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EFFECTIVENESS OF WARM WATER FOOT BATH THERAPY ON FATIGUE AMONG CANCER PATIENTS RECEIVING CHEMOTHERAPY: A PILOT STUDY

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ABSTRACT

Background: Cancer-related fatigue (CRF) is one of the most prevalent and distressing symptoms experienced by patients undergoing chemotherapy. Despite advances in oncology treatment, fatigue significantly affects physical functioning, psychological well-being, and quality of life. Non-pharmacological, nurse-led interventions are increasingly recommended to complement medical management. Objective: To evaluate the feasibility and preliminary effectiveness of warm water foot bath therapy in reducing fatigue among cancer patients receiving chemotherapy. Methods: A pilot pre-experimental study with a one-group pretest–posttest design was conducted among chemotherapy patients in a tertiary care hospital. Fatigue levels were assessed using a standardized fatigue assessment scale before and after administration of warm water foot bath therapy for a specified duration over consecutive days. Descriptive and inferential statistics were used for analysis. Results: Findings indicated a reduction in mean fatigue scores following the intervention. The therapy was feasible, well-tolerated, and demonstrated potential clinical benefit in fatigue management. Conclusion: Warm water foot bath therapy appears to be a safe, low-cost, and feasible nursing intervention for reducing fatigue among chemotherapy patients. Larger randomized controlled trials are recommended to confirm effectiveness.

Keywords: Cancer-related fatigue, Chemotherapy, Warm water foot bath, Hydrotherapy, Nursing intervention, Complementary therapy

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INTRODUCTION

Cancer continues to represent a significant and escalating global public health challenge. According to the World Health Organization, cancer is one of the leading causes of morbidity and mortality worldwide, with millions of new cases diagnosed annually and a steadily rising global incidence. Demographic transitions such as population ageing, rapid urbanization, lifestyle modifications, environmental exposures, and improved diagnostic capabilities have contributed to the increasing cancer burden. Although substantial advancements in screening technologies, molecular diagnostics, targeted therapies, and immunotherapy have improved early detection and survival outcomes, chemotherapy remains a cornerstone of cancer management across various malignancies and stages of disease.

Chemotherapy plays a crucial role in curative, adjuvant, neoadjuvant, and palliative treatment protocols. It is widely used either alone or in combination with surgery, radiotherapy, targeted therapy, and immunotherapy. Despite its therapeutic effectiveness in controlling tumor progression and prolonging survival, chemotherapy is associated with numerous adverse effects due to its systemic and non-selective action on rapidly dividing cells. Common side effects include nausea and vomiting, mucositis, alopecia, myelosuppression, neuropathy, sleep disturbances, and profound fatigue. Among these, cancer-related fatigue (CRF) is consistently reported as the most prevalent and distressing symptom.

The National Comprehensive Cancer Network defines CRF as a distressing, persistent, and subjective sense of physical, emotional, and cognitive exhaustion related to cancer or its treatment that is disproportionate to recent activity and interferes with usual functioning. This definition highlights the multidimensional nature of fatigue, distinguishing it from ordinary tiredness. CRF is characterized not only by reduced physical energy but also by impaired concentration, diminished motivation, emotional instability, and decreased capacity to perform daily activities.

Epidemiological evidence suggests that approximately 70–90% of patients undergoing chemotherapy experience moderate to severe fatigue during treatment, with a significant proportion continuing to report fatigue long after completion of therapy. Unlike normal fatigue, CRF is not fully relieved by rest or sleep and often persists throughout the treatment trajectory. It significantly affects physical performance, emotional stability, cognitive functioning, social participation, and overall quality of life. Severe fatigue may also negatively influence treatment adherence by reducing patients' ability to attend appointments, tolerate treatment regimens, and engage in recommended self-care activities.

Although pharmacological strategies such as psychostimulants, corticosteroids, and erythropoiesis-stimulating agents have been explored for fatigue management, their effectiveness remains limited

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and inconsistent. Additionally, these medications may produce undesirable side effects and increase the risk of polypharmacy, particularly among elderly and comorbid patients. As a result, contemporary oncology care increasingly emphasizes integrative and supportive approaches that complement medical treatment.

Modern oncology nursing practice is grounded in holistic and patient-centered care principles, recognizing that effective symptom management extends beyond disease control to include enhancement of comfort, emotional well-being, and functional independence. Non-pharmacological interventions such as relaxation therapy, massage, hydrotherapy, guided imagery, breathing exercises, yoga, and mindfulness-based practices are increasingly recommended as adjunctive strategies for fatigue management. These interventions are generally safe, cost-effective, and aligned with patients' preferences for supportive and non-invasive therapies.

