ORIGINAL RESEARCH ARTICLE

Impact of comprehensive nursing on hand-foot syndrome caused by oral capecitabine in breast cancer patients

DOI: 10.29063/ajrh2024/v28i9.15

Shanshan He[1], Mi Wang[2,#], Liuliu Zhang[3], Ping Zhu[3], Jianmei Zhou[1], Zhiping Fang[4] and Lingyun Shi[2]

Department of Medical Oncology, Jiangsu Cancer Hospital, Nanjing 210000, China[1]; Department of Radiotherapy, Jiangsu Cancer Hospital, Nanjing 210000, China[2]; Department of Nursing, Jiangsu Cancer Hospital, Nanjing 210000, China[3]; Department of Emergency, Jiangsu Cancer Hospital, Nanjing 210000, China[4]

***For Correspondence:** Email: *wangmi1218@163.com*

Abstract

This study examines the effects of comprehensive nursing care on hand-foot syndrome (HFS) in breast cancer patients treated with capecitabine. A retrospective analysis was conducted on 71 patients, divided into a study group receiving comprehensive care and a control group receiving conventional care. Results showed that the study group experienced significant improvements in skin symptoms, self-efficacy, quality of life, and lower anxiety and depression levels compared to the control group. Additionally, patients who were compliant with medications were notably better in the study group. Comprehensive care effectively alleviates the symptoms of hand-foot syndrome in breast cancer patients treated with capecitabine and enhances patient well-being *(Afr J Reprod Health 2024; 28 [9]: 163-171)*

Keywords: Breast cancer; Hand-foot syndrome; Comprehensive nursing; Anxiety; Depression

Résumé

Cette étude examine les effets des soins infirmiers complets sur le syndrome main-pied (SMP) chez les patientes atteintes de cancer du sein traitées par capécitabine. Une analyse rétrospective a été réalisée sur 71 patientes, divisées en un groupe d'étude recevant des soins complets et un groupe témoin recevant des soins conventionnels. Les résultats ont montré que le groupe d'étude a connu des améliorations significatives des symptômes cutanés, de l'auto-efficacité, de la qualité de vie, ainsi qu'une réduction des niveaux d'anxiété et de dépression par rapport au groupe témoin. De plus, les patientes adhérant au traitement médicamenteux étaient notablement meilleures dans le groupe d'étude. Les soins complets atténuent efficacement les symptômes du syndrome main-pied chez les patientes atteintes de cancer du sein traitées par capécitabine et améliorent leur bien-être. *(Afr J Reprod Health 2024; 28 [9]: 163-171).*

Mots-clés: Cancer du sein; Syndrome main-pied; Soins infirmiers complets; Anxiété; Dépression

Introduction

Hand-Foot Syndrome (HFS), also known as palmar-plantar erythrodysesthesia, is a relatively common adverse reaction in cancer patients undergoing chemotherapy. Initially, clinical symptoms include numbness, tingling, or burning sensations in the palms and soles, often accompanied by well-defined erythema with or without swelling, cracking, or desquamation[1]. HFS usually occurs within two to three weeks after chemotherapy and can recur with repeated drug use. Symptoms lessen after stopping the drug. While HFS is not life-threatening, it requires prompt and early appropriate interventions. Studies have shown that HFS significantly reduces the quality of life and treatment willingness in cancer patients[2].

Capecitabine is a commonly used drug in the treatment of breast cancer, with reported incidence rates of HFS ranging from 7.5% to 16.67% when used alone[3,4]. Current treatments for HFS include the use of emollients, drugs to prevent secondary infections (such as antibiotics, topical steroids, Cyclooxygenase-2 inhibitors, vitamin B6, corticosteroids, celecoxib), and reducing or even discontinuing chemotherapy dosage in severe cases[5,6]. Treatment strategies depend on the severity of symptoms and the impact on quality of life, but

there are no uniform treatment standards nationally or internationally yet[7]. Traditional nursing models often lack specificity and fail to meet the comprehensive needs of patients[8]. In recent years, integrated nursing interventions have been widely used in cancer patients with HFS. The overall goal is to improve the physical and psychological functions of patients, reduce the length of hospital stay and mortality, and benefit patients. Generally, integrated nursing interventions include health education, medication supervision, psychological care, and various disease-specific nursing measures. This study employed an integrated nursing intervention for HFS in breast cancer patients, enhancing routine care (health education, medication guidance, medication supervision, dietary guidance) with psychological care, comprehensive skin care, and continued care to achieve better nursing outcomes and promote faster patient recovery.

