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Paternal peripartum depression: emerging issues and questions on prevention, diagnosis and treatment. A consensus report from the cost action Riseup-PPD

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Paternal peripartum depression: emerging issues and questions on prevention, diagnosis and treatment. A consensus report from the cost action Riseup-PPD

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ABSTRACT

Introduction: Paternal peripartum depression (P-PPD) is a serious and understudied public health problem associated with impaired family functioning and child development. The lack of recognition of P-PPD may result in limited access to both information and professional help.

Objective: The aim of the study was to review studies on paternal peripartum depression and to identify issues and questions where future research and theory formation are needed.

Methods: A literature search for systematic reviews, meta-analyses and primary studies was conducted using PubMed, Web of Science, Embase, Scopus, Medline, PsychInfo and Informit databases. Key results within the retrieved articles were summarised and integrated to address the review objectives.

Results: Based on the literature, the knowledge related to prevalence, screening, risk factors unique to fathers, management strategies and outcomes of P-PPD is lacking. Currently, there is no consensual understanding of the definition of P-PPD and recommendations for dealing with P-PPD. Limited data were available regarding the barriers preventing fathers from accessing support systems.

Conclusion: Emerging issues that need to be addressed in future research include: P-PPD definition and pathogenetic pathways; prevention strategies and assessment tools; self-help seeking and engagement with interventions; the cost-effectiveness of P-PPD management; needs of health professionals; effect on child

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development, and public awareness. Future studies and clinical practice should account the complexities that may arise from the father's perceptions of health care services. Results from this review highlights the critical issues on how to plan, provide and resource health services, to meet the health needs of fathers.

Introduction

Peripartum depression (PPD) typically refers to major or minor depression that starts during pregnancy or up to 12 months postpartum (Batt et al., 2020; Gavin et al., 2005; O'Hara & McCabe, 2013). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013), peripartum depression is a specifier of depression that has an onset of mood symptoms during pregnancy or in the first four weeks following delivery. Although this specification does not exclude PPD in men, it typically refers to women, as most studies have examined PPD in mothers. As a consequence, this condition is less studied and understood in fathers. A growing body of empirical evidence suggests that it is indispensable to identify and treat paternal PPD at an early stage as well as to minimise its negative effects on the father and the family system. A delay in treatment of P-PPD is associated with the worsening of paternal mental health status (Livingston et al., 2021; Seidler et al., 2016). It has also been reported that untreated P-PPD may cause or exacerbate the mother's psychiatric symptoms (Nath et al., 2016; Paulson et al., 2016) and can adversely affect the development of the child (Cui et al., 2020; Gutierrez-Galve et al., 2019).

However, for fathers willing to seek support, the lack of recognition of P-PPD may result in limited access to both information and help. Empirical data reports that a lack of knowledge and information about P-PPD could be one of the greatest barriers in the process of help-seeking (Pedersen et al., 2021; Swami et al., 2019). As a result, symptoms of depression may be overlooked by fathers themselves, friends, family or health professionals and the mental state of the father may worsen. Given the potential implications of P-PPD, it is essential for families and healthcare providers to expand awareness and knowledge on P-PPD.

This study focuses on the current global challenge of responding to fathers' mental health needs. The COST Action 'Research Innovation and Sustainable Pan-European Network in Peripartum Depression Disorder (Riseup-PPD)' (CA18138) network has set the goal of filling gaps in PPD research, practice and social awareness. The network includes researchers and clinicians in and outside Europe with various backgrounds and expertise as well as representatives of end-users' associations.

The objective of this narrative review is to provide both researchers and practitioners with an up-to-date summation and integration of relevant topics on P-PPD and guidance to identify areas in which the research findings are inconsistent and where future research, theory formation and interventions are needed. While Riseup-PPD conceptualises peripartum depression as a mental condition that affects the whole family, this review on P-PPD will follow the structure of previous consensus report by Fonseca et al. (2020) on peripartum depression in women. The potential negative impact of P-PPD on family systems, representing a socioeconomic burden to society, and the need for

clinicians, policymakers and developers of clinical guidelines to have updated information and engender new initiatives, stress the relevance and importance of this narrative review.

