perceived themselves to be blamed by HCPs for having a deficient lifestyle(see also Nicklas *et al.*, 2011), 'I felt like straightaway they were saying, 'Because of the foods you are eating you have caused yourself to get gestational diabetes' [Fiona]. Participants discussed having to show HCPs their dietary records, with some saying they felt judged, and/or disbelieved(see also Stenhouse *et al.*, 2013).

Four women discussed having seen pejorative televisual representations implying that obesity/poor lifestyle were the cause of GDM. Louise was particularly concerned about how she might be perceived because of this:

> Well it come across to me that all people who have gestational diabetes are overweight…There were all these bigger women on there and it came across to me like you shouldn't be fat and having a baby because you've got the risk of diabetes…I had started telling people that I had got gestational diabetes and then I was thinkin', 'Oh my God', if they'd seen the programme then they

> would probably think I was like that…like eating crap and …then they'd sort of put me in the same sort of category as the people on that.

Sherry described feeling stigmatised by members of her family. She said that they had criticised her lifestyle, parenting practices and called her a 'Chav':

> My sisters was always criticising what we were eating and what we were giving the kids to eat….They had seen stuff on telly about women having big babies because they were eating junk. She said the children should have healthy stuff all the time…They were saying to me that I shouldn't be having a fry up after I go to Iceland. Saying I'm not meant to have it, it's not good for me and all that lot because I've got the diabetes thing....

Claire felt judged generally, but particularly by other pregnant women, for having GDM, and she had felt the need to defend herself:

> Some people, if you've got gestational diabetes, do look at you and go, 'You've got gestational diabetes?' And I go, 'Yeah, it's managed by diet though', because…they think it's something really bad and you are such a bad person for having it…Some people can be quite judgemental if you've got it…I was at my antenatal group and this woman, well when I said it you kind've get looks…They must think you are unhealthy and you are causing problems to your baby.

All women were aware of their risk of having a big baby. Many participants were anxious that having a big baby was potentially stigmatising, and a site of maternal blame (see also, Author, 2016)

> It worried me that I'd have a big baby and that it was my fault…I suppose it's a bit like stigma isn't it? If you've got a big baby it's not seen as a good thing is it?' [Fiona]

Women were perturbed that they might be judged as irresponsible, deficient mothers if their baby was too large. Three women reported receiving disparaging comments from friends/family/work colleagues imputing responsibility for a big baby(see also Furber & McGowan, 2010a). Andrea was shocked to be told by a work colleague,

‘You could have a 15 pounder!’ Participants such as Sapphire, defended against perceived judgement by asserting they had eaten responsibly during pregnancy:

> I do think you get judged [for having a big baby]…Like I have a really healthy diet. I have you know…I am worried that people just think I’m sat here eating cake and chips and crap all through my pregnancy.

Cherry, who perceived herself to be reprimanded by HCPs for not adhering to lifestyle changes/diabetic regimen, reported being informed that she was, ‘going to have a really, really big baby’, and said that additionally she had been told:

> …she would be an obese kid, “obese child that’s gonna have diabetes”…you think, “Really love or are you just trying to scare me?”…I think she was in a bad mood that day anyway. I think she was just trying to scare me into managing my diabetes…and because of my age [19] as well. They are trying to scare you…because they are saying about all these blimmin’ morbidly obese adults now….The midwives that told me about the diabetes said that. I think they believe anything they read as well. Like they are saying like all these scientific experiments show this and all that lot, but I don’t think some of it’s true…

Cherry and Fiona disclosed that, what were perceived as stigmatising encounters with HCPs, had induced bouts of comfort eating(see also, Nyman *et al.*, 2010). Fiona had asked her midwife to record in her notes a plea for HCPs to desist from making further weight-related comments because it was, ‘ruining her pregnancy’:

> It wasn’t just the dietician, the consultant for my blood pressure, and any scans and things like that. Basically anything I went to they commented about my weight, or said, ‘You know these issues are going to be because of your weight’…If I get upset I comfort eat, and the thing is when you get upset at appointments because they say about BMI, you go and comfort eat.

Other participants said that they were unhappy with the frequency of: comments from different HCPs/documentation in their notes vis-à-vis BMI/weight/obesity. Ultrasound scans were experienced as distressing when women were informed their high BMI might compromise visualisation of the fetus(see also Furber &

McGowan, 2010b). Gemma commented:

> I mean it did upset me when they were like, ‘Oh yeah it’s because you’re overweight’ and ‘You’re rather large’ and ‘We actually can’t see properly because you are obese’…I didn’t want [partner] to come in because of that. I knew they were going to bring it up because it gets brought up every single week.

Gemma also discussed non-attendance of some hospital clinic appointments due to anticipation of further stigmatising experiences.

Conversely, some women discussed having good relationships with community midwives with whom they felt comfortable discussing weight/lifestyle issues. ‘Affirming encounters’ (Nyman *et al.*, 2010) were cited where midwives had praised them for making lifestyle changes. In some cases midwives appeared to act as ‘buffers’, preparing women in advance in case weight was discussed by other HCPs, or providing support if they perceived themselves to be stigmatised.

