

Examining the (lack of) evidence on physical activity for paternal postnatal depression: A call to action

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ABSTRACT

Background and aims: Previous research has linked physical activity to a reduced risk of postnatal depressive symptoms in mothers. Despite up to 13% of fathers experiencing postnatal depressive symptoms, little is known about the association with physical activity in fathers. This study aimed to systematically examine the evidence investigating the association between physical activity and paternal postnatal depressive symptoms, and provide suggestions to support advancing the field.

Methods: A systematic search of original research articles investigating the association between physical activity and paternal postnatal depressive symptoms was conducted using six electronic databases in October 2021 and updated in June 2023.

Results: A total of two intervention studies (both randomized controlled trials) were identified. Neither study focused specifically on physical activity but both found that lifestyle-based training had a positive effect on antenatal and postnatal depressive and anxiety symptoms in fathers.

Conclusion: Research investigating the association between physical activity and paternal postnatal depressive symptoms is scarce. Fathers are a target group who are likely to benefit from alternative/adjunct mental health strategies such as physical activity, therefore future research investigating physical activity and its association with paternal postnatal depressive symptoms is urgently needed.

1. Background and aims

Depression is a serious health condition that has a negative impact on the physical and mental health of individuals (Mammen & Faulkner, 2013). Postnatal depression is a form of depression that can arise within the first year after childbirth and is associated with decreased enjoyment in life, feelings of uselessness, social withdrawal, insomnia, emotional detachment from the infant, as well as infant-harm in extreme cases (Lee & Chung, 2007). Much evidence exists regarding postnatal depression in women (Shorey et al., 2018). However, it is now recognised that the postnatal period is associated with higher prevalence of depressive symptoms amongst fathers (Nath et al., 2016), with global estimates suggesting up to 13% of fathers experience depression/heightened depressive symptoms in the postpartum period (Cameron et al., 2016).

Paternal postnatal depression is associated with less paternal interaction behaviours with their child (Sethna et al., 2015) and may in some cases have an impact on the emotional, cognitive and behavioural development of children (Nath et al., 2016). Further, fathers experiencing postnatal depression can feel a loss of sense of self, low parental self-efficacy, lower levels of affection and higher levels of relationship dissatisfaction (Giallo et al., 2013; Ramchandani et al., 2011). Postnatal depression in mothers can be caused by both biological (e.g. changes in hormonal levels after childbirth) and environmental (e.g. sleep deprivation) factors (Lee & Chung, 2007). However, the factors found to increase the risk of paternal postnatal depression are predominately environmental and include having a depressed partner, high marital conflict, lack of social support, a previous history of depression, having an infant with sleep problems, and a greater number of financial

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stressors or paternal unemployment (Nishimura et al., 2015; Philpott & Corcoran, 2018; Wee et al., 2011).

It is well accepted that physical activity, even in low doses, is efficacious in the prevention and treatment of depression across the lifespan (Schuch et al., 2018; Heissel et al., 2023; Pearce et al., 2022). Similarly, systematic reviews and meta-analyses have shown that physical activity is effective in the treatment (i.e., from randomized controlled trials) and prevention (i.e., from prospective studies) of postnatal depression in mothers (Teychenne & York, 2013; Pritchett et al., 2017). Specifically, a systematic review of $n = 17$ studies found that leisure-time physical activity is consistently linked to a reduced risk of postnatal depressive symptoms in mothers (Teychenne & York, 2013), whilst one longitudinal study indicated that work-related physical activity was associated with higher postnatal depressive symptoms (Teychenne & York, 2013). However, these systematic reviews and meta-analyses included only postnatal women and therefore it is unclear whether the same relationships are seen for fathers in the postnatal period. Given that men/fathers are less likely to seek help from General Practitioner's (GP's) or psychologists for their mental health due to factors such as the stigma associated with seeking mental health support as a man (Venning et al., 2021), physical activity may offer a potential alternative/adjunctive strategy to support this high-risk population group.

This review aimed to systematically examine the evidence investigating the association between physical activity and paternal postnatal depressive symptoms.

2. Methods

The methods were conducted in accordance with the 'Preferred Reporting Items for Systematic Reviews and Meta-Analysis' (PRISMA) statement (Moher et al., 2015). This systematic review has been registered on the PROSPERO International prospective register of systematic reviews (registration ID: CRD42021276816). The data sources, search strategy, inclusion/exclusion criteria, selection process/data extraction and methodological quality assessment are described in Supplementary Table 1.

