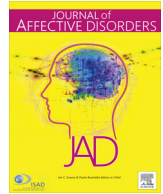




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Review article

A systematic review and meta-analysis of the association between unintended pregnancy and perinatal depression



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ABSTRACT

Background: There is a growing interest in exploring maternal mental health effects of unintended pregnancies carried to term. However, the evidence base from a small number of available studies is characterised by considerable variability, inconsistency and inconclusive findings. We present a systematic review and meta-analysis of all available studies on unintended pregnancy as these are related to maternal depression.

Methods: Using PRISMA guideline, we systematically reviewed and meta-analysed studies reporting an association between unintended pregnancy and maternal depression from PubMed, EMBASE, PsychINFO and Google Scholar. We used a priori set criteria and included details of quality and magnitude of effect sizes. Sample sizes, adjusted odds ratios and standard errors were extracted. Random effects were used to calculate pooled estimates in Stata 13. Cochran's Q , I^2 and meta-bias statistics assessed heterogeneity and publication bias of included studies.

Results: Meta-bias and funnel plot of inverse variance detected no publication bias. Overall prevalence of maternal depression in unintended pregnancy was 21%. Unintended pregnancy was significantly associated with maternal depression. Despite statistically significant heterogeneities of included studies, subgroup analyses revealed positive and significant associations by types of unintended pregnancies, timing of measurements with respect to pregnancy and childbirth, study designs and settings.

Conclusions: The prevalence of perinatal depression is two-fold in women with unintended pregnancy. Perinatal care settings may screen pregnancy intention and depression of women backed by integrating family planning and mental health services.

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1. Introduction

Internationally there are concerns associated with the high prevalence of unintended pregnancies (McIntosh and Finkle, 1995) carried to term and their impact on maternal mental health in general and (Brown and Eisenberg, 1995; Gipson et al., 2008; Logan et al., 2007) perinatal depression in particular (Klier et al., 2008; Gavin et al., 2005; Kingsbury et al., 2015). Poor maternal mental health is a public health problem (Balaji et al., 2007) with implications for familial wellbeing (Burke, 2003), child psychopathology and abnormal development (Goodman and Gotlib, 1999; Cogill et al., 1986; Kurstjens and Wolke, 2001). Moreover, pregnancy and childbirth related events including unintended pregnancy (Brown and Eisenberg, 1995; Gipson et al., 2008; Logan et al., 2007) may make a substantial contribution to maternal depression (Klier et al., 2008; Gavin et al., 2005; Kingsbury et al., 2015).

Maternal mental health problems have been purported as both causes and consequences of unintended pregnancies. For instance, stress is suggested to increase the risk of poor maternal mental health (Hall et al., 2014) by reducing coping skills (Kuroki et al., 2008) in mothers with unintended pregnancies. However, findings from a randomized clinical trial reveal a negative association between unintended pregnancy and stress (Kuroki et al., 2008). Other available data show inconsistent findings (Ikamari et al., 2013; McCrory and McNally, 2013; Messer et al., 2005; Yanikkerem et al., 2013; Fellenzer and Cibula, 2014; Iranfar et al., 2005; Lau and Keung, 2007; Cheng et al., 2009; Najman et al., 1991; Grussu et al., 2005; Mercier et al., 2013; Christensen et al., 2011). Unintended pregnancies assessed through retrospective reports were found to be associated with maternal perinatal mental health including varying degrees of depressive disorders (Ikamari et al., 2013; McCrory and McNally, 2013; Messer et al., 2005; Yanikkerem et al., 2013), moderate to severe prenatal (Yanikkerem et al., 2013; Fellenzer and Cibula, 2014; Iranfar et al., 2005; Lau and Keung, 2007) and postpartum (Cheng et al., 2009) depression. Findings from some prospective studies suggest prenatal (Messer et al., 2005) and postpartum depression (Iranfar et al., 2005; Najman et al., 1991), and other mood disorders in women (Grussu et al., 2005). Other longitudinal studies however report statistically nonsignificant associations between unintended pregnancies and postpartum depression (Mercier et al., 2013; Christensen et al., 2011).