Methods

A literature search was performed between February and October 2022. The literature search for systematic reviews, meta-analyses and primary studies was conducted using PubMed, Web of Science, Embase, Scopus, Medline, PsychInfo and Informit databases. The following keywords and their synonyms were combined (father OR paternal OR male OR men) AND (peripartum OR prepartum OR postpartum OR perinatal OR prenatal OR postnatal OR pregnancy OR childbirth OR birth OR labour) AND (depression OR depressive) AND diagnosis (e.g. diagnosis OR diagnostic criteria OR diagnostic instruments) AND screening (e.g. screening OR screening instruments OR screening tools) AND prevention (e.g. preventive interventions OR prevention OR preventive strategies) AND treatment (e.g. psychological treatment OR pharmacological treatment) AND cost-effectiveness (e.g. cost-effectiveness OR cost-effective OR cost-utility) AND risk factors (e.g. psychological risk factors OR psychosocial risk factors OR biological risk factors) AND effect on child development (e.g. child development OR infant development). The search was limited to full-text articles published in English, in peer-reviewed journals, and studies containing fathers as participants. In the review 97 articles were included spanning the years 1999–2022.

Results

Prevalence of P-PPD

In a recent population-based study, data from men living in 27 European countries showed an overall prevalence of current depressive disorder of 4.9% (Arias de la Torre et al., 2021). A meta-analysis by Cameron et al. (2016) revealed a total rate of depression of 8.4% during pregnancy and up to one year postpartum. The meta-analysis by Rao et al. (2020) showed a pooled prevalence of depression in 9.8% of men during pregnancy and 8.8% within a year postpartum. The prevalence of prepartum depression was 13.6% in the first, 11.3% in the second and 10.1% in the third trimester. The prevalence of postpartum depression was 9.0% within one month, 7.8% between one and three months, 9.2% between three and six months and 8.4% between six to twelve months after childbirth.

Overall, rates of P-PPD vary broadly and are not always conditional on the timing of assessment. Varying rates of P-PPD might be influenced by social and cultural biases (e.g. differing interpretations of depressive symptoms, social acceptance of mental health problems, divergent expectations with respect to paternal-infant care responsibilities or presence/absence of paternity leave). Culture, as an etiopathogenic and pathoplastic factor, and as a contributing factor of severity, may have a significant impact on the detection of P-PPD (Alarcón, 2009). Additionally, methodological aspects such as the use of different diagnostic approaches, biased translations of instruments, or differing sampling methods may also impact P-PPD

prevalence data (Berg et al., 2022; Cameron et al., 2016; Paulson & Bazemore, 2010; Perez et al., 2017).

Diagnosis of P-PPD

The literature suggests that the clinical features of P-PPD are more heterogeneous when compared with maternal PPD (Bruno et al., 2020; Livingston et al., 2021; O'Brien et al., 2017). Research findings indicate that avoidance or withdrawal from social situations, work, or family, indecisiveness, cynicism, anger attacks, affective rigidity, self-criticism, and irritability are typical signs and symptoms of P-PPD (Bruno et al., 2020; Livingston et al., 2021; Musser et al., 2013; O'Brien et al., 2017). Recurrent worries and intrusive thoughts about the child's health and development may mask depression in men (Bruno et al., 2020). Additionally, a range of somatic symptoms, negative parenting behaviours, alcohol and drug use, as well as increased marital conflict should alert healthcare professionals to a possible diagnosis of P-PPD (Bruno et al., 2020; Musser et al., 2013). In order to avoid measurement bias, traditional and male-type symptoms of depression should be combined in assessment and diagnostics (Martin et al., 2013; Psouni et al., 2017; Scarff, 2019).

Studies examining the longitudinal patterns of P-PPD show consistency in symptom duration, with the majority of prenatally depressed fathers remaining symptomatically depressed when assessed at different points in the postpartum period (Cameron et al., 2016; Paulson & Bazemore, 2010; Thiel et al., 2020). To date, the longest follow-up study on P-PPD has evaluated 1604 fathers up to 24 months postpartum (Kiviruusu et al., 2020). Based on their findings, stability was one of the main features of the identified depression symptom trajectories, indicating the chronic nature of perinatal or postpartum depression. Further, prevalence rates of clinically significant depressive symptoms were found to double from prenatal to 24 months postpartum.

Although studies outside the perinatal period demonstrate comorbidity between depression and other diseases (e.g. generalised anxiety disorder, obsessive-compulsive disorder), there is a lack of evidence concerning the comorbidity in the perinatal period among fathers (Dennis et al., 2022; Leach et al., 2016). This is, in part, because the prevalence and the course of mental disorders across the perinatal period is not well understood for fathers (Dennis et al., 2022; Leach et al., 2016; Scarff, 2019). A longitudinal study by Dennis et al. (2022) examined comorbidity in fathers and reported high rates of comorbid depression and anxiety symptoms in the first 2 years postpartum. Although findings from the study indicate comorbidity between depression and anxiety, further evidence is needed to understand the comorbidity of depression and anxiety and other diseases (Dennis et al., 2022).

