Combined Aerobic and Resistance Exercise Interventions for Children and Adolescents With Cancer: A Systematic Review and Meta-Analysis

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PROBLEM IDENTIFICATION: Systematic reviews in adults with cancer have shown the benefits of combined aerobic and resistance exercise (CE) interventions on physical and psychological fitness. However, data on the efficacy of CE interventions for children and adolescents are limited and discordant.

LITERATURE SEARCH: The PubMed®, Embase®, Cochrane Central Register of Controlled Trials, Web of Science, and China National Knowledge Infrastructure electronic databases were searched from inception to April 19, 2022.

DATA EVALUATION: Nine randomized controlled trials met the inclusion criteria. A quantitative synthesis method was used to investigate the effects of CE interventions on fatigue, cardiorespiratory fitness, physical activity levels, and health-related quality of life.

SYNTHESIS: This systematic review and meta-analysis indicates that CE interventions have beneficial effects on the fatigue, cardiorespiratory fitness, and physical activity levels of this population.

IMPLICATIONS FOR PRACTICE: Healthcare providers should implement CE interventions during hospital care and recommend home-based CE interventions to patients who have barriers to performing hospital-based sessions.

KEYWORDS pediatric cancer; aerobic exercise; resistance exercise; systematic review; meta-analysis
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It is estimated that about 300,000 children and adolescents aged 0–19 years around the world are diagnosed with cancer every year (Miller et al., 2020; Ward et al., 2014). With the improvement of treatment techniques, the five-year postdiagnosis survival rates of this patient population have exceeded 80% (Miller et al., 2020). However, this increase in survival carries an enhanced risk of treatment-related late effects, which can deteriorate survivors' functional capacity and health-related quality of life (HRQOL) (Braam, van der Torre, et al., 2016; Ospina et al., 2021). Cancer treatment requires repeated and prolonged hospitalizations, which directly affect the physical activity (PA) levels of patients (Mueller et al., 2018). It is reported that, compared with the prediagnosis levels, the habitual PA levels of patients with childhood cancer during hospitalization and at home decreased significantly (Götte et al., 2014). Although the physical impairment of children and adolescents with cancer may be caused by many reasons, physical inactivity is one of the important contributors (Braam, van Dijk-Lokkart, et al., 2016). Physical inactivity, particularly bed rest, will further reduce poor cardiorespiratory fitness (CRF), aggravate (cancer-related) fatigue, and affect activities of daily living. Therefore, implementing evidence-based rehabilitation interventions tailored to the pediatric oncology population to attenuate negative physical and mental side effects is a major issue.

Exercise is increasingly regarded as an important part of supportive care for individuals with cancer and cancer survivors, albeit focusing more on adults than on children so far. Aerobic exercise and resistance training are common exercise therapies (Xi et