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Perinatal mental health and risk of child maltreatment: A systematic review and meta-analysis

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Abstract

Background: Mental health problems in parents have been identified as a risk factor for child maltreatment. The perinatal period (from conception to 1 year) is a critical period but it is unclear whether perinatal mental health problems are also associated with increased risk.

Objective: To review evidence on perinatal mental health and risk of child maltreatment.

Methods: Searches were conducted on six databases and 24 studies reported in 30 papers identified. Studies were conducted in seven countries, mainly the USA (n=14). Sample sizes ranged from 48-14,893 and most examined mothers (n=17). Studies were conducted in community (n=17) or high-risk (n=7) samples.

Results: The majority of studies found a relationship between parental perinatal mental health problems and risk of child maltreatment, but inconsistent findings were observed between and within studies. The few studies that examined fathers (n=6) all found a relationship between fathers' mental health and risk of child maltreatment. Meta-analysis of 17 studies (n=22,042) showed perinatal mental health problems increased risk of child maltreatment by OR 3.04 (95% CI 2.29–4.03). This relationship was moderated by type of sample, with larger effects for risk of child maltreatment in high-risk samples. The relationship was not moderated by type of mental illness, child maltreatment; methodological or measurement factors.

Conclusion: The association between perinatal mental health and risk of child maltreatment is similar to that observed at other times during childhood. Methodological heterogeneity and inconsistent findings mean conclusions are tentative and need to be considered alongside other individual, family and social/cultural risk factors.

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Introduction

Although pregnancy and birth are a positive time for most women, between 10 and 20% of women suffer from mental health problems during this time, and a proportion of men are also affected (Parfitt & Ayers, 2014; Ramchandani, Stein, Evans & O'Connor, 2005). Mental health problems can arise in pregnancy or after birth and most commonly consist of anxiety, depression, and stress-related conditions such as post-traumatic stress disorder (PTSD) after a traumatic birth. Severe postpartum mental illness such as postpartum psychosis is less common but a leading cause of maternal death in the first year after birth (Knight et al., 2017). There is also evidence that perinatal mental health problems are associated with a variety of adverse outcomes for women, children and their partners with associated costs to society. A recent economic analysis conducted in the UK estimated the cost of not treating perinatal mental health problems was £8.1 billion per annual cohort of women giving birth, with 72% of this cost being attributable to long term adverse consequences for the child (Bauer, Parsonage, Knapp, Iemmi & Adelaja, 2014). There is therefore increasing awareness of the importance of perinatal mental health from a public health perspective, which has prompted prioritisation of perinatal mental health services in some countries. For example, in the UK the Government invested £365 million in NHS England's perinatal mental health community services between 2015 and 2021 (NHS England, 2016).

One of the potential adverse outcomes associated with parental mental health problems is increased risk of child/infant maltreatment. The World Health Organisation (WHO) defines child maltreatment as an act that includes "*all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity*". Within this broad definition, five subtypes can be distinguished: physical abuse; sexual abuse; neglect and negligent treatment; emotional abuse; and exploitation (WHO, 2016). Research suggests that severe

perinatal mental health problems such as postpartum psychosis are associated with self-reported child abuse. For example, Chandra, Bhargavaraman, Raghunandan, and Shaligram (2006) interviewed 108 women with postpartum onset of severe mental illness and found that mothers who had delusions that their baby was a devil, ill-fated or someone else's baby, were more likely to report abusive incidents towards their baby. Affective disorders have also been associated with child maltreatment. For example, Chemtob, Gudino and Larague (2013) found that mothers with both depression (score of 13 or more on the Edinburgh Postnatal Depression Scale) and PTSD reported the highest levels of physically and psychologically abusive behaviours towards their 3-5 year old children. Severity of depressive symptoms was also independently associated with child physical assault and neglect.

This research suggests that diagnoses of depression, PTSD and postpartum psychosis are associated with an increased risk of child maltreatment. This may also be the case for probable diagnoses based on cut-offs on self-report questionnaires, such as the Edinburgh Postnatal Depression Scale (Cadzow, Armstrong & Fraser, 1999). However, it is not clear if subthreshold symptoms of these mental health problems are also associated with increased risk of child maltreatment. Furthermore, in many cases mental health problems are assessed in parents outside of the perinatal period (i.e. more than one year after birth), meaning it is not clear whether mental health problems specifically in the perinatal period are associated with increased risk of child maltreatment. This review therefore aimed to synthesise the evidence on whether mental health problems in the perinatal period are associated with increased risk of child maltreatment and whether this risk is moderated by the severity of perinatal mental health problems.

Method

Literature searches and study selection were conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Moher et al., 2015).

Search terms were formed for four categories (perinatal period, psychological disorders, child, and maltreatment) which were crossed using Boolean operators e.g. OR, AND (see Table 1 for search terms). Searches were conducted in six databases (MEDLINE, PsycINFO, PsychARTICLES, E-Journals, Web of Science, and Scopus) up to and including January 2018. Where the database allowed, searches were limited by abstract/title/English language/and human population. In addition, the reference lists of identified articles and existing reviews were hand searched to identify additional relevant papers.

Insert Table 1 about here

Inclusion and exclusion criteria

Studies were included if they were quantitative studies reporting empirical research that examined the association between perinatal mental health in men and/or women during the perinatal period (defined as conception to 1 year after birth) and child maltreatment. A child was defined as 0 - 16 years of age.

Studies were excluded if they were not primary research, used animals as main population, were not reported in English, did not include parents or children as the main population, did not use a measure of child maltreatment, or did not assess the association between perinatal mental health and child maltreatment. Papers with no measure of adult mental health or where the measure of mental health was not clear were excluded, as were papers where the measure of mental health was not specific to the perinatal period. In addition, a number of papers on Munchausen's by-proxy were excluded because this is an adult disorder with a highly specific impact on the child.