Methods

Study participants

A retrospective analysis was conducted on 71 breast cancer patients with HFS who received treatment at Jiangsu Cancer Hospital between January 2023 and December 2023. The patients were divided into a study group and a control group, with 38 cases in each group, based on the type of nursing care they received. All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Ethics Committee of Jiangsu Cancer Hospital (NO. 2023-009) and informed consent was taken from all the patients.

Inclusion Criteria: (1) Women diagnosed with breast cancer via pathological examination. (2) Patients who developed Grade I or higher HFS following capecitabine chemotherapy and had not discontinued the original nursing plan. (3) Patients with a Karnofsky Performance Status (KPS) score of 60 or above. The KPS score was assessed by medical staff based on the patient's daily performance and functional activities, used to guide treatment decisions and prognosis assessment. Scores ranged from 0 to 100, with lower scores generally indicating poorer activity levels and overall health status of the patient. (4) Patients expected to live more than 6 months. Exclusion Criteria: (1) patients with pre-existing histories of hand-foot skin lesions; (2) patients in critical conditions;(3) pregnant or lactating women, or those with mental health disorders; and (4) patients with poor compliance who did not sign informed consent forms.

Intervention methods

Control Group: (1) Health Education: Mainly involved educating patients about HFS, explaining current treatment options, nursing measures, and precautions in a clear and understandable way, enabling them to be well-informed. (2) Lifestyle Nursing: Patients were advised to minimize friction on hands and feet in daily life, avoid contact with hot items and chemical detergents, and not apply irritating medications or substances like alcohol or iodine. They were encouraged to wear cotton, breathable clothing and pants, and to avoid tight garments. (3) Medication Supervision: Ensure adherence to medical advice, urging patients to take their medication on time, including chemotherapy drugs and vitamin B6 tablets. Before bedtime, patients were instructed to apply urea ointment to affected areas. (4) Dietary Guidance: Inform patients and their families about the benefits of consuming high-protein, high-vitamin, high-calorie, low-fat, fresh fruits, and vegetables that are easy to digest. Patients are encouraged to drink plenty of water to help flush toxins from the body.

Study Group: In addition to routine care, the following comprehensive nursing measures were implemented: (1) During chemotherapy, breast cancer patients with HFS may develop a resistance to treatment and experience negative emotions due to physical discomfort. The specialized nurse was responsible for providing psychological care tailored to the patient's educational background, personality, and mental state. The nurse demonstrated care and empathy, encouraged patients to fully express their feelings, and listened patiently to understand their psychological changes. Based on the patient’s mental state, the nurse selectively offered psychological counseling and explanations to alleviate anxiety, fear, depression, and other negative emotional reactions, thereby improving the

patient's mood. The nurse also applied medical and psychological knowledge to provide scientific explanations, helping patients overcome or replace negative emotions with positive ones. Additionally, the nurse taught patients relaxation techniques for managing anxiety, such as listening to their favorite light music and practicing deep breathing exercises. In this study, a psychologist was asked to assess the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDA) scores of all patients. SAS and SDS Scoring Criteria: Both SAS and SDS consist of 20 items, each rated on a 4-point scale based on the severity of symptoms (1 point: none or very little; 2 points: mild; 3 points: moderate; 4 points: severe). The total score is obtained by summing the scores of the 20 items, and then multiplying by 1.25 to get the standard score. For all patients, one-on-one psychological counseling was provided to encourage them to actively cooperate with treatment. (2) Comprehensive Skin Care: Grid-pattern ice packs were used to apply cold compresses to the limbs, maintaining a temperature of 0°C, with two sessions per day, each lasting one hour. During the ice pack application, patients were monitored for changes in the colour and sensation of their hands and feet, as well as skin temperature. Patients were asked about their comfort levels, and ice packs were removed if numbness or intolerance occurred. After icing, patients with HFS grade I were assisted in applying urea ointment gently and evenly using circular motions from the centre of the hands outward, with similar techniques used for the feet. For patients with HFS grades II and III, a healing solution was applied to the affected areas followed by a dry gauze covering, which were changed daily[9-10]. (3) Continued Care: A continued care management team was established, and a WeChat service account (A social media platform launched by China's Tencent) was set up to provide ongoing nursing interventions for discharged patients. The service duration provided by the WeChat service account was for six months. Intervention content included: (i) the team reviewed literature and compiled key content on breast cancer and HFS health education in formats such as text, voice dialogues, videos, and images, which were reviewed by the head nurse and published through the service account to provide health guidance. (ii) The team collected patient medical records and medication details, providing daily reminders for medication schedules and pushing reminders for scheduled medical appointments well in advance. (iii) Professional team members were available online for 2 hours daily to respond to inquiries, offering guidance and answering questions online.

