INPLASY PROTOCOL

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None declared.

Are Active Video Games Useful In The Development Of Gross Motor Skill Of Non-Typically Developing Children?A Meta-Analysis

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Review question / Objective: **This study systematically evaluated the effect of active video games on the development of gross motor skills in children and adolescents with non-typically developing children development.**
Condition being studied: **Active video games are increasingly used in sports rehabilitation, especially among children and adolescents. However, due to the variety of video games, the different intervention environments and intervention doses, there are often differences in treatment effects. There may be questions about the actual effectiveness of video games in sports rehabilitation.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 May 2022 and was last updated on 20 May 2022 (registration number INPLASY202250124).

INTRODUCTION

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about the actual effectiveness of video games in sports rehabilitation.

METHODS

Search strategy: The following databases were used: PubMed, Cochrane Library, Embase, Elton Bryson Stephens Company, Web of Science, China National Knowledge Infrastructure, and Wanfang. We retrieved data from RCTs from the inception of each database until March 16, 2021.

Participant or population: 3–14 years with non-typically developing children.

Intervention: Active video games intervention.

Comparator: Other intervention or blank control group.

Study designs to be included: Randomized controlled trial.

Eligibility criteria: The inclusion criteria were as follows: (i) the study population was aged 3–14 years with NTDC; (ii) at least one of the GMSs was objectively measured and reported separately; (iii) the intervention in the study was conducted using an AVG platform and was not a single intervention; (iv) the study was published and peer-reviewed in English or Chinese ; and (v) the study was a randomized controlled trial (RCT).The exclusion criteria were as follows: (i) subjects were children and adolescents with physical disabilities or who had not been informed clearly; (ii) evaluation of motor skill is a combination of gross motor skill and fine motor skill; (iii) data on the change in FMS before and after the test (e.g., mean ± SD) were absent; and (iv) the subjects were not 3-14 years old.

Information sources: The following databases were used: PubMed, Cochrane Library, Embase, Elton Bryson Stephens Company, Web of Science, China National Knowledge Infrastructure, and Wanfang. We retrieved data from RCTs from the inception of each database until March 16, 2021. The search strategy was based on principles of PICOS (population, intervention, comparison, outcomes, and study design).

Main outcome(s): (i) LS index, including walking, running, jumping, shuttle run, etc.; (ii) OCS index, including throwing, catching, hitting, and beating; and (iii) SS index, including balance beam standing, on one or both feet, etc.

Quality assessment / Risk of bias analysis: Two researchers independently judged the risk degree of the literature according to the seven areas of the Cochrane system evaluation manual:random sequence generation (selective bias), allocation concealment (selective bias), blind method of subjects and researchers(performance bias), blind method of outcome evaluator (detection bias), incomplete outcome data (attrition bias), selective reporting (reporting bias) and other bias. For each index, “low bias risk”, “uncertainty bias risk” and “high bias risk” are used for judgment. If the evaluation results are inconsistent, the third researcher shall be consulted appropriately to reach an agreement and finally determine the literature quality.

Strategy of data synthesis: We employed Review Manager 5.4 for data processing. The boundary values of “small”, “medium”, and “large” effect sizes were 0.2, 0.5, and 0.8[19]. Also, 75%, 50%, and 25% denoted the proportion of “high”,“medium” and “low” inter-study heterogeneity, respectively[20].If significant heterogeneity between studies was not observed ($P > 0.1$, $I2 < 40\%$), we used a fixed-effects model for analysis. If there was significant heterogeneity between studies ($P< 0.1$, $I2\geq40\%$), a random-effects model was used for analyses, and further subgroup analyses were carried out to discover the source of heterogeneity.

Subgroup analysis: In this study, there was no significant difference in the improvement of OCS; therefore, only the LS and SS subgroups were analyzed. The subgroup analysis of the intervention effect on the LS of NTDC shows that the game intervention platforms are widely

distributed, including Nintendo Wii, Xbox 360 Kinect, Q4 Scene Interactive Training System, and KMC1 virtual reality movement system. From the perspective of disease types and intervention settings, the intervention effect for children with cerebral palsy in medical and clinical institutions is more obvious; the conclusions of the intervention cycle, single intervention duration, and intervention frequency are relatively consistent, that is, the longer intervention cycle and intervention duration, as well as the higher intervention frequency every week, have a greater effect on the intervention effect of LS in NTDC.

Sensitivity analysis: To explore whether the heterogeneity among studies was caused by a single study, sensitivity analysis was performed. After excluding one study one by one, there was no significant change in the effect size.

Language: English and Chinese.

Country(ies) involved: China.

Keywords: active video games; gross motor skill; non-typically developing children; meta-analysis.

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