Original Article

Effectiveness of Warm Water Foot Submerged Technique on the Level of Fatigue, Quality of Sleep, and Quality of Life among Patients with Cancer in Selected Hospital at Mangaluru

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Abstract

Introduction   Cancer is the most leading cause of death globally. Fatigue and poor quality of sleep are the common side effects of cancer treatment that lead to poor quality of life. There is a need of complementary therapy, which can help to minimize the side effects of cancer treatment and boosting relaxation. Warm water foot submerged technique helps to relieve fatigue and improve the quality of sleep; hence, quality of life can be improved. This study was conducted to assess effectiveness of warm water foot submerged technique on the level of fatigue, quality of sleep, and quality of life among patients with cancer.

Materials and Methods   A quasi-experimental pretest and post-test control group research design was adopted to conduct the study in oncology ward of selected hospital. Sixty-eight participants were recruited using a nonprobability purposive sampling technique and allocated to intervention and control groups. Data was collected using multidimensional fatigue inventory, Groningen sleep quality scale, EORTC QLQ-C30. The control group received normal routine care and the intervention group received warm water foot submerged technique that was given for 15 minutes two times per day for 5 consecutive days.

Results   Warm water foot submerged technique showed a significant difference in level of fatigue ($p < 0.05$), quality of sleep ($p < 0.001$), and quality of life ($p < 0.001$) in the intervention group. There was no significant difference in control group.

Conclusion   This study showed that the warm water foot submerged technique is effective in reducing the fatigue and improving the quality of sleep and quality of life among patients with cancer. Thus, this study was found to be effective.

Keywords
► warm water foot submerged technique
► level of fatigue
► quality of sleep
► quality of life
► patients with cancer

Introduction

The World Health Organization has revealed that cancer is the second leading cause of death globally accounting for nearly 19.3 million new cases and 10 million deaths in 2020.[1] Cancer treatment depends on the type of cancer, organ, condition of cells, and its stages. It includes single treatment or combination treatment, such as surgery with radiation

and chemotherapy, bone marrow transplantation, and immunotherapy.[2] It can cause serious side effects that disrupt the quality of life (QOL) in both physiological and psychological aspects.[3]

During and after treatments, the patient may experience fatigue. It is different from normal drowsiness experienced by a healthy person and this will not relieve by rest or sleep.[4] Prevalence of fatigue can be during treatment range from 25 to 99% depending on the patient.[5] Chemotherapy drugs side effects, the tension of cancer, and sleeping day time during treatment may lead to difficulty in falling asleep.[6] Radiation therapy is received by approximately 50% of all cancer patients during their treatment period; 40% of curative treatment is contributed by radiation therapy.[7] About 65,000 cancer patients receive chemotherapy in the US outpatient's oncology outpatient department. Chemotherapy patients more prone to getting an infection require hospitalization and even lead to death due to complications.[8]

Side effects that arise during cancer treatment improve afterward for many patients but persist for others. Late side effects may arise months or even years later. Both the prevalence and severity of side effects vary from person to person by cancer type, the treatment received, and other factors. The most common side effects of cancer and its treatment are pain, fatigue, emotional changes, and sleep disturbance.[9] The overall prevalence of sleep disturbance in cancer patients was 60.7%.[10] With the continued development of cancer therapeutic advanced technologies, patient survival duration has been significantly extended. Fatigue is the side effect of treatment for cancer and can have a major negative impact on QOL by altering a person's ability to engage in personal work and social activities.[11]

When queried regarding their top three concerns, cancer survivors often list sleep difficulty with fatigue and pain as one of their top three worries. Fatigue, pain, and sleep disturbance are interrelated, exacerbating one another and decreasing the QOL. All symptoms overlap together making it difficult to target specific therapies.[11]

There is no single therapy to treat cancer-related fatigue but treatment is given as per causes.[4] Understanding fatigue, sleep disturbance aspects are essential for defining interventions to improve the quality of care, prevent damage, and reduce the severity in patients.[9]

