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The Impact of Exercise on Mental Health and Systemic Inflammation in Women with Polycystic Ovary Syndrome: A Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 January 2026 and was last updated on 16 January 2026.

INTRODUCTION

Review question / Objective This meta-analysis aimed to systematically evaluate the effects of exercise interventions on mental health and systemic inflammation levels in patients with Polycystic Ovary Syndrome(PCOS).

Condition being studied

Inclusion Criteria:
(1) Female patients diagnosed with PCOS[28].
(2) Intervention group receiving a single exercise intervention, including but not limited to structured programs of aerobic exercise, resistance training, high-intensity interval training, and mind-body exercises.
(3) Control group receiving no intervention, placebo, or usual care without an exercise component.
(4) Studies reporting at least one of the following outcomes: depression score, anxiety score, quality of life score, hs-CRP, or CRP.
(5) Randomized Controlled Trials.
Exclusion Criteria:
(1) Non-PCOS females or animal studies.
(2) Interventions not involving physical exercise/ structured physical activity (e.g., pharmacological or psychological therapy alone). Studies where the intervention group combined exercise with other therapies (e.g., exercise plus cognitive therapy). (3) Studies without a control group.
(4) Non-RCTs (e.g., descriptive studies, reviews, systematic reviews, news reports, case reports, meta-analyses).
(5) Others: Studies where pre- and post-intervention data (mean, standard deviation, sample size) were unavailable for analysis; results presented only in graphs/figures from which data could not be accurately extracted; studies with missing, unclear, or irrelevant data; duplicate publications; studies not reporting relevant adverse events.

METHODS

Participant or population Female patients diagnosed with PCOS.

Intervention Intervention group receiving a single exercise intervention, including but not limited to structured programs of aerobic exercise, resistance training, high-intensity interval training, and mind-body exercises.

Comparator Control group receiving no intervention, placebo, or usual care without an exercise component.

Study designs to be included Randomized Controlled Trials.

Eligibility criteria
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Information sources We searched seven databases, including Embase, Web of Science, PubMed, The Cochrane Library, Wanfang, VIP, and China National Knowledge Infrastructure (CNKI), from inception to October 2025 for randomized controlled trials (RCTs) investigating the effects of exercise on mental health and inflammation in PCOS patients.

Main outcome(s) Mental Health and Systemic Inflammation.

Quality assessment / Risk of bias analysis Meta-analysis, subgroup analyses, sensitivity analysis, and assessment of publication bias were conducted using Stata 17.0. Heterogeneity across studies was evaluated based on sample sizes, as well as means and standard deviations of pre- to post-intervention changes for all included outcome measures. All outcomes were continuous variables. The mean difference (MD) was used when measurement methods and units were identical across studies; otherwise, the standardized mean difference (SMD) was applied. Heterogeneity was assessed using the P-value and I^2 statistic , $P < 0.05$ and $I^2 > 50\%$ indicated significant heterogeneity, in which case a random-effects model was employed. Otherwise, a fixed-effects model was used. Results of the meta-analysis are presented with 95% confidence intervals (95% CI). If a single study included multiple independent intervention groups, each group was treated as a separate study entry to ensure consistency in the unit of analysis and accuracy of the results.

Strategy of data synthesis Meta-analysis, subgroup analyses, sensitivity analysis, and assessment of publication bias were conducted using Stata 17.0. Heterogeneity across studies was evaluated based on sample sizes, as well as means and standard deviations of pre- to post-intervention changes for all included outcome measures. All outcomes were continuous variables. The mean difference (MD) was used when measurement methods and units were identical across studies; otherwise, the standardized mean difference (SMD) was applied. Heterogeneity was assessed using the P-value and I^2 statistic , $P < 0.05$ and $I^2 > 50\%$ indicated significant heterogeneity, in which case a random-effects model was employed. Otherwise, a fixed-effects model was used. Results of the meta-analysis are presented with 95% confidence intervals (95% CI). If a single study included multiple independent intervention groups, each group was treated as a separate study entry to ensure consistency in the unit of analysis and accuracy of the results.

Subgroup analysis This study intends to conduct subgroup analyses on the types, intensities, frequencies, periods and durations of exercise.

Sensitivity analysis Egger test.

Country(ies) involved China.

Keywords Exercise ; Polycystic Ovary Syndrome ; Mental Health ; Depression ; Anxiety ; Quality of Life ; Inflammation ; hs-CRP.

Contributions of each author

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