

Efficacy of Regular Exercise During Pregnancy on the Prevention of Postpartum Depression

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Abstract

Postpartum depression (PPD) poses a significant mental health challenge for new mothers, particularly in low-income countries like India. Recognising its adverse effects on maternal and neonatal well-being, this study aimed to investigate the role of antenatal exercise in preventing PPD. The Edinburgh Postnatal Depression Scale was utilised to assess PPD symptoms subjectively. A total of 30 postnatal mothers from Saveetha Medical College participated, with exclusion criteria including pre-existing heart disease and previous preterm birth or miscarriage. Among them, 15 met the criteria for antenatal exercise, engaging in mild-to-moderate physical activity at least five times a week throughout pregnancy. Results indicated a slight decrease in Edinburgh PPD scores among mothers who exercised antenatally. However, both exercising and non-exercising groups showed a positive screening for PPD. Despite exercise potentially reducing the severity of PPD, other contributing factors were evident. It is imperative to destigmatise PPD and ensure better resources for affected mothers, with routine screening recommended during postnatal follow-ups. The study's limitations include a small sample size and the absence of baseline antenatal depression scoring. Future research should explore these aspects further to provide a comprehensive understanding of PPD prevention strategies.

Keywords:

Antenatal Exercise, Depression Prevention, Edinburgh Postnatal Depression Scale (EPDS), Maternal Mental Health, Physical Activity, Postpartum Care, Postpartum Depression (PPD), Pregnancy.

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Introduction

Postpartum depression is a problem faced by most postnatal women. It is most common in low-income countries such as India. Signs of depression develop postpartum in 10 to 20 per cent of women.

Risk factors for postpartum depression include: young maternal age, antenatal depression, unmarried status, smoking, and newborns requiring intensive care. It is generally under-recognised and under-treated, as seeking help for mental health is considered taboo in our society.

Postpartum depression can have a devastating effect on new mothers, neonates, and their families. Postpartum depression can result in poor attachment of the newborn infant and mother, which can later cause social developmental delays in the children. There is poor access to mental health care and support in our country. Hence, identification and prevention of postpartum depression will help young mothers sail through motherhood with ease.

To identify the role that exercise in the antenatal period plays in the prevention of postpartum depression.

We have used the Edinburgh Postnatal Depression Scale (EPDS) to assess postpartum depression.

Edinburgh Postnatal Depression Scale is a questionnaire that assesses postpartum depression through subjective grading. The questionnaire evaluates whether the mother can laugh, whether she enjoys activities she previously enjoyed, and whether she experiences feelings of guilt, fear, anxiety, or thoughts of self-harm. It comprises a total of 10 questions, each scored from 0 to 3.

Hence, the total score ranges up to 30. A score of 12 or greater was defined as screening positive for postpartum depression, and the effect of exercise was then analysed. The questionnaire has a sensitivity of 65.4% and a specificity of 82.1%.

Aim: To determine whether regular mild-to-moderate antenatal exercise is associated with a reduction in postpartum depression symptoms among postnatal women, as measured by the Edinburgh Postnatal Depression Scale (EPDS)

Materials and methods

This hospital-based case-control study was conducted at the Department of Obstetrics and Gynaecology, Saveetha Medical College and Hospital, to evaluate the efficacy of regular antenatal exercise in preventing postpartum depression

among postnatal mothers. A total of 30 postnatal women who delivered at the institution were recruited at their one-week postpartum follow-up after obtaining written informed consent. Women with pre-existing heart disease, previous preterm birth or miscarriage, pregnancy conceived by in vitro fertilisation (IVF), or multiple pregnancy were excluded from the study. Demographic and obstetric details, including maternal age, mode of delivery, and history of antenatal hospital admission, were recorded using a structured proforma. Participants were categorised into exercise and non-exercise groups based on their antenatal physical activity. Regular antenatal exercise was defined as engaging in at least 1 hour of mild-to-moderate-intensity exercise, such as brisk walking or prenatal yoga, on at least 5 days per week throughout pregnancy. Fifteen participants met these criteria and constituted the exercise group, while the remaining fifteen formed the non-exercise group. Postpartum depressive symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS), a validated, self-administered screening questionnaire specifically designed to identify women at risk of postpartum depression. The EPDS consists of 10 items, each scored on a 4-point Likert scale (0–3), yielding a total score ranging from 0 to 30. The questionnaire evaluates depressive symptoms experienced during the preceding seven days, including mood, ability to enjoy activities, feelings of guilt, anxiety, fear, sadness, sleep disturbances related to unhappiness, and thoughts of self-harm. The EPDS was administered one week postpartum under investigator supervision to ensure completeness while maintaining participant confidentiality. An EPDS score of ≥ 13 was considered a positive screen for postpartum depression. The primary outcome measure was the comparison of mean EPDS scores between the exercise and non-exercise groups, along with the proportion of mothers screening positive for postpartum depression. Data were entered into Microsoft Excel and analysed using appropriate statistical software. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. Mean EPDS scores were compared using the independent Student's t-test, and categorical variables were analysed using the Chi-square test or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant.