Discussion

Participants discussed numerous social and economic stressors that compromised their ability to manage pregnancies complicated by maternal obesity and GDM. Byrd-Craven and Massey (2013) assert that pregnant women of low SES are likely to have more daily and cumulative stressors compared to those of higher SES. Requisite lifestyle change and frequent antenatal clinic attendance were often seen as onerous, and as exacerbating already stressful life circumstances. When women perceived HCPs’ recommendations with respect to management of pregnancies and lifestyle change to be unrealistic/impracticable given their social and material circumstances, this appeared to have adversely affected their relationships with care providers, and compounded feelings of stigmatisation. Draffin *et al’s* (2016, p.145) recent study of women with GDM highlighted that, ‘careful consideration of a women’s background and needs is vital to avoid them feeling patronised or alienated’.

Financial constraints were discussed as affecting women’s ability to purchase healthy food and adhere to recommended dietary regimen. A recent study of service-users’ views of a maternal obesity intervention (Khazaezadeh *et al.*, 2011) indicated

that women felt financial constraints/food prices were a barrier to weight management(see also Chang *et al.*, 2008). The financial burden of a healthy/diabetic diet has been documented in studies of women with GDM in the USA(Rhoads-Baeza & Reis, 2012), Canada(Evans & O'Brien, 2005), Sweden (Hjelm *et al.*, 2008; Persson *et al.*, 2010) and Australia(Carolan *et al.*, 2012), but has not been previously discussed in the UK context. Some women in this study were experiencing 'low food security': 'not having the means to buy the foods desired'(Martin & Lippert, 2012, p.1755). Food insecure mothers are shown to be at greater risk of obesity and weight gain(Martin & Lippert, 2012). The UK has seen large declines in household income and contemporaneous large increases in the price of food(Griffith *et al.*, 2012), and The Family Food Survey (ONS, 2011) indicates that poorer families struggle to afford the recommended consumption of fruit and vegetables(Schmuecker, 2012).

Women on low incomes found it difficult to meet travel and parking costs of supernumerary antenatal appointments necessitated by diagnoses of maternal obesity and GDM. Frequent trips to diabetic antenatal clinics at hospitals were seen as expensive, onerous and stressful. Women accepted the necessity for additional ultrasound scans, but wanted the checking of BGLs and ongoing dietary/lifestyle advice to be provided in a community setting/by their community midwife/over the telephone. Mackillop et al (2014, p.1006) acknowledge that in the case of GDM there is, 'a significant burden to the patient of having to attend many antenatal clinics and to the healthcare system in providing the service'. To facilitate convenience and potential cost saving to women and healthcare providers, 48 women were provided with smartphones incorporating a GDM management system software application, enabling monitoring and feedback on blood glucose, and the provision of dietary and lifestyle information(Mackillop *et al.*, 2014). When evaluated, the system was considered to be user-friendly and had high levels of usage and compliance.

Some women had low self-efficacy with respect to weight management/exercise: financial constraints and lack of childcare were frequently cited as barriers. Shrewsbury et al (2009) have shown that socio-economic status can mediate weight loss self-efficacy postpartum. A metasynthesis of 16 qualitative studies pertaining to women's experiences of GDM identified financial constraints and limited childcare to be key barriers to a healthy lifestyle post-pregnancy (Parsons *et al.*, 2014) .

A pervasive feature of women in this study's pregnancies was a sense of stigmatisation due to obesity and GDM. Women perceived stigmatisation by family members, work colleagues, acquaintances, the general public and HCPs. Some women seemed to be experiencing the layering of stigma (Lekas *et al.*, 2011) due to low socio-economic position/material deprivation, and their obese and gestational diabetic status. Recent empirical studies have highlighted how women with obesity in pregnancy perceive themselves to be stigmatised due to their weight (DeJoy *et al.*, 2016; Furber & McGowan, 2010b; Furness *et al.*, 2011; Mulherin *et al.*, 2013; Nyman *et al.*, 2010). US (Nicklas *et al.*, 2011) and Canadian (Wazqar & Evans, 2012) studies have shown that that women were concerned about being judged due to GDM , and recent research in the UK by Draffin *et al* (2016, p.145) suggests women with GDM, 'feared becoming a social stigma'.

Women recounted various experiences where they felt judged/discredited due to their obese and gestational diabetic status. Narratives indicated participants grappled with a sense of shame vis-à-vis their weight/lifestyle and how this might be implicated in the development of GDM, and a fear/anticipation of being stigmatised because of this. Women perceived themselves to be stigmatised due to the high frequency of references to weight and necessity for lifestyle change made by a variety of different HCPs throughout their pregnancies. The relatively high frequency of clinic appointments/ interactions with different HCPs/ultrasound scans induced by diagnoses of maternal obesity and GDM are likely to increase the instances where these issues may be broached/discussed. Increased medicalisation of pregnancies appeared to contribute to women with these conditions being particularly susceptible to perceived stigmatisation by HCPs. However, some women discussed the relationships with midwives whom they had rapport with as enabling them to instigate, and be receptive to, discussions regarding weight/lifestyle. Dencker *et al's* (2016) research of the experiences of women with high BMI regarding an intervention to minimise gestational weight gain, showed that women wanted support on their own terms, in a personal relationship with their midwife. Continuity of care facilitated communication regarding weight and lifestyle change.

