Systematic Review on the Impact of Different Presentations of Maternal Depression on Children's Socio-Emotional Development: A Study Protocol

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ABSTRACT

Background: Maternal depression from the perinatal period onwards is associated with an increased likelihood of suboptimal socio-developmental outcomes in offspring, with increasing interest in the extent to which sustained maternal depression impacts on these associations. The current protocol outlines the methodology of a systematic review to synthesise the evidence on the impact of maternal depression from the perinatal period onwards and offspring socio-emotional development, defined as internalising, externalising, and social competence outcomes. We aim to explore the effects of timing, chronicity and severity of maternal depression on outcomes, and identify sources of methodological bias.

Methods/Design: The conduct and reporting of the protocol will adhere to PRISMA-P guidelines. The systematic review will be conducted using the following electronic databases: APA PsycInfo, EMBASE, MEDLINE. Grey literature will be searched from the ProQuest Dissertations & Theses Global database.

Discussion: Findings from the systematic review will enhance knowledge around potential heterogeneity of timing, chronicity and severity of maternal depression and its impact on offspring socio-emotional development.

Keywords: maternal depression, perinatal period, depression trajectories, socio-emotional development, children

1. Background

Frequently occurring in around 13-15% of women, maternal depression (MD) is a psychiatric disorder with possibly severe symptoms and complications (Madigan, Wade, Plamondon, & Jenkins, 2017). Maternal depression may have onset during any stage of pregnancy, in the postpartum period, or through the offspring's childhood and adolescence (Westin, 2005). Maternal depressive symptoms during pregnancy may impact fetal development, via the transmission of stress hormones and noxious substances across the placenta barrier (Ghosh et al., 2018). It may also affect mothers at a cognitive and emotional level, in preparing themself for motherhood during the perinatal stage (Pearson et al., 2012). Furthermore, it may impact on a mother's capacity to be attuned to the baby's needs and cues

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in the postpartum period with consequent effects on the mother-child relationship (McAndrew, 2017).

The association between MD and children's socio-emotional outcomes has been widely examined over the past 20 years, with both antenatal (AND) and postnatal depression (PND) symptoms associated with a range of negative child (Bolea-Alamanac et al., 2019; Ghosh et al., 2018; Lahti et al., 2017; McAndrew, 2017; Reuben & Shaw, 2015), and adolescents outcomes (Capron et al., 2015; Pearson et al., 2013). Maternal depression during pregnancy may raise the risk of suboptimal birth outcomes, such as prematurity, lower birth weight, and intrauterine growth restriction, that themselves represent developmental hazards to offspring (Bussières et al., 2015; Ding et al., 2014; Grote et al., 2010). Concerning socio-emotional outcomes, MD during pregnancy and the postnatal period has been associated with increased rates of externalising (Lahti et al., 2017; Robinson, Lahti-Pulkkinen, Heinonen, Reynolds, & Raikkonen, 2019), internalising (Lahti-Pulkkinen et al., 2018), peer relationship problems, and lower prosocial behaviours (Maruyama et al., 2019). Longitudinal cohort studies have also shown associations between MD in the perinatal stage and externalising problems (Robinson et al., 2019), depressive (Pearson et al., 2013), and anxiety symptoms (Capron et al., 2015) in adolescence.

Although the effects of MD in the perinatal period on children's socio-emotional development have been broadly studied, there is limited literature on the course of maternal depressive symptoms and its effects on offspring socio-emotional outcomes, since most studies are cross-sectional and evaluate antenatal, postnatal, and co-current depression separately (Underwood, Waldie, D'Souza, Peterson, & Morton, 2016). Studies with longitudinal MD measurements show that while the majority of women with AND or PND show improvement after the postpartum period, around one-third of them maintain depressive symptoms and are in at increased risk of future depressive episodes (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Cents et al., 2013; Netsi et al., 2018). Consequently, it is important to account for differing presentations of MD when examining the impact on children socio-emotional outcomes.

Three factors have been suggested to be central to account for different presentations of MD: timing, chronicity and severity of depressive symptoms (Brennan et al., 2000; van der Waerden et al., 2015). Recent longitudinal studies have shown that AND and PND may constitute independent risk factors for offspring socio-emotional outcomes (Lahti et al., 2017; Pearson et al., 2013; Tuovinen et al., 2018), demonstrating that MD may lead to different pathways for transmission of risk depending on the specific period of onset of depression. In contrast, other studies suggest chronicity, rather than the timing of MD, is a significant factor in children's externalising problems and social competence (Brennan et al., 2000; Kim-Cohen, Caspi, Rutter, Tomas, & Moffitt, 2006; Netsi et al., 2018; van der Waerden et al., 2015). For internalising symptoms, there is stronger evidence for an independent effect of PND, which remains stable after accounting for repeated maternal depressive episodes in later developmental stages and contextual risks factors (Hay, Pawlby, Waters, Perra, & Sharp, 2010; Pearson et al., 2013). Also, it has been reported that the severity and chronicity of depressive symptoms are correlated with each other (Brennan et al., 2000; Campbell et al., 2007), showing that severity of MD is also predictive of offspring socio-emotional outcomes (Hammen & Brennan, 2003; Netsi et al., 2018; Wickramaratne et al., 2011).

Considering the evidence from longitudinal studies, several questions concerning the association between distinct patterns of MD and children's socio-emotional outcomes remain unclear, including how timing, chronicity, and severity of MD has an impact on offspring socio-emotional development.

1.1 Aims

We aim to systematically review prospective studies that have measured MD longitudinally, from the perinatal period onwards. Research questions are: (i) What is the evidence of associations between different patterns of maternal depression from the perinatal period and later stages of motherhood and children's socio-emotional development? (ii) What is the evidence for the impact of timing, chronicity, and severity of maternal depressive symptoms on children's socio-emotional development? (iii) What are the methodological sources of bias in the published literature?