Despite patient's symptoms being managed through medical treatment, patients use alternative methods to relieve symptoms. Patients are encouraged for nonpharmacological methods that are safe to induce sleep and to reduce fatigue like hot water foot bath, biofeedback, aromatherapy, relaxation techniques, herbal remedies, massage, acupuncture, meditation, and exercise.[12] Hot water bath therapy is the one type of hydrotherapy that has impact on overall health and daily living. It is a local moist heat application, simple and easy to carry at home. It will increase blood circulation, promote muscle relaxation, and provide soothing.[6] Here it is a need of complementary therapy to reduce the side effects of cancer treatment and boosting relaxation.

Warm water foot submerged technique has its importance and needs to relieve fatigue and improve the quality of sleep and life. The objective of this study was to assess the effectiveness of warm water foot submerged technique on the level of fatigue, quality of sleep, and QOL among patients with cancer.

Materials and Methods

A quasi-experimental pretest and post-test control group research design was adopted to conduct the study in oncology ward of selected hospital of Mangaluru, Karnataka, from November 29, 2022 to June 29, 2023. The research protocol was approved by the Scientific Review Board and Institutional Ethics Committee. Informed consent was obtained from all participants before the study. Formal written permission was obtained from the administrative authorities of the hospital. Subjects were informed about the nature and purpose of the study before the data collection and informed consent was obtained. Sample size was calculated by using G*Power. 95% confidence level and 80% power standard effect size is 0.9. Sixty-eight patients with cancer recruited using a nonprobability purposive sampling technique.

Patients who are receiving chemotherapy or radiation therapy or adjuvant therapy, aged above 18 years, and having all stages of cancer, all solid tumor cancer were included in the study. Critically ill patients having leg injuries and foot ulcers were excluded from the study. The tool was administered for seven samples to assess the reliability. The reliability coefficient was assessed using the test–retest method. The calculated reliability of the multidimensional fatigue inventory was as follows: general fatigue = 0.8, physical fatigue = 0.84, reduced activity = 0.83, reduced motivation = 0.9, and mental fatigue = 0.7. Groningen sleep quality scale was 0.77 and EORTC QLQ-C-30 was 0.8.

The tools used to collect the information were demographic proforma, clinical proforma multidimensional fatigue inventory, Groningen sleep quality scale, and EORTC QLQ-C30. Demographic proforma included age, gender, marital status, educational status, occupation, monthly family income. Clinical proforma included stage of cancer, duration of illness, comorbid illnesses, treatment received, number of chemotherapy cycles, and number of radiation fraction.

Multidimensional fatigue inventory scores per item run from 1 to 5. A higher score indicates more fatigue. Therefore, the items indicative for fatigue needs to be recoded (1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1). This concerns item 2, 5, 9, 10, 13, 14, 16, 17, 18, and 19. For each scale, a total score is calculated by summation of the scores of the individual items.[13] Groningen sleep quality scale scores can range from 0 to 14, a higher score indicating a lower subjective quality of sleep. These statements are related to patients feeling about the difficulty in falling asleep, sleep fragmentation duration of sleep, and early morning awakening. The first question does not count toward the total score. One point of answer is "True" for questions 2, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15, while one point of answer is "False" for questions 8, 10, 12 and it is categorized as undisturbed or unrestricted sleep (0–5), disturbed sleep (6–7), and poor sleep (8–14).[14]

QLQ-C30 is composed of all of the scales and single-item measures range in score from 0 to 100. A high scale score represents a higher response level. Thus, a high score for a functional scale represents a high/healthy level of functioning; a high score for the global health status/QOL represents a high QOL, but a high score for a symptom scale / item represents a high level of symptomatology/problems.[15]

Data Collection Procedure

This study was performed in the oncology department of selected hospital Mangaluru. The basin was filled with hot water. The temperature of the water was checked by using lotion thermometer. The temperature of the water was maintained between 39 and 43°C. Then the patient was instructed to immerse the foot till the ankles. Warm water foot submerged technique was given for 15 minutes two times per day for 5 consecutive days in the morning and evening. The temperature of the water was checked every 5 minutes once. Hot water was added when the temperature decreased (<39°C). The patient was instructed to dry the legs after the procedure.

