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Effects of exercise during pregnancy on postpartum depression: a meta-analysis

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Abstract

Background: Postpartum depression is a pervasive depressive episode in the postpartum period that adversely affects the mother, her partner, mother-infant interaction, and offspring development. There are many limitations in the treatment of postpartum depression, which makes prevention during pregnancy important. Exercise has many brain and psychological benefits, but current results are inconsistent as to whether exercise during pregnancy prevents postpartum depression.

Objective: The goal of this meta-analysis was to systematically assess the effect of exercise during pregnancy on postpartum depression, to provide clinicians with the most up-to-date evidence, and to provide

additional information to improve guidelines for the prevention of postpartum depression.

MATERIALS AND METHODS: This study was conducted in accordance with the PRISMA systematic evaluation statement. Four electronic literature databases were searched: PubMed, Web of Science, Embase, and Cochrane Library.The search was conducted from the time of construction to March 2025. Data were analyzed using RevMan 5.4.1 and stata17.

RESULTS: A total of six randomized controlled trials with 1787 pregnant women were included. Exercise interventions were in the form of aquatic exercise, home exercise and group exercise. Exercise intervention durations ranged from eight weeks to five months. The results of the meta-analysis showed that exercise during pregnancy reduced the severity of postpartum depression [MD=-1.54, 95% CI (-2.69, -0.39), P=0.009]. However, the small number of included studies and high heterogeneity suggest that this result should be treated with caution.

Conclusion: Exercise during pregnancy reduces the severity of postpartum depression, but more high-quality randomized controlled trials are needed to obtain more accurate results in the future.

Keywords: Exercise, postpartum depression, pregnancy

1 Introduction

Postpartum depression is a common and serious psychological problem that refers to a generalized depressive episode after childbirth(1). The prevalence of postpartum depression is high, with statistics indicating that as many as 19.2% of women have a major depressive episode in the first three months after delivery(2) and the global prevalence may be higher than believed due to screening limitations caused by clinicians' reluctance with mental illness, among other reasons(3,4).

The harms of postpartum depression are multifaceted, adversely affecting the individual mother, family relationships, mother-infant interactions, and offspring. For example, depressed mothers have lower physical condition scores, overall quality of life, and higher suicidal ideation than women in general(5); a large proportion of men become depressed and have increased marital discord and conflict when their wives suffer from postpartum depression(6); in addition, depressed mothers have less interactive play behavior with their infants and a higher likelihood of discontinuing breastfeeding(7); and lastly, postpartum depression in mothers has been associated with offspring having poor socialization in school-age children, increased risk of adolescent depression, childhood overweight, and symptoms of attention deficit hyperactivity disorder(8). Therefore, it is necessary to take appropriate measures to treat or prevent postpartum depression to minimize its potentially serious consequences for individuals and society.

Treatment for postpartum depression includes psychotherapy and antidepressants(3). Antidepressant medications for postpartum depression have higher remission rates compared to placebo(9), but children may be affected and women may be reluctant to take them(10). In contrast, women prefer psychotherapy(1,11), but the antidepressant effectiveness of cognitive behavioral therapy, an effective psychotherapy, is steadily declining(12). Most importantly, due to perceptions of depression and reluctance to admit to experiencing emotional difficulties, most depressed mothers do not seek any help(13). Considering the above limitations regarding treatment, prevention of postpartum depression during pregnancy is especially important, and the National Institutes of Health has called for more research on preventive interventions(1).

Exercise is an important means of preventing depression and it has been shown that regular exercise in the general population can promote overall brain health and prevent and alleviate depression(14,15). Moderate-intensity exercise for pregnant women also reduces the risk of excessive weight gain during pregnancy and gestational diabetes(16), and the American Medical Association also recommends that pregnant women get at least 150 minutes of moderate-intensity aerobic exercise per week(17). However, the results of current research are inconsistent as to whether exercise during pregnancy is effective in preventing postpartum depression. One prospective study found that women who were more physically active had lower levels of postpartum depression(18), a finding supported by a meta-analysis that found significant reductions in depression and anxiety symptoms in postpartum women who participated in prenatal exercise(19). However, a recent randomized controlled trial of a six-month telephysical activity intervention in low-income pregnant women during pregnancy found no effect on depressive symptoms(20) and another study also found that exercise during pregnancy did not reduce the risk of postpartum depression(21). Therefore, a comprehensive analysis of current studies is necessary to systematically assess the preventive effect of exercise during pregnancy on postpartum depression.

Several previous meta-analyses have discussed the effects of exercise during pregnancy on postpartum depression, but these meta-analyses had the following limitations: (1) they were not exercise-only interventions; (2) the exercise interventions lasted into the postpartum period; (3) limitations were placed on the intensity or

type of exercise; and (4) a wide range of study designs were included. This can lead to an inability to accurately and comprehensively assess the effects of exercise-only interventions during pregnancy on postpartum depression, as the produced impacts may arise from other interventions that exercise is combined with or occurs in the postpartum period. Our study differs from previous meta-analyses in that the interventions included were exercise-only interventions performed during pregnancy without restrictions on the type and intensity of exercise, and we included only randomized controlled trials to obtain higher-quality results, in the hope of providing clinicians with up-to-date and useful evidence and offering valuable information for improving guidelines for the prevention of postpartum depression.

2 Materials and Methods

2.1 Literature search

This meta-analysis was conducted following the PRISMA Statement for Systematic Evaluation and Meta-Analysis Priority Reporting Entries(22). The following 4 databases were searched: Web of Science, Embase, PubMed, and Cochrane Library. The search was conducted from the time of construction to March 2025. The search strategy was based on the following criteria. The search strategy synthesized subject and free terms for interventions, study population, outcome indicators, and study design (Table 1) and was adjusted accordingly to the requirements of different databases. In addition, for studies that met the inclusion criteria and review articles on related topics, reference lists were examined to identify additional studies.

Table 1. Meta-analysis search terms.
Interventions, Participants,Outcomes and study are linked by‘AND’.

Interventions (linked by or)	**Participants (linked by or)**	**Outcomes (linked by or)**	**Study (linked by or)**
Exercise ; Exercises Exercise Therapy ; Physical Exercise ; Aerobic Exercise ; Isometric Exercise ; Acute Exercise ; Exercise Training ; physical training ; Physical Activity ; Physical Activities ; physical fitness ; Sport ; aerobic activity ; Strength Training ; Walking ; running ; jogging ; swimming ; weight lifting ; yoga ; Pilates ; Biking ; Cycling	Pregnancy ; Pregnancies ; Gestation ; pregnancy trimester ; prenatal period ; Prenatal ; during pregnancy ; pregnant woman ;	Depression, Postpartum ; Postpartum Depression ; Post-Natal Depression ; Depression, Post-Natal ; Post Natal Depression ; Post-Partum Depression ; Depression, Post-Partum ; Post Partum Depression ; Postnatal Depression ; Depression, Postnatal ; Postnatal Dysphoria ; Postpartum Dysphoria ; Post-Partum Dysphoria ; Post-Natal Dysphoria ;	randomized controlled trial ; RCT ; random*

2.2 Inclusion and exclusion criteria

The inclusion criteria for this study were based on the PICOS principles (study population, intervention, control, outcome indicators, and study design): (1) study population: pregnant women with no contraindications to exercise; (2) intervention: any intensity and type of exercise intervention during pregnancy that was not combined with other interventions; (3) control: receiving routine prenatal care or no exercise intervention; (4) outcome indicators: postnatal depression based on a standardized scale of postpartum depression; (5) study design: randomized controlled trial. Exclusion criteria: (1) dissertations, research protocols, and studies on animals; (2) studies for which full text or data were not available.

2.3 Study screening and data extraction

The screening was conducted independently by two researchers (YYW and MTP) based on the inclusion and exclusion criteria; if there was disagreement about whether an article should be included, the two researchers discussed the issue to reach a consensus, and if the issue could not be resolved, a third person was consulted. The retrieved articles were first imported into Endnote21 software, which was used to delete duplicates, and then the two researchers read the titles and abstracts to delete articles that did not meet the inclusion criteria and read the full text of the remaining articles to decide whether or not they should be included based on the inclusion and exclusion criteria. Data extraction was also carried out independently by two researchers (YYW and MTP) and cross-checked, and data extracted included (1) basic study information: authors, year of publication; (2) study participant information: sample size, mean age, country; (3) intervention information: exercise intensity, amount of exercise, duration of the intervention, and type of exercise; (4) information on the intervention in the control group; (5) Outcome indicators: scores on standardized scales.

2.4 Quality assessment and publication bias assessment

The quality of the included articles was assessed using the Cochrane Collaboration's risk of bias assessment tool for randomized controlled trials in the following areas: random allocation method, allocation scheme concealment, blinding, completeness of outcome data, selective reporting of findings, and other sources of bias. Articles were categorized as low risk of bias, uncertain risk of bias, and high risk of bias according to the evaluation criteria. Publication bias was first evaluated visually using funnel plots, followed by further evaluation using Egger's test using stata17.

2.5 Statistical analysis

Standardized scale scores (means and standard deviations) of the test and control groups were analyzed using RevMan 5.4.1 software. Combined effect sizes were expressed as mean difference (MD). Heterogeneity was assessed using I^2; if $I^2 \geq 50\%$ and $P \leq 0.1$, heterogeneity was considered high and a random-effects model was used, and if $I^2 < 50\%$ and $P > 0.1$, heterogeneity was relatively low, and a fixed-effects model was used. Sensitivity analyses were performed to assess the robustness and reliability of the results using methods such as changing the computational model, and excluding articles with high risk of bias and small sample sizes.

3 Results

3.1 Results of Literature Screening

We searched a total of 954 articles in four databases. After excluding 338 duplicate articles using the software, two researchers (YYW and MTP) screened the remaining 616 articles following the steps described above. First, 597 articles that did not meet the inclusion criteria were excluded by reading the titles and abstracts, leaving 19 articles. Then, the full text of these 19 articles was read and 13 articles were excluded. Of the 13 excluded articles, 4 were excluded because the intervention did not meet the inclusion criteria, 5 were excluded because the outcome metrics did not meet the inclusion criteria, 1 was excluded because it lacked key data, and 3 were excluded because they were research protocols. Finally, a total of 6 articles that met the requirements were included in the meta-analysis(23–28). The literature inclusion flowchart is shown in Figure 1.

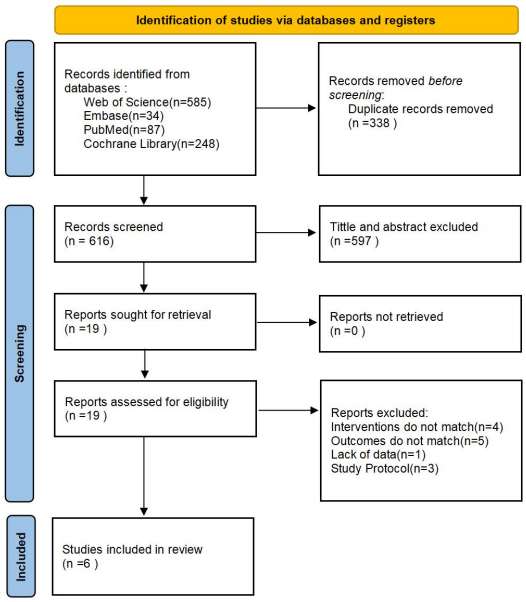

Figure 1. Flowchart of literature screening and inclusion.

3.2 Characterization of the study

The basic characteristics of the included studies are presented in Table 2. In total, six studies from five countries were included(23–28), involving 1787 pregnant women, 821 in the trial group. 966 in the control group. Only 16 pregnant women in one study had depressive symptoms at baseline(26). All six studies were randomized controlled trials and all trial groups received exercise-only interventions during pregnancy, ranging from a minimum of eight weeks(26) to a maximum of five months(25). The frequency of exercise was three times a week in five studies(23–25,27,28) and twice a week in only one study(26). The type of exercise varied, with two studies being water-based(25,28), two studies being home-based(26,27), and two studies being group-based(23,24). All studies assessed the severity of postnatal depression after delivery using the Edinburgh Postnatal Depression Scale.

Table 2. Basic characteristics of the literature.

Study	Country	Sample	Age	Interventions	Comparison
		Test/Control group			
Kim 2022	South Korea	8/8	39.71 ± 2.01 / 38.14 ± 1.39	Online Pilates, 100 minutes per week for 8 weeks.	Do not take part in any exercise.
Nunes Coll 2019	Brazil	192/387	27.2 (5.5) / 27.3 (5.5)	Exercise supervised by a team, 180 minutes per week for at least 16 weeks.	/
Mohammadi 2015	Iran	38/35	25.2 ± 4.7 / 25.3 ± 5.2	Low-intensity stretching and breathing exercises, 60 to 90 minutes per week, continuing until childbirth.	Routine prenatal care
Navas 2021	Spain	139/132	31.1 ± 4.1 / 31.5 ± 4.2	Aqua aerobics, 135 minutes per week for five months.	Routine prenatal care
Songoygard 2012	Norway	379/340	30.59(4.3)/30.57(4.2)	Combining group exercises and home exercises, with 150 minutes of exercise per week for 12 weeks.	Routine prenatal care
Maria 2019	Spain	65/64	34.52(4.5) / 33.67(5.37)	Aquatic exercise, 180 minutes per week for 17 weeks.	Routine prenatal care

3.3 Quality of research

Two researchers (YYW and MTP) assessed the quality of the included articles using the Cochrane Collaboration's risk of bias assessment tool for randomized controlled trials, and the results are shown in Figure 2. Three articles were rated at high risk of bias, of which one was at risk of selective reporting of outcomes(26), one was at risk in terms of blinding implementation(23), and one was at risk in terms of both blinding implementation and completeness of outcome data(24). The remaining articles did not provide complete information on allocation scheme concealment and blinded implementation of outcome measures, making it difficult to judge whether they were correct or not, and were therefore rated at unclear risk of bias.

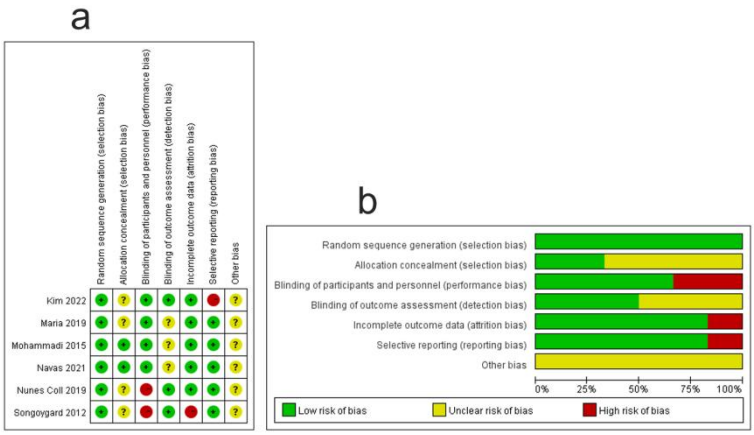

Figure 2. Evaluation of the quality of the included literature: (a) ROB summary. (b) ROB graph

3.4 Meta-analysis

3.4.1 Combined effect size

A total of six studies were included for meta-analysis involving 1787 pregnant women, all six studies used the Edinburgh Postnatal Depression Scale (EPDS) to assess the severity of postpartum depression in pregnant women, therefore the combined effect sizes will be expressed using mean difference (MD), the results are shown in Figure 3. Due to high heterogeneity (I^2 =92%, P< 0.00001), the analysis was performed using a random effects model, and the results showed that women who exercised during pregnancy had significantly lower severity of postpartum depression compared to standard prenatal care or no exercise [MD=-1.54, 95% CI (-2.69, -0.39), P=0.009], and the 95% confidence interval did not contain 0. This result was statistically significant.

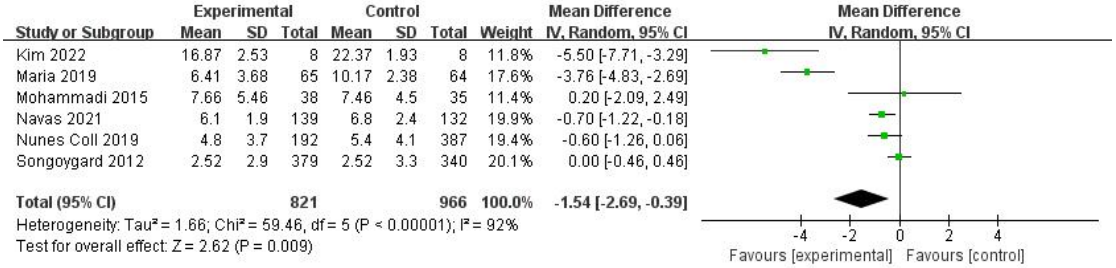

Figure 3. Effects of prenatal exercise on postpartum depression.

3.4.2 Subgroup analysis based on sport type

There were three groups based on different types of exercise: an aquatic exercise group, a home exercise group, and a group exercise group. The aquatic exercise group included 2 studies(25,28) involving 400 pregnant women. The home exercise group included 2 studies(26,27) involving 89 pregnant women. The group exercise group included 2 studies(23,24) involving 1298 pregnant women. Due to high heterogeneity, all three groups were analyzed using a random effects model, and the results, as shown in Table 3, showed that the home exercise group had the most significant effect on reducing the severity of postpartum depression [MD=-2.66, 95% CI (-8.24, 2.93), P=0.35], followed by aquatic exercise [MD=-2.19, 95% CI (-5.19, 0.8), P= 0.15], and finally group exercise [MD=-0.25, 95% CI (-0.83, 0.33), P=0.4]. Notably, none of the three groups' results were statistically significant.

3.4.3 Subgroup analysis based on weekly exercise time

Two groups were divided based on the duration of weekly exercise: the group exercise< 150 minutes per week and the group exercise≥150 minutes per week. The exercise< 150 minutes per week group included 3 studies(25–27) involving 360 pregnant women. The exercise≥150 minutes per week group included 3 studies(23,24,28) involving 1427 pregnant women. Due to high heterogeneity, both groups were analyzed using a random effects model, and the results, as shown in Table 3, showed that the duration of weekly exercise did not have a significant effect on the results and that both <150 minutes and ≥150 minutes of weekly exercise significantly improved the severity of postpartum depression. Exercise<150 minutes per week [MD=-1.93, 95% CI (-4.82, 0.97), P=0.19] showed slightly better improvement than exercise≥150 minutes per week [MD=-1.39, 95% CI (-3.16, 0.39), P=0.13]. The results were not statistically significant in either group.

3.4.4 Age-based subgroup analysis

Based on different ages were divided into two groups: age <34 and age >34 groups. Age <34 group included 4 studies(23–25,27) involving 1642 pregnant women. The age >34 group included 2 studies(26,28) involving 145 pregnant women. The homogeneity of the two groups was good, so the fixed effect model was used for the analysis, and the results are shown in Table 3, which shows that the effect of exercise during pregnancy on the improvement of postpartum depression was strongly influenced by age. The improvement effect of exercise during pregnancy was significantly better in pregnant women aged >34 [MD=-4.09, 95% CI (-5.05, -3.13), P<0.00001] than in those aged <34 [MD=-0.36, 95% CI (-0.66, -0.06), P=0.02], and the results were statistically significant in both groups.

Table 3. Summary of subgroup meta-analyses.

Subgroup		No. of studies	Meta analysis			I^2	P
			MD	95% CI	P		
Type of exercise	Aquatic Exercise	2	-2.19	-5.19, 0.8	0.15	96%	<0.00001
	Home exercise	2	-2.66	-8.24, 2.93	0.35	92%	0.0004
	Group exercise	2	-0.25	-0.83, 0.33	0.4	53%	0.14
Total weekly exercise time	<150min	3	-1.93	-4.82, 0.97	0.19	89%	0.0001
	≥150min	3	-1.39	-3.16, 0.39	0.13	95%	<0.00001
Age	<34	4	-0.36	-0.66, -0.06	0.02	37%	0.19
	>34	2	-4.09	-5.05, -3.13	<0.00001	48%	0.16

3.5 Sensitivity analysis and publication bias

After changing the computational model or excluding articles with a high risk of bias and small sample sizes, the results of the meta-analysis were found not to be significantly altered, indicating that the results of this study are relatively robust. Combining the funnel plot (Figure 4) with the results of Egger's test (P=0.112) (Supplementary file 1) showed that there was no significant publication bias.

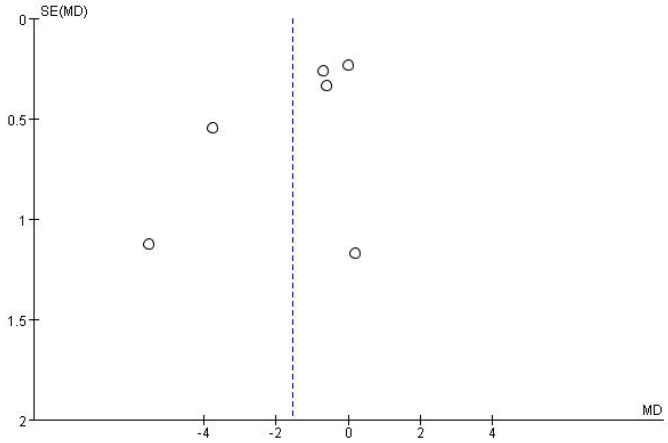

Figure 4. Funnel plot of the effects of prenatal exercise on postpartum depression.

4 Discussion

This study aimed to investigate the effect of exercise during pregnancy on postpartum depression. A total of six randomized controlled trials were included. The results of the meta-analysis showed that exercise during pregnancy significantly reduced the severity of postpartum depression in pregnant women compared to no exercise or receiving standard prenatal care during pregnancy [MD=-1.54, 95% CI (-2.69, -0.39), P=0.009]. Conducting home-based exercise for <150 minutes per week had the best effect. Pregnant women over 34 years of age reaped better improvements than pregnant women under 34 years of age.

4.1 Effect of exercise during pregnancy on postpartum depression

The results of the meta-analysis suggest that exercise-only interventions during pregnancy can reduce the severity of postpartum depression, consistent with the findings of two recent meta-analyses(29,30), which found that higher levels of physical activity or aerobic exercise during pregnancy were associated with reduced postpartum depression. It is worth noting that there was a high degree of heterogeneity in our study, and therefore caution is still needed regarding the interpretation of the results. Among the six randomized controlled trials we included, there were differences in the type of exercise intervention and total time spent exercising per week, so we conducted subgroup analyses in the hope of finding the source of heterogeneity, but subject to the number of studies and socio-demographic differences between studies, there was still a high level of heterogeneity in the subgroups, which may indicate that the type of exercise intervention and total time spent exercising per week may not be the cause of the heterogeneity. Since age is a significant predictor of postnatal depression scores(31), we conducted subgroup analyses based on different ages, which showed lower heterogeneity in the subgroups, and the results did not change significantly, and exercise during pregnancy reduced Edinburgh Postnatal Depression Scale scores in pregnant women of different ages.

There are three possible mechanisms by which exercise during pregnancy prevents postpartum depression: affecting neuronal, psychological, or biochemical changes. New neuron synthesis decreases in the hippocampus of adults with major depressive disorder, whereas exercise increases neuron synthesis; therefore, exercise during pregnancy may have a preventive effect against postpartum depression by increasing new neuron production in the brains of pregnant women(32). A second possible mechanism is the psychological model of physical activity(33). For example, sudden changes in body weight and size during pregnancy may lead to body image dissatisfaction in pregnant women, which is positively associated with depression.(34) Exercise prevents excessive weight gain during pregnancy.(35) Exercise during pregnancy may ultimately prevent postpartum depression by improving body image satisfaction in pregnant women. Another possible mechanism is a biochemical change, whereby exercise increases endorphin levels and thus affects mental health(36).

4.2 Effect of type of exercise during pregnancy on postpartum depression

Three types of exercise were included in this study in randomized controlled trials: home exercise, aquatic exercise, and group exercise. The results of the meta-analysis showed that pregnant women performing group exercise with others had a lower improvement effect than pregnant women exercising individually at home, which is inconsistent with the results of a previous meta-analysis that found a slightly higher efficacy in the team

exercise group than in the individual exercise group(30) Most studies have also found a positive effect of team sport participation on mental health outcomes(37). This inconsistency may be due to (1) the small number of studies we included and the high heterogeneity between studies, and (2) the low participant adherence to one of the group exercise we included, with 42% of pregnant women exercising less than 10 times, although the exercise intervention lasted until delivery. Although there may be some differences in the magnitude of impact, either type of exercise improves the severity of postpartum depression.

4.3 Effect of weekly exercise time during pregnancy on postpartum depression

The six randomized controlled trials included in the meta-analysis varied considerably in terms of weekly exercise time, with the shortest exercising for only 60 minutes per week and the longest exercising for up to 180 minutes per week. Dividing the studies into two groups using 150 minutes as a cut-off(17), the results showed that exercise<150 minutes per week was more effective in affecting postpartum depression than exercise≥150 minutes per week, whereas Yuan et al.'s study found that longer duration of exercise reduced the risk of postpartum depression(38). Different time points for assessing postpartum depression may have contributed to the inconsistent results, as studies with ≥150 minutes of exercise per week were assessed later than those with <150 minutes of exercise per week, and the scores on the Edinburgh Postnatal Depression Scale may have been progressively decreased over time(39), which may have led to the situation that the effect of interventions on postpartum depression did not become more effective with increased exercise in our meta-analysis, because of the passage of time. A second reason may be the different timing of the start of the exercise intervention, as all of the studies we included implemented exercise interventions during pregnancy, whereas the study by Yuan et al. included trials in which exercise interventions were initiated after delivery.

4.4 Effect of age on the prevention of postpartum depression by exercise during pregnancy

The results of the meta-analysis found that exercise during pregnancy was more effective in improving postpartum depression in pregnant women aged over 34, but this result should be interpreted with caution due to the small number of included studies and the presence of depressive symptoms at baseline in subjects of one study. Considering that advanced maternal age is strongly associated with early pregnancy miscarriage and chromosomal risk abnormalities(40) and that the severity of postpartum depression is positively influenced by a woman's age(31), older pregnant women may derive more health benefits from exercising during pregnancy. For example, pregnant women aged 30 and over who were overweight before pregnancy are more likely to experience sleep disturbances during pregnancy, which can lead to adverse maternal and fetal outcomes such as gestational hypertension, gestational diabetes mellitus, preterm labor, stillbirth, etc.(41), and studies have demonstrated that moderate aerobic exercise can be used as a non-pharmacological treatment to improve sleep disturbances(42).

4.5 Limitations

This meta-analysis attempted to obtain higher-quality evidence by systematically summarizing the results of randomized controlled trials, but several limitations remain. First, the number of included studies was small, with most studies performing exercise interventions in the perinatal period and fewer randomized controlled trials specifically performing exercise interventions during pregnancy to prevent postpartum depression, leaving the number of studies included in the meta-analysis at only six. Second, there was a high degree of heterogeneity among the studies, and we attempted to explore the sources of heterogeneity through subgroup analyses but were constrained by reasons such as insufficient information about the original studies or excessive differences in the moderating factors, which prevented us from conducting meaningful subgroup analyses.

5 Summary

The results of the meta-analysis suggest that different types of exercise during pregnancy with different total weekly exercise times are effective in improving postpartum depression, but the results should be treated with caution due to the small number of studies and high heterogeneity. In the future, more high-quality randomized controlled trials should be conducted to explore the effects of exercise during pregnancy on mental health problems such as postpartum depression in more depth.

Declarations

Author's contribution
Conceptualization, YYW and JH; methodology, YYW; software, YYW; check, YYW, MTP and JH; formal analysis, YYW; investigation, YYW; resources, YYW; data curation, YYW; writing - rough preparation, YYW; writing - review and editing, YYW; visualization, BJW; supervision, HWS; project administration, YYW; receiving funding, JH. All authors have read and agreed with the published version of the manuscript.

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Informed Consent Statement
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Data Availability Statement
Since this research is a systematic review, all the analyzed data were sourced from the databases used. The datasets used or analysed during the current study are available from the corresponding author on reasonable request. The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Acknowledgments
Not applicable.

Conflict of Interest Statement
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary 1

```
. metabias _ES _seES, egger graph

Note: data input format theta se_theta assumed

Egger's test for small-study effects:
Regress standard normal deviate of intervention
  effect estimate against its standard error

.
Number of studies =  6                              Root MSE      =   2.436
```

Std_Eff	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
slope	.2412581	.2418118	1.00	0.375	-.430119	.9126352
bias	-4.111792	2.027005	-2.03	0.112	-9.739659	1.516075

```
Test of H0: no small-study effects          P = 0.112
```

Figure1. Egger's test results.