Diagnosis of P-PPD can be delayed or missed because symptoms of PPD are often not recognised and may be minimised by both fathers and healthcare professionals as normal, natural consequences of childbirth (Hammarlund et al., 2015; Pedersen et al., 2021; Seidler et al., 2016). The findings from a systematic review and meta-analysis suggest that prioritising care for others may delay fathers seeking help for themselves (Livingston et al., 2021). If treatment is delayed, the course of the disease may worsen (Seidler et al., 2016). In order to facilitate an early diagnosis and timely treatment, the effectiveness of identification and management strategies for P-PPD should be essentially

worked on. While there is no universally accepted diagnosis of P-PPD, using DSM-5 criteria is recommended (Scarff, 2019).

Screening for P-PPD

Another important issue to address relates to screening for P-PPD. Based on the synthesis of the literature, self-reported questionnaires (sent by post or email), were most prevalent followed by mixed self-report questionnaires with a clinical interview, semi- and structured interviews, and very few questionnaires administered via telephone calls. In terms of research design, both cross-sectional and longitudinal studies were presented. While screening for P-PPD is a consensual recommendation, there are several important gaps to overcome. First, several meta-analyses and systematic reviews have documented that most existing screening and diagnostic instruments for PPD in men are developed for mothers and may not adequately capture depression symptoms in fathers (e.g. Cameron et al., 2016; Kennedy & Munyan, 2021). A recent review identified thirteen instruments that were used in previous research to assess P-PPD, of which the three most extensively examined instruments were the Edinburgh Postnatal Depression Scale (EPDS), Center for Epidemiologic Studies Depression Scale (CES-D), and Beck Depression Inventory (BDI). While the decision on which cut-off to use for the detection of P-PPD is crucial, there is still no agreement on the optimal cut-off scores. In addition, while universal screening of fathers is the consensus recommendation of most studies, there is no specific guidance regarding the timing of screening related to the sensitivity of the instruments studied (Bruno et al., 2020; Cameron et al., 2016; Kennedy & Munyan, 2021; Thiel et al., 2020). Second, somaticizing symptoms and externalising behaviours, typically related to male depression, are not measured in the most frequently used scales for assessing PPD. The lack of knowledge on male-type symptoms of depression may lead to diagnostic misses, misdiagnosis or rejection (Cameron et al., 2016; Kennedy & Munyan, 2021; Krumm et al., 2017; Martin et al., 2013; Psouni et al., 2017; Seidler et al., 2016). Third, there is a gap in the knowledge regarding the prevalence of P-PPD. Several literature reviews (e.g. Cameron et al., 2016; Thiel et al., 2020) emphasise that many different questionnaires are used in studies and only few interview studies are available which leads to issues in conducting reliable analysis on prevalence. Namely, findings indicate that the measurement used to assess depression moderated the prevalence estimate. Interviews diagnosed depression less often compared to self-report measures (Cameron et al., 2016). The limitedness of interview studies could be explained by the fact that administering diagnostic interviews is costly because of the time and trained personnel requirements, whereas self-report methods are considered cost-efficient. However, while the use of self-report measures does not allow clinical diagnosis, self-screening tools might facilitate the recognition of depressive symptoms and early help-seeking among fathers who are not screened by healthcare professionals (Edward et al., 2019). Understanding men's preferences is critical to the success of paternal perinatal mental health identification and treatment efforts. Findings indicate that acceptability of screening is influenced by perceptions of its intention and possible outcomes (Schuppan et al., 2019). While there is very little research into the acceptability and preferences of P-PPD screening comparing to the studies on measurement studies, there is a need to future research on complexities raised by men's perceptions of health care services.

Overall, findings from literature reviews indicate that the knowledge on screening and diagnostic instruments to assess P-PPD remains inconclusive. Research delving deeper into the occurrence and manifestation of symptomatology of depression is imperative for the assessment, prevention and diagnosis of P-PPD.