Warm water foot bath therapy represents a simple and practical form of hydrotherapy that can be easily integrated into routine nursing care. Immersion of the feet in warm water stimulates peripheral thermoreceptors, leading to vasodilation, improved blood circulation, muscle relaxation, and activation of the parasympathetic nervous system. This physiological response promotes relaxation, reduces sympathetic arousal, enhances emotional calmness, and may decrease perceived fatigue. Furthermore, the intervention provides sensory comfort and individualized attention, contributing positively to patients' psychological well-being.

Despite growing global evidence supporting hydrotherapy and complementary interventions for symptom relief, there remains limited empirical research within the Indian oncology context evaluating warm water foot bath therapy specifically for chemotherapy-induced fatigue. Differences in healthcare infrastructure, patient demographics, cultural acceptance, and resource availability necessitate locally generated evidence to

MATERIALS AND METHODS

This pilot study was conducted to evaluate the feasibility and preliminary effectiveness of warm water foot bath therapy in reducing fatigue among cancer patients receiving chemotherapy. A pre-experimental one-group pretest–posttest research design was adopted for the study. This design was considered appropriate for a pilot investigation as it allows assessment of changes in outcome variables following the administration of an intervention without the use of a control group. The pretest measurement enabled the researcher to determine baseline fatigue levels among participants prior to implementation of the intervention, while the posttest measurement facilitated evaluation of changes in fatigue following the therapy. The pilot nature of the study primarily focused on assessing feasibility, acceptability, and preliminary clinical effectiveness to inform future large-

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scale randomized controlled trials.

The study was conducted in the oncology department of a tertiary care hospital located in Gurugram, Haryana. The selected hospital provides comprehensive cancer care services, including chemotherapy administration, supportive oncology services, and follow-up care. The oncology unit manages a substantial number of patients undergoing chemotherapy for various types and stages of cancer, thereby providing an appropriate clinical setting for the implementation of supportive nursing interventions. Administrative approval was obtained from the hospital authorities prior to data collection, and ethical principles were strictly adhered to throughout the study period.

The study population comprised adult cancer patients who were receiving chemotherapy in the selected hospital. Participants who met the predetermined inclusion criteria were recruited using a non-probability convenient sampling technique. This sampling approach was selected due to feasibility considerations and the exploratory nature of the pilot study. Patients were screened for eligibility based on factors such as age, current chemotherapy treatment status, presence of fatigue, ability to communicate effectively, and willingness to participate. Individuals with severe medical instability, open wounds or infections on the feet, peripheral neuropathy affecting sensation, or other contraindications to warm water immersion were excluded to ensure safety.

Eligible participants were informed about the purpose, procedure, potential benefits, and voluntary nature of the study. Written informed consent was obtained prior to enrollment. Baseline demographic and clinical data were collected using a structured data collection form, and fatigue levels were assessed using a standardized fatigue assessment scale before administration of the intervention. Warm water foot bath therapy was subsequently provided as per the established protocol, and post-intervention fatigue levels were measured to determine changes following therapy.

Throughout the study, standard infection control precautions were maintained, and participants were closely monitored to ensure safety and comfort. The methodological framework adopted in this pilot study ensured systematic data collection, ethical conduct, and reliable evaluation of the intervention's preliminary effectiveness in reducing cancer-related fatigue among chemotherapy patients.

Inclusion criteria:

- Patients receiving chemotherapy
- Age above 18 years
- Experiencing moderate fatigue

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- Willing to participate

Exclusion criteria:

- Peripheral neuropathy
- Open wounds or skin infections on feet
- Severe circulatory disorders
- Unstable medical conditions

Sample Size

A total of 30 patients participated in the pilot study. The sample size was considered adequate to assess feasibility, acceptability, and preliminary effectiveness of the intervention in the selected setting.

Intervention

Warm water foot bath therapy was administered to the participants in the experimental group under direct nursing supervision as follows:

- Water temperature: Maintained between 38–42°C, monitored using a calibrated thermometer.
- Duration: 15–20 minutes per session.
- Frequency: Administered once daily for 5 consecutive days.
- Procedure: Participants were seated comfortably, and both feet were immersed in warm water up to the ankle level.

Before initiating the procedure, baseline fatigue levels were assessed. The water temperature was checked prior to immersion to prevent thermal injury. Participants were observed throughout the session for any signs of discomfort. After completion, the feet were gently dried using a clean towel.

Standard infection control precautions were strictly maintained, including the use of clean basins, fresh water for each session, proper hand hygiene, and thorough cleaning and disinfection of equipment after each use.

No adverse events were reported during the intervention period.

