The longitudinal relationship between child emotional disorder and parental mental health in the British Child and Adolescent Mental Health surveys 1999 and 2004

Abbreviated title: Child emotional disorder and parental mental health

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Abstract

Background: Research suggests parental psychopathology has an adverse effect on child mental health. However, due to the interactional nature of parent-child relationships and with a high rate of emotional disorders reported in school-age children, it is important to know whether the effect is reciprocal.

Methods: We explored the longitudinal relationship between child and parent mental health in the British Child and Adolescent Mental Health Surveys (N=7,100 child-parent dyads) and their three-year follow-ups. The Development and Well-Being Assessment with DSM-IV diagnostic criteria was used to measure child psychiatric diagnoses, while parental mental health was assessed using the General Health Questionnaire. Multivariable logistic regression was used to explore the longitudinal association between child emotional disorder and parent mental health.

Results: Parents of children who had an emotional disorder at baseline were more likely to have poor mental health three years later compared with parents whose children had no psychiatric diagnosis (33.3% versus 16.7%; crude odds ratio=2.52; adjusted odds ratio=2.19, 95% CI=1.58 to 3.05, p<0.001). Children of parents with poor mental health at baseline were more likely to develop an emotional disorder three years later compared with children whose parents had good mental health (5.2% versus 2.5%; crude odds ratio=2.08; adjusted odds ratio=1.63, 95% CI=1.18 to 2.25, p=0.003).

Limitations: The findings of this research are limited by the survey data collected, the measures used and survey dropout.

Conclusions: We detected a bi-directional relationship between child and parent mental health, suggesting that effective intervention for one individual may benefit other family members.

Keywords: Emotional disorder, depression, anxiety, mental health

Highlights

- Child emotional disorder is associated with later parental poor mental health.
- Parental poor mental health is associated with later child emotional disorder.
- Relationship mediators need investigation for potential risk/protective factors.
- Professionals need to consider the wider family impact of emotional disorders.
- Services should consider how to work together to support individuals and families.

Introduction

Parental psychopathology has demonstrated adverse effects on children's mental health (Goodman et al., 2011; Wickramaratne et al., 2011); predicting the incidence, severity and persistence of emotional disorders amongst young people (Costello and Maughan, 2015). Furthermore, treatment of parent psychopathology is associated with improvements in symptoms and function amongst their children (Cuijpers et al., 2015; Garber et al., 2011; Gunlicks and Weissman, 2008; Stein et al., 2018). However, recent research has emphasized that, given the interactional nature of the parent-child relationship, the direction of effect may be reciprocal (e.g. Bagner et al., 2013). Studies have also suggested that child and adolescent mental health is prospectively related to parental mental health (e.g. Hughes and Gullone, 2010; Kouros and Garber, 2010; Nicholson et al., 2011; Raposa et al., 2011).

Although an interactional model of parent and child mental health recognises that each member of the dyad has reciprocal effects on the other (Baker et al., 2020; Perloe et al., 2014) most research to date has focussed on the impact of parental mental health on children. Studies have shown that both maternal and paternal depression and anxiety is related longitudinally to child internalising and externalising problems (Brown et al., 2015; Gross et al., 2008; Hughes and Gullone, 2010) as well as adolescent psychopathology, including depression, anxiety disorders and substance dependence (Allen et al., 2010; Betts et al., 2014). Furthermore, these relationships are modified by the gender of the parent; the effects of parental mental health on the child appear greater when the mother, versus the father, suffers from mental health problems (Hughes and Gullone, 2010) . Some studies have also found the impact of parental mental health problems are greater on girls versus boys (Guo and Slesnick, 2011), although others have found the opposite (e.g. O'Connor et al., 2003). In addition, there is evidence to suggest stronger associations with maternal psychopathology for younger children than for adolescents, and conversely greater associations between paternal psychopathology and difficulties in adolescence (Connell and Goodman, 2002).

With respect to the impact of child health on parents, studies have largely focused on the effect of child behavioural problems on parental mental health (e.g. Civic and Holt, 2000; Hails et al., 2018); the evidence for the deleterious effects of children's emotional problems on parental mental health is less clear. Some studies suggest that maternal and adolescent depressive symptoms are coupled prospectively in the short- and long-term (Hughes and Gullone, 2010; Kouros and Garber, 2010; Nicholson et al., 2011; Perloe et al., 2014; Raposa et al., 2011). In contrast, Nicholson and colleagues (2011) reported that increases or decreases in mothers' depressive symptoms were reflected by

parallel changes in their children's symptoms, but the reciprocal effect of the child's symptoms on maternal depression was not as robust. Furthermore, Brown et al. (2015) found that maternal depression prospectively predicted adolescent depression one and two years later, but did not detect a reciprocal relationship between earlier child and later maternal depression.