Risk factors for P-PPD

Current or earlier psychopathology

Prenatal and previous psychopathology was the strongest risk factor for P-PPD (Ansari et al., 2021; Wang et al., 2021). Chhabra et al. (2020) reported that prenatal depression was associated with a fivefold increase, and a history of psychiatric illness with more than a threefold increase in the likelihood of P-PPD.

Relation with maternal PPD

Reviewed literature indicates that fathers' depressive symptom trajectories resemble those of mothers in the number and stability of trajectories, at least regarding those trajectories with low or moderate levels of symptoms (Bruno et al., 2020; Kiviruusu et al., 2020; Paulson et al., 2016; Thiel et al., 2020). A recent meta-analysis showed that the pooled prevalence of depression in both parents is increasing from 1.7% during pregnancy to 2.4% up to 12 weeks postpartum and 3.2% in three to 12 months postpartum (Smythe et al., 2022).

Having a depressed mother of the child increases the risk of fathers to be depressed themselves in the perinatal period by 2.5 times or higher (Chhabra et al., 2020). While fathers who are depressed are affected in their ability to support mothers and children (Fisher et al., 2021; Ierardi et al., 2019) and paternal prenatal depression incrementally increases the risk for worsened depressive symptoms in mothers (Paulson et al., 2016), the interaction between the psychological states of both parents should be recognised both in research and practice. Indeed, despite the heterogeneity reported in prevalence, the systematic review and meta-analysis by Thiel et al. (2020) indicated that the relationship between paternal and maternal depression in the peripartum period could be stable across cultures.

Psychosocial risk factors

Psychosocial factors that have been associated with P-PPD include distressing life events (Bruno et al., 2020; Kiviruusu et al., 2020; Leung et al., 2017), marital distress and low income (Chhabra et al., 2020; Kiviruusu et al., 2020). Pregnancy, childbirth and infant care are psychosocial stressors that are unique to the peripartum period. It has been reported that childcare or parenting stress and infant temperament affect P-PPD risk (Bruno et al., 2020; Chhabra et al., 2020). Fathers may also be in an at-risk situation due to maternal health problems (Zacher et al., 2022).

Although some studies have reported that paternal age, parity and level of education are risk factors for prenatal or postpartum depression (Edward et al., 2015; Kiviruusu et al., 2020), several meta-analyses and an integrative review found that P-PPD is not conditional on sociodemographic variables (Cameron et al., 2016; Kennedy & Munyan, 2021). These nonsignificant findings could be due to the paucity of analyses related to the demographic characteristics of participating fathers. Moreover, estimating the risk factors

of P-PPD is problematic given the variability in P-PPD definitions, measurement methods (interview or a self-report scale), and instruments used to screen and diagnose P-PPD. More precisely, there have been significant differences noted in various instruments (Berg et al., 2022; Cameron et al., 2016; Kennedy & Munyan, 2021).

Overall, there are critical knowledge gaps regarding psychosocial risk factors. First, although paternal depression is strongly associated with low income and financial worry, minimal literature is currently available on the differences in prevalence, associated factors and outcomes of P-PPD between low-income and middle-income countries compared with high-income countries. Second, there is a call for more systematic research on P-PPD risk factors. While the methodological quality of the studies varied and given the heterogeneity of the sample characteristics and sizes, current findings should be interpreted with caution. Furthermore, more longitudinal studies are needed in order to obtain more conclusive results. Third, since the identified psychosocial risk factors could provide opportunities for early screening and targeted prevention strategies, these should be recognised and taken into account when conducting research and developing guidelines.

Biological risk factors

Men, just like women, may undergo endocrine changes during the prenatal and up into the postpartum period. Although changes in hormones may be biological risk factors in P-PPD, they have also been found to be related to aspects of parenting (Bruno et al., 2020; Glasser & Lerner-Geva, 2019). The findings show that testosterone level decreases before the childbirth and maintains low levels for several months after the childbirth (Bruno et al., 2020; Wynne-Edwards, 2001). It is suggested that lower testosterone in fathers is linked to more sensitive parenting (Fleming et al., 2002; Rohde et al., 2005; Wynne-Edwards, 2001). While findings suggest that both particularly low and particularly high testosterone are associated with increased depressive symptoms (Saxbe et al., 2017), the literature on the relationship between testosterone and paternal peripartum depression is limited.

P-PPD could also be related to lower levels of oestrogen. The oestrogen level begins to increase before the childbirth until the early postpartum period (Wynne-Edwards, 2001). Research suggests that the increase in oestrogen might enhance more active parenting behaviours and that dysregulation of paternal oestrogen may constitute an important risk factor for the onset of depressed mood in fathers (Bruno et al., 2020; Fleming et al., 2002).