3. Results

See Fig. 1 for the flow diagram of the search and screening process. A total of two studies that were part of the same program of research from a single research group and were conducted in consecutive years using similar methodology met the inclusion criteria. Both were RCT's (Charandabi et al., 2017; Sanaati et al., 2018) and conducted in Bukan, Iran. Sample sizes were 126 (Charandabi et al., 2017) and 63 (Sanaati et al., 2018) men respectively. Both RCT's aimed to determine the effect of lifestyle-based training on paternal depressive and anxiety symptoms (Charandabi et al., 2017) or on postpartum depressive and anxiety symptoms in women and their husbands (Sanaati et al., 2018). One RCT (Charandabi et al., 2017) recruited the spouses of pregnant women while the other RCT (Sanaati et al., 2018) included pregnant women and some spouses. The average age (standard deviation) of participants was 31.9 (5.3) (Charandabi et al., 2017) and 27.8 (5.0) years (Sanaati et al., 2018) respectively. Almost one-third of men had a high school and diploma education level (38%) and the majority of them were self-employed (85.7%) (Charandabi et al., 2017). Sanaati et al., 2018 reported that approximately one-third of the mothers (34.3%) had a secondary education, however the education level of their spouses was not provided. These interventions (Charandabi et al., 2017; Sanaati et al., 2018) were conducted over a four-week period between 24 and 28 weeks of pregnancy with participants followed up until 6 weeks post-childbirth. Both studies measured depressive and anxiety symptoms using self-report methods, the Edinburgh Postnatal Depression Scale (EPDS) and Spielberger's State-Trait Anxiety Inventory (STAI) (Charandabi et al., 2017; Sanaati et al., 2018). No physical activity measures were used in these interventions.

Topics covered in the paternal lifestyle-based training intervention (Charandabi et al., 2017) included: sleep health, nutrition, self-image, sexual problems, sport, and physical activity. One RCT randomly allocated participants into either an intervention group (that received two weekly 60–90-min lifestyle-based training sessions where physical activity was a key component of the training, a training booklet and one weekly 10-min telephone counselling session) and a control group (who continued their usual behaviours) (Charandabi et al., 2017). The other RCT (Sanaati et al., 2018) consisted of three parallel arms: intervention

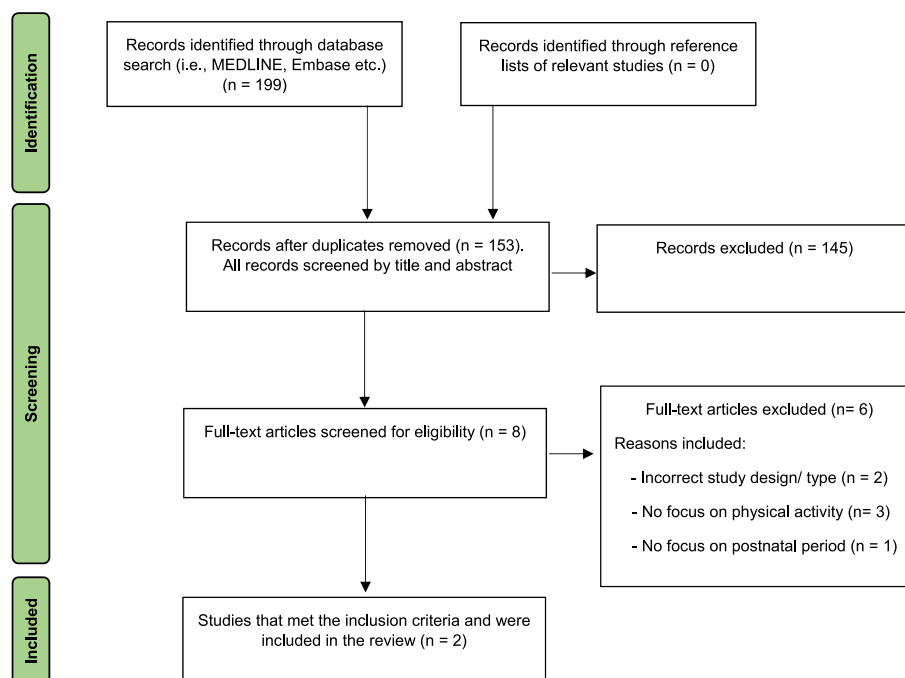


Fig. 1. Flow of studies selected through the different phases of the systematic review.

group 1 (where both women and their husbands received lifestyle-based education); intervention group 2 (where only women received lifestyle-based education); and a control group (where women received only routine care). Both intervention groups received training booklets and weekly 10-min telephone counselling sessions.