Most studies demonstrating a significant relationship between offspring and parental poor mental health were conducted with high risk (e.g. low socioeconomic status), adolescent populations (e.g., Kouros and Garber, 2010; Perloe et al., 2014). Few studies have investigated whether the age of the child made a difference to whether the offspring's mental health problems affected parental mental health. For example, parents of young children may attribute their child's difficulties to early, changeable causes (i.e., "they'll grow out of it"), instead of enduring causes. There is a lack of research involving population-based samples when investigating whether the age of the child affects the parent's prospective risk for developing mental health problems. It is also possible that child gender may moderate relationships between child mental health problem and parental mental health. For example, Sellers et al. (2016) reported that a daughter's, but not a son's, depression predicted maternal depressive symptoms over time. However, the research evidence is mixed, and the potential effect of child gender on the likelihood of child mental health problems impacting on parental mental health remains unclear. The present study analyses data from parent-child dyads from a large probability-based population sample of children who elected to be representative of the general population. Further, we included all who screened negative for mental health problems at baseline, providing a representative sample in which the effects of child age and gender can be investigated. The inclusion of a diagnostic child mental health disorder measure in the present study further strengthens the robustness of the findings compared with much of the previous literature in this field.

Likewise, previous studies have investigated the impact of child mental health on parents who already have mental health problems, in terms of the rates and severity of later mental health problems. Parents who have existing mental health problems may perceive their child's problems differently to parents who do not have pre-existing mental health problems. For example, depressed mothers are more likely to generate stress in their relationships with their children than non-depressed mothers, putting them at greater risk of ongoing, chronic depression (Hammen et al., 2004). Depressed parents are also more likely to attribute children's behaviours to permanent, trait-like causes (Johnston et al., 2018; Johnston and Freeman, 1997), an attributional style that when coupled with stressful life events, such as poor child mental health, is

associated with a prospective risk for depression (Alloy et al., 2006, 1988). It is therefore important to examine how child mental health problems impact on parents who are not currently suffering from mental health problems themselves.

In contrast, the present study includes a broad population-based sample and as such includes parents without mental health problems at baseline, which is important because parents without mental health difficulties will ostensibly not struggle with the same levels of cognitive and behavioural risk factors as much as parents who are suffering from mental health problems (Campelo et al., 2014; Civic and Holt, 2000; Gerkensmeyer et al., 2008).

Key factors may mediate the relationship between poor parent mental health and the psychological health of their children, including aspects of family functioning such as conflict, adaptability, cohesion and organisation (e.g. Cummings et al., 2005; Wiegand-Grefe et al., 2019). Parenting stress has also been associated with child emotional problems in both general population studies (Rodriguez, 2011; Stone et al., 2016; Vaughan et al., 2013) and clinical samples (Perez Algorta et al., 2018; Sellers et al., 2016), and may mediate the relationship between child and parental poor mental health. For example, poor child mental health may influence parental mental health via increased parental burden and stress, and the strain it may place on the child-parent relationship (Branje et al., 2010; Combs-Ronto et al., 2009; Gross et al., 2008; Hale et al., 2011). There may also be a number of factors that moderate the relationship between child and parental mental health. For example, low socioeconomic status is strongly associated with depression in adults and children (Amone-P'Olak et al., 2009; Joinson et al., 2017; McConnell et al., 2011). Results from international prevalence studies of children aged 4-17 years report that belonging to a single parent family was an important predictor for children's emotional disorder (Ahmad et al., 2015; Kovess-Masfety et al., 2016; Wang et al., 2016) as well as belonging to families where at least one carer was not in employment (Canals et al., 2019; Lawrence et al., 2016). Furthermore, parents whose children have poor physical health have reported poorer mental health (Gallagher and Whiteley, 2013; Miodrag et al., 2015). The present study investigates these factors and their potential moderating effects on the reciprocal relationship between child and parental poor mental health.

We investigated the longitudinal bi-directional association of child emotional disorder (depression and anxiety) with parental mental health in a population-based probability sample of children from England aged 5-16 years. The data used were from two separate British Child and Adolescent Mental Health Surveys (BCAMHS), conducted in 1999 and 2004 (Ford et al., 2020), and their respective

three-year follow-ups. We hypothesised that we would find an association in both directions; from child to parent and parent to child. Specifically:

(1) for parents with no mental health problem at baseline, having a child with an emotional disorder predicts the presence of a common mental health disorder three years later (Objective 1);

(2) for children with no mental health condition at baseline, having a parent with poor mental health predicts the presence of an emotional disorder three years later (Objective 2); and

(3) onset of a mental health problem between baseline and three years later in one member of the child-parent dyad is associated with onset of a mental health problem in the other (Objective 3).

The study also aimed to investigate the moderating effect of child and family characteristics on these relationships, including child age, child gender, socio-economic status (measured using average household income) and survey cohort. We also explored any mediating effect of measures of family functioning and parent-reported burden.

Methods

Ethical approval for analysis of this dataset was granted by the University of Exeter College of Medicine and Health Ethics Committee (reference: CA279).

Participants

The 1999 and 2004 British Child and Adolescent Mental Health Surveys (BCAMHS) assessed the mental health of two separate cohorts of school-aged children (5-15 and 5-16 years, respectively). They were conducted by the same team and using the same methods (Ford et al., 2020). The Child Benefit register, which at the time of data collection was a universal financial benefit available to all parents with almost complete take-up, was used to develop a sampling frame of children within postal sectors from England, Wales and Scotland. Ten percent (901/9,000) of postal sectors were sampled with a probability related to size of sector, and stratified by regional health authority and socio-economic group. This sampling frame represented 90% of all British children aged 5-16 years (Ford et al., 2020), while postal sectors with fewer than 100 children were excluded. Of these, 7% of parents opted their child out before their details were passed to the researchers, while 6% were ineligible or uncontactable. Therefore, from an initial sample of 26,544 children across the two surveys, 23,025 (87%) were approached. 4,610 children (20%) were not contactable or opted out, leaving an achieved final sample across the two surveys of 18,415 (80% of those approached, 69% of those initially selected). Altogether, 7,912 were followed up across both cohorts.