Statistical Analysis

The collected data was coded and transformed into a master data sheet for statistical analysis. Demographic data, clinical proforma multidimensional fatigue inventory, Groningen sleep quality scale, and EORTC QLQ-C-30 scores were analyzed using descriptive statistics such as frequency, percentage, mean, and standard deviation (SD). Paired t-test was used for the comparison of pretest and post-test scores of the level of fatigue and quality of sleep. Wilcoxon signed-rank test was used to compare the QOL pretest and post-test scores within the group.

Results

The most of participants in both the intervention and control groups were in the age group of 51 to 60 years, accounting for 35.5% each. More females were part of both groups, comprising 52.9% in the intervention and 58.8% in the control group. Regarding education, a higher percentage in the control group had primary education, reaching 52.9% compared with 29.4% in the intervention group. In terms of marital status, 70.6% of the intervention group were married, while 47.1% of the control group were widows or widowers. A significant portion of participants in both groups identified as homemakers, with 41.2% in the intervention and 29.4% in the control group. Moreover, the majority in the intervention group and control group consumed a mixed diet 88.3 and 64.7% respectively. The majority of participants in both groups reported a monthly income of Rs less than or equal to 25,000, which accounted for 91.2% in each group.

The majority of the participants 52.9% in intervention and 55.9% in control group were diagnosed with stage II cancer, where the duration of illness is lasted within 1 to 2 months 76.5 and 64.7%, respectively. Majority of the participants have not presented with comorbidities (73.5%, 82.4%),

receiving chemotherapy and radiation (58.8%, 70.6%), received 1 to 5 chemotherapy cycle (58.8%, 67.6%). Most of the 41.2% participants in intervention group equally received 1 to 10 and 11 to 20 radiation and 50% of control group were received 1 to 10 radiation (►**Table 1**).

Paired t-test showed significant difference in level of fatigue in intervention group ($p < 0.05$) after the warm water footbath technique and no significance difference in control group ($p > 0.05$; ►**Fig. 1**). The significant difference was found in quality of sleep in intervention group ($p < 0.001$); thus, it states that warm water foot submerged technique improves sleep quality ($p < 0.001$; ►**Fig. 2**).

The overall QOL mean pretest score in intervention and control group were 79.92 ± 12.049 and 77.49 ± 10.91, respectively. The mean pretest scores of global health were 63.38 ± 11.01 and 66.17 ± 12.80, respectively. The mean pretest score in functional scales were categorized in subscale such as physical functioning (76.08 ± 19.22, 73.72 ± 25.58) the role functioning (81.86 ± 18.52, 80.88 ± 23.97), emotional functioning (81.86 ± 20.36, 77.94 ± 19.01), cognitive functioning (97.06 ± 7.64, 85.78 ± 15.96), and social functioning (85.29 ± 24.54, 86.27 ± 21.11). The mean pretest scores of symptoms scales in intervention and control group were categorized in different items such as fatigue (54.25 ± 25.48, 52.61 ± 24.96), nausea and vomiting (3.92 ± 11.65, 13.23 ± 22.76), pain (23.04 ± 24.96, 28.43 ± 23.40), dyspnea (6.68 ± 17.94, 6.86 ± 13.68), insomnia (58.82 ± 32.88, 53.92 ± 30.72), appetite loss ($17.65 \pm 18.78,24$, 51 ± 32.11), constipation (1.96 ± 7.967, 84 ± 21.82), and diarrhea (16.67 ± 28.72, 9.80 ± 22.51). The financial difficulties mean pretest scores in intervention and control group were 11.76 ± 25.80 and 15.69 ± 24.94, respectively (►**Table 2**).

