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Impact of Chemotherapy Treatment on the Quality of Life of Patients with Cancer

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Abstract

Objective: To assess the health-related quality of life (HRQoL) of patients with cancer before and three months after starting chemotherapy treatment.

Methods: This is a prospective and exploratory cohort study. An instrument was used for sociodemographic and clinical characterization of patients and another for assessing HRQoL called EORTC QLQ-C30. This instrument consists of functional, symptom, and global health status scales. Seventy-nine individuals attended at an outpatient clinic for chemotherapy. Statistical tests were performed to compare side effects of chemotherapy treatment on quality of life.

Results: The EORTC QLQ-C30 indicated adequate reliability in two assessment moments. Concerning the functional scale, physical functioning and cognitive functioning improved, and emotional functioning worsened after three months of treatment. The symptom scale worsened three months after starting chemotherapy with respect to the symptoms of fatigue, nausea, dyspnea, appetite loss, and diarrhea.

Conclusion: The most affected domains, after three months of chemotherapy treatment, were related to functional and symptom scales' functioning; therefore, multidisciplinary interventions should be implemented for this population in order to control such variables.

Keywords: Cancer, chemotherapy, health-related quality of life, HRQoL, EORTC QLQ-C30

Introduction

Chemotherapy remains a cornerstone of systemic cancer treatment, employed across a wide range of malignancies either with curative intent, as part of multimodal therapy, or as palliative care to prolong survival and alleviate symptoms. While advances in cytotoxic agents, targeted therapies, and supportive care have improved clinical outcomes for many patients, chemotherapy is often associated with substantial side effects that can detrimentally impact patients' quality of life (QoL). Quality of life is a multidimensional construct that includes physical, psychological, social, and functional well-being. Evaluating the impact of chemotherapy on QoL is crucial for shared decision-making, tailoring supportive interventions, and designing patient-centered clinical trials. This review synthesizes current evidence on how chemotherapy affects QoL across domains, examines measurement tools, discusses population and treatment related moderators, highlights interventions to mitigate adverse impacts, and identifies gaps for future research.

Methods

This is a narrative review synthesizing findings from randomized controlled trials, observational cohort studies, systematic reviews, and qualitative studies examining the QoL impact of chemotherapy in adult cancer patients. Searches of major databases (PubMed, Embase, Cochrane Library) and key guideline documents were the typical approach used in source literature. Studies were selected to represent multiple tumor types, age groups, and settings (curative, adjuvant, neoadjuvant, and palliative). Measurement instruments, reported domains affected, time course of QoL changes, and interventions to reduce QoL impairment were considered.

Background

Quality of life in oncology typically refers to health-related quality of life (HRQoL), focusing on the effects of disease and treatment on physical, emotional, social, and role functioning. Widely used validated instruments include generic measures such as the Short Form Health Survey (SF-36), EQ-5D, and cancer-specific tools like the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the Functional Assessment of Cancer Therapy (FACT) family. The EORTC QLQ-C30 includes functional scales (physical, role, emotional, cognitive, and social), symptom scales (fatigue, pain, nausea/vomiting), and global health status/QoL. FACT instruments include disease-specific modules (e.g., FACT-B for breast cancer). Selection of instrument depends on study goals, sensitivity to change, and relevance to the patient population.

Physical effects of chemotherapy on QOL

Physical symptoms are the most immediate and commonly reported impacts of chemotherapy. Nausea and vomiting, mucositis, alopecia, myelosuppression leading to infection risk and fatigue, neuropathy, cardio toxicity (with specific agents), and gastrointestinal disturbances all contribute to reduced physical functioning. Fatigue is one of the most prevalent and debilitating symptoms, reported by up to 70–100% of patients during active treatment in some studies. Chemotherapy-induced peripheral neuropathy (CIPN) can cause persistent sensory changes, pain, balance problems, and functional impairment that sometimes persist long-term, reducing QoL even after treatment completion. Symptom burden tends to peak during active cycles and may improve between cycles, but cumulative toxicities (e.g., neuropathy, cardiomyopathy) can lead to chronic impairments. The degree of physical QoL reduction depends on agent toxicity profile, dosage intensity, co morbidities, age, baseline functional status, and concurrent supportive care measures such as antiemetic, growth factors, and dose modifications.