All children meeting diagnostic criteria for psychiatric disorder in the 1999 BCAMHS (n=911) and a random sample of those who did not (n=2,334) were invited to the 3-year follow-up survey in 2002 (n=3,245). After exclusion of 9% (n=307) who were untraceable, deceased, or were under the care of the local authority (n=2,938), the response rate was 88% (2,587) of those approached (Meltzer et al., 2003). The 2007 follow-up to the 2004 BCAMHS included as many of the children who participated in the baseline survey as possible (total invited=7,329; 90%) (Ford et al., 2020); 23% (n=1,660) were lost to follow up or refused, while 5% (n=343) children were ineligible as above; the final sample of 5,326 children represented approximately 73% of those approached (see Figure 1).

Insert Figure 1 here.

The analyses in this paper are based on 7,100 (out of 7,913) parent-child dyads from across the 1999 and 2004 BCAMHS cohorts who provided data for all included variables. Figure 1 illustrates how the final sample was obtained for each objective Where children had a comorbid diagnosis including an emotional disorder and another psychiatric disorder (conduct, autism spectrum, tic, eating disorders or Attention Deficit Hyperactivity Disorder), they were included in the analysis (n=47). However, children with a psychiatric diagnosis without emotional disorder were excluded (n=294). The comparison group of children thus comprised children with no psychiatric disorder (emotional and otherwise). Sample sizes vary by research question for specific analyses as indicated in the results.

Measures

The Development and Well-Being Assessment (DAWBA) (Goodman et al., 2000), a multi-informant standardised diagnostic assessment for childhood psychiatric disorder, was completed for every child at baseline and follow-up. It combines structured and semi-structured questions administered via interview (parents and children aged 11 plus) or questionnaire (teachers). Respondents complete detailed interview sections covering a wide range of specific diagnoses. The questions are closely related to the DSM-IV (American Psychiatric Association, 2000) and ICD-10 (World Health Organization, 1993) diagnostic criteria and focused on current rather than life-time problems; the specific time frame of the questions relates to the diagnostic criteria (for example, two weeks for depressive disorder). Information from the different informants (parents, children, and teachers) is drawn together by a computer program that predicts the likely diagnosis or diagnoses, generating six probability bands, ranging from a probability of less than 0.1% of having the relevant diagnosis to a probability of over 70% of having the relevant diagnosis. Experienced clinical raters then review

responses and decide whether to accept or overturn the diagnoses in the light of all the data. In this study, responses were reviewed by a team of experienced child psychiatrists, who assigned diagnoses according to DSM-IV criteria. In the 1999 BCAMHS, the Kappa statistic for chance-corrected agreement between two clinical raters who independently rated 500 children was 0.86 (standard error (SE) 0.04) for any disorder, 0.57 (SE 0.11) for internalizing disorders, and 0.98 (SE 0.02) for externalizing disorders (Ford et al., 2003). The DAWBA was used to identify the presence/absence of emotional disorder (anxiety and depressive disorders) as per the measure's assessment guidelines.

Parents also completed the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001) at baseline and follow-up to provide a dimensional measure of child psychopathology. The questionnaire comprises 25-items on psychological attributes (with response options 'not true', 'somewhat true', 'certainly true'), and has good internal consistency for the UK population (Cronbach's alpha of 0.73; (Goodman, 2001)). The Impact Supplement asks all parents if they considered that their child had a mental health problem; those who answer negatively are asked no further questions and all their subsequent responses assumed to be zero. Those proceeding further were asked whether their child's problems "put a burden on you or the family as a whole", with response options: 'not at all', 'only a little', 'quite a lot' and 'a great deal'. Those who previously answered that their child did not have a mental health problem were pro-rated a burden score of 0, or 'not at all'.. The rating correlated well (r=0.74) with a standardised interview rating of the impact of children's difficulties – the Child and Adolescent Impact Assessment (Goodman, 1999). Parent responses to this question were included in the analyses to determine level of burden.

The 12-item General Health Questionnaire (GHQ-12) was used at baseline and follow-up to assess parent mental health. The scale asks whether the respondent has experienced a particular symptom or behaviour recently, and has four response options that vary by item ('better/healthier than normal', 'same as usual', 'worse/more than usual', and 'much worse/more than usual'). Higher scores on the GHQ-12 (possible range 0 to 12) indicate greater distress, and a cut-off point of 3 or more was applied to denote probable common mental disorder (Goldberg et al., 1997).

In our analyses, 'no mental health problem' at baseline referred to individuals (parents and children) who reported no current mental health problem; within this group there will have been individuals who had never had a mental health problem and those who had a past history of a mental health problem.