Observational (outcome) indicators

The following indicators were recorded to evaluate the effectiveness of the nursing interventions:
(1) HFS Grading: Grading was based on the NCI CTCAE 5.0[11]. 0: No symptoms. I: Mild skin changes or dermatitis (e.g., erythema, edema, or hyperkeratosis) without pain. II: Skin changes (e.g., peeling, blistering, bleeding, edema, or hyperkeratosis) with pain. III: Severe skin changes (e.g., peeling, blistering, bleeding, edema, or hyperkeratosis) with pain.
(2) Time to Initial alleviation of HFS: The duration from the start of treatment to the first signs of symptom relief was recorded.
(3) Primary Symptom Scoring: (i) Skin pain score: Utilized the Numeric Rating Scale (NRS)[12]. The score ranges from 0 to 10. 0: No pain. 1-3: Mild pain (mild discomfort, annoying but not interfering significantly with daily activities. 4-6: Moderate pain (interferes significantly with daily activities, but patient can still perform them). 7-10: Severe pain (disabling pain, unable to perform daily activities). (ii) Skin burning score: Utilized the Numerical Rating Scales for burning sensation[13]. The score ranges from 0 to 10. 0: No burning sensation. 1-3: Mild burning sensation (noticeable but not bothersome). 4-6: Moderate burning sensation (interferes somewhat with daily activities. 7-10: Severe burning sensation (significant interference with daily activities, may be intolerable). (iii)Skin itching score: Utilized the Worst Pruritus Numerical Rating Scale (WP-NRS)[14]. The score ranges from 0 to 10. 0: No itching (no sensation of itching). 1-3: Mild itching (barely noticeable itching sensation). 4-6: Moderate itching (bothersome itching sensation, but not to the point of interfering significantly with daily activities). 7-10: Severe itching (very bothersome itching sensation, significantly interfering with daily activities, may be intolerable).

(iv)Skin dryness score: Utilized the Xerosis Assessment Scale[15]. The score ranges from 0 to 10. A score of 0 indicates skin is moist with no noticeable dryness. A score of 10 indicates skin is very dry, significantly affecting quality of life. (v) Skin erythema score: Utilized the Visual Erythema Score[16]. 0: No visible erythema, skin appears normal. 1: Slight erythema, visible but not obvious, lighter in color or locally distributed. 2: Moderate erythema, clearly visible, darker or widely distributed, but does not affect the overall appearance of the skin. 3: Severe erythema, which significantly affects the appearance of the skin, is dark in color and widely distributed, and may be accompanied by inflammation. 4: Extremely severe erythema, which seriously affects the overall appearance of the skin, and may be accompanied by severe inflammatory reactions and skin damage.

(4) Quality of Life (QOL) Scoring: The QOL score for cancer patients is calculated based on the "Quality of Life Scoring System for Cancer Patients[17]. The score ranges from 0 to 100 points. A higher score indicates that patients experience better overall quality of life, encompassing various aspects such as physical, psychological, and social well-being, along with maintaining normal functional activities, and stable emotions.

(5) Self-Efficacy Scoring: Utilizes the General Self-Efficacy Scale to determine scores[18]. The total score ranges from 10 to 40 points. A higher score indicates that the individual believes they can effectively handle various challenges and difficulties and has stronger confidence in their abilities.

(6) Anxiety and Depression Scoring: The level of anxiety was assessed using the SAS, and the level of depression was evaluated using the SDS.[8] SAS scale: ranged from 25 to 100 points. 25-49 points: normal range, no obvious symptoms of anxiety. 50-59 points: mild anxiety. 60-69 points: moderate anxiety. Score 70 or above: severe anxiety. SDS scale: ranged from 20 to 80 points. Score 20-49: normal range or mild depression. 50-59 points: moderate depression. Score 60 or above: major depression.