Study selection and Data Extraction

A data extraction sheet was used to extract all relevant information from the full text of eligible studies. This included: (i) Citation (ii) Country; (iii) Study design; (iv) study aim; (v) number of infants and their characteristics; (vi) age of infant when parents were recruited;

(vii) type of abuse exposed to and how and when this was measured; (viii) source of data; (ix) number of parents and their characteristics; (x) age of infant when mental health was assessed; (xi) measure used to assess parental mental health; (xii) statistical analyses used; (xiii) associations reported between perinatal mental health and child maltreatment; (xiv) any other associations reported. Effect sizes for (xiii) and (xiv) were also extracted.

Quality assessment

Quality of studies was assessed using the Joanna Briggs Institute (2017a; 2017b) critical appraisal tools. Seventeen studies were cross-sectional studies therefore the cross-sectional critical appraisal tool was used. Five were cohort studies and the cohort critical appraisal tool was used. Eight studies were longitudinal studies so the cohort critical appraisal tool was deemed the most appropriate tool to use in this case. To make the quality assessment comparable across all study types, each criterion was scored 0 (not met) or 1 (met) and an average score calculated by dividing total scores by the number of criteria (i.e. questions). Quality therefore had a possible range of 0 – 1 and an actual range of 0.57 - 1 with a mean of 0.88 (SD=0.12).

Data synthesis

A narrative synthesis was conducted on all 24 studies identified as eligible for inclusion in the review, then a meta-analysis conducted on 17 of these 24 studies. Studies that could not be included in the meta-analysis did not report relevant effect sizes (n=6; Chandra, Venkatasubramanian & Thomas, 2002; Choi et al., 2010; Easterbrooks et al., 2013; Egeland & Brunnuell, 1979; Shapiro, Krysik & Pennar, 2011; Zelenko, Huffman, Lock, Kennedy & Steiner, 2001) or reported an effect that was an extreme outlier ($r = .90$; Sachs, Hall, Lutenbacher & Rayens, 1999).

The meta-analysis was conducted following the guidance of Field and Gillet (2010). The effects reported in the majority of studies (n=10) were odds ratios. Three studies reported

correlations and four studies standardised mean differences. These effects were therefore converted to odds ratios as recommended by the Campbell Collaboration when dealing with different types of effect sizes in meta-analyses (Polanin & Snilstveit, 2016).

Multiple effects were reported for four studies (Isumi & Fujiwara, 2017; Lean, Pritchard & Woodward, 2013; Sidebotham & Golding, 2001; Windham, Rosenberg, Fuddy, McFarlane, Sia, & Duggan, 2004) so one effect was chosen to include in the meta-analysis to avoid including multiple effects from one study. Preference was given to effects that focused on mothers' mental health rather than fathers' mental health because this was most common (n=15). If effects were reported for different types of abuse, actual or suspected abuse was used rather than potential abuse or inadequate care because it was most commonly reported (n=13). Similarly, where effects for different mental health problems were reported depression was used as this was most commonly reported (n=11). A robust meta-analysis (Hedges, Tipton & Johnson, 2010; Tipton, 2015) was carried out including all these multiple effects to ensure this strategy did not alter results. This found a similar pattern of results so we report the analysis here where only one effect per study was included.

Insert Figure 1 about here

Results

The literature searches provided a total of 36,238 citations, with a further 2 papers identified through hand searching the reference lists of key papers. After removing duplicates and screening through abstracts, titles and full texts according to the inclusion and exclusion criteria, 30 papers reporting 24 studies remained for inclusion in the review. Detailed results of the literature search and screening are shown in Figure 1. A summary of these studies is given in Table 2. Characteristics of the 24 studies and a narrative synthesis are outlined below. Seventeen studies were included in the meta-analysis, which is reported after the narrative synthesis.

Study characteristics

Studies were conducted from 1979 to 2017 and had varied designs: cross-sectional (n=15), longitudinal (n=5), and cohort (n=4). Studies were conducted in seven countries: the USA (n=14), UK (n=3), Japan (n=3), India (n=1), Australia (n=1), South Korea (n=1) and New Zealand (n=1). Sample sizes ranged from 48 to 14,893. Most studies focused on mothers with young children (n=17), some included fathers as well as mothers (n=4), two focused on fathers only, and one on women in pregnancy (Zelenko et al., 2001). All studies attempted to recruit samples that were ethnically representative for that country, with the exception of one study in New Zealand which focused on Maori mothers (Lean et al., 2013).

Most studies were conducted in low risk community samples (n=17). The remaining 7 studies were conducted with high-risk samples: either psychiatric samples (women on a methadone programme (Lean et al., 2013); admission to a psychiatric unit postpartum (Chandra et al., 2002) or vulnerable samples (vulnerable families: Bugental & Happaney, 2004; Chandra et al., 2006; high-risk families: Egeland, Breitenbucher & Rosenberg, 1981; Egeland & Brunnuell, 1979; at risk infants: Windham et al., 2004; abused mothers: Egeland, Jacobvitz & Sroufe, 1988; and single adolescent mothers who live in poverty: Zelenko et al., 2001).

Measures of maltreatment

All of the studies focussed on physical, sexual and/or emotional abuse and neglect or contact with child protection services. In addition, a few of these studies included a particular focus on harsh parenting (n=1), shaking and smothering (n=1), aggression (n=2) and spanking (n=1). One study specifically looked at failure and hostile rejection and psychological unavailability and another looked at hitting, smothering, harming, neglecting and wanting/trying to kill the child.