Parents also provided demographic details, and family functioning was assessed using the McMaster Family Assessment Device (Miller et al., 1985). Parents also rated their child's general health on a five-point scale, analysed here as *good* (very good and good) versus *bad* (average, bad and very bad), plus whether their child had experienced any of the following stressful life events within their lifetime: parental separation, major financial crisis, parental criminal court appearance, parental mental or physical health problem, death of a sibling or friend, hospital admission, involvement in a serious accident, ending of a key friendship (Goodyer et al., 1990). The number of life events experienced was analysed as three or more versus two or less.

Statistical analysis

Characteristics of the sample were summarised using means and standard deviations for continuous variables and numbers and percentages for categorical variables. For parents with good mental health at baseline (GHQ-12 score<3), we used logistic regression to examine the association between child emotional disorder status at baseline and parent common mental health disorder at follow-up, adjusted for: survey cohort; mother's age at child's birth; mother's education level; household income; rented/owned accommodation; whether at least one parent worked; parent baseline GHQ-12 score; child age, gender and physical health. A further adjusted analysis included baseline family functioning and parent-reported burden as additional predictors, but this was only a sensitivity analysis as there is uncertainty about whether these factors mediate the association of interest.

Similarly, we used logistic regression to examine the association between parent common mental disorder at baseline and child emotional disorder at follow-up among children with no disorder at baseline, adjusted for the same confounders as measured at baseline.

Tests of interaction were used to examine the following factors as potential moderators of the associations between child emotional disorder status at baseline the presence of parent common mental health disorder at follow-up, and between parent common mental health disorder status at baseline and the presence of child emotional disorder at follow-up: child age (5-10 years versus 11-16 years), gender (male versus female), family household income groups (less than £200 versus £200 or more gross income per week) and survey cohort (BCAMHS 1999 versus BCAMHS 2004).
All analyses were conducted using STATA 15.

Results

The characteristics of the 7,100 parent-child dyads we analysed were similar to those of the remaining 11,315 dyads with respect to: child gender (48.5% versus 49.9% female), child age (mean (SD): 10.1 (3.3) versus 10.2 (3.3)) and poor parent mental health status at baseline (23.4% versus 24.5%). The dyads we analysed had a larger proportion of children of white ethnicity (92.5% versus 87.4%), were less likely to live in rented accommodation (23.7% versus 35.3%) and had a slightly greater proportion of children with emotional disorders at baseline (5.3% versus 3.2%).

Table 1 summarises the distribution of baseline characteristics for each analysis conducted.

Insert Table 1 here

Approximately three quarters of parents (72.5% (5,147/7,100)) reported good mental health at baseline; 483 (8.9%) of these had a child with a psychiatric disorder (including depression, anxiety, conduct disorder, autism spectrum disorder, tics, eating disorders or Attention Deficit Hyperactivity Disorder). Of those children with a psychiatric diagnosis, 189 (3.5%) had an emotional disorder (depression and/or anxiety). Similarly, most children had no psychiatric disorder at baseline (87.9%; 6,238/7,100); 1,280 (20.5%) of these had a parent with probable common mental health disorder at baseline, while the remaining 4,958 (79.5%) had parents in good mental health. There were 379 (5.3%) child/parent dyads where the child had a diagnosed psychiatric disorder and the parent had poor mental health at baseline.

The demographic information suggests that families where parents had a child with an emotional disorder at baseline were more likely to face multiple social stressors, including lower income, having no parent in active employment, a mother with no qualifications, and unhealthy family functioning. Children with emotional disorders at baseline were also more likely to be female, in poor general health and have experienced more than three significant live events.

Association between child emotional disorder and parent mental health three years later
These analyses are based on the 5,147 dyads where parents reported good mental health at baseline with complete data on all the required variables; their characteristics are summarised in Table 2.

Insert Table 2 here

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We compared presence of parent poor mental health at follow-up between 189 dyads for which the child had an emotional disorder at baseline and 4,958 dyads for which the child was free of any psychiatric disorder at this time. Almost double the proportion of parents whose child had an emotional disorder at baseline reported probable common mental health disorder at follow-up (33.3% versus 16.7%; crude odds ratio (OR)=2.52, 95% CI=1.83 to 3.46, p<0.001). This association remained after adjusting for potential confounders (adjusted OR=2.19, 95% CI=1.58 to 3.05, p<0.001), did not differ between the two survey cohorts and remained after excluding 32 children with comorbid disorders from the child emotional disorder group (OR=2.34, 95% CI=1.64 to 3.35, p<0.001). The relationship also remained after further adjustment for family functioning and parent-reported burden in the model (OR=1.64, 95% CI=1.16 to 2.32, p=0.006).

Tests of interaction demonstrated that the relationship between child emotional disorder status at baseline and presence of parent common mental health disorder at follow-up was not significantly moderated by age (interaction test p=0.07), gender (interaction test p=0.28) or family household income (interaction test p=0.61). Table 3 reports the unadjusted odds ratios for the association between the confounders and the presence of poor parent mental health at follow-up. It highlights a number of significant associations between the confounders and the onset of parental common mental health disorder at the three-year follow-up (such as household income, employment status, family functioning, and child's significant life events).

Insert Table 3 here

Association between poor parent mental health and child emotional disorder three years later
These analyses were based on 6,238 dyads where the children were free of any psychiatric disorder at baseline with complete data on all the required variables (described in Table 4). Again, the demographics illustrate a difference between those parents with and without probable common mental health disorder at baseline. For example, parents who had poor mental health were more likely to have low household income, live in rented accommodation, be unemployed, have unhealthy family functioning and be parenting alone. They were also more likely to have a child in general poor health.

