Is device-measured vigorous-intensity physical activity associated with health-related outcomes in children and adolescents? A systematic review and meta-analysis

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Abstract
Objective: This study sought to analyze the prospective association between vigorous-intensity physical activity (VPA) and health-related outcomes in children and adolescents. Methods: Studies reporting associations between device-measured VPA and health-related factors in children and adolescents aged 3–18 years were identified through database searches (MEDLINE, EMBASE, and SPORTDiscus). Correlation coefficients were pooled if outcomes were reported by at least 3 studies, using DerSimonian–Laird random effects models. Results: Data from 23 studies including 12,056 participants were pooled using random effects models. Significant associations were found between VPA at baseline and overall adiposity \( (r = -0.09, 95\% \text{ confidence interval} (95\% \text{CI}): -0.15 \text{ to } -0.03, p = 0.002; I^2 = 90.4\%) \), cardiometabolic risk score \( (r = -0.13, 95\% \text{ CI}: -0.24 \text{ to } -0.02, p = 0.020; I^2 = 69.6\%) \), cardiorespiratory fitness \( (r = 0.20, 95\% \text{CI}: 0.13 \text{ to } 0.28, p < 0.001; I^2 = 0\%) \), and total bone mineral density \( (r = 0.16, 95\% \text{CI}: 0.06 \text{ to } 0.25, p = 0.001; I^2 = 0\%) \). Conclusion: VPA seems to be negatively related to adiposity and cardiometabolic risk score and positively related to cardiorespiratory fitness and total body bone mineral density among children and adolescents at follow-up. Therefore, our findings support the need to strengthen physical activity recommendations regarding VPA due its health benefits in children and adolescents.

Author keywords
Accelerometry
Adiposity
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Physical activity