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The effect of physical exercise on anxiety/ depression and emotion in children with Attention-Deficit Hyperactivity Disorder: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - Shanghai Key Lab of Human Performance (Shanghai University of sport)(NO:11DZ2261100).

Review Stage at time of this submission - Preliminary searches.

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 28 July 2024 and was last updated on 28 July 2024.

INTRODUCTION

Review question / Objective The aim of this systematic review and meta-analysis was to systematically investigate the intervention effect of physical exercise on anxiety/ depression and emotion in children with Attention-Deficit Hyperactivity Disorder.

Condition being studied About 25% to 50% of children with ADHD will show varying degrees of anxiety / depression and mood disorders.As a safe, low-cost and easy-to-implement intervention, exercise therapy is recommended for adjuvant or supplementary treatment of children with ADHD, and the effect of intervention is similar to that of drug therapy.The aim of this systematic review and meta-analysis was to systematically investigate the intervention effect of physical exercise on anxiety/ depression and emotion in children with Attention-Deficit Hyperactivity Disorder.

METHODS

Participant or population Children with Attention-Deficit Hyperactivity Disorder.

Intervention Physical exercise OR Sport* OR Exercise.

Comparator Physical exercise OR Sport* OR Exercise.

Study designs to be included RCT.

Eligibility criteria Inclusion criteria:(1) Study type: RCTs; (2) Study population: children with ADHD;(3) Intervention: The control group received routine rehabilitation treatment or no intervention, while the experimental group received sports training in addition to routine rehabilitation treatment; (4)Language: English.Exclusion criteria:(1) Reviews, comments, animal experiments, and duplicate publications; (2) Studies with unclear descriptions

of experimental data, incomplete data, an inability to obtain raw data even after contacting the authors, or poor quality; (3) Studies involving subjects with other physical diseases; (4) Studies involving animal-assisted therapy in the intervention group; (5) Studies with unclear diagnostic criteria or intervention plans.

Information sources Search conducted from the starting year of the library to now, and a comprehensive search was conducted through PubMed, Web of Science, Cochrane Library, CNKI, VIP Data, Wan Fang Data and EMbase electronic databases, with no language restriction.The references of the other relevant studies or systematic reviews were manually screened for inclusion.

Main outcome(s) The primary outcome was anxiety/depression and the secondary outcome was emotion.

Quality assessment / Risk of bias analysis The PEDro scale(PhysiotherapyEvidenceDatabase) was used to rate the quality of the RCTs. The calibration of the scale was established via the Delphi scale, and two calibrations were conducted. The scale included 11 evaluation items: “eligibility criteria”, “random allocation”, “concealed allocation”, “similar baseline”, “blinding of subjects”, “blinding of therapists”, “blinding of outcome assessment”,“dropout rate ≤15%”, “intention analysis”,“between-group statistical comparisons”, and “point measures and measures of variability”.Among them, “eligibility criteria” was not counted in the scoring system. If a certain criterion was explicitly met, it was given a score of 1, otherwise, it received a score of 0. The total score was 10, with “<4” indicating poor quality, “4–5”medium quality, “6–8” good quality, and “9–10” high quality. Two authors independently graded the quality of the included studies, and if there was a disagreement, they discussed it with the third author until there was a consensus.Publication bias was detected using “Stata 18.0” software, in which funnel plots were used to assess the likelihood of publication bias.Egger’s test was used to assess the magnitude of publication bias.

Strategy of data synthesis Meta-analysis was performed using “Stata 18.0” software.The effect sizes were combined using the standardized mean difference (SMD) and the 95% confidence interval (CI) because of the differences in testing methods and indicator units.The effect sizes were quantified, and SMD≥0.8 was defined as large, 0.5≤SMD<0.8 was defined as medium, 0.2≤SMD<0.5 was defined as small, and SMD50%, the sensitivity analysis of heterogeneity was carried out by one-by-one removal method. The heterogeneity of each study was considered to be acceptable when I^2≤50%.

Subgroup analysis Subgroup-analysis was performed using “Stata 18.0” software.Based on the physical exercise intervention period, subgroup analysis was performed.The pooled effect size was measured for the type of exercise, Period/week, Frequency(time/week), intervention duration/min.

Sensitivity analysis The sensitivity analysis will be carried out by using Stata software, and the sensitivity of the article will be reflected by the change of the amount of effect after one of the articles was deleted one by one.

Country(ies) involved China.

Keywords attention deficit hyperactivity disorder; anxiety/depression; emotion; exercise intervention; meta.

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