Additionally, increases in other hormones, such as cortisol, vasopressin, and prolactin, might be associated with less depressed mood (Fleming et al., 1999, 2002; Kozorovitskiy et al., 2006, Scraff, 2019; Storey et al., 2000). While there is extensive literature on biological risk factors for maternal depression, the knowledge on biological risk factors that are unique to fathers is still lacking.

Prevention of P-PPD

In recent years, several systematic reviews and meta-analyses have reviewed the evidence for peripartum preventive interventions for fathers, demonstrating an increasing research interest in this field. The findings show that most of the interventions were mother-inclusive interventions, where the father was included, and only a few were focused exclusively on fathers (Goldstein et al., 2020; Lee et al., 2018; Rodrigues et al., 2022; Rominov et al., 2016; Suto et al., 2017). The majority of

interventions were based on psychosocial approaches. However, no evidence identified that prenatal psychosocial interventions for fathers (Lee et al., 2018; Rominov et al., 2016; Suto et al., 2017) or couple-based interventions prevent the onset of P-PPD (Goldstein et al., 2020; Lee et al., 2018; Rominov et al., 2016). Interventions that encourage fathers to provide hands-on care (e.g. massage-technique) reported significantly reduced depression levels in expectant fathers (Field et al., 2008), while interventions in the postnatal period (e.g. infant massage, skin-to-skin contact) indicated lower paternal postnatal stress levels (Cheng et al., 2011; Huang et al., 2019). In addition, actively involving the fathers of preterm infants in early care is associated with lower paternal stress levels (Filippa et al., 2021).

Overall, a preventive perspective regarding P-PPD has been addressed over the past years; however, the current evidence of preventive interventions for fathers is poor. Regarding the obvious public health concerns, there is a need to address several questions. First, there is no evidence to support the superiority of one intervention over another. Systematic reviews (Goldstein et al., 2020; Suto et al., 2017) reported that the evaluation of the interventions' effectiveness was problematic because the studies substantially differed regarding intervention intensity and content, outcome types, measurement tools, and outcome timing. Furthermore, future studies should improve knowledge on the identification and inclusion of particular groups at risk. Therefore, verification of the effectiveness of interventions for the prevention of P-PPD is a gap that needs to be overcome. Second, there is a need to employ more rigorous research designs to improve the effectiveness of prevention practice and assist practitioners in implementing prevention programmes. The lack of randomised controlled trials is one of the most notable limitations in the literature. In addition, both longitudinal studies and large clinical trials are required to evaluate the effects of prevention strategies (Ansari et al., 2021). Given the aforementioned, the evidence of the interventions to prevent PPD in fathers is still unclear and warrants further investigation.

Treatment of P-PPD

Psychological treatment of P-PPD

While the available literature suggests that fathers with P-PPD may require interventions that address their specific needs, reviews on the treatment of P-PPD emphasise that there is a lack of empirical evidence on how to modify existing treatment programmes for women into treatment programmes for fathers with P-PPD (Goldstein et al., 2020; Lee et al., 2018; Livingston et al., 2021; O'Brien et al., 2017; Psouni et al., 2017; Rodrigues et al., 2022; Rominov et al., 2016; Suto et al., 2017). Several review studies synthesised the literature on psychological interventions and concluded that while cognitive behavioural therapy (CBT) is likely to be effective in treating P-PPD, therapy delivered via the Internet could be a more viable mode of treatment for fathers than face-to-face delivery format (O'Brien et al., 2017; Rominov et al., 2016). Although fathers prefer psychotherapy to pharmacological interventions (Cameron et al., 2017), they are more likely to engage in treatment programmes that do not conflict with work schedules (Primack et al., 2010; Rominov et al., 2016). Findings also indicate that home support and individual therapy are more preferred by men than group therapy (Letourneau et al., 2012). In addition, research indicates that couple-based interventions do not report significant treatment outcomes for fathers (Goldstein et al., 2020; Rominov et al., 2016).