Insert Table 4 here

We compared the presence of child emotional disorder at follow-up between 1,280 dyads for which the parent had poor mental health at baseline and 4,958 dyads for which the parent did not have poor mental health at baseline. The percentage of children with presence of emotional disorder at follow-up was twice as great for those whose parent had a probable common mental health disorder at baseline compared to those with parents of normal mental health (5.2% versus 2.5%; crude OR=2.08, 95% CI=1.54 to 2.82, p<0.001). The association reduced after adjusting for potential confounders but remained statistically significant (adjusted OR=1.63, 95% CI=1.18 to 2.25, p=0.003). The relationship did not differ between the two survey cohorts and remained after family functioning and parent reported burden were included in the adjusted analyses (OR=1.55, 95% CI=1.11 to 2.15, p=0.01).

The relationship between parent common mental health disorder at baseline and presence of child emotional disorder at follow-up was not significantly moderated by age (interaction test p=0.87), gender (interaction test p=0.87) or household income level (interaction test p=0.07). Table 5 reports the unadjusted odds ratios for the association between the confounders and the presence of child emotional disorder at follow-up. It highlights a number of significant associations between the confounders and the onset of child emotional disorder at the three-year follow-up (such as child age, gender, general health and experience of significant life events, as well as parent employment status).

Insert Table 5 here

Tables 3 and 5 indicate that socioeconomic deprivation strongly predicted clinically impairing emotional distress in both parents and children, as did the extent to which the parent reported burden, significant life events and older age of the child. In contrast, unhealthy family functioning only predicted the onset of parental common mental disorder at follow up (Table 3), while female gender, poorer general child health and living in a blended family were related to the onset of childhood emotional disorder (Table 5).

Association between the onset of child emotional disorder and onset of parent poor mental health
We examined the association between the onset of child emotional disorders and the onset of parent poor mental health between baseline and follow-up for 4,958 dyads where the children were free of any psychiatric disorder at baseline *and* their parents reported good mental health at baseline. Presence of poor parent mental health at follow up was greater when the child developed

an emotional disorder during this time than when they did not (39.7% versus 16.1%; crude OR=3.42, 95% CI=2.38 to 4.93, p<0.001). The association remained after adjusting for potential confounders, including family functioning and parent-reported burden (adjusted OR=3.19, 95% CI=2.19 to 4.65, p<0.001).

Discussion

In a large, community-based sample of parent-child dyads, we detected a bi-directional relationship between child emotional disorder and parent mental health, which persisted after adjusting for a number of potential confounding variables shown in previous research to contribute to the development of mental health problems in both children and adults. Our findings suggest that emotional disorders cluster within families, although for most included dyads, neither parent nor children had an emotional disorder at baseline or follow up. Parents who had good mental health at baseline were more likely to have poor mental health three years later if their child had a diagnosis of emotional disorder at baseline. Similarly, children without a mental health problem at baseline had higher rates of later emotional disorders if their parent had a mental health problem at baseline. Furthermore, the onset of parent poor mental health was greater over the three-year follow-up when their child also developed an emotional disorder during this time. In contrast to previous research (e.g. Connell and Goodman, 2002; Hughes and Gullone, 2010; Sellers et al., 2016; Wang et al., 2016), these relationships were not moderated by socioeconomic status, child age, gender, or survey cohort, although there was a strong association between lower socioeconomic status and poor mental health for both parents and children. Previous studies have primarily focussed on adolescence and specifically on depression and externalising disorders (e.g. Hails et al., 2018; Hughes and Gullone, 2010; Kouros and Garber, 2010). This study adds to the existing epidemiological literature by examining both depression and anxiety, in a broad age range of children, and in a sample drawn from a representative rather than high-risk sample.

Strengths, and explanation of findings
A reciprocal effect of child emotional disorder impact on parental mental health may be explained by difficulties in the child-parent relationship related to psychological distress in one or both members of the dyad (Branje et al., 2010; Combs-Ronto et al., 2009; Gross et al., 2008; Hale et al., 2011). Parenting a child with an emotional disorder may affect a parent's self-esteem (identifying themselves as a 'good parent'), diminishing parenting satisfaction and efficacy and in turn be associated with elevated parent emotional symptoms (Hughes and Gullone, 2010). Similarly, the

impact of parents with poor mental health on their child may be mediated through less sensitive responding, reduced interactions and increased negative affect (Hughes and Gullone, 2010).

We test whether these relationships were moderated by child age and gender, and socio-economic status, but did not detect any interactions. Other factors such as awareness of the disorder (Stapley et al., 2016), self-stigma (Campelo et al., 2014), perceived personal control and subjective distress (Gerkensmeyer et al., 2008), the parent-child relationship (Chan et al., 2014) and access to services and effective treatment (Gerkensmeyer et al., 2008; Stapley et al., 2016) may influence this association but were not measured in these surveys. Social support may also act as a likely moderator, through its potential to improve parental coping resources (Armstrong et al., 2005). Indeed, the moderating effect of parenting coping strategies or styles on the impact of children's symptoms on parent stress has been recognised in the literature (Lyons et al., 2010). Such factors may not only influence the presence of emotional disorders, but predict poorer treatment outcomes for patients (e.g. Rengasamy et al., 2013). Furthermore, family functioning and parent reported burden did not mediate the association between child and parent poor mental health in our analysis. Future studies would benefit from examining these additional contextual factors as potential moderators or mediators in the relationship between child and parent mental health.