(7) Patient Compliance Assessment: Compliance was assessed based on proper diet, and adherence to medication schedules. Drug adherence was evaluated using the Morisky Medication Adherence Scale (4-item version)[19]. The total score ranges from 0 to 4 points. 0 point: High compliance. 1-2 points: Moderate compliance. ≥3 points: Low compliance. Dietary compliance is assessed using the Healthy Eating Index (HEI)[20]. The total score of HEI 2015 was 100 points. The higher the score, the better the quality of the diet.

Statistical analysis

Data were analyzed using SPSS version 26.0. In this study, the Shapiro-Wilk test was conducted on all quantitative data. Quantitative data that conform to a normal distribution are expressed as (x±s) deviation and compared using t-tests. Quantitative data that do not conform to a normal distribution are expressed as [median (P25, P75)] and compared using the Mann-Whitney U test. Categorical data are expressed as "n (%)" and were analyzed using the chi-square (χ^2) test. A p-value of less than 0.05 was considered statistically significant.

Results

General data of the two groups of patients

Before nursing, there was no statistically significant difference between the two groups in all baseline data (p>0.05, Table 1).

Changes in HFS Grading Post-Nursing Care

After nursing intervention, the difference in the composition ratio of HFS grades between the two groups was statistically significant(χ^2=7.673, p=0.216), with the proportion of patients in the research group at HFS grade 0 being significantly higher than that in the control group. (Table 2). The time to initial alleviation of HFS in the study group was 5.00 (3.00, 6.00) days, which was significantly shorter than that in the control group [7.00 (6.00, 8.00) days, p<0.0001).

Changes in primary skin symptoms before and after nursing care

After the nursing interventions, there was a significant decrease in scores for skin pain, burning, itching, dryness, and erythema in both groups

Table 1: General data of the two groups of patients [$\bar{x}$±s/ median (P25, P75)/n(%)]

Subject	Study group (n=38)	Control group (n=38)	t/Z/χ^2	*p*
Age（years）	51.00 (46.75, 55.00)	51.00 (47.00, 55.75)	-0.4058	0.7002
BMI（kg/m^2）	21.89 ± 2.22	22.06 ± 1.66	-0.3866	0.6849
KPS (score)	71.00 (62.75, 76.50)	69.00 (64.25, 75.00)	-0.1353	0.8924
HFS appearance time (days)	6.00 (3.25, 8.00)	4.00 (2.25, 7.50)	-1.5733	0.1157
HFS grade [n (%)]			0.5903	0.7444
I	21 (55.26)	19 (50.00)		
II	14 (36.84)	17 (44.74)		
III	3 (7.89)	2 (5.26)		
Skin pain score	5.00 (3.00, 6.00)	5.00 (3.00, 6.00)	-0.4814	0.6302
Skin burning score	5.50 (3.00, 7.00)	5.00 (2.00, 6.00)	-0.3971	0.6913
Skin itching score	2.00 (1.00, 3.00)	5.00 (4.00, 7.00)	-0.5784	0.5630
Skin dryness score	2.00 (1.00, 3.00)	2.00 (1.00, 3.00)	-0.1165	0.9073
Skin erythema score	5.00 (3.00, 6.00)	3.00 (1.00, 3.00)	-0.6104	0.5416
QOL	24.50 (18.00, 28.00)	20.50 (18.00, 25.00)	-1.7490	0.0803
SAS	51.00 (46.00, 56.00)	53.00 (47.00, 57.00)	-0.6150	0.5386
SDS	27.50 (24.00, 36.00)	29.00 (26.00, 35.00)	-0.7862	0.4318
	63.00 (61.00, 65.00)	63.00 (60.00, 66.00)	-0.3496	0.7266
TNM stage I-II	20（52.63）	21（55.26）	0.0530	0.8180
III	18（47.37）	17（44.74）		

Table 2: Changes in HFS grading of patients after nursing [n (%)]

HFS grade	Study group (n=38)	Control group (n=38)	χ^2	*p*
0	25（65.79）	13（34.21）	7.673	0.0216
I	9（23.68）	16（42.11）		
II	4（10.53）	9（23.68）		
III	0（0.00）	0（0.00）		

Table 3: Main symptom scores [median (P25, P75)]