Results

A total of 30 postnatal mothers were enrolled in the study, with 15 participants each in the antenatal exercise and non-exercise groups. The mean maternal age was comparable between the groups (26.0 ± 3.4 years vs. 24.0 ± 3.8 years, $p = 0.12$). The

distribution of mode of delivery was similar, with normal vaginal delivery observed in 46.7% of women in the exercise group and 53.3% in the non-exercise group ($p = 0.71$). A prior antenatal hospital stay was reported in 26.7% of women in the exercise group compared to 46.7% in the non-exercise group, although this difference was not statistically significant ($p = 0.26$).

The mean Edinburgh Postnatal Depression Scale (EPDS) score was lower among women who engaged in regular antenatal exercise compared with those who did not (13.0 ± 3.2 vs. 15.0 ± 3.8). However, the difference did not reach statistical significance ($p = 0.08$). Both groups had mean EPDS scores above the screening threshold of 13, indicating that postpartum depressive symptoms were present irrespective of exercise status.

Although regular antenatal exercise demonstrated a trend towards lower postpartum depression scores, the observed reduction was not statistically significant in this study. This may be attributed to the limited sample size and the presence of additional psychosocial and obstetric factors influencing postpartum depression.

Variable	Exercise (n = 15)	Non-exercise (n = 15)	p-value*
Age (years)	26.0 $\pm$ 3.4	24.0 $\pm$ 3.8	0.12
Normal vaginal delivery	7 (46.7%)	8 (53.3%)	0.71
Caesarean section	8 (53.3%)	7 (46.7%)	0.71
Prior antenatal hospital stay	4 (26.7%)	7 (46.7%)	0.26
EPDS score	13.0 $\pm$ 3.2	15.0 $\pm$ 3.8	0.08

The results gathered have been summarised in graphical representation below in Figure 1 and 2

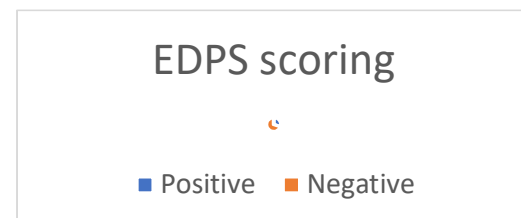


Figure 1

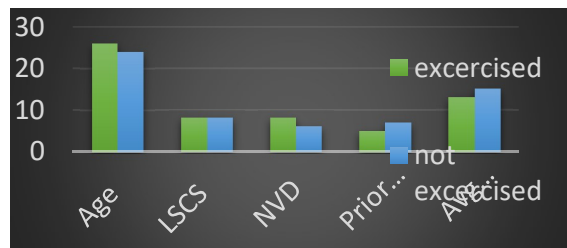


Figure 2

Discussion

The present study evaluated the effect of regular antenatal exercise on the prevention of postpartum depression among postnatal mothers using the Edinburgh Postnatal Depression Scale (EPDS). Women who engaged in regular mild-to-moderate exercise during pregnancy demonstrated lower mean EPDS scores than women who did not exercise (13 vs. 15). Although this reduction did not eliminate postpartum depressive symptoms and both groups screened positive for postpartum depression, the findings suggest that antenatal exercise may contribute to reducing the severity of depressive symptoms following childbirth.

Postpartum depression remains one of the most common psychiatric disorders affecting women after childbirth, with an estimated global prevalence of approximately 10–20%, and an even higher prevalence reported in low- and middle-income countries such as India. Maternal depression adversely affects maternal well-being, mother–infant bonding, breastfeeding practices, infant cognitive development, and family functioning. Early identification of women at risk and implementation of preventive strategies are therefore essential components of comprehensive maternal healthcare^{1,2}.