Measures of maltreatment also varied. Most studies used parents self-report of abuse through specific items or scales such as the Child Abuse Potential Inventory (CAPI), which measures *potential* for child abuse through questions about distress, rigidity, unhappiness, problems with child and self, problems with family, and problems from others. Other studies measured *confirmed* abuse through official records such as the county records in the USA or child protection registers in New Zealand and the UK.

Measures of mothers' and fathers' mental health

Measurement of mothers and/or fathers' mental health was mostly by self-report questionnaire (n=19) with a smaller number of studies using clinical interviews (n=2), lifetime history of psychiatric disorders (n=2), or medical records (n=1). Most studies examined depression (n=13), or depression and anxiety (n=2). Others looked at any current psychological disorder (n=4), a history of psychological disorders (n=3), or global distress (n=2).

Insert Table 2 about here

Narrative synthesis of results

The majority of papers reported significant relationships between perinatal mental health and child maltreatment (n=19; 61.3%). A few papers found no impact (n=5; 16.1%) and the remainder were unclear (n=5; 19.4%) or had insufficient data (n=1). Inconsistent results were apparent both between and within studies, as evidenced by the 20.8% of papers reporting unclear findings. An example of this is the three studies that reported results in multiple papers which, depending on the variables analysed, present both significant and unclear relationships (Pawlby, Hay, Sharp, Waters & Pariante, 2011; Plant, Barker, Waters, Pawlby & Pariante, 2013; Sidebotham & Heron, 2006; Sidebotham & Golding, 2001) or significant and no relationship (Egeland & Brunnuell, 1979; Egeland et al., 1981; Egeland et al., 1988).

These inconsistent results are likely to be due to a few key issues which are considered below.

Psychiatric illness versus symptoms

One explanation is that child maltreatment may be more likely to occur when parents have severe mental illness as opposed to moderate symptoms. This is supported by many of the studies reviewed. For example, a large UK cohort study of 14,893 mothers and fathers found a history of parental psychiatric illness was predictive of children being on the child protection register but maternal symptoms of depression were not (Sidebotham & Golding, 2001; Sidebotham & Heron, 2006). Similarly, a smaller USA study compared mothers who did or did not abuse their children and found no differences in symptoms of anxiety and depression between these two groups (Egeland & Brunnuquell, 1979; Egeland et al., 1981). It is also notable that the two studies that examined child maltreatment in psychiatric samples both found an increased risk of child maltreatment in women with severe depression or psychotic beliefs (Chandra et al., 2002; Lean et al., 2013). It is therefore likely that the risk of child maltreatment is greater in parents with clinically diagnosed mental illness.

Vulnerable or high-risk mothers

However, this is not to say that moderate symptoms may not be important. It is possible that in vulnerable and high-risk families the association between perinatal mental health and child maltreatment may occur at a lower threshold of symptoms. For example, the USA study comparing women who did or did not abuse their children found that, although there was no relationship between maternal anxiety and child maltreatment, mothers who had been abused as children and had high anxiety were more likely to abuse their children (Egeland & Brunnuquell, 1979; Egeland et al., 1981). Similarly, nearly all studies conducted with vulnerable or at-risk mothers found maternal symptoms of distress, depression and anxiety were correlated with child maltreatment (Bugental & Happaney, 2004; Chandra et al., 2006;

Egeland et al., 1988; Windham et al., 2004; Zelenko et al., 2001). A number of studies also found that intimate partner violence, including psychological or verbal abuse and coercion, were associated with increased risk of child maltreatment (Lee & Guterman, 2010; Shapiro et al., 2011; Windham et al., 2004). It is therefore important to consider other risk factors which may interact with poor mental health to increase the risk of child maltreatment.

Fathers and the couple's relationship

Although there were only a few studies looking at fathers they all found a relationship between fathers' mental health and child maltreatment. Studies of paternal depression found it increased the risk of the father maltreating the child (Davis, Davis, Freed & Clark, 2011; Sidebotham & Golding, 2004; Sidebotham & Heron, 2006; Takerhara, Suto, Kakee, Tachibana & Mori, 2017). For example, a UK study of 14,893 mothers and fathers found that both paternal and maternal depression was associated with increased risk of a child being on the child protection register. However, once analyses were adjusted for other risk factors, paternal depression remained a significant risk factor but maternal depression did not (Sidebotham & Golding, 2001). The importance of the relationship between mothers and fathers is also illustrated by the increased risk of child maltreatment in families where fathers were less involved (measured by whether fathers were resident or non-resident and the extent of contact) (Shapiro et al., 2011). Risk of child maltreatment is also greater in families where fathers were psychologically abusive (Shapiro et al., 2011), coercive (Lee & Guterman, 2010) or violent (Windham et al., 2004) towards the mother. It is therefore important to consider child maltreatment in the context of the family circumstances.

The perpetrator of abuse

The issue of who perpetrates the abuse is important but not explicitly addressed in many studies. Most studies focused on maternal mental health and child maltreatment, but often did not explicitly consider who was the perpetrator of the abuse and that this may not have been the mother. Studies that measured abuse through public records (e.g. child protection

services) or children's self-report did not always ascertain who the abuser was. It is therefore possible that some of the relationship between maternal mental health and risk of child maltreatment may be due to other family members being perpetrators of abuse. For example, the South London Child Development Study found that women's depression in pregnancy was associated with increased risk of child abuse and harsh parenting from family members (Pawlby et al., 2011; Plant et al., 2013; Plant et al., 2015). However, these family members included biological mothers/fathers and non-biological step-mothers/fathers. When they looked specifically at women's risk of perpetrating abuse they found that in biological mothers, depression in pregnancy was not associated with an increased risk of abuse (Pawlby et al., 2011). This is consistent with the need to consider family context as well as other risk factors.