Interventions for P-PPD also include psychoeducational interventions through support and educational programmes, which can teach coping strategies and offer encouragement. Findings from a meta-analysis showed that of the interventions that provided in-person training or support to couples, only the longest intervention (22 hours over 22 weeks) reported a statistically significant difference in reducing paternal depressive symptoms (Goldstein et al., 2020). While findings suggest that a majority of antenatal father-focused interventions have an immediate and positive impact on fathers' well-being, the outcomes of such interventions for fathers with PPD are yet unclear (Goldstein et al., 2020). Furthermore, there is a lack of evidence concerning the effectiveness of interventions in clinically depressed men (Goldstein et al., 2020; Rodrigues et al., 2022; Rominov et al., 2016), the lack thereof presumably being due to the fact that most studies do not undertake a clinical interview for diagnosis or screen positive depression symptoms on entry. Thus, it may happen that men are not identified as being clinically depressed (Goldstein et al., 2020; Rodrigues et al., 2022; Rominov et al., 2016).

It has been reported that when needing help for themselves, men express a strong need for support from the spouse (Chhabbra et al., 2022; Seidler et al., 2016). However, during the perinatal period, it has been found that men perceive their primary role is to support the mother of the child (Leahy-Warren et al., 2022; Livingston et al., 2021). Therefore, there may be barriers in the perinatal period preventing men from using their usual primary support systems. Fathers are often aware of the existence of maternal PPD, but fathers' awareness of P-PPD is poor (Bruno et al., 2020; Holopainen & Hakulinen, 2019). Thus, another important challenge is to improve fathers' ability to enhance help-seeking behaviour in time. It has been suggested that the initiation of preventive measures should start in the prenatal period (Garthus-Niegel et al., 2020).

In conclusion, there are research gaps which should be addressed regarding the treatment of P-PPD: a) the effectiveness of specific types of psychosocial and psychological interventions, b) the effectiveness of individually-based versus couple-based interventions, c) the impact of delivery format on intervention outcomes, d) whether interventions are more effective in fathers with specific risk factors, and e) the effects of intervention onset and duration.

Pharmacological treatment

In case of severe depression, lack or failure of psychotherapeutic interventions, antidepressant medication is often required. Although there are no reasons to assume that treatment of P-PPD should be different from other period in a father's life, so far, there are no studies available investigating the effectiveness of antidepressant medication for treatment of P-PPD. A topic that might be of particular concern is the effect of antidepressant medication on fertility and quality of semen. As far as we know, only two studies focused on the paternal use of antidepressants in the conception period and during pregnancy. A Swedish study showed that 2.3% of fathers had dispensed an antidepressant drug during the conception period (Viktorin et al., 2018). This study showed that children born to fathers receiving antidepressant treatment during conception did not seem to be at a higher risk of adverse outcomes (preterm birth, malformation, autism, and intellectual disability). In a Norwegian study, antidepressants were used by 1.1% of fathers. Paternal antidepressant use was not associated with gestational age at

birth, whereas it was positively associated with child anxiety symptoms. This association was attenuated when controlling for maternal and paternal history of depression and other measured factors (Cohen et al., 2019). The under-representation of studies focusing on the effects of antidepressant medication on paternal P-PPD, fertility and child outcomes calls for high quality clinical and population-based studies to better understand and inform fathers and their families about the pros and cons of medication in periconception and perinatal period.

Cost-effectiveness of P-PPD management

P-PPD is not only associated with direct paternal burdens, but also with family dysfunction such as maternal PPD and an increased risk of adverse child outcomes (Stein et al., 2014). Therefore, it is a public concern to investigate whether P-PPD is also associated with increased community care costs, such as primary care, psychologist contacts, mental health groups, and outpatient hospital services or utilisation. In addition, it is important to investigate whether adequate detection and treatment of P-PPD might lower these eventual costs. One study that examined healthcare costs of P-PPD showed that paternal depression was associated with significantly higher community care costs when compared to fathers at high risk of developing depression and those without depression in which increased contacts with general practitioners and psychologists made the highest contribution to the observed cost difference. In addition, fathers with depression and at high risk of developing postnatal depression showed higher total father – child dyad costs than fathers without depression (Edoka et al., 2011).

A Swedish study investigated the possible cost-effectiveness of screening for paternal postpartum depression. For this, they made use of registration data from national Swedish databases in combination with a systematic review (Asper et al., 2018). The result of these combined approaches indicated that a screening programme for P-PPD is likely to lower costs and increase the quality of life and health. In addition, the analyses showed that screening of P-PPD still indicated cost-effectiveness and domination when the different time horizons, depression probabilities and treatment options were tested. Based on these results, the researchers recommend the implementation of a postpartum screening intervention for fathers, although their findings need to be replicated by future research in other countries and settings. A more recent review about the cost-effectiveness of mental health interventions during and after pregnancy also concluded that cost-effectiveness studies that specifically target paternal mental health are scarce (Verbeke et al., 2022). This review did not reveal any new studies on the cost-effectiveness of P-PPD since the review of Asper et al. (2018). Recommendation in this review is to investigate the co-occurrence of mental health conditions in couples and comorbidities on cost-effectiveness, since maternal and paternal depression are positively correlated (Verbeke et al., 2022).