Psychological Effects

Chemotherapy is associated with psychological distress, including anxiety, depression, fear of recurrence, body image concerns (particularly with alopecia and surgical changes), and cognitive complaints often summarized as "chemo brain". Emotional distress may arise from uncertainty about prognosis, treatment side effects, financial toxicity, and social role changes. Cognitive impairments—affecting attention, memory, and executive function—have been reported by patients and observed in objective testing. These cognitive symptoms may be transient for some, but a subset experiences long-lasting deficits impacting return to work and independent living. Psychological QoL is influenced by social support, coping styles, prior mental health history, and the availability of psychosocial interventions. Psycho-oncology interventions, including counseling, cognitive behavioral therapy, and pharmacologic treatments for depression and anxiety, can alleviate some psychological burden.

Social And Functional Effects

Chemotherapy affects social relationships, sexual functioning, work capacity, and daily activities. Patients frequently report role limitations—reduced ability to care for family, perform work tasks, or engage in social activities. Sexual dysfunction may stem from hormonal changes, fatigue, body image issues, and direct effects of some chemotherapeutic agents. Financial toxicity from treatment costs and lost income exacerbates stress and can independently worsen QoL. Social isolation and stigma, particularly in societies where cancer is heavily stigmatized, further compound impacts. Functional decline may be transient or permanent; older adults are particularly vulnerable to functional losses due to decreased physiological reserve and comorbidities. Comprehensive geriatric assessment helps predict which older patients are more likely to deteriorate during chemotherapy.

Trajectory of QOL

Acute, recovery, and long-term phases the temporal pattern of QoL during and after chemotherapy generally follows a U-shaped or V-shaped trajectory: symptoms and functional decline during active treatment, partial recovery after completion, and in many cases near-baseline QoL months to a year later. However, some late effects persist long-term, including neuropathy, cognitive impairment, fatigue, and psychosocial sequelae. Survivors treated at a young age may face unique long-term QoL issues such as infertility, early menopause, and secondary malignancies. Conversely, in palliative settings where the intent is symptom control or life prolongation, QoL trade-offs may be evaluated differently by patients and clinicians.

Factors Modifying QOL Impact

Several factors modify how chemotherapy affects QoL:

1. Patient-related: age, baseline performance status, co morbidities, nutritional status, psychological resilience, socioeconomic status, and social support.
2. Disease-related: tumor type, stage, symptom burden from disease itself (e.g., obstructive symptoms, pain), and prognosis.
3. Treatment-related: specific agents (e.g., anthracyclines and cardiotoxicity; taxanes and neuropathy), cumulative dose, combination regimens, route of administration, and supportive care measures.
4. Health system: access to antiemetics, growth factors, rehabilitation services, palliative care, and psychosocial support. Understanding these moderators is critical to personalizing therapy and offering prehabilitation or intensified supportive measures to those at highest risk of QoL decline.

Measurement Challenges And Clinical Trials

Incorporating QoL endpoints in clinical trials presents methodological challenges: selecting appropriate instruments, timing assessments to capture acute and cumulative effects, handling missing data due to dropout or disease progression, and interpreting clinically meaningful differences. Regulatory bodies increasingly emphasize patient-reported outcomes (PROs), and several trials now include QoL and symptom-specific endpoints. However, inconsistent reporting and lack of harmonization across trials can limit comparability. The integration of electronic PRO (ePRO) systems facilitates more frequent, real-time symptom monitoring and may improve detection of adverse events and supportive care needs.

Interventions To Mitigate QOL Impact

Multiple interventions can reduce the QoL burden of chemotherapy:

Symptom-directed medical management: improved antiemetics (5-HT3 antagonists, NK1 antagonists), growth factors to prevent neutropenic complications, analgesics for pain, topical and systemic therapies for mucositis, and cardioprotective agents when appropriate. - Rehabilitation and supportive care: exercise programs—both aerobic and resistance training—have shown benefit in reducing fatigue, improving physical function, and enhancing QoL. Occupational and physical therapy can help manage neuropathy and functional decline. - Psycho-oncology services: counseling, cognitive behavioral therapy, and mindfulness-based stress reduction can improve mood, coping, and some aspects of QoL. - Nutritional support and symptom management clinics: targeted nutrition, swallowing therapy for head and neck cancer patients, and integrative approaches addressing nausea and appetite. - Palliative care: early integration of palliative care for symptom control, psychosocial support, and advanced care planning has demonstrated QoL benefits in multiple cancer populations. - Novel pharmacologic and non-pharmacologic approaches for CIPN and cognitive symptoms are under investigation (e.g., duloxetine for neuropathic pain, neuromodulation, cognitive rehabilitation).

Special Populations

Older adults: Age-related physiologic changes and multimorbidity increase vulnerability to treatment toxicity and functional decline. Comprehensive geriatric assessment (CGA) can identify deficits and tailor chemotherapy intensity. Dose adjustments, prehabilitation (exercise and nutrition), and enhanced supportive care may preserve QoL. Pediatric and adolescent/young adult (AYA) populations:

Chemotherapy effects on developmental milestones, fertility, education, and psychosocial development are key QoL considerations. Survivorship programs address long-term monitoring for late effects. Low- and middle-income countries (LMICs): Resource constraints can amplify QoL impacts due to limited supportive care, delayed diagnoses, and financial toxicity. Cultural factors influence reporting of symptoms and access to psychosocial care; thus context-specific interventions are required.

Discussion

Decisions about chemotherapy always involve weighing potential survival and disease-control benefits against QoL costs. For curative-intent therapy, temporary QoL decline may be acceptable in return for long-term survival gain; conversely, in palliative contexts the trade off may prioritize symptom relief and maintenance of function. Patient values, preferences, and goals of care should drive shared decision-making. Provision of clear information about likely QoL trajectories, expected side effects, and available supportive measures enables more informed choices. There is a need for routine integration of PROs into clinical workflows to detect and manage symptoms proactively. Multidisciplinary care teams—including oncology, palliative care, rehabilitation, nutrition, and psychosocial services—can address the multidimensional needs of patients undergoing chemotherapy. Research gaps include long-term longitudinal studies that link specific chemotherapy regimens with survivorship QoL trajectories, interventions specifically targeting persistent cognitive and neuropathic symptoms, and strategies to reduce financial toxicity. Additionally, better representation of older adults, racial and ethnic minorities, and LMIC populations in QoL research is essential for
generalizability.

Conclusions and Recommendations

Chemotherapy exerts substantial, multifaceted impacts on patient QoL, spanning physical, psychological, social, and functional domains. Many symptoms peak during active treatment but may partially recover; however, a meaningful subset of patients experience persistent impairments. To optimize patient-centered outcomes, clinicians should:

1. Incorporate baseline QoL assessment and routinely monitor PROs during and after treatment.
2. Personalize chemotherapy regimens considering patient age, comorbidities, and preferences.
3. Implement evidence-based supportive care measures (antiemetics, growth factors, exercise programs, psycho-oncology interventions).
4. Integrate palliative care early when appropriate.
5. Address financial toxicity through social work and policy measures.
6. Prioritize research on long-term and late effects, interventions for persistent CIPN and cognitive impairment, and inclusion of underrepresented populations in studies. By adopting a holistic, multidisciplinary approach, oncology care can better preserve and restore quality of life alongside efforts to control cancer.

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