Subject	Study group before	After	Control group before	after
Skin pain score	5.00 (3.25, 6.00)	3.00 (1.25, 4.00)*	5.00 (3.25, 6.00)	3.50 (3.00, 5.00)
Z		-5.015		-2.666
P		<0.0001		0.0077
Skin burning score	5.00 (3.25, 7.00)	2.00 (2.00, 3.75)*	5.00 (4.00, 7.00)	3.00 (2.00, 4.00)
Z		-6.044		-4.038
P		<0.0001		<0.0001
Skin itching score	2.00 (1.25, 3.00)	1.00 (0.00, 1.00)*	2.00 (1.00, 3.00)	1.00 (0.00, 2.00)
Z		-5.117		-2.879
p		<0.0001		0.0040
Skin dryness score	2.00 (1.00, 3.00)	1.00 (0.00, 2.00)*	3.00 (1.00, 3.00)	2.00 (0.00, 3.00)
Z		-6.194		-4.472
p		<0.0001		<0.0001
Skin erythema score	5.00 (3.25, 6.00)	3.00 (1.25, 4.00)*	5.00 (3.25, 6.00)	3.50 (3.00, 5.00)
Z		-4.586		-3.288
p		<0.0001		0.0010

*P<0.05, compared with control group.

Table 4: Self-efficacy, QOL, anxiety and depression scores [median (p25, p75)]

Subject	Study group before	After	Control group Before	after
Self-efficacy score	24.00 (18.25, 28.00)	30.00 (28.00, 32.00) *	20.00 (18.00, 25.00)	23.00 (21.00, 25.00)
Z		-5.004		-1.824
p		<0.0001		0.0681
SAS score	51.00 (46.00, 56.75)	46.00 (41.00, 48.00) *	53.50 (47.25, 57.00)	51.00 (48.00, 54.00)
Z		-3.972		-1.827
p		<0.0001		0.0677
SDS score	27.50 (24.25, 36.00)	25.00 (23.00, 28.00) *	29.00 (26.00, 35.00)	28.00 (26.00, 29.00)
Z		-2.216		-1.513
p		0.0276		0.1304
QOL score	63.00 (61.00, 65.75)	70.00 (68.00, 74.00) *	63.50 (60.00, 65.75)	65.00 (62.25, 68.00)
Z		-5.462		-1.805
p		<0.0001		0.0711

*$p<0.05$, compared with control group

Table 5: Compliance of the two groups [median (P25, P75)]

Subject	Medication	Dietary
Study group	2.00 (1.00, 4.00)	80.00 (76.00, 85.75)
Control group	4.00(2.00, 6.00)	79.50 (76.00, 85.25)
Z	-3.607	-0.0885
p	0.0003	0.9295

($p<0.05$, Table 3). However, the study group showed significantly lower scores for skin pain, burning, dryness, itching, and erythema compared to the control group (Z=-2.9180, $p=0.0035$; Z=-2.4134, $p=0.0158$; Z=-2.4289, $p=0.0151$; Z=-1.9856, $p=0.0471$; Z=-2.2525, $p=0.0243$, Table 3).

Self-efficacy, QOL, anxiety and depression scores

After the nursing interventions, the control group did not show significant changes in these scores from before the care was provided (all $p>0.05$). However, in the study group, there were significant improvements in self-efficacy ($p<0.05$) and QOL scores ($p<0.05$), SAS and SDS scores significantly decreased (all $p<0.05$, Table 4). Comparison between the groups showed that after nursing intervention, the Self-efficacy score and QOL score in the study group were significantly higher than those in the control group (Z=-6.127, $p<0.0001$; Z=-4.658, $p<0.0001$), while the SAS score and SDS score were significantly lower than those in the control group(Z=-4.981, $p<0.0001$; Z=-3.718 $p=0.0002$).

Comparison of patient compliance between the two groups

There was no significant difference in the compliance of dietary between the two groups after discharge ($p>0.05$). However, the compliance of medication in the study group was significantly better than that in the control group ($p<0.05$, Table 5).

Discussion

In recent years, integrated nursing models have been widely adopted for the management of HFS in cancer patients. Current literature suggests that comprehensive nursing care models not only include conventional nursing interventions but also encompass psychological care, which can significantly reduce the risk of HFS. For instance, Krzemieniecki reported that patients who received nursing care and followed nursing advice had a fiftyfold reduction in the risk of developing HFS[21]. Son noted that symptoms of HFS could be greatly alleviated through health education, preventive management, and the application of ointments[22].

