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Effects of exercise on gut microbiota in patients with cancer: A Scoping Review

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Background: Cancer and its treatments, such as chemotherapy, radiotherapy, endocrine, and targeted therapies, often cause systemic effects including chronic inflammation, immune suppression, metabolic alterations, and gastrointestinal toxicity. These complications are increasingly linked to gut microbiota dysbiosis, which plays a central role in maintaining host homeostasis. Although exercise can modulate gut microbiota in healthy populations, its specific effects in cancer patients remain unclear.
Objective: To synthesize observational evidence on the association between exercise and gut microbiota outcomes in cancer patients, focusing on microbial diversity, taxonomic changes, and clinical implications.
Methods: This scoping review followed the PRISMA-ScR framework. Prospectively registered on OSF (Registration ID: hn92y). Peer-reviewed English-language studies examining exercise and gut microbiota in cancer populations were searched in PubMed, CINAHL, Cochrane, and Web of Science up to January 4, 2025. Reviews, case reports, and conference abstracts were excluded.
Results: Six observational studies (three cross-sectional and three prospective cohorts) were included from 2,814 records. Studies covered breast, colorectal, gynecological, and hematologic cancers. Exercise interventions—such as aerobic walking, inpatient physical therapy, and resistance training—were generally associated with favorable modulation of the gut microbiota. Exercise appeared to preserve microbial diversity, enrich beneficial taxa (Faecalibacterium, Roseburia, Akkermansia), and reduce potentially pathogenic taxa (Enterococcus) and pro-inflammatory markers. However, heterogeneity in cancer types, exercise modalities, timing, and microbiome analysis methods, along with small sample sizes and absence of standardized protocols or long-term follow-up, limited comparability.
Conclusion: Preliminary evidence suggests that exercise may help mitigate gut microbiota dysbiosis and inflammation in cancer patients. However, all available studies are observational, and no randomized controlled trials (RCTs) have been conducted to confirm causal relationships. Future research should employ standardized methodologies, incorporate the FITT framework (Frequency, Intensity, Time, Type) for exercise prescription, and include RCTs to clarify mechanisms and evaluate long-term clinical impacts on gut health across diverse cancer populations.

Keywords

Exercise; Cancer; Gut microbiota; Rehabilitation

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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