Methodology and measurement

Inconsistent results may also be influenced by methodological and measurement issues such as type of measure of perinatal mental health and child maltreatment. For example how maltreatment is measured (confirmed from records, self-report, observed); which type of parental mental health problem is examined (depression, anxiety, inpatient status) and how (self-report, medical records, clinical interview). Also the time at which mental health and child maltreatment were measured; and the length of time between measures of mental health and child maltreatment in longitudinal studies.

Meta-analysis

Meta-analysis to examine the overall effect of perinatal mental health on child maltreatment, as well as possible moderators of this relationship was conducted on 17 of the 24 studies with a total sample size of 22,042. Results are shown in Figure 2. The effect of perinatal mental health on child maltreatment ranged from odds ratios of 1.04 to 8.02. Overall there was a strong relationship between perinatal mental health and child maltreatment with an average

odds ratio of 3.04. There is, however, significant variability in effect size as indicated by the significant Q statistic and an I² statistic of 87%. The studies also have significant heterogeneity in terms of design and measures.

Results of moderator analyses are shown in Table 3. It can be seen that the only factor that moderated the relationship between perinatal mental health and risk of child maltreatment was if the sample was low or high risk, with larger effects of perinatal mental health on risk of child maltreatment found in high risk samples (i.e. psychiatric and vulnerable samples). The effect of perinatal mental health on risk of child maltreatment was not significantly moderated by any of the other factors examined.

Insert Figure 2 about here

The results of the meta-analysis support the narrative synthesis by confirming that the relationship between perinatal mental health and risk of child maltreatment is significant, with a three times increased risk of child maltreatment if parents have a mental health problem during this time. Results of the moderator analyses support the notion that the risk of child maltreatment is greater in high-risk samples. In other words, children whose mothers/families are considered high risk are at greater risk of child maltreatment if a parent has a mental health problem during the perinatal period. The finding that no other perinatal mental health, child maltreatment, methodological or statistical factors moderated the relationship between mental health and child maltreatment suggests it is a relatively robust effect regardless of different methods and measures used.

Discussion

This review aimed to synthesise the evidence on the effect of perinatal mental health problems (from pregnancy to 12 months postpartum) on risk of child maltreatment (from 0 – 16 years of age). Results found only 24 studies in this area with substantial methodological and geographical heterogeneity. Narrative synthesis showed the majority of these studies

supported a relationship between poor perinatal mental health and increased risk of child maltreatment, and meta-analysis showed poor perinatal mental health was associated with a 3.04 times increased risk. The only moderator of this relationship was that risk of child maltreatment was greater in high-risk samples of women with severe mental illness or other risk factors. There was inconsistent evidence for the influence of mild-moderate perinatal mental health difficulties, and it is probable these are only associated with increased risk when other risk factors are present.

The finding that perinatal mental health problems place infants at increased risk of maltreatment is consistent with literature looking at parents' mental health at other times in life (i.e. not the perinatal period) (Cadzow et al., 1999; Chemtob et al., 2013). For example, a large epidemiological study of 404,022 children born in Western Australia in a 15-year period found that children of mothers who had contact with mental health services were 2.64 times more likely to be involved in a maltreatment allegation, after adjusting for demographics, child disability, maternal assault admissions and hospital records of housing and economic issues (O'Donnell, Maclean, Sims, Morgan, Leonard & Stanley, 2015). This is similar to the 3.04 increased risk identified in the current review. The fact that the odds ratio is slightly higher in the current review is probably because it does not adjust for other risk factors. It therefore appears that mental health problems in pregnancy and the first 12 months postpartum carry a similar increased risk of child maltreatment as mental health problems at other times during childhood.

This is particularly important to address in the perinatal period because of the relationship between early childhood adversity and the child's later physical and mental health (Infurna, Reichl, Parzer, Schimmenti, Bifulco, Kaess, 2016; Oh et al., 2018). However, the increased risk of maltreatment at any time across childhood needs to be interpreted in the context of the low prevalence of child maltreatment overall. Thus, a 2 to 3 times increased

risk does not mean the majority of parents with mental health problems will maltreat their children. The Western Australia study illustrates this by showing that only 1 in 10 (9.2%) of children whose mothers had contact with mental health services were involved in a maltreatment allegation (O'Donnell et al., 2015). Similarly, a UK survey of 2,160 parents/carers of children under 11 years of age reported a prevalence of 2.5% of children under 11 years of age experiencing maltreatment (Radford, Coral, Bradley & Fisher, 2013). It is therefore important to consider the three times increased relative risk of child maltreatment in the context of the low absolute risk.

Given the adverse impact of child maltreatment it is important to be able to accurately identify those most at risk. This review identified and confirmed a number of factors that are important to consider in relation to perinatal mental illness and risk of child maltreatment. The first is the severity of perinatal mental illness is likely to be important. This is based on the finding that high-risk samples, which included women in psychiatric inpatient units, are at greater risk of child maltreatment provides some support for this consideration. However, this sample also included other high-risk or vulnerable women/families. It was not possible to directly examine the severity of perinatal mental health symptoms because the research studies included in the review did not examine this. More research is therefore needed that directly examines the potential differing impact of mild, moderate or severe symptoms of perinatal mental health problems on child maltreatment.

The second factor is recognising that perinatal mental health problems are likely to interact with other risk factors to increase risk of child maltreatment. This is consistent with the broader literature where a range of risk factors have been identified both for risk of children being maltreated and risk of adults perpetrating maltreatment. The World Health Organisation list a range of risk factors for child maltreatment at the levels of the child, parent/caregiver, relationship and community (WHO, 2016). Relationship factors include

mental health problems, family breakdown or violence as well as social isolation and lack of support for child rearing (WHO, 2016). In terms of adults being involved in maltreating a child Thornberry et al., (2013) identified risk factors in 10 different developmental domains, four of which were strongly associated with risk of perpetrating abuse: family background/structure, education, antisocial behaviours and precocious transitions to adulthood. Cumulative risk factors in a number of developmental domains also substantially increased the risk of perpetrating abuse from 3% (no risk domains) to 45% (nine risk domains).