In this study, the comprehensive nursing intervention developed not only included standard nursing measures but also incorporated

psychological care, comprehensive skin care, and continued care. Patients receiving comprehensive nursing care exhibited significant reductions in HFS symptoms and experienced quicker alleviation of symptoms compared to those in the control group. Moreover, the improvements in skin pain, burning, dryness, itching and erythema were significantly better in the study group than in the control group. The results of this study indicate that integrated nursing care significantly outperforms conventional nursing in managing HFS in breast cancer patients treated with capecitabine. The enhanced effectiveness of the study group's interventions, particularly in skin care, which included cold compress therapy and the use of emollients, played a pivotal role. Research has shown that local cold compresses can constrict blood vessels, reducing the entry of chemotherapy drugs into peripheral circulation and thereby minimizing their accumulation in exocrine glands. Additionally, by lowering body temperature, sweat production is decreased, reducing the excretion of chemotherapy drugs through sweat and lessening their toxic effects on the skin[23]. The use of skin lotions and moisturizers also helps alleviate symptoms of HFS and promote skin healing[24]. For cancer patients who have not yet developed HFS, the application of skin lotion and moisturizers can serve as preventive measures. For patients with Grade I HFS, it is advisable to use these products along with petroleum jelly. For those with more severe HFS (Grades II and III), the application of a moist burn ointment with dressing changes is recommended[25]. In this study, similar measures were adopted for patients with different grades of HFS. Following local cold applications, patients with Grade I HFS were treated with urea ointment, which was massaged into the skin to enhance absorption. For patients with Grade II or III HFS, a healing solution was applied, and the area was covered with dry gauze for protection. The outcomes demonstrated that these measures were effective in significantly reducing symptoms of skin burning, erythema, and pain, and are therefore recommended for wider adoption in clinical practice.

During chemotherapy, the use of multiple drugs is common to consolidate the effectiveness of treatment. This approach often exacerbates the physical discomfort of breast cancer patients, causing significant physiological distress and consequently severe psychological changes. Statistics show that a large portion of breast cancer patients experience depression and/or anxiety months to years after treatment, with 38.2% exhibiting depressive symptoms and 32.2% showing signs of anxiety[26]. The negative emotional states of cancer patients are linked to a reduction in overall quality of life and adversely affect treatment compliance. Therefore, emotional distress is considered the sixth vital sign in cancer care[27]. Given these challenges; psychological care is crucial for breast cancer patients. Effective psychological support can improve patients' negative emotions and help them develop a positive attitude towards treatment[28]. Bidstrup implemented an intervention for breast cancer patients that combined routine post-operative care with psychological support, which significantly improved the patients' emotional well-being and stress resilience, thereby enhancing their health behaviors[29]. Self-efficacy refers to an individual's belief in their capability to execute behaviors necessary to produce specific performance attainments. Patients with high self-efficacy tend to have a more positive outlook on life, exhibit greater initiative, and thus show higher compliance with treatment. In this study, after nursing interventions, the study group showed significantly higher self-efficacy and quality of life scores, and notably lower SAS and SDS scores than the control group. This improvement is attributed to the psychological care integrated into the comprehensive nursing interventions. Psychological support provides effective reassurance, enhances patients' confidence and courage to combat the disease, and encourages a more optimistic and proactive attitude towards illness. This not only effectively reduces negative emotions but also, as symptoms of HFS lessen, boosts patients' confidence in treatment, subsequently enhancing their self-efficacy and quality of life.

Compliance not only affects the normal recovery of patients but can also determine the success of medical and nursing operations. Studies have shown that comprehensive nursing interventions for breast cancer surgery patients can improve their attitudes towards treatment[25]. In this

study, a WeChat service account was established to provide ongoing nursing interventions. This service sent disease-related information and enhanced health education to breast cancer HFS patients, encouraged and urged patients to participate in self-management of their disease, and offered an optimal channel for consultation. After discharge, the drug compliance of the study group was significantly higher than that of the control group. This suggests that ongoing nursing interventions enhance health education, improve their understanding of the disease, and encourage them to view their illness in a more positive light. This realistic approach to the disease helps to improve patient adherence to medications and strengthen self-management skills.

This study presents several strengths. First, it provides compelling evidence that comprehensive nursing care significantly alleviates the symptoms of HFS in breast cancer patients treated with capecitabine. The integration of psychological care and specialized skin care into the nursing regimen resulted in marked improvements in patients' quality of life, as well as in their self-efficacy, anxiety, and depression levels. Moreover, the use of continued care via a WeChat service account demