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Effect of virtual reality on pain of children with neoplasm: systematic review with meta-analysis

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Abstract

INTRODUCTION: Virtual reality is a non-pharmacological intervention increasingly used for pain control in pediatric settings. However, there is a lack of syntheses of studies focused on the effect of virtual reality in pediatric oncology, where children are subjected to numerous and repeated painful medical procedures. This study evaluated the effect of virtual reality on pain control in children with neoplasm.

METHODS: A systematic review with meta-analysis of randomized or quasi-randomised parallel-group controlled trials was implemented. Six biomedical databases and one trial registry were queried. Virtual reality has been compared to standard care. The primary outcome was children's self-reported pain at the end of the procedure. The risk of bias was assessed with RoB 2. The standardized mean difference was used to calculate the point estimate of the intervention effect, measured with Cohen's d; statistical heterogeneity was quantified with Higgins I^2 index. The risk of publication bias was assessed by inspection of the funnel plot and measured with Egger test, Mazumdar and Begg test and FailSafe N test. The certainty/quality of evidence was presented with GRADE method.

RESULTS: Nine studies (N = 492) at moderate-high risk of bias were included. Compared to standard care, the effect of virtual reality on pain is positive, large and statistically significant (d = -1.39 [95% CI: -2.03, -0.75]); the statistical heterogeneity is high (I^2 = 89.55%), the risk of publication bias is unlikely and the certainty/quality of the evidence is low.

CONCLUSIONS: Virtual reality seems more effective than standard care on pain control in children with neoplasm. However, further studies with larger sample sizes, high methodological quality and low risk of bias are needed to confirm the observed benefit.

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