Thus, it is possible that moderate perinatal mental health problems may be one of many risk factors for child maltreatment in families when other psychosocial or developmental risk factors are present. However, there is still relatively poor understanding of the nuances of how risk factors interact. The risk factor approach assumes that there is no single pathway to negative outcomes and that risk factors occur across multiple developmental domains or levels of a person's social ecology (Bronfenbrenner, 1988). This is consistent with the cumulative risk observed in the literature (Thornberry et al., 2013). However, taking a risk only approach potentially misses other factors that may moderate these risk factors, such as strong social support, resilience etc.

The third factor is the importance of the father and the family context. Although there were only a few studies looking at fathers they all found a relationship between fathers' mental health and child maltreatment (Sidebotham & Golding, 2001; Sidebotham & Heron, 2006; Takerhara et al., 2017). In other studies, greater risk of child maltreatment was observed in families where fathers were not resident and/or had less contact (Shapiro et al., 2011), or were psychologically abusive (Shapiro et al., 2011), coercive (Lee & Guterman, 2010) or violent (Windham et al., 2004) towards the mother. Finally, another issue is that more evidence is needed about who perpetrates the maltreatment, which was not explicitly

addressed in many of the studies reviewed. Most studies focused on maternal mental health and maternal abuse and did not look at child maltreatment from the father or other family members. This is despite evidence from the broader literature that family disorganisation, breakdown or violence is a key risk factor for child maltreatment (Centre for Disease Control & Prevention, 2018). More research is therefore needed that looks at this in relation to perinatal mental health.

Before drawing conclusions, a number of caveats need to be considered. The evidence reviewed was limited in number, with only 24 studies identified that focused on perinatal mental health and child maltreatment. These studies were very heterogeneous methodologically and geographically with research conducted in seven countries, mainly with individualistic cultures. The focus of the research was also largely on mothers' mental health, predominantly depression, making it difficult to draw conclusions about the impact of other perinatal mental health problems such as anxiety disorders or PTSD on risk of child maltreatment.

Summary and conclusion

This review showed this is an under-researched area with significant methodological and geographical heterogeneity so, although findings are consistent with evidence at other times during childhood, conclusions remain tentative. Meta-analysis found perinatal mental health problems were associated with a three times increased risk of child maltreatment, which is similar in magnitude to that observed at other times during childhood. This needs to be interpreted in light of the low absolute risk of child maltreatment at this time. No research directly examined the impact of different levels of symptom severity (i.e. mild/moderate/severe), although meta-analysis found the association between parental mental health and risk of child maltreatment is greater in high-risk samples. It is therefore important for future research to consider how the severity of mental health problems interacts with

other risk factors and who is perpetrating the maltreatment. Studies with fathers all found a relationship between fathers' mental health, absence or violence and risk of child maltreatment but this was based on a few studies so more research is needed. Results are consistent with models of child maltreatment that emphasise the importance of individual, family and social/cultural factors but further research is needed that directly examines the impact of severity of mental health problems, as well as the interaction with other risk factors and family context.