Given high rates of unintended pregnancies in the general population (McIntosh and Finkle, 1995) and its potential maternal mental health impact (Brown and Eisenberg, 1995; Gipson et al., 2008; Logan et al., 2007), there is a need to know more about associations between pregnancy intendedness and maternal depression. A handful of prior studies of the impact of unintendedness on maternal depression have had methodological weaknesses with concerns about the validity of measurement and substantial inconsistency across findings (Brown and Eisenberg, 1995; Gipson et al., 2008; Logan et al., 2007). To our knowledge, there has been no systematic review and meta-analysis of unintendedness of pregnancy and its relationships with depression. The current meta-analysis focuses on overall prevalence and association of unintended pregnancies and maternal depression and provides sub-group estimates across time of measurement with regard to pregnancy or childbirth, types of unintendedness, study designs and settings.

2. Methods

We employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (Moher et al.,

2009) and used two strategies to identify studies—systematic searches of electronic databases (PubMed, EMBASE, PsycINFO and Google Scholar) and hand searches of reference lists of included articles. A Boolean search strategy was established and used. The key terms were: exposure identifiers—*uninten* OR unintended OR unplanned OR unwanted pregnancy OR childbirth*; outcome identifiers—*maternal depression OR perinatal depression OR mental health disorders*; and combined exposure and outcome identifiers—*uninten* OR unintended OR unplanned OR unwanted pregnancy OR childbirth AND maternal depression OR perinatal depression OR mental health disorders*. Moreover, we used an *operator “uninten*” to capture possible variations in two terms, “unintentional” and “unintended”.

We included (McIntosh and Finkle, 1995) all quantitative studies (Brown and Eisenberg, 1995) which employed robust analyses controlling for confounders and (Gipson et al., 2008) published before 2015 reporting unintendedness and maternal depression of singleton live births. Qualitative (McIntosh and Finkle, 1995) and quantitative studies of descriptive-only statistics (Brown and Eisenberg, 1995) were excluded.

We extracted sample sizes, proportions and adjusted odds ratios with 95% confidence intervals (OR; 95%CI). Numerator and denominator data and beta coefficients and their standard errors (if given) were used to estimate ORs where ORs with 95%CI were not provided. Efforts were made to contact corresponding authors, whenever there was insufficient information to calculate the estimates.

Quality was assessed based on study features using an eight-point checklist (DB, 2014). Criteria for quality assessment include the validity of study methods, interpretation and applicability of results. Quality scores were derived for our purposes and did not necessarily represent the original objective of each included research article. Moreover, we used effect size magnitude definitions for each included study based on individual OR obtained from forest plot (small ($</=1.44$); medium ($>/=2.47$); and large ($>/=4.25$)) (Cohen, 1992). The primary author (AAA) conceived the hypothesis, developed the methodology, identified all potential studies, wrote and proofread the manuscript. Two authors (AAA and JCM) reviewed abstracts, extracted data and assessed quality of included studies independently. Discussions and mutual consensus was sought when possible disagreements were raised between these two reviewers.

Stata 13 was used for meta-analysis and forest plots that showed combined estimates with 95%CI. It produced Cochran's Q, I^2 and inverse variances tests of overall and between group heterogeneity of estimates (Egger et al., 2008). Cochran's Q set at 0.05 random error and I^2 statistic were used to determine heterogeneity (Doi and Williams, 2013) suggesting the extent of bias associated with eligible studies. We reviewed forest plots of summary estimates of each study to determine whether we could identify any heterogeneity between studies. We used random effects (RE) models to account for any remaining heterogeneity in the estimates across studies because these models account for both random variability and the variability in effects among the studies (Okin, 1999; Higgins et al., 2003). We conducted meta-bias and funnel plot for publication bias. A series of sub-group analyses were conducted to estimate effect sizes for maternal depression in terms of time of outcome measurement (given reference to pregnancy or childbirth), types of unintendedness, study designs and settings. The Diagnostic Statistical Manual (DSM-IV) definition of depression was adapted to assess perinatal depression across countries and cultures and was used to measure point prevalence (Gorman et al., 2004).

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