Limitations

Our study benefitted from an extremely large, nationally representative probability sample and validated measures. Despite these strengths, the findings are limited by the data available for analysis. For example, the survey only included mental health information for one parent (the mother, in 95% of cases), and one child, at the time of assessment. We have no information about whether mental health problems were present prior to the survey for the reporting parent or index child, or at all for the other parent or siblings. This may have impacted on the likelihood of either parent or child developing problems, or indeed the parent's ability to cope with a child with significant emotional difficulties. Reciprocal relationships between parent and child emotional problems are likely to be impacted by other family stressors over time, and to impact on other family members.

We cannot be sure of the accuracy of the parental assessments of children's emotional difficulties, and it is possible that parents with poorer mental health may have interpreted these more negatively; previous research indicates that parental psychological distress was associated with parents' ratings of their child's mental health (Collishaw et al., 2009). However, the contribution of

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teachers to the DAWBA assessment at baseline, and self-report for children over 11 years old should mitigate this effect, since different informants from different contexts increases the overall accuracy of the reports (Garb, 2005).

Selection biases may operate in relation to initial non-response and attrition between surveys. Only 69% of those invited at follow-up participated and provided data on all required variables. Those with poor mental health and lower socio-economic status were less likely to be retained (Ford et al., 2020). This means that the sample included in this analysis includes parents with a higher overall socio-economic status at baseline than the total sample, providing less variability and an inability to detect any potential moderating effects of income. Further, since 95% of the parents included in the surveys were mothers, these findings cannot be generalized to fathers. Indeed, some studies looking at maternal and paternal relationships have reported stronger reciprocal associations between maternal psychopathology and child emotional problems compared to paternal psychopathology (Hughes and Gullone, 2010), while others have found that child emotional disorder is associated with increased risk of paternal psychopathology (e.g. Cooper et al., 2006). Further research is required to investigate the differential effect of maternal and paternal psychopathology on children, and vice versa.

This study benefited from the use of standardised assessments, but did not have a diagnostic measure of parental mental health, nor a continuous measure of childhood psychological distress. The symptoms associated with anxiety and depression are normally distributed, with diagnosis occurring at one end of a dimensional trait (Hankin et al., 2005); as such, an exploration of symptoms rather than disorder diagnosis would also be informative. Our final analyses investigated the association between onset of child emotional disorder during the three-year gap between surveys and the onset of poor parental mental health during this time as these were the data points available. Before, during and after this time, family members' mental health and factors that influence it would be fluctuating dynamically. Whilst an association was found, for this analysis we cannot be sure which came first (the child's or the parent's ill-health), so cannot report which may have a greater impact. Future studies should include more frequent data collection so that the trajectories of child and parent mental health can be studied in more depth, as we lack data on the time-frame in which these reciprocal influences operate. Intervention studies with parents, children or both offer a useful platform to study these fluctuations in detail in the short term, while cohort studies offer a longer term perspective.

Implications

Our findings add to the existing evidence to suggest a dynamic, reciprocal effect of parent and child mental health problems, that may well extend to other members of their family, which raises important issues for practitioners, service provision and policy in relation to children and families. Since recovery or deterioration in one family member may influence the mental health and functioning of others in the household, improved collaboration between child and adult mental health services seems essential (Campelo et al., 2014; Civic and Holt, 2000; Gerkensmeyer et al., 2008). Equally, treatment approaches that work explicitly with both parents and young people may amplify the effectiveness of treatment for either, individually, and may be particularly useful for highly vulnerable young people or those living in families with chronically depressed parents (Eckshtain et al., 2017; Wolff et al., 2017). Acknowledgement of the distress and strain of coping with a family member with emotional difficulties for both children and parents is also important and support for other family members may mitigate negative effects on the wider family. Indeed, increased support may prevent the deterioration of mental health among parents of children who are struggling with psychopathology (Armstrong et al., 2005).

Conclusion

We found evidence for predictive and reciprocal relationships between child and parent mental health in a large community-based sample over time, which suggests that active treatment for either parent or child might potentially prevent the presence of mental health problems in the other. Further research is required to examine the numerous factors that may mediate these relationships, and whether they exist equally for mothers and fathers. Commissioners, service providers and intervention developers need to consider how best to support children and parents with emotional difficulties given the impact this can have on other family members.