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Figure 1. Search results

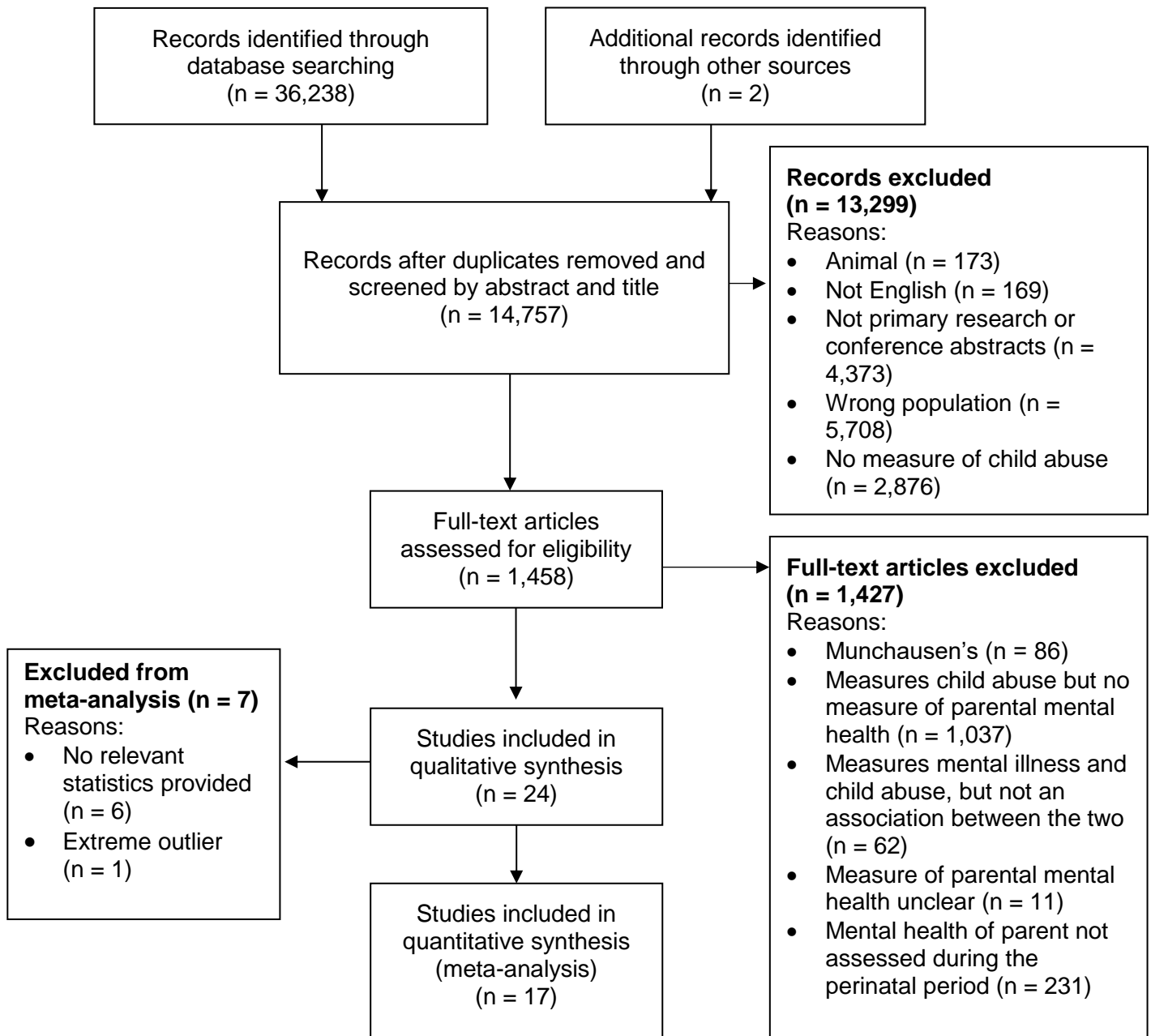


Figure 2. Odds ratios [95% confidence intervals] for the effect of perinatal mental health on risk of child maltreatment

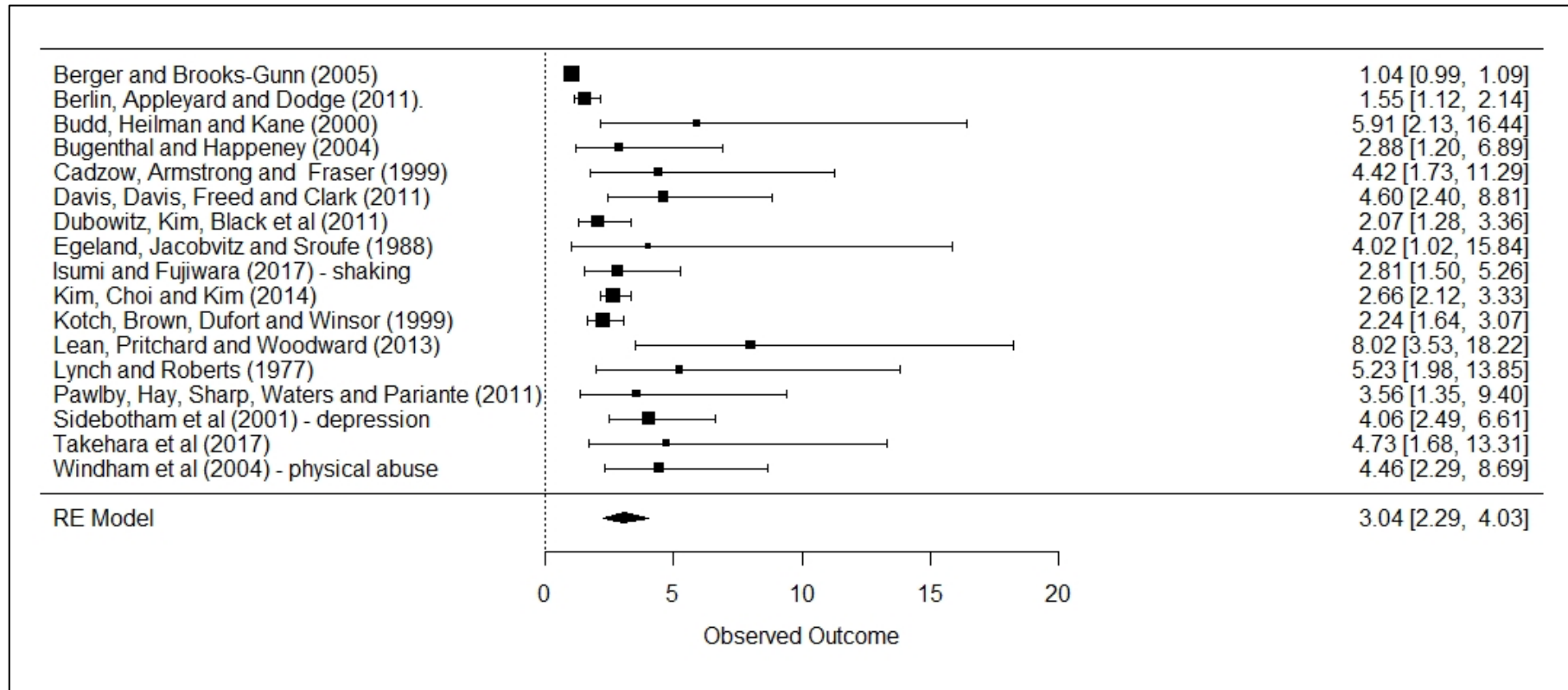


Table 1. Search terms

Parent	Mental health difficulties	Child	Maltreatment
*natal	Psychological	Child	Abuse
*partum	Mental	Baby	Neglect
Pregnan*	Emotion*	Toddler	maltreatment
Mother*	Psychiatric	Infant	
Mum*	Health	Teenager	
Mom*	Wellbeing	Adolescent	
Dad*	Problem*		
Father*	Disorder*		
Couple*	Illness*		
	Symptom*		
	Depress*		
	Anxiety		
	Anxious		
	Stress		
	Mood		
	Affect*		