Wilcoxon signed-rank test has shown significant difference in the QOL that includes global health status ($p < 0.001$), physical functioning ($p < 0.001$), emotional functioning ($p = 0.03$), fatigue ($p < 0.001$), insomnia ($p < 0.001$), and overall QOL score ($p < 0.001$) in intervention group. Hence, it improves QOL. In the control group, nausea and vomiting ($p = 0.01$) showed significant difference but there was no significant difference in overall QOL score ($p = 0.20$; ►**Table 3**).

Discussion

The cancer patient during their treatment may experience fatigue, pain, sleep disturbance that are interrelated, exacerbating one another and decreasing the QOL.[11] Warm water foot submerged technique helps to reduce the side effects of cancer treatment and boosting relaxation. The baseline characteristics obtained from these studies are majority of participants in the intervention, control groups (35.5% each) belong to the age group of 51 to 60 years, and majorities were female (52.9%, 58.8%). Majority of the participants in intervention (52.9%) and control group (55.9%) were diagnosed with stage II cancer, and had not presented with comorbidities (73.5%, 82.4%). The study done by D'Souza et al revealed that most of the participants, 47%, in the intervention and, 40%, in the control group were in the age group of 51 to 60 years. Majority of participants, 60%, in the intervention

Table 1 Distribution of participants according to clinical proforma

Sl. no.	Clinical proforma	Intervention group	Control group $n = 34 + 34$
		f(%)	f(%)
1	Stage of cancer		
	a) Stage1	02(5.9)	02(5.9)
	b) Stage II	18(52.9)	19(55.9)
	c) Stage III	08(26.5)	11(32.4)
	d) Stage IV	04(11.8)	02(5.9)
2	Duration of illness		
	a) 1–2 months	26(76.5)	22(64.7)
	b) 3–4months	06(17.6)	06(17.6)
	c) 5–6 months	02(5.9)	06(17.6)
3	Comorbid illnesses		
	a) Diabetes mellitus	04(11.8)	02(5.9)
	b) Hypertension	05(14.7)	04(11.8)
	c) Cardiovascular disease	–	–
	d) No illness	25(73.5)	28(82.4)
4	Treatment received		
	a) Chemotherapy	-	01(2.9)
	b) Radiation therapy	14(41.2)	09(26.5)
	c) Both	20(58.8)	24(70.6)
5	Number of chemotherapy cycles		
	a) No chemotherapy	12(35.3)	08(23.5)
	b) 1–5	22(64.7)	23(67.6)
	c) 6–10	–	03(8.8)
6	Number of radiation fraction		
	a) 1–10	14(41.2)	17(50)
	b) 11–20	14(41.2)	08(23.5)
	c) 21–30	06(17.6)	09(26.5)

The data represented is the frequency with percentage.

and, 66.66%, in the control group were female. In the intervention group, all participants (100%) and in the control group, majority of the participants (93%) were diagnosed with stage II cancer. In both, the intervention (53%) and control group (40%) majority did not have any comorbid illness.[16]

This study depicted the mean scores of general fatigue (13.2,13.64), physical fatigue (11.91,13.35), reduced fatigue (11.91,11.85) mental fatigue (9.41,9.47), and reduced motivation (9.71, 10.18). The study conducted by Bindusha revealed that, both the intervention and control group had severe fatigue during pretest (63.33% 60%).[17] It proved that patient will experience fatigue during cancer treatment period.[4]

This study identified that sleep quality of study participants was poor in both the intervention and control group. The study done by Lanjewar et al revealed that most of

participants had poor sleep due to the side effect of treatment.[18]

This study revealed that in the intervention group the mean ± SD of general fatigue was 13.21 ± 3.16 and 10.44 ± 2.46 during pretest and post-test, respectively. There was a significant difference found at the level of p-value less than 0.05. The study conducted by Chauhan and George revealed there was a significant decrease in fatigue level, mean ± S.D. of pretest and post-test of mean ± S.D. value was 53.63 ± 7.978 and 43.27 ± 7.682 respectively at $p < 0.05$ level.[19]