The beneficial effects of exercise on maternal mental health have been attributed to several physiological and psychological mechanisms. Physical activity stimulates the release of serotonin, dopamine, endorphins, and brain-derived neurotrophic factor (BDNF), which improve mood regulation and reduce symptoms of anxiety and depression. Exercise also decreases hypothalamic-pituitary-adrenal (HPA) axis activation, lowers cortisol levels, improves sleep quality, enhances self-esteem, and promotes social interaction, all of which may contribute to improved psychological well-being during pregnancy and the postpartum period³.

The findings of the present study are consistent with the PAMELA Randomized Clinical Trial conducted by Coll et al⁴, which demonstrated significantly lower EPDS scores among women who participated in a structured antenatal physical activity programme compared with controls. The authors proposed that regular exercise exerts neurobiological antidepressant effects through

increased serotonergic neurotransmission and improved psychological resilience. Similarly, Lewis et al⁵ reported that structured exercise interventions during pregnancy significantly reduced depressive symptoms and perceived stress in the postpartum period, although adherence to exercise programmes influenced the magnitude of benefit. The Healthy Mom II Trial⁶ further demonstrated that behavioural interventions encouraging regular physical activity during pregnancy are feasible and may reduce the incidence of postpartum depression among high-risk women.

More recently, the umbrella review by Singh et al⁷ evaluated evidence from multiple systematic reviews and concluded that physical activity has moderate-to-high certainty evidence for reducing symptoms of depression and anxiety across diverse populations, including pregnant women. These findings strengthen the growing evidence supporting exercise as an effective, low-cost, and non-pharmacological intervention for improving maternal mental health.

Despite observing lower EPDS scores among women who exercised regularly, postpartum depression remained prevalent in both groups in the present study. This finding suggests that postpartum depression is a multifactorial disorder and that exercise alone may not be sufficient to prevent its occurrence. Numerous biological, psychological, and social determinants—including antenatal depression, lack of social support, marital conflict, financial stress, sleep deprivation, unplanned pregnancy, obstetric complications, previous psychiatric illness, and neonatal health problems—have all been identified as independent risk factors for postpartum depression. The persistence of elevated EPDS scores in both study groups likely reflects the contribution of these additional determinants, many of which were not evaluated in the present study.

Several limitations should be considered while interpreting these findings. First, the study included only 30 participants, which limits statistical power and the ability to detect clinically meaningful differences between groups. Second, depressive symptoms were assessed only during the first postpartum week without baseline antenatal EPDS assessment; therefore, it was not possible to determine whether depressive symptoms developed after delivery or were already present during pregnancy. Third, exercise participation was self-reported, introducing the possibility of recall bias and variability in adherence, intensity, and duration of physical activity. Furthermore, potential confounding variables such as socioeconomic status, educational level, family support, obstetric complications, previous psychiatric history, breastfeeding practices, and neonatal intensive care admission were not controlled for, which may have influenced postpartum mental health outcomes.

Nevertheless, the study contributes to the growing body of evidence supporting antenatal exercise as a safe, inexpensive, and potentially effective strategy for promoting maternal mental health. Routine counselling regarding physical activity should form an integral part of antenatal care, provided there are no obstetric contraindications. In addition, universal postpartum screening using validated tools such as the Edinburgh Postnatal Depression Scale should be incorporated into routine postnatal follow-up to facilitate early identification, timely referral, and appropriate psychological intervention for women at risk of postpartum depression.

Future research should involve larger multicentre prospective studies with adequate statistical power, baseline antenatal mental health assessment, objective measurement of physical activity, and longer postpartum follow-up. Such studies would help clarify the dose-response relationship between exercise and maternal mental health and identify the subgroups of women who derive the greatest benefit from structured antenatal exercise programmes.

Conclusion:

Regular antenatal exercise was associated with lower Edinburgh Postnatal Depression Scale (EPDS) scores among postnatal mothers, suggesting a potential beneficial effect in reducing the severity of postpartum depressive symptoms. However, postpartum depression remained prevalent in both the exercise and non-exercise groups, indicating that physical activity alone may not be sufficient to prevent its occurrence. These findings highlight the multifactorial nature of postpartum depression and emphasise the importance of integrating regular antenatal exercise with comprehensive psychosocial support, routine mental health screening, and timely intervention as part of standard antenatal and postnatal care. Although the present study was limited by its small sample size and lack of baseline antenatal depression assessment, it contributes to the growing evidence supporting exercise as a safe, accessible, and cost-effective strategy for promoting maternal mental health. Larger prospective studies with longer follow-up and adjustment for potential confounding factors are warranted to establish further the role of antenatal exercise in the prevention of postpartum depression.

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