

# Effects of neurofeedback versus methylphenidate for the treatment of attention-deficit/hyperactivity disorder protocol for a systematic review and meta-analysis of head-to-head trials

Yan L, Zhang J, Yuan Y, Cortese S.

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Abstract

## INTRODUCTION:

Attention-deficit/hyperactivity disorder (ADHD) is developmental disorder characterized by inattention and/or hyperactivity/impulsivity. Psychostimulants, including methylphenidate (MPH), are recommended as a first-line pharmacological intervention, whereas neurofeedback (NF) has been proposed as a nonpharmacological option. The comparative effects of MPH and NF need further exploration. We will conduct a systematic review and meta-analysis of head-to-head randomized controlled trials (RCTs) comparing the efficacy and/or tolerability of MPH and NF in children/adolescents and adults with ADHD.

## METHOD AND ANALYSIS:

We will include published as well as unpublished data. Two investigators will independently search PubMed, OVID, ERIC, Web of Science, ClinicalTrials.gov, and a set of Chinese databases, including CNKI, CQVIP, and WanFang for head-to-head RCTs comparing MPH and NF. Experts will be contacted for unpublished data. The primary outcome will be the efficacy on ADHD core symptoms, measured by the change in the severity of ADHD symptoms, from baseline to endpoint and, if available, at follow-up (at any available time point). Secondary outcomes will be: dropouts for any reasons; efficacy on neuropsychological measures (working memory, inattention, and inhibition). We will conduct subgroup analyses to assess the impact of the following variables: age; type of NF; language of publication; comorbidities. Additionally, we will carry out meta-regression analyses to investigate the effect of sponsorship, year of publication, duration of intervention, and age of participants. Sensitivity analyses will be conducted to test the robustness of the findings. Risk of bias of individual studies will be assessed using the Cochrane risk of bias tool. Analyses will be performed using Comprehensive Meta-Analysis Software.

## ETHICS AND DISSEMINATION:

No ethical issues are foreseen. Results from this study will be published in a peer-reviewed journal and presented at relevant national and international conferences.

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