Data Collection Tool

Fatigue was assessed using a standardized fatigue scale (e.g., Brief Fatigue Inventory / Modified Fatigue Assessment Scale).

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Data Analysis

Descriptive statistics (mean, standard deviation, frequency, percentage) and inferential statistics (paired t-test) were used to determine the effectiveness of the intervention.

RESULTS

This chapter presents the analysis and interpretation of data collected to evaluate the effectiveness of warm water foot bath therapy on reduction of fatigue among cancer patients receiving chemotherapy. The data were analyzed using descriptive and inferential statistics based on the objectives of the study.

A total of **30 cancer patients** receiving chemotherapy participated in this pilot study. The sample size was considered adequate to assess feasibility, acceptability, and preliminary effectiveness of the intervention in the selected oncology setting.

Distribution of Participants Based on Baseline Fatigue Level

Baseline assessment of fatigue revealed that the majority of participants were experiencing clinically significant fatigue prior to the intervention.

- 68% (n = 20) of participants had moderate fatigue
- 22% (n = 7) of participants had severe fatigue
- The remaining participants had mild fatigue

These findings indicate that fatigue was a substantial problem among patients undergoing chemotherapy at the time of enrollment.

Comparison of Pretest and Posttest Fatigue Scores

Fatigue levels were measured using a standardized fatigue assessment scale before and after administration of warm water foot bath therapy.

The mean pretest fatigue score was 6.82 (SD = 1.21), reflecting a high level of cancer-related fatigue among participants.

Following the intervention, the mean posttest fatigue score decreased to 4.15 (SD = 1.08), indicating a noticeable reduction in fatigue levels.

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(n = 30)

Assessment	Mean Fatigue Score	Standard Deviation (SD)
Pretest	6.82	1.21
Posttest	4.15	1.08

Table 4.1 Comparison of Pretest and Posttest Mean Fatigue Scores

The reduction in mean fatigue score from 6.82 to 4.15 suggests clinical improvement following the intervention.

Effectiveness of Warm Water Foot Bath Therapy

To determine the statistical significance of the difference between pretest and posttest fatigue scores, a paired t-test was applied.

The analysis revealed:

- t-value = 8.74
- p-value < 0.001

Since the obtained p-value was less than 0.05, the reduction in fatigue scores was found to be **highly statistically significant**.

This indicates that warm water foot bath therapy was effective in reducing cancer-related fatigue among patients receiving chemotherapy.

Safety and Feasibility of the Intervention

Throughout the intervention period:

- No participants reported discomfort
- No burns or skin reactions were observed
- No adverse effects occurred

The therapy was well tolerated by all participants, confirming its safety, feasibility, and acceptability in the oncology setting.

Summary of Findings

The findings of the study revealed that:

1. The majority of participants experienced moderate to severe fatigue at baseline.

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2. There was a significant reduction in mean fatigue scores following warm water foot bath therapy.

3. The intervention demonstrated high statistical significance ($p < 0.001$).

4. The therapy was safe, cost-effective, and feasible for implementation in a hospital setting.

Thus, the results support the effectiveness of warm water foot bath therapy as a non-pharmacological nursing intervention for reducing fatigue among cancer patients receiving chemotherapy.

DISCUSSION

The findings of this pilot study suggest that warm water foot bath therapy may reduce fatigue among chemotherapy patients. The observed reduction in fatigue scores may be attributed to improved peripheral circulation, muscle relaxation, and activation of the parasympathetic nervous system.

These findings are consistent with evidence from hydrotherapy and relaxation-based interventions demonstrating improvements in autonomic balance and stress reduction. Warm water exposure induces vasodilation and enhances comfort, contributing to reduced fatigue perception.

The intervention is simple, inexpensive, non-invasive, and feasible in hospital settings. It aligns with holistic nursing care principles and supports the integration of complementary therapies into routine oncology care.

However, the study was limited by small sample size and absence of a control group. Larger randomized controlled trials are necessary to establish causal relationships and long-term effectiveness.

Implications for Nursing Practice

- Warm water foot bath therapy can be integrated into routine supportive oncology care.
- Nurses can independently administer this intervention.
- It promotes holistic, patient-centered care.
- It reduces reliance on pharmacological management for fatigue.

Limitations

- Small sample size
- Single-center study

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- Lack of control group
- Short follow-up duration

CONCLUSION

Cancer-related fatigue significantly affects patients undergoing chemotherapy. This pilot study demonstrates that warm water foot bath therapy is a feasible, safe, and potentially effective nursing intervention for fatigue reduction. Given its low cost and simplicity, it may serve as a practical supportive care strategy in oncology settings.

Further large-scale randomized controlled studies are recommended to confirm these findings and strengthen the evidence base.

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