This study revealed that in the intervention group the mean ± SD of quality of sleep in pretest was 6.38 ± 2.42 and in post-test it was 5.09 ± 2.19 that was highly significant to maintain the sleep quality ($p < 0.001$). The study conducted by Suneesh et al revealed that warm water foot bath helps in reducing insomnia and improving sleep onset time ($p < 0.001$).[20]
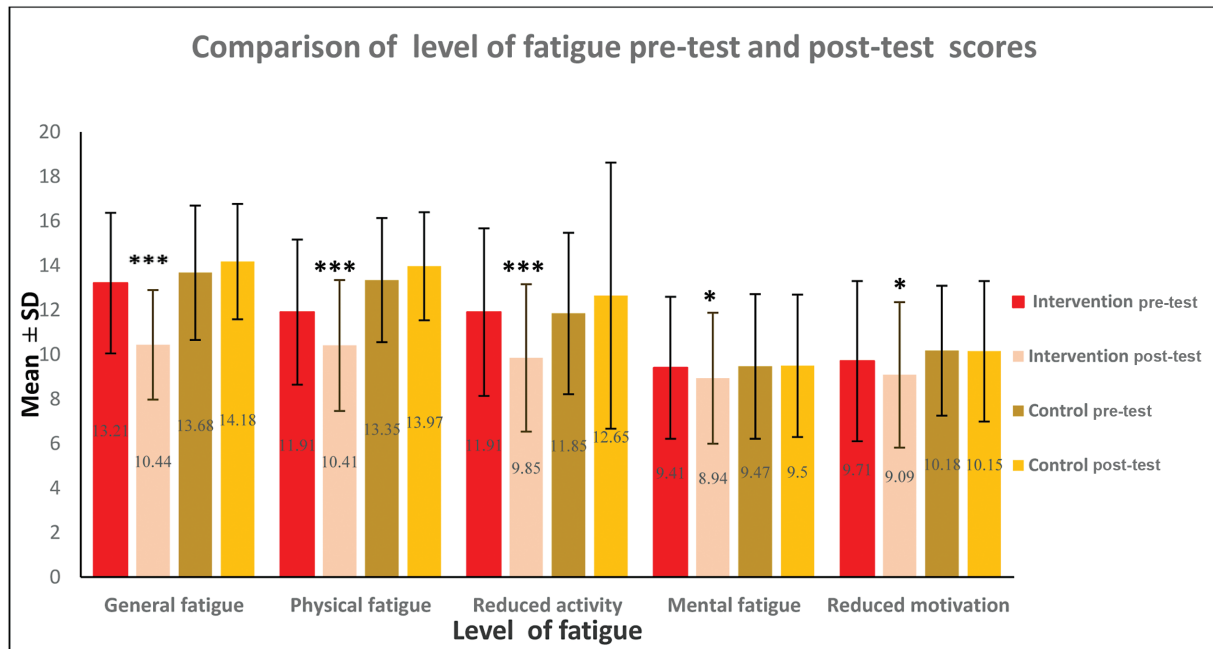
Fig. 1 Comparison of pretest and post-test level of fatigue scores in intervention and control group. *Significant ($p < 0.05$), ***very highly significant ($p < 0.001$). SD, standard deviation.
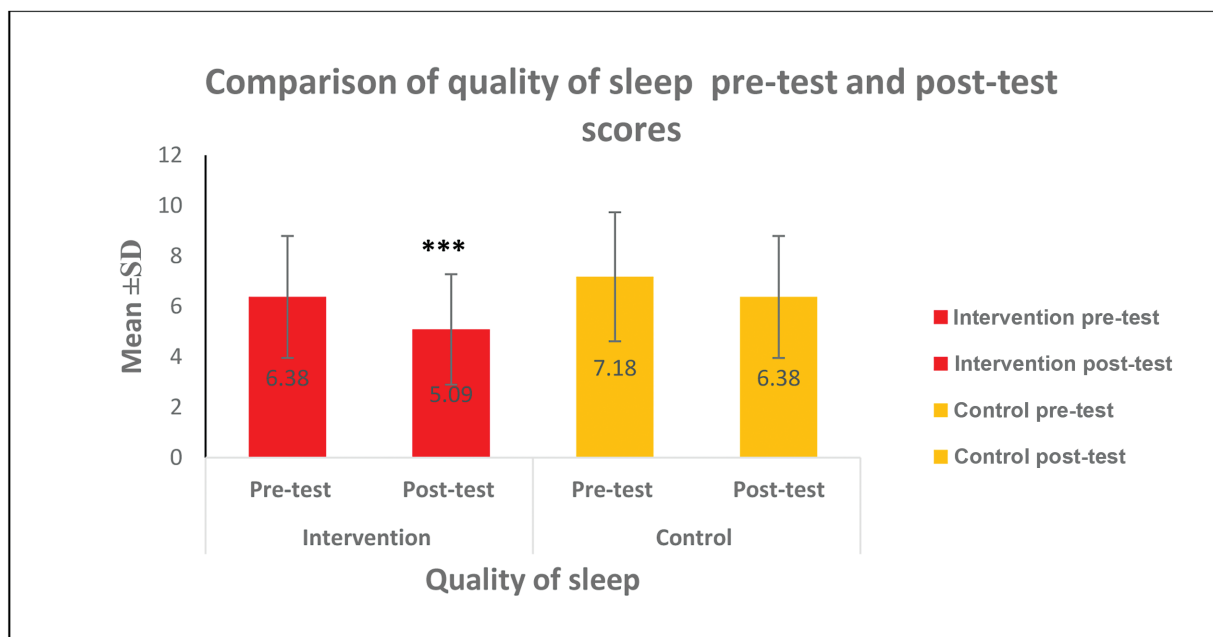