Limitations

This was a qualitative study of 27 women utilising purposive sampling and so findings may not be representative of the wider population of women with co-existing maternal obesity and GDM. However, given strong epidemiological evidence showing that maternal obesity and GDM are independently associated with lower socio-economic status, it is plausible to suggest that other women of low SES with these conditions in the UK may share similar experiences regarding social and economic stressors.

Conclusion and Recommendations

Clinical guidance and literature pertaining to maternal obesity/GDM focuses predominantly on lifestyle and behaviour change, with limited emphasis on women's social and material circumstances and the constraints this may pose. Some women in this study felt recommendations regarding healthy lifestyle 'choices' and behaviour change were out of step with what was experienced as real possibilities in their lives. They discussed wanting less directive, and more collaborative care during pregnancy/the post-birth period, which acknowledged and addressed their personal and financial circumstances. This study corroborates Draffin *et al's* (2016) findings, indicating the need for women with GDM to be given more individualised and culturally appropriate advice, particularly with regards to diet. The introduction of vouchers for non-diabetogenic food/commercial weight loss programmes/exercise classes for women with high BMI and GDM/previous GDM would likely be well-received, and could be effective in facilitating lifestyle change.

Women were concerned about being stigmatised and discredited due to their obese and gestationally diabetic status. This pervasively affected their pregnancies and caused additional stress. The frequency with which issues of weight/necessity for lifestyle change was discussed by different HCPs was perceived as stigmatising, and appeared to be counterproductive inasmuch as it compromised their relationships with care providers and, in some cases, resulted in 'comfort eating'. Evidence suggests that women with these conditions are likely to be more receptive to, and less likely to feel stigmatised by, discussions of issues of weight/lifestyle change in the context of an ongoing and trusting relationship with a known midwife. Women wanted more of their care to be carried out in community settings, due to difficulties attending frequent outpatient appointments, and perceived effective relationships

with community midwives. Care for these women could potentially be improved by organisation of some diabetes specialist team outreach sessions in the community, and/or the training of additional diabetes specialist midwives. The use of a smartphone GDM management system (Mackillop *et al.*, 2014), has potential to reduce expenditure for women and thus improve satisfaction with care. Policy makers/HCPs/multi-disciplinary teams may wish to appraise the frequency, ways in which, and by whom issues of weight/lifestyle are being discussed with women experiencing pregnancies complicated by co-existing maternal obesity and GDM, as this could potentially reduce the chances of women feeling stigmatised, becoming disengaged, improve their relationships with the health system and improve outcomes.

First interview – loosely structured interview guide
Demographic information (eg ethnicity/information in order to ascertain SES)
Life trajectories/routes into, and experiences of, pregnancy and motherhood
Pre-conception 'planning'/care
Experience/diagnosis of 'maternal obesity' (discussed as BMI ≥ 30)/GDM
Perceptions of GDM causation eg 'Why do you think you might have got diabetes?'
Views/experiences of lifestyle/lifestyle changes/diabetic regimen – short/long term
Perceptions of social support
Perceptions of care receiving/received and relationships with HCPs
Perceptions of popular media representations of 'maternal obesity'/GDM eg 'Have you seen anything relevant in the media, for example on television or in newspapers?'
Thoughts about labour/anaesthesia/birth?
Infant feeding intentions
Perceptions of long term health/prognosis eg 'Do you know if there are any long term effects of diabetes in pregnancy?'

Figure 1: Loosely Structured Interview Guide

Pseudonym	Age	Country of birth	Number of children	Employment
Louise	28	UK	0	Hairdresser
Aysel	30	Turkey	2	Part-time (PT) retail
Shaynie	26	UK	1	Full time (FT) mother
Jacqui	36	USA	2	Business
Cherry	19	UK	0	None
Sherry	30	UK	4	FT mother
Sarah	30	UK	2	FT mother
Andrea	36	UK	1	PT administrator
Judith	32	UK	1	PT supervisor/manager
Nat	27	UK	2	FT mother
Ruby	32	Central Cameroon	1	PT care assistant
Tracey	34	UK	1	PT administrator
Kylie	31	UK	2	FT mother
Joanne	30	UK	1	PT call centre – recent redundancy
Caroline	21	UK	1	FT mother
Melanie	32	UK	1	P/T care co-ordinator
Claire	30	UK	0	Customer services – recent redundancy
Emese	27	Hungary	1	P/T Cleaner
Lucy	32	UK	1	P/T Administrator
Tina	39	UK	3	F/T mother
Gemma	23	UK	0	Care assistant
Sapphire	23	UK	1	F/T mother

Susie	30	UK	1	P/T administrator
Lorraine	35	UK	1	P/T administrator
Danielle	30	UK	1	P/T café manager
Bernice	43	UK	1	Nurse
Fiona	27	UK	0	Factory engineering planner

Table 1: Participant Data on entry to study

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