There are no studies available about the cost-effectiveness of screening interventions for paternal depression during pregnancy, while it is plausible that early interventions for P-PPD during pregnancy could be at least as effective as after childbirth because of its impact on couple relationship and the unborn child (Verbeke et al., 2022).

Effect of P-PPD on child development

Parental-child interactions play an important role in the well-being and development of the child. However, the literature has tended to focus on the effects of maternal depression on child development. Although less empirical attention has been devoted to effect of paternal PPD on child development, it has been reported that P-PPD is associated with a behavioural and mental health problems in offspring (Brophy et al., 2021; Gutierrez-Galve et al., 2019; Pilowsky et al., 2014; Shen et al., 2016). A systematic review of 21 studies reported that antenatal P-PPD was associated with emotional and behavioural problems in children aged between 2 months and 7,5 years (Sweeney & MacBeth, 2016). There are also indications that paternal depressive symptoms during pregnancy may be related to excessive infant crying (de Kruijff et al., 2021; van den Berg et al., 2009). The longitudinal population cohort study showed that children whose fathers were depressed in both the prenatal and postnatal periods had the high risk of psychiatric diagnosis at age 7 (Ramchandani et al., 2008), demonstrating the long-lasting effect of P-PPD symptoms on children. In addition, Shen et al. (2016) found that paternal depression before the birth was associated with poor academic attainment at age 16. It has also been reported that P-PPD is related to an increased risk of internalising and externalising behaviours in offspring in early to late childhood (Ramchandani et al., 2005; Shen et al., 2016; Spry et al., 2020; Sweeney & MacBeth, 2016). While the mechanisms underlying these associations are not yet sufficiently understood, it has been suggested that depression in fathers may impact upon a developing child through an increase in maternal stress (Bergunde et al., 2022; Gutierrez-Galve et al., 2019; Martin et al., 2022; O'Connor et al., 2003). However, other factors such as genetic liability (Shen et al., 2016), parenting style (Brophy et al., 2021), or shared familial characteristics (socioeconomic, lifestyle) (Van Batenburg-Eddes et al., 2013), may play a role in explaining the influence of parental depression on child outcomes.

Based on a synthesis of the literature, a father without a mental health problem is a protective factor for children of mothers with depression (Edwards et al., 2021; Livingston et al., 2021; Martin et al., 2022). The father can support the mother of the child for quicker help-seeking and engagement with interventions (Livingston et al., 2021) and buffer the impacts of the mother's depression on the child's behaviour (Letourneau et al., 2019; Martin et al., 2022). However, findings suggest that the association between paternal and offspring depression is not mediated by couple conflict or paternal involvement (Gutierrez-Galve et al., 2019).

Overall, the impact of P-PPD on the offspring requires more attention than has been previously given. It is critical to focus on the prevention, identification and treatment of P-PPD at an early stage, in order to minimise negative long-term effects for not only the affected father, but also on mother and offspring. In that regard, video recording techniques (e.g. CARE-Index; Crittenden, 2006) have been used to assess the father-child interaction highlighting possible emotional and relational difficulties, with the advantage of being also used as a therapeutic tool (Bruno et al., 2020). Future research should broaden the understanding of P-PPD by looking more closely at P-PPD and their families.

Discussion

Despite the fact that the prevalence of P-PPD is understudied, the existing data indicate that during the perinatal period fathers may have an increased risk of depression compared with men in the general population. While data from men living in 27 European countries showed an overall prevalence of current depressive disorder of 4.9% (Arias de la Torre et al., 2021), the meta-analysis by Rao et al. (2020) showed a pooled prevalence of depression in 9.8% of men during pregnancy and 8.8% within a year postpartum. Earlier identification and intervention of P-PPD can lead to improved outcomes for fathers, mothers and children, which can lead to improved well-being for the whole family. The literature search was based on a narrative approach to provide a descriptive summary of studies that raised issues related to P-PPD. This review allows to provide a valuable summary of research in P-PPD and highlights the critical issues both in theory and practice. The aim of the current work is not only to draw attention to gaps in the existing knowledge but also to foster integrative work in order to improve knowledge and practice. These objectives are supported by four lines of the cost action Riseup-PPD action.

