INPLASY

Influence of Exercise Management for Frail Elderly Cancer Patients on Chemotherapy Tolerance and Complications: A Systematic Review and Meta-analysis

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Corresponding author:
Yudan Ni

wlk_dr@163.com

Author Affiliation:
Nanjing First Hospital.

Ni, YD; Ye, Q; Zhang, AL; Wang, F; Wu, LK.

ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 August 2025 and was last updated on 21 August 2025.

INTRODUCTION

Review question / Objective To evaluate the impact of exercise management on chemotherapy tolerance and complications in elderly frail cancer patients through a systematic review and meta-analysis.

Rationale Elderly frail cancer patients face reduced chemotherapy tolerance and higher complication rates due to decreased physiological reserve, comorbidities, and frailty syndrome. Exercise intervention, as a low-cost, low-side-effect non-pharmacological approach, shows potential benefits, but existing studies are limited by small sample sizes, heterogeneous protocols, and insufficient systematic evaluation. This study aims to synthesize evidence to clarify the efficacy and optimal protocol of exercise intervention, providing a basis for clinical practice.

Condition being studied Frailty is a clinical state characterized by multisystem functional decline, manifesting as decreased physical strength, muscle weakness, reduced mobility, and cognitive impairment. It is a core indicator of the elderly's ability to respond to disease and treatment stress, significantly increasing chemotherapy-related toxicity, treatment delays, and poor prognosis in cancer patients.

METHODS

Search strategy Electronic databases included PubMed, Embase, Cochrane Library, and Web of Science, with a search timeframe from database inception to July 2025. MeSH terms and free-text words were used, including "aged," "older adults," "neoplasms," "cancer," "frailty," "exercise," "physical activity," "chemotherapy tolerance," and "chemotherapy complications."

Participant or population Elderly cancer patients aged ≥65 years, pathologically or radiologically confirmed with malignant tumors, undergoing chemotherapy, and meeting internationally recognized frailty diagnostic criteria (e.g., Fried frailty syndrome criteria, Clinical Frailty Scale score ≥5).

Intervention Structured exercise interventions, including aerobic exercise, resistance training, balance training, flexibility training, or multi-component combinations (e.g., aerobic plus resistance training).

Comparator Conventional care or waitlist treatment without structured exercise intervention.

Study designs to be included Randomized controlled trials (RCTs).

Eligibility criteria Inclusion criteria: RCTs; participants aged ≥65 years with frailty undergoing chemotherapy; exercise intervention vs. conventional care; reporting outcomes related to chemotherapy tolerance (e.g., quality of life, 12-minute walking distance) or complications (e.g., complication rate).
Exclusion criteria: Non-RCTs; severe cardiovascular/cerebrovascular diseases, exercise contraindications, or cognitive impairment; exercise combined with non-exercise interventions (e.g., nutritional support); duplicate or incomplete data.

Information sources Electronic databases (PubMed, Embase, Cochrane Library, Web of Science), manual retrieval of references from included studies, and contact with authors for unpublished data.

Main outcome(s) Chemotherapy complications: Total complication rate, severe complication rate.
Chemotherapy tolerance: 12-minute walking distance (functional capacity), fatigue score, quality of life (QLQ-C30 scale).

Additional outcome(s) Comprehensive Complication Index (CCI) and readmission rate.

Data management Two researchers independently extracted data using standardized forms (study characteristics, patient demographics, intervention details, outcomes). Disagreements were resolved via discussion or third-party arbitration.

Quality assessment / Risk of bias analysis Methodological quality was evaluated using the Cochrane Risk of Bias Assessment Tool (ROB 2.0), covering seven domains: random sequence generation, allocation concealment, blinding of participants/personnel, blinding of outcome assessment, data completeness, selective reporting, and other biases. Each domain was classified as low, high, or uncertain risk.

Strategy of data synthesis Meta-analysis was performed using RevMan 5.4. Continuous variables were expressed as mean difference (MD) or standardized mean difference (SMD); categorical variables as odds ratio (OR) with 95% confidence intervals (CI). Heterogeneity was assessed via I^2 statistic and Q test: $I^2 \leq 50\%$ (fixed-effects model); $I^2 > 50\%$ (random-effects model). Subgroup or sensitivity analyses were conducted to explore heterogeneity sources.

Subgroup analysis Planned subgroup analyses include exercise type (aerobic vs. resistance vs. combined training), intervention duration (≥8 weeks vs. <8 weeks), and tumor type (solid tumors vs. hematological malignancies).

Sensitivity analysis Sensitivity analyses will exclude studies with high risk of bias or incomplete data to verify the robustness of pooled results.

Language restriction No language restrictions.

Country(ies) involved China.

Keywords elderly cancer patients; frailty; exercise management; chemotherapy tolerance; complications; systematic review; meta-analysis.

Contributions of each author
Author 1 - Yudan Ni.
Author 2 - Qing Ye.
Author 3 - Ailing Zhang.
Author 4 - Feng Wang.
Author 5 - Linke Wu.