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Table 1. Baseline characteristics of parent-child dyads for: (a) dyads who provided data on all key variables, (b) all dyads included in analyses of onset of parent poor mental health, (c) all dyads included in analyses of onset of child emotional disorders

Characteristics	Full sample of dyads who provided data on all key variables (N = 7,100)	Dyads included in analysis of onset of poor parent mental health (N = 5,147)	Dyads included in analysis of onset of child emotional disorders (N = 6,238)
Age of mother at child's birth, mean (SD)	28.6 (5.2)	28.8 (5.0)	28.8 (5.1)
Mother has no qualifications, n (%)	1,109 (15.6%)	697 (13.5%)	853 (13.7%)
Household gross weekly income <£200, n (%)	1,008 (14.2%)	586 (11.4%)	779 (12.5%)
Rented accommodation (vs owned), n (%)	1,680 (23.7%)	1,005 (19.5%)	1,302 (20.9%)
No parent in active employment, n (%)	829 (11.7%)	439 (8.5%)	605 (9.7%)
Unhealthy (vs healthy) family functioning, n (%)	1,173 (16.5%)	580 (11.3%)	907 (14.5%)
Parent reported burden from child disorder (SDQ):			
Not at all, n (%)	5,428 (76.5%)	4,322 (84.0%)	5,201 (83.4%)
A little, n (%)	952 (13.4%)	584 (11.3%)	740 (11.9%)
A medium amount, n (%)	442 (6.2%)	178 (3.5%)	233 (3.7%)
A great deal, n (%)	278 (3.9%)	63 (1.2%)	64 (1.0%)

Parent GHQ score, mean (SD)	1.7 (2.7)	0.4 (0.7)	1.4 (2.4)
Child age, mean (SD)	10.1 (3.3)	10.0 (3.3)	10.1 (3.3)
Female child, n (%)	3,447 (48.5%)	2,574 (50.0%)	3,109 (49.8%)
Child in poor general health (vs normal child health), n (%)	423 (6.0%)	209 (4.1%)	279 (4.5%)
More than 3 significant life events, n (%)	787 (11.1%)	364 (7.1%)	541 (8.7%)
Family structure – Child lives with:			
Both biological parents, n (%)	5,014 (70.6%)	3,860 (75.0%)	4,565 (73.2%)
Single parent, n (%)	1,363 (19.2%)	813 (15.8%)	1,082 (17.3%)
One biological, one step parent, n (%)	723 (10.2%)	474 (9.2%)	591 (9.5%)

GHQ – General Health Questionnaire-12; SDQ – The Strengths and Difficulties Questionnaire

Table 2. Baseline characteristics of parent-child dyads included in analyses of onset of parent poor mental health at 3-year follow-up, stratified by child emotional disorder status at baseline

Characteristics	Child has emotional disorder at baseline (N = 189)	Child had no psychiatric disorder at baseline (N = 4,958)
Age of mother at child's birth, mean (SD)	27.3 (5.2)	28.9 (5.0)
Mother has no qualifications, n (%)	49 (25.9%)	648 (13.1%)
Household gross weekly income <£200, n (%)	33 (17.5%)	553 (11.2%)
Rented accommodation (vs owned), n (%)	65 (34.4%)	940 (19.0%)
No parent in active employment, n (%)	38 (20.1%)	401 (8.1%)
Unhealthy (vs healthy) family functioning, n (%)	37 (19.6%)	543 (11.0%)
Parent reported burden from child disorder (SDQ):		
Not at all, n (%)	72 (38.1%)	4,250 (85.7%)
A little, n (%)	55 (29.1%)	529 (10.7%)
A medium amount, n (%)	36 (19.0%)	142 (2.9%)
A great deal, n (%)	26 (13.8%)	37 (0.7%)
Parent GHQ score, mean (SD)	0.6 (0.8)	0.4 (0.7)

Child age, mean (SD)	10.9 (3.3)	10.0 (3.3)
Female child, n (%)	112 (59.3%)	2,462 (49.7%)
Child in poor general health (vs normal child health), n (%)	27 (14.3%)	182 (3.7%)
More than 3 significant life events, n (%)	52 (27.5%)	312 (6.3%)
Family structure – Child lives with:		
Both biological parents, n (%)	115 (60.8%)	3,745 (75.5%)
Single parent, n (%)	48 (25.4%)	765 (15.4%)
One biological, one step parent, n (%)	26 (13.8%)	448 (9.0%)

GHQ – General Health Questionnaire-12; SDQ – The Strengths and Difficulties Questionnaire

Table 3. Unadjusted odds ratios for the association between the potential confounders and onset of parent poor mental health at 3-year follow-up (outcome variable) (N=5,147)

Potential confounders	Estimates	
Parent-related characteristics reported at baseline		
	Odds ratio (95% CI)	p-value
Age of mother at child's birth	0.986 (0.972 to 1.001)	0.06
Mother has no qualifications (vs some)	1.28 (1.04 to 1.56)	0.02
Household gross weekly income <£200 (vs £200+)	1.39 (1.12 to 1.71)	0.002
Rented accommodation (vs owned)	1.25 (1.05 to 1.49)	0.01
No parent in active employment (vs one/more in employment)	0.73 (0.57 to 0.92)	0.009
Unhealthy (vs healthy) family functioning	1.49 (1.21 to 1.84)	<0.001
Parent reported burden from child emotional disorder (SDQ):		
Not at all	Reference category	<0.001
A little	1.67 (1.36 to 2.06)	
A medium amount	2.61 (1.89 to 3.61)	
A great deal	2.70 (1.59 to 4.59)	