Table 2. Study Characteristics

Study	Authors/ Quality Rating	Country	Design	Child N; Age of Child	Parent N; Sample type	Type of maltreatment	Parental mental health (measure)	Findings
1	Berger & Brooks-Gunn (2005) 1.0	USA	Cross-sectional	NR; 0-3 years	84 mothers; Community	Abuse/neglect	Maternal emotional distress (depression and anxiety) (GHQ)	<i>Unclear.</i> Emotional distress was a risk factor that increased the probability to engage in maltreatment, but there was insufficient data on this.
2	Berlin et al. (2013) [§] 1.0 Berlin, Appleyard & Dodge (2011) 1.0	USA	Longitudinal	NR; 0-26 months	499 mothers; Community	Abuse/neglect	Depression (2 questions from CIDI SF) Anxiety (1 question from CIDI SF)	<i>Positive.</i> Child maltreatment and harsh parenting positively correlated with maternal health problems (depression and anxiety). <i>No impact.</i> Mental health problems did not predict offspring victimisation.
3	Budd, Heilman & Kane (2000) 0.67	USA	Validation/cross-sectional	61; 2-20 months	61 mothers; Community	Abuse/neglect	Any disorder (SCL-90-R) Global distress (GSI Subscale)	<i>Unclear.</i> Emotional distress significantly correlated with child abuse, but when the emotional distress measures from the CAPI were removed, emotional distress no longer predicted abuse.
4	Bugental & Happaney (2004) 1.0	USA	Cross-sectional	NR; 12 months	96 mothers (73 families); High risk	Abuse/neglect	Depression (BDI)	<i>Positive.</i> Depression significantly correlated with physical punishment & maternal attributions no longer predicted harsh parenting once depression was controlled for.
5	Cadzow, Armstrong & Fraser (1999) 1.0	Australia	Cross-sectional	151; 7 months	90 mothers; High risk	Abuse/neglect	Depression (EPDS)	<i>Positive.</i> Depression predicted child abuse.
6	Chandra, Venkatasubramanian & Thomas (2002) [§] 0.86	India	Cross-sectional	49; 6 weeks-12 months	49 mothers; Psychiatric	Hitting, shouting, smothering, harming in other way, neglecting,	Depression, Psychotic ideas, Psychotic ideas about	<i>Positive.</i> Depression and psychotic beliefs predicted infanticidal ideas. Psychotic ideas predicted infanticidal behaviour.

Study	Authors/ Quality Rating	Country	Design	Child N; Age of Child	Parent N; Sample type	Type of maltreatment	Parental mental health (measure)	Findings
7	Choi et al. (2010) [§] 1.0	Japan	Cross-sectional	413; <12 months	413 mothers; Community	wanting/trying to kill child Abuse/neglect	infant (ICD- 10) Depression (Zung Scale)	<i>No impact.</i> Depression did not predict child abuse.
8	Davis et al. (2011) 0.89	USA	Cohort	1746; 12 months	1746 fathers; Community	Spanking	Depression (CIDI SF)	<i>Positive.</i> Depression predicted spanking.
9	Dubowitz et al. (2011) 0.89	USA	Longitudinal	97; 0-12 years; every 2 years	224 mothers; Community	Abuse/neglect (physical/sexual)	Depression (BSI)	<i>Positive.</i> Depression predicted child abuse.
10	Easterbrooks et al. (2013) [§] 0.67	USA	Cross-sectional	707; NR	707 mothers; Community	Abuse (physical)/ neglect	Depression (CES-D)	<i>Positive.</i> Depression predicted child maltreatment.
11	Egeland & Brunnquell (1979) [§] 0.86 Egeland, Breitenbucher & Rosenberg (1981) [§] 0.89 Egeland, Jacobvitz & Sroufe (1988) 0.89	USA	Cross-sectional	275; 0-3 months 267; 0-3 months	275 mothers; High Risk 267 mothers; High risk	Abuse (physical)/ neglect failure to thrive	Depression (Schaefer & Manheimer 1960) Anxiety (IPAT)	<i>No impact.</i> Anxiety and depression did not predict child abuse. <i>Positive.</i> High anxiety interfered with adequate care.
12	Isumi & Fujiwara (2017) 1.0	Japan	Cross-sectional	4666; 3-4 months	4,159 mothers; Community	Shaking & smothering	Depression (EPDS) & items on general symptoms	<i>Unclear.</i> Unexpected pregnancy in younger mothers predicted shaking and smothering compared to older age and intended pregnancies, but not depression during pregnancy.
13	Kim, Choi & Kim (2014) 0.57	South Korea	Cross-sectional	1060; 0-24 months	1060 mothers; Community	Abuse (physical, emotional)/ neglect	Depression (BDI & EPDS)	<i>Positive.</i> Depression had significant effect on child abuse and influenced abuse through marital relationship

Study	Authors/ Quality Rating	Country	Design	Child N; Age of Child	Parent N; Sample type	Type of maltreatment	Parental mental health (measure)	Findings
14	Kotch et al. (1999) 0.89	USA	Cohort	172; 0-4 years	708 mothers; Community	Abuse/neglect	Depression (CES-D)	<i>Positive.</i> Depression was significantly associated with maltreatment.
15	Lean, Pritchard & Woodward (2013) 0.89	New Zealand	Prospective longitudinal study	73; 0-4.5 years	72 mothers; Psychiatric	Contact with Child Protection Services	Depression (EPDS)	<i>Positive.</i> Depression predicted child protection concerns.
16	Lee & Guterman (2010) [§] 1.0	USA	Cohort	1597; 3 years old	1597 mothers & fathers; Community	Aggression (physical/psycholo gical) Spanking	Depression (CIDI SF)	<i>No impact.</i> Maternal aggression and spanking associated with paternal coercion of mother and paternal spanking. Fathers depression not associated with maternal aggression to child.
17	Lynch & Roberts (1977) 0.71	UK	Cross-sectional	50; NR	50 mothers; Community	Abuse/neglect	History of disorder (antenatal medical records)	<i>Positive.</i> Prevalence of abuse higher in mothers with psychiatric illness or emotional disturbance.
18	Pawlby et al. (2011) 0.75	UK	Longitudinal	120; 11 years	Community 120 mothers	Abuse (physical/sexual), harsh parenting	Depression (CIS)	<i>Unclear.</i> Antenatal depression increased risk of child abuse by any family member. Maternal antenatal depression not associated with greater risk of mothers abusing their children.
	Plant et al., (2013) [§] 0.89			125; 11 years	125 mothers			<i>Positive.</i> Antenatal depression significantly predicted child maltreatment.
	Plant et al. (2015) [§] 0.89			103; 11 years	103 mothers			
19	Sachs et al. (1999) [§] 0.71	USA	Cross-sectional	48; 1-20 months	48 mothers; Community	Abuse/neglect	Depression (CES-D)	<i>Positive.</i> Depression symptoms correlated with and predicted child abuse.
20	Shapiro, Krysik & Pennar (2011) [§] 0.86	USA	Cross-sectional	197; NR	197 mothers & fathers; Community	Abuse/neglect	Depression (CES-D)	<i>No impact.</i> Depression did not predict psychological abuse. Involvement with child protection services associated with less father involvement and maternal psychological abuse by fathers.

Study	Authors/ Quality Rating	Country	Design	Child N; Age of Child	Parent N; Sample type	Type of maltreatment	Parental mental health (measure)	Findings
21	Sidebotham et al. (2001) 0.89	UK	Cohort	162; 0-6 years	14893 mothers & fathers; Community	Abuse (physical/ sexual/emotional)/ neglect	History of disorder (reported by parents)	<i>Unclear.</i> Paternal depression increased the risk of child maltreatment, but maternal depression did not. Other psychiatric illness also significantly predicted maltreatment. <i>Positive.</i> Previous psychiatric illness significantly influenced child maltreatment e.g. more likely to be investigated or have a child registered on the child protection register.
	Sidebotham et al. (2006) [§] 0.89			293; 0-6 years				
22	Takehara et al. (2017) 1.0	Japan	Population based longitudinal study	196; 2 months	196 fathers; Community	Abuse (physical) neglect	Depression (EPDS)	<i>Unclear.</i> Paternal depression was significantly associated with child maltreatment during postpartum period (2 months). Prenatal paternal depression and maternal depression had no impact.
23	Windham et al. (2004) 0.86	USA	Cross-sectional	595; 0-3 years	595 mothers (families); High risk	Aggression (physical or psychological)	Depression (CES-D)	<i>Positive.</i> Maternal depression and intimate partner violence were significantly associated with child severe physical assault and assault to child self-esteem.
24	Zelenko et al. (2001) [§] 0.89	USA	Cross-sectional	50 (foetuses); Pregnancy	50 mothers; High risk	Abuse/neglect	Any disorder (SCL-90-R) History of disorder (reported by mothers)	<i>Positive.</i> During pregnancy current psychological distress and history of psychiatric disorder predicted child abuse.

NOTES: [§] Papers not included in the meta-analyses. **Abbreviations:** NR = Not Reported

Measures: BDI = The Beck Depression Inventory; BSI = The Brief Symptom Inventory; CES-D = The Center for Epidemiologic Studies - Depression scale; CIDI SF = Composite International Diagnostic Interview Short Form; CIS = Clinical Interview Schedule; EPDS = Edinburgh Postpartum Depression Scale; GHQ = General Health Questionnaire; IPAT Anxiety Scale = Institute of Personality and Testing Scale; Schaefer & Manheimer (1960) = Dependency and depression; SCL-90-R = Symptom Checklist 90-Revised; ZSDS = Zung Self-Rating Depression Scale.

Table 3. The effect of moderator variables on the relationship between perinatal mental health and child maltreatment

Moderators	Categories	N	Statistic QM (df)	Significance
Parental mental health moderators				
Type of mental illness	Maternal depression	11	QM (df 1) = 0.02	$p = .896$
	Other	6		
Quality of measure of mental health	Unvalidated self-report	3	QM (df 2) = 1.21	$p = .545$
	Validated questionnaire	11		
	Clinical interview	3		
Time mental health measured	Pregnancy	5	QM (df 2) = 1.19	$p = .550$
	0-6 months postpartum	6		
	6+ months postpartum	5		
High or low risk sample	Low risk (community)	13	QM (df 1) = 3.68	$p = .055^*$
	High risk (psychiatric/vulnerable)	4		
Child maltreatment moderators				
Child's age when maltreatment measured	0-12 months	5	QM (df 3) = 1.11	$p = .775$
	0-24 months	2		
	0-6 years	6		
	6+ years	2		
Confirmed maltreatment	Actual & suspected	13	QM (df 1) = 1.95	$p = .162$
	Potential & inadequate care	4		
Type of maltreatment	Maltreatment	11	QM (df 1) = 1.86	$p = .173$
	Physical abuse	6		
Quality of measure of maltreatment	Unvalidated self-report	5	QM (df 2) = 0.12	$p = .948$
	Validated questionnaire	6		
	Confirmed cases	6		
Methodological & statistical moderators				
Time between measuring mental health & child maltreatment	Number of months	16	QM (df 1) = 0.17	$p = .677$
Type of effect size	odds ratios	10	QM (df 1) = 1.36	$p = .244$
	r or d	7		

* statistically significant moderation of the relationship between parental mental health and child maltreatment