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Systematic Review and Meta-analysis on Factors Influencing Quality of Life of Breast Cancer Patients Undergoing Chemotherapy and Corresponding Nursing Strategies

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ADMINISTRATIVE INFORMATION

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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 20 January 2025 and was last updated on 20 January 2025.

INTRODUCTION

Review question / Objective Population: Breast cancer patients undergoing chemotherapy.
Intervention: Chemotherapy for breast cancer.
Comparison: Different factors influencing quality of life (QOL) and corresponding nursing strategies.
Outcomes: Quality of life (QOL) of breast cancer patients.
Study Design: Systematic review and meta-analysis of observational studies.

Condition being studied Breast cancer is one of the most common malignancies among women, with its incidence rate increasing annually and a trend of younger age at diagnosis [1, 2]. Chemotherapy, as an essential component of comprehensive breast cancer treatment, has a significant importance in improving patient survival rates [3]. However, while chemotherapy drugs destroy cancer cells and damage normal cells, leading to a series of adverse reactions that impact patients' quality of life (QOL) [4, 5]. Therefore, understanding the factors influencing the QOL of breast cancer patients undergoing chemotherapy and adopting corresponding nursing measures are crucial for improving patient prognosis and QOL. Currently, researches on QOL of breast cancer patients undergoing chemotherapy have made certain progress. Some studies indicate that patients' QOL changes across multiple dimensions before and after chemotherapy, such as cognitive function, physical function, overall health status, and symptomatic areas [6]. Additionally, factors such as patient age, clinical stage, economic status, medical insurance form, education level, and occupational status may also affect their QOL [7]. However, these studies are mostly single studies or small-scale clinical observations, lacking systematic and comprehensive analysis. To gain a more comprehensive and in-depth understanding of the factors influencing the QOL of breast cancer patients undergoing chemotherapy and corresponding nursing strategies, this study conducted a systematic review of relevant

literature. The aim is to provide theoretical support and practical guidance for nursing of breast cancer patients undergoing chemotherapy, thereby improving patient prognosis and enhancing their QOL.

METHODS

Participant or population The study population is breast cancer patients undergoing chemotherapy.

Intervention The intervention of interest in this systematic review and meta-analysis is nursing interventions aimed at improving quality of life (QOL) in breast cancer patients undergoing chemotherapy. These interventions may include, but are not limited to, supportive care, educational interventions, psychological support, and symptom management strategies.

Comparator The comparator in this review will be usual care or standard of care for breast cancer patients undergoing chemotherapy. Usual care may vary across different settings and countries but typically includes medical management of the cancer and any associated symptoms, as well as referral to specialized services as needed.

Study designs to be included Randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, etc.

Eligibility criteria Inclusion criteria are: (a) The study population is breast cancer patients undergoing chemotherapy; (b) the study content includes influencing factors of QOL; (c) the study design is a primary study, including randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, etc.; (d) the literature is of high quality with complete and extractable data.
Exclusion criteria are: (a) the study population is patients with other types of cancer or breast cancer patients who have not undergone chemotherapy; (b) the study design is a secondary study such as a review, commentary, case report, or experience summary; (c) animal experiments.

Information sources PubMed, Web of Science, and Elsevier.

Main outcome(s) The primary outcome of this systematic review and meta-analysis will be quality of life (QOL) in breast cancer patients undergoing chemotherapy. QOL will be assessed using validated instruments such as the Functional Assessment of Cancer Therapy-Breast (FACT-B), the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-C30 (EORTC QLQ-C30), and the Short Form-36 (SF-36). The timing of outcome assessment will vary across studies, but will typically be at baseline, during chemotherapy, and at follow-up time points after chemotherapy completion. Effect measures will include mean differences, standardized mean differences, and odds ratios, with 95% confidence intervals reported for all outcomes.

Quality assessment / Risk of bias analysis The Newcastle-Ottawa Scale (NOS) was used in this study to evaluate the quality of the included literature, it is a tool specifically designed to assess the quality of non-randomized controlled trials (such as cohort studies and case-control studies), including three dimensions: selection, comparability, and outcome. Each dimension has several specific items. The selection dimension primarily assesses whether the study subjects are appropriately and representatively selected, the comparability dimension evaluates whether the study design fully considers confounding factors that may affect the results, and the outcome dimension assesses whether the study results are accurate and complete. Based on the description and reporting of these items in each piece of literature, the corresponding scores were assigned, with a higher total score indicating higher literature quality.

Strategy of data synthesis Meta-analysis was conducted using RevMan 5.4. Firstly, heterogeneity tests were performed on the study results of the included literature, using Q statistics and I^2 statistics for quantitative assessment. If the heterogeneity was low ($I^2<30\%$), a fixed-effects model was used for combined analysis; if the heterogeneity was high ($I^2\geq30\%$), a random-effects model was used for combined analysis, and the sources of heterogeneity were explored. For continuous variables, the weighted mean difference (WMD) or standardized mean difference (SMD) and their 95% confidence intervals (CI) were used for combined analysis; for dichotomous variables, the odds ratio (OR) or relative risk (RR) and their 95% CI were used for combined analysis. Meanwhile, subgroup analyses were conducted based on factors such as the study design, study population, influencing factors, etc., to further explore the impact of different factors on QOL and the effectiveness of nursing strategies. Finally, funnel plots, Egger's test, and other methods were used to assess publication bias.

Subgroup analysis Subgroup analysis will be conducted to explore potential differences in the

effect of nursing interventions on quality of life (QOL) in breast cancer patients undergoing chemotherapy across various subgroups. The following subgroups will be considered:
Age: Studies will be stratified by patient age (e.g., younger vs. older patients) to assess whether the effect of interventions varies by age group.
Stage of Cancer: Studies will be stratified by the stage of breast cancer (e.g., early vs. advanced) to assess whether the effect of interventions differs based on disease severity.
Type of Chemotherapy: Studies will be stratified by the type of chemotherapy regimen received by patients (e.g., anthracycline-based vs. taxane-based) to assess whether the effect of interventions varies by treatment type.
Duration of Intervention: Studies will be stratified by the duration of the nursing intervention (e.g., short-term vs. long-term) to assess whether the duration of the intervention impacts its effectiveness.
Setting: Studies will be stratified by the setting in which the intervention was delivered (e.g., inpatient vs. outpatient) to assess whether the context in which the intervention is delivered affects its impact on QOL.

Sensitivity analysis Using Q statistics and I^2 statistics for quantitative assessment. If the heterogeneity was low ($I^2<30\%$), a fixed-effects model was used for combined analysis; if the heterogeneity was high ($I^2\geq30\%$), a random-effects model was used for combined analysis, and the sources of heterogeneity were explored.

Country(ies) involved China.

Keywords breast cancer; quality of life; psychological support; meta-analysis; nursing strategies.

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