2. Design and Methods

2.1 Protocol

The conduct and reporting of this review protocol will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) guidelines (Moher, Stewart, & Shekelle, 2016).

2.2 Eligibility criteria

Inclusion criteria are as follows:

- Longitudinal prospective cohorts targeting biological mothers with a diagnosis or symptoms of depression.
- Studies using a validated measure of depressive symptoms, with the onset measured in the antenatal, postnatal or first year after childbirth.
- Repeated measurements of MD with at least one measure of depressive symptoms during the antenatal or postnatal period and one at later stages of motherhood (after the first year of childbirth).
- Studies assessing the impact of MD longitudinally on children's socio-emotional development (i.e., internalising, externalising problems, social competence) from three to twelve years old using previously validated measures of socio-emotional development. Studies that included a broader age will be selected if they present subgroup analyses on children from three to twelve years old.

Exclusion criteria are as follows:

- Cross-sectional designs, experimental designs (e.g. interventions or antidepressant treatment), qualitative studies, reviews and meta-analysis studies, case studies.
- Papers where MD was employed as a mediator of other variables, or without a clear results section examining the association between MD and children's socio-emotional outcomes.
- Studies reporting on children with developmental disabilities.

2.3 Information sources

Three electronic databases will be searched for relevant published and unpublished literature by OVID multi-field search: APA PsycInfo (1806 to present); Embase Classic+Embase (1947 to present); and Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily (1946 to present). Additionally, grey literature will be searched from the ProQuest Dissertations & Theses Global database. The search will be restricted from 1992 to the present, as Depression Disorder with postnatal onset was admitted in the ICD-10 in this year.

2.4 Search and selection

Searches will be devised in collaboration with an information specialist from the University of Edinburgh Library. Key search terms will be employed in each database using a five-module approach: maternal depression in the perinatal period, trajectories, longitudinal studies, socio-emotional development, and children (e.g. 'depress* adj3 mother*', 'antenatal', 'postpartum', 'trajector*', 'longitudinal', 'socioemotion* develop*', 'child*'). Articles from the initial search will be de-duplicated. A screening pilot will be conducted by two independent researchers with the first 30 articles. Disagreements will be resolved by discussion and consensus meetings. Thereafter, all study titles and abstracts will be reviewed independently by the same researchers, continuing with the revision of the full-text of papers which are expected to meet the inclusion criteria. Interrater reliability will be calculated between both researchers, and any discrepancies will be reassessed with the participation of a third researcher.

2.5 Data extraction

Data will be extracted by the first author into an excel spreadsheet. Information will be extracted on (i) study characteristics (title, name of the first author, year of publication, location, language, name of the cohort, number of follow-ups); (ii) sample characteristics (sample size, ages); (iii) assessments characteristics (timing of data collection, assessment tool used in mothers and offspring, cutoff used in each instrument, type of informant); and (iv) study results (main findings, number and types of MD trajectories if trajectory analysis is used, type of methodology and statistical modeling of MD longitudinally, reported significance values of the association between MD and children's socio-emotional outcomes, fully adjusted).

2.6 Risk of bias/ Quality assessment

The methodological quality of included studies will be assessed using the Agency for Healthcare Research and Quality (AHRQ) checklist (Williams, Plassman, Burke, & Benjamin, 2010). Each item will be evaluated and scored as follows: "yes" (2 points), "partially" (1 point), "no" (0 points), or "not applicable" (N/A). Then, a *percentage score* will be presented for each article that meets the eligibility criteria, calculated by the *total score* (sum of points per study) divided by the *maximum score* (maximum score of applicable items) (Raouna, Osam, & MacBeth, 2018). A second researcher will independently evaluate the methodological quality of one-third of the eligible papers, and interrater reliability will be assessed with Cohen's kappa score. Major discrepancies will be resolved through consensus after discussion if necessary.

2.7 Data synthesis

A narrative synthesis will be conducted addressing the following key areas: presentation of MD longitudinally; associations between MD and offspring' socio-emotional outcomes (internalising, externalising and social competence); the impact of timing, chronicity and severity on offspring' internalising, externalising and social competence outcomes.

3. Discussion

Considering the large proportion of women who experience MD during the perinatal period (Madigan et al., 2017), it is essential to develop rigorous research to improve the knowledge around MD and its impact on offspring. Most of the existing literature has studied

the association between MD and children's socio-emotional outcomes considering MD as a homogenous condition across women. However, in the last decades, an increasing number of studies have stated the importance of recognising the heterogeneous presentation of MD (Brennan et al., 2000; Cents et al., 2013; Matijasevich et al., 2015). Thus, this research intends to synthesise these results to improve the understanding of differing presentations of MD across time. Findings will help to target needs-matched intervention for women, their families and social supports, according to the unique characteristics of each group, along with informing policies about prevention and intervention strategies in different periods of motherhood.

Limitations of the review are likely to be related to the assessment of MD. First, there is no "gold standard" of available tools to assess maternal depressive symptoms and its course over time, and there are a wide variety of measurements used in this research. This variability may result in considerable differences between findings, depending on which measurement was applied, the type of informant, and the cutoffs used. Second, although the literature has shown the importance of the onset of symptoms during pregnancy, only a few cohort studies have assessed MD from the antenatal period onwards. Therefore, studies that indicate the onset of MD after childbirth may not take into account that symptoms may be an extension of MD during pregnancy. These limitations may impact on the robustness of conclusions concerning the longitudinal presentation of maternal depression and its impact on children socio-emotional outcomes.

Declarations

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