Fig. 2 Comparison of pretest and post-test scores of quality of sleep in intervention and control group. ***Very highly significant ($p < 0.001$). SD, standard deviation.

Warm water foot submerged technique has showed significant difference in the global health status ($p < 0.001$), physical functioning ($p < 0.001$), emotional functioning ($p = 0.03$), fatigue ($p < 0.001$), insomnia ($p < 0.001$), and overall QOL score ($p < 0.001$) in the intervention group. A study was conducted by Prakash et al to assess the effectiveness of yoga on QOL of breast cancer patients undergoing chemotherapy. The study

results found that yoga practice effective in global health status, physical function, role function, emotional function, and reducing the symptoms of fatigue, insomnia, loss of appetite, and constipation during the period of chemotherapy p-value less than 0.05 level.[21]

Warm water foot submerged technique has its importance and needs to relieve fatigue and improve the quality of sleep and QOL.

Table 2 Distribution of QOL pretest scores

$n = 34 + 34$		
QOL	Intervention group	Control group
	Pretest	Pretest
	Mean ± SD	Mean ± SD
Overall QOL	79.92 ± 12.049	77.49 ± 10.91
Global health status/QOL		
Global health status/QOL (revised)	63.38 ± 11.01	66.17 ± 12.80
Functional scales		
Physical functioning (revised)	76.08 ± 19.22	73.72 ± 25.58
Role functioning (revised)	81.86 ± 18.52	80.88 ± 23.97
Emotional functioning	81.86 ± 20.36	77.94 ± 19.01
Cognitive functioning	97.06 ± 7.64	85.78 ± 15.96
Social functioning	85.29 ± 24.54	86.27 ± 21.11
Symptom scales/items		
Fatigue	54.25 ± 25.48	52.61 ± 24.96
Nausea and vomiting	3.92 ± 11.65	13.23 ± 22.76
Pain	23.04 ± 24.96	28.43 ± 23.40
Dyspnea	6.68 ± 17.94	6.86 ± 13.68
Insomnia	58.82 ± 32.88	53.92 ± 30.72
Appetite loss	17.65 ± 18.78	24.51 ± 32.11
Constipation	1.96 ± 7.96	7.84 ± 21.82
Diarrhea	16.67 ± 28.72	9.80 ± 22.51
Financial difficulties	11.76 ± 25.80	15.69 ± 24.94

Abbreviations: QOL, quality of life; SD, standard deviation.
Each subscale score: 0–100

Table 3 Comparison of pretest and post-test QOL scores in the intervention and control group

$n = 34 + 34$							
QOL	Groups	Pretest		Post-test		Z value	p-Value
		Median	IQR	Median	IQR		
Overall quality score	Intervention	82.35	14.17	87.1	15.36	5.08	<0.001[a]
	Control	78.20	14.48	79.20	13.86	1.26	0.200
Global health status/QOL							
Global health status/QOL (revised)	Intervention	66.66	18.75	70.83	10.42	−4.30	<0.001[a]
	Control	66.66	16.67	66.66	16.67	−0.45	0.651
Functional scales							
Physical functioning (revised)	Intervention	83.33	26.67	93.33	20	−4.66	<0.001[a]
	Control	80	46.66	80	40	−0.83	0.401
Role functioning (revised)	Intervention	83.33	33.34	91.66	33.33	−1.78	0.075
	Control	91.66	33.33	91.66	25	−0.10	0.916
Emotional functioning	Intervention	87.5	27.09	91.66	33.34	−2.08	0.03[b]
	Control	83.33	5	75	25	−1.34	0.180
Cognitive functioning	Intervention	100	0	100	0	−0.44	0.655
	Control	83.3	33.33	83.3	16.67	−0.33	0.739

Table 3 (*Continued*)

$n = 34 + 34$							
QOL	Groups	Pretest		Post-test		Z value	*p*-Value
		Median	IQR	Median	IQR		
Social functioning	Intervention	100	33.34	100	16.67	−1.63	0.102
	Control	100	20.83	100	20.83	−0.37	0.705
Symptom scales / items							
Fatigue	Intervention	55.55	44.44	22.22	33.33	−4.83	<0.001[a]
	Control	44.44	36.11	55.5	44.44	−1.81	0.07
Nausea and vomiting	Intervention	0	0	0	0	−1.63	0.102
	Control	0	16.67	0	4.17	−2.57	0.01[b]
Pain	Intervention	16.66	33.33	16.66	33.33	−1.89	0.058
	Control	25	16.67	16.66	16.66	−0.47	0.655
Dyspnea	Intervention	0	0	0	0	−1.0	0.31
	Control	0	0	0	0	−1.63	0.102
Insomnia	Intervention	66.66	66.66	33.33	33.33	−4.59	<0.001[a]
	Control	50	33.33	66.66	33.33	−0.83	0.405
Appetite loss	Intervention	16.66	33.33	0	33.33	−1.73	0.083
	Control	0	41.66	0	33.33	−0.81	0.417
Constipation	Intervention	0	0	0	0	−1.41	0.157
	Control	0	0	0	0	−0.70	0.48
Diarrhea	Intervention	0	33.33	0	33.33	−1.26	0.206
	Control	0	0	0	0	−1.13	0.257
Financial difficulties	Intervention	0	0	0	0	0	1
	Control	0	33.33	0	33.33	0	1

Abbreviations: IQR, interquartile range; QOL, quality of life.
Statistical test used: Wilcoxon signed-rank test.
[a]Very highly significant ($p < 0.001$).
[b]Significant ($p < 0.05$).

Limitation

The small sample size and short duration of time limit the generalization of this study. This study results were confined to a single hospital. Confounding variables have to be evaluated. Comparative study can be conducted using other complementary therapy.

Conclusion

This study showed that the warm water foot submerged technique is effective in reducing the fatigue and improving the quality of sleep and QOL among patients with cancer. Thus, this study was found to be effective. The nurse can encourage the caregivers to use warm footbath therapy as a complementary therapy for patients to improve quality of care.