Child-related characteristics at baseline		
Child age	1.03 (1.01 to 1.05)	0.01
Child gender, female (vs male)	0.95 (0.82 to 1.09)	0.46
Poor child general health (vs normal child health)	1.17 (0.83 to 1.66)	0.37
More than 3 significant life events (vs 3 or less)	1.82 (1.43 to 2.33)	<0.001
Family structure – Child lives with…		
Both biological parents	Reference category	0.09
Single parent	1.24 (1.02 to 1.50)	
One biological, one step parent	1.07 (0.83 to 1.38)	

SDQ - The Strengths and Difficulties Questionnaire

Table 4. Baseline characteristics of parent-child dyads included in analyses of onset of child emotional disorders at 3-year follow-up, stratified by parent mental health status at baseline

Characteristics	Parent has poor mental health at baseline (N = 1,280)	Parent has normal mental health at baseline (N = 4,958)
Age of mother at child's birth, mean (SD)	28.4 (5.3)	28.9 (5.0)
Mother has no qualifications, n (%)	205 (16.0%)	648 (13.1%)
Household gross weekly income <£200, n (%)	226 (17.7%)	553 (11.2%)
Rented accommodation (vs owned), n (%)	362 (28.3%)	940 (19.0%)
No parent in active employment, n (%)	204 (15.9%)	401 (8.1%)
Unhealthy (vs healthy) family functioning, n (%)	364 (28.4%)	543 (11.0%)
Parent reported burden from child disorder (SDQ):		
Not at all, n (%)	951 (74.3%)	4,250 (85.7%)
A little, n (%)	211 (16.5%)	529 (10.7%)
A medium amount, n (%)	91 (7.1%)	142 (2.9%)
A great deal, n (%)	27 (2.1%)	37 (0.7%)
Parent GHQ score, mean (SD)	5.5 (2.5)	0.4 (0.7)

Child age, mean (SD)	10.4 (3.2)	10.0 (3.3)
Female child, n (%)	647 (50.5%)	2,462 (49.7%)
Child in poor general health (vs normal child health), n (%)	97 (7.6%)	182 (3.7%)
More than 3 significant life events, n (%)	229 (17.9%)	312 (6.3%)
Family structure – Child lives with:		
Both biological parents, n (%)	820 (64.1%)	3,745 (75.5%)
Single parent, n (%)	317 (24.8%)	765 (15.4%)
One biological, one step parent, n (%)	143 (11.2%)	448 (9.0%)

GHQ – General Health Questionnaire-12; SDQ – The Strengths and Difficulties Questionnaire

Table 5. Unadjusted odds ratios for the association between the potential confounders and onset of child emotional disorders at 3-year follow-up (outcome variable) (N=6,238)

Potential confounders	Estimates	
Parent-related characteristics reported at baseline		
	Odds ratio (95% CI)	p-value
Age of mother at child's birth	0.972 (0.945 to 1.000)	0.05
Mother has no qualifications (vs some)	1.17 (0.79 to 1.75)	0.43
Household gross weekly income <£200 (vs £200+)	1.59 (1.09 to 2.31)	0.02
Rented accommodation (vs owned)	1.67 (1.22 to 2.29)	0.001
No parent in active employment (vs one/more in employment)	0.47 (0.32 to 0.68)	<0.001
Unhealthy (vs healthy) family functioning	1.23 (0.84 to 1.80)	0.29
Parent reported burden from child emotional disorder (SDQ):		
Not at all	Reference category	<0.001
A little	1.93 (1.33 to 2.82)	
A medium amount	2.42 (1.37 to 4.26)	
A great deal	5.40 (2.53 to 11.6)	

Child-related characteristics at baseline		
Child age	1.10 (1.06 to 1.16)	<0.001
Child gender, female (vs male)	1.59 (1.19 to 2.14)	0.002
Poor child general health (vs normal child health)	2.92 (1.84 to 4.62)	<0.001
More than 3 significant life events (vs 3 or less)	2.62 (1.81 to 3.80)	<0.001
Family structure – Child lives with…		
Both biological parents	Reference category	0.02
Single parent	1.36 (0.95 to 1.96)	
One biological, one step parent	1.70 (1.11 to 2.60)	

SDQ - The Strengths and Difficulties Questionnaire

Figure 1: Flow chart of survey sample for secondary analyses

1999 BCAMHS survey: 10,438 child/parent pairs	2004 BCAMHS survey: 7,977 child/parent pairs

2002 follow-up:

Approached 2,938 child/parent pairs

2,587 sufficient data; 88%

2007 follow-up:

Approached 7,329 child/parent pairs

5,326 sufficient data; 73%

7,100 child/parent pairs with complete data on included variables

(90% of the 7,913 recruited across both surveys)

189 child/parent pairs, where at baseline:

Children had a diagnosed emotional disorder (*47 were comorbid and included, 294 were psychiatric without emotional and excluded*)

AND

Parents had good mental health

4,958 child/parent pairs, where at baseline:

Children had no psychiatric disorder (including emotional)

AND

Parents had good mental health

1,280 child/parent pairs, where at baseline:

Children had no psychiatric disorder (including emotional)

AND

Parents had poor mental health

379 child/parent pairs, where at baseline:

Children had a diagnosed psychiatric disorder

AND

Parents had poor mental health

Sample where parent has good mental health at baseline (Objective 1)*.*

Sample where child has no psychiatric disorder at baseline (Objective 2)*.*

Sample where children had no psychiatric disorder and parents had good mental health at baseline(Objective 3)*.*