The first line of action aims to contribute to an updated and comprehensive synthesis of existing knowledge and practice in order to develop clinical recommendations and guidelines for parental PPD management. Based on the literature reviewed, there is a lack in guidance of management of P-PPD. Currently, there is no consensual understanding of the definition of P-PPD and recommendations for dealing with P-PPD. The literature suggests that identical approaches and recommendations for PPD in mothers may not apply to PPD in fathers. In order to avoid bias, both traditional and male-type symptoms of depression should be combined in assessment, diagnostics and interventions. Accordingly, there is a need for: understanding the specific aspects of diagnosis and pathogenetic pathways of P-PPD; identification of effective universal, selective and indicative preventive interventions; investigating father's perceptions of barriers to professional help-seeking; identification of effective treatment strategies in the antenatal and postnatal period; identification of a preferred format for delivering interventions; raising knowledge of obstetric and health care providers about P-PPD and for raising public awareness of the importance of P-PPD.

The second line aims to clarify inconsistent findings concerning diagnosis, prevalence, prevention, risk factors, treatment and effects on child development. While the reviewed studies have looked at possible predictors, including psychosocial stressors and biological vulnerability, the specific aetiology of P-PPD remains unclear. Another important gap in knowledge is that culturally sensitive awareness of depression as a mental health condition is lacking. The literature on maternal PPD suggests that the variability in maternal PPD across countries may be due to cross-cultural variables, reporting style, perceptions of mental health, differences in socio-economic environments, and/or biological vulnerability factors (Hahn-Holbrook et al., 2018; Thombs et al., 2018), each of which may also influence reporting of P-PPD. Therefore, it is possible that the wide range of P-PPD prevalence rates may reflect cultural and healthcare factors in addition to methodological differences. In addition, while the availability of mental health services may vary across countries, tailored prevention and treatment strategies for paternal PPD are needed.

The third line of action emphasises a future direction of research and practice in the field of P-PPD. Based on the literature reviewed, there is a lack of knowledge on effective prevention and treatment strategies specifically targeting paternal PPD. Since depressive disorder can be effectively treated, there is a need for: mental health awareness focusing on P-PPD symptom recognition, education and early detection; promoting professional help-seeking among fathers; efforts to develop effective prevention and treatment interventions targeted for fathers; identification of effective methods of offering and accessing support while including fathers from various demographic groups (e.g. adolescent fathers) and addressing the various needs (e.g. men of preterm birth, men who have lost a child). In addition, potential mechanisms linking maternal and paternal PPD (e.g. parallel analysis), and parental depressive symptoms to child outcomes, should be addressed in more detail. Given the complexity of accessing the P-PPD, future research should integrate more qualitative, quantitative and mixed-methods approaches. In order to illustrate possible trajectories of P-PPD, qualitative and quantitative longitudinal studies are recommended.

The fourth line of action concentrates on the international recommendation for paternal PPD diagnosis, prevention and treatment. To prevent adverse outcomes associated with P-PPD and its impact on the mother and child, it is important that the management of paternal PPD would become a vital part of adequate medical care. It should also be considered that family-focused approach has the potential not only prevent and treat mental health problems, but also improve parental functioning. Moreover, since research-based prevention and/or treatment strategies may not be effective if providers are poorly motivated, trained, or supervised, the needs and expectations of health professionals should be addressed.

Conclusions

The current narrative review can serve as a catalyst for future research and clinical practice related to P-PPD. Our primary recommendation for future research is to address the issues of PPD from the perspective of the whole family and expand existing knowledge on P-PPD with a wider variety of sociocultural factors that may require critical methodological and conceptual considerations in the design of studies. Based on the four lines of action, the multidisciplinary network of researchers will contribute to the development of evidence-based knowledge and practice for the prevention, diagnostic and treatment strategies of P-PPD. While the global direct and indirect economic costs of mental health problems may consist of barriers to mental care access, improvement of knowledge on P-PPD, advances in prevention, diagnosing, and effectively treating P-PPD have essential benefits for women, children, and society at large.

Author statement

All authors independently screened the potential database studies and contributed to the conceptualisation and writing of the manuscript. KU and MLvdB drafted the manuscript. All the authors edited, revised, and approved the final manuscript.

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