Impact of Exercise on Psychological Burden, Quality of Life, and Cognitive Dysfunction in Adult Survivors of Childhood Cancer: A Report from the Childhood Cancer Survivor Study (CCSS)

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Background: Adult survivors of childhood cancer are at risk for adverse psychological outcomes. Whether exercise can attenuate this risk is unknown.

Methods: Using a longitudinal design, 6199 CCSS participants (median [range] age 34 years [22-54] and median [range] age at diagnosis 10 years [0-21]) completed a baseline questionnaire assessing vigorous exercise, medical and psychological conditions. Psychological outcomes were evaluated in a subsequent questionnaire a median of 7.8 years later (range 0.1-10). Primary outcome was overall psychological burden, defined as: symptom level above the 90th percentile of population norms on the Brief Symptom Inventory-18 for depression, anxiety, or somatization; cancer-related pain; cognitive impairment; or poor quality of life. Log-binomial regression estimated associations between exercise [total metabolic equivalent-hrs wk\(^{-1}\) (MET-hrs wk\(^{-1}\))] and these outcomes adjusting for cancer diagnosis/treatment, demographics, and baseline medical/psychological illness.

Results: The prevalence of overall psychological burden at follow-up was 71.3%. The prevalence of depression was 11.4%, anxiety 7.4%, and somatization 13.9%. Among those not engaged in vigorous exercise, the prevalence of overall psychological burden was 75.9%, compared to 68.6% in those who exercised ≥ 3 MET-hrs wk\(^{-1}\) (p<0.001). Compared to 0 MET-hrs wk\(^{-1}\) of vigorous exercise, the adjusted prevalence ratio (PR) for overall psychological burden was 0.98 (95% CI, 0.95-1.01) for 3-6 MET-hrs wk\(^{-1}\), 0.93 (95% CI, 0.90-0.96) for 9-12 MET-hrs wk\(^{-1}\), and 0.94 (95% CI, 0.90-0.98) for 15-21 MET-hrs wk\(^{-1}\). Compared to not reporting vigorous exercise, 9 to 12 MET-hrs wk\(^{-1}\) was associated with an adjusted PR of 0.76 (95% CI, 0.62-0.93; p=0.004) for depression and 0.79 (95% CI, 0.66-0.94; p=0.003) for somatization. Vigorous exercise was associated with higher cognitive function in domains of task completion, organization, and working memory (p’s<0.05) but was not associated with cancer pain or quality of life.

Conclusions: Vigorous exercise is associated with lower psychological burden and less cognitive impairment in long-term survivors of childhood cancer.