References

1 World health organization Cancer [document from internet]. 2022 February 3 [Accessed February 15, 2022]. Accessed January 5, 2023 at: who.int/nesroom /factsheet/details/cancer
2 Types of cancer treatment [Internet]. National Cancer Institute. 2017 [Accessed January 6, 2022]. Accessed January 5, 2023 at: https://www.cancer.gov/about-cancer/treatment/types
3 Arunachalam SS, Shetty AP, Panniyadi N, et al. Study on knowledge of chemotherapy's adverse effects and their self-care ability to manage - the caner survivors impact. Clin Epidemiol Glob Health 2021;11(100765):100765
4 Hofman M, Ryan JL, Figueroa-Moseley CD, Jean-Pierre P, Morrow GR. Cancer-related fatigue: the scale of the problem. Oncologist 2007;12(Suppl 1):4–10
5 Bower JE. Cancer-related fatigue–mechanisms, risk factors, and treatments. Nat Rev Clin Oncol 2014;11(10):597–609
6 Cleveland Clinic Cancer Sleep Problems [Internet]. Chemocare. com. [Accessed January 6, 2022]. Accessed January 5, 2023 at:

https://chemocare.com/chemotherapy/side-effects/sleep-problems.aspx

7 Baskar R, Lee KA, Yeo R, Yeoh KW. Cancer and radiation therapy: current advances and future directions. Int J Med Sci 2012;9(03):193–199

8 Nugusse T, Lemlem SB, Deressa J, Kisa S. Prevalence of fatigue and associated factors among cancer patients attending Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. Cancer Manag Res 2021;13:1909–1916

9 Ancoli-Israel S, Moore PJ, Jones V. The relationship between fatigue and sleep in cancer patients: a review. Eur J Cancer Care (Engl) 2001;10(04):245–255

10 Al Maqbali M, Al Sinani M, Alsayed A, Gleason AM. Prevalence of sleep disturbance in patients with cancer: a systematic review and meta-analysis. Clin Nurs Res 2022;31(06):1107–1123

11 Souza RCDS, Dos Santos MR, das Chagas Valota IA, Sousa CS Costa Calache ALS. Factors associated with sleep quality during chemotherapy: an integrative review. Nurs Open 2020;7(05):1274–1284

12 Effectiveness of warm water foot bath on quality of sleep among patients in a selected hospitals at Guntur Andhra Pradesh. Nurs Health Sci 2021;10(02):01–10 Accessed January 5, 2023 at :https://www.iosrjournals.org/iosr-jnhs/papers/vol10-issue2/Series-1/A1002010110.pdf

13 Smets EM, Garssen B, Bonke B, De Haes JC. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. J Psychosom Res 1995;39(03):315–325

14 Jafarian S, Gorouhi F, Taghva A, Lotfi J. High-altitude sleep disturbance: results of the Groningen Sleep Quality Questionnaire survey. Sleep Med 2008;9(04):446–449

15 Aaronson NK, Ahmedzai S, Bergman B, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993;85(05):365–376

16 D'Souza S, Thakuria I, D'Almeida V. Effect of warm water footbath on chemotherapy-induced fatigue among patients with cancer in a selected hospital at Mangaluru. Indian J ContNsgEdn. 2022;23(02):153

17 Bindusha M A Quasi Experimental Study to evaluate the effectiveness of warm water foot bath on level of fatigue and insomnia among patients receiving chemotherapy in selected hospitals, Kanyakumari district. (pdf)2015. Accessed January 5, 2023 at: http://repository-tnmgrmu.ac.in/11761/

18 Lanjewar AK, Sukare L, David P. Effectiveness of warm foot bath on quality of sleep among cancer patients admitted in selected hospital. Int J Pract Nurs 2020;8(02):59–68

19 Chauhan T, George RM. Effect of hot water foot immersion therapy on level of fatigue among advanced stage cancer patients. Int J Sci Res 2018;10:212–215

20 Suneesh PM, Thangavel K, Doss KJJ. A study to assess the effectiveness of warm foot bath on sleep onset time among cancer patients with insomnia in Nath Lal Parekh Cancer Hospital at Rajkot. Asian J Nurs Educ Res 2017;7(02):231–234

21 Prakash K, Saini SK, Pugazhendi S. Effectiveness of yoga on quality of life among breast cancer patients undergoing chemotherapy. Indian J Palliat Care 2020;26;