Both RCT's (Charandabi et al., 2017; Sanaati et al., 2018) found that lifestyle-based training had a positive effect on prenatal and postnatal depression and anxiety symptoms in fathers. The intervention study that recruited the spouses of pregnant women (Charandabi et al., 2017) reported a significant decrease in postnatal depressive symptoms (adjusted difference: 3.3), postnatal state anxiety (−7.5) and postnatal trait anxiety (−8.3) scores compared to the control group. The second RCT that had three parallel arms (i.e., intervention group 1: women and husbands; intervention group 2: women only; control group) (Sanaati et al., 2018) reported significant reductions in postnatal depressive symptoms (adjusted difference: 5.5), state anxiety (−13.6) and trait anxiety (−12.6) scores in fathers allocated to intervention group 1 compared to the control group.

4. Discussion

Research investigating the association between physical activity and paternal postnatal depression is overwhelmingly lacking, especially when compared to studies involving the general population and postnatal women. The growing evidence-base examining the association between physical activity and maternal postnatal depressive symptoms (Poyatos-León et al., 2017; Pritchett et al., 2017; Teychenne & York., 2013; Yuan et al., 2022) may provide some potential insight into this association amongst fathers. Reviews (Pritchett et al., 2017; Teychenne & York., 2013) and meta-analyses (Poyatos-Leon et al., 2017; Yuan et al., 2022) have shown that physical activity is likely efficacious in the prevention and treatment of maternal postnatal depression. Given this lack of evidence amongst fathers, it is not possible to draw firm conclusions on the benefit of physical activity for paternal postnatal depressive symptoms. However, this paper can be used to highlight the clear evidence gaps and provide suggestions for future research in the physical activity and mental health field in relation to fathers in the postnatal period.

The two existing studies that have examined the impact of health behaviours (including physical activity) on paternal postnatal depressive symptoms, showed that lifestyle-based training had a positive effect on antenatal and postnatal depressive and anxiety symptoms in fathers (Charandabi et al., 2017; Sanaati et al., 2018). This is an important finding as it illustrates that providing fathers with support and education on healthy behaviours including physical activity has the potential to improve paternal mental health outcomes. However, caution must be taken when interpreting findings as neither study measured nor focused solely on physical activity so while they suggest positive impact on paternal mental health outcomes we cannot isolate the role of physical activity.

This paper has highlighted key research gaps, that warrant further study. To date, there are no existing studies that have specifically examined the behaviour of physical activity (in its own right) and its association with paternal postnatal depressive symptoms. As such, no studies have investigated the optimal dose (i.e., frequency, intensity, duration) or other potentially important contextual factors (e.g. domain, social environment, physical environment) of physical activity for paternal postnatal depressive symptoms. Given the high prevalence of postnatal depressive symptoms in fathers (Nath et al., 2016; Cameron et al., 2016) better understanding the role of these contextual factors for fathers physical activity is important to ensure the design of physical activity programs optimises opportunities to enhance paternal mental health (Vella et al., 2023). As such, physical activity that fosters enjoyment, autonomous motivation, mastery of skills, preference for activity, social interaction and sense of belonging (Biddle & Mutrie, 2007; White et al., 2017) will subsequently better support mental health

outcomes associated with physical activity (Teychenne et al., 2020; Vella et al., 2023). Furthermore, research indicates that mental health concerns are more common in fathers when they have a depressed partner (Nishimura et al., 2015; Wee et al., 2011). Given that it is theorised that physical activity could potentially support both paternal and maternal mental health, exploring physical activity interventions that engage mother-father couples could be one possibility. However, currently to date no such interventions exist. These considerations may be particularly important when designing physical activity interventions for fathers experiencing heightened postnatal depressive symptoms who are typically hard to reach and encounter a number of barriers to physical activity participation during this life stage (e.g. lack of time, exhaustion, guilt associated with taking time away from family to engage in physical activity) (Hoare et al., 2017; Mailey et al., 2014).

5. Conclusion

The mental health of fathers in the postnatal period is a neglected area of research and explains the lack of studies investigating the association between physical activity and paternal postnatal depressive symptoms. This is a call to action, for further research that: 1) investigates the potential for physical activity to support paternal postnatal depressive symptoms; and 2) investigates the contextual factors of physical activity most important for enhancing mental health amongst postnatal fathers.

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CRediT authorship contribution statement

Maria Apostolopoulos: Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Kylie D. Hesketh:** Writing – review & editing, Conceptualization. **Adam Walsh:** Writing – review & editing, Conceptualization. **Nazgol Karimi:** Writing – review & editing. **Megan Teychenne:** Writing – review & editing, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Given her role as Associate Editor for Mental Health and Physical Activity, Megan Teychenne had no involvement in the peer-review of this article and has no access to information regarding its peer-review. Full responsibility for the editorial process for this article was delegated to Editor in Chief. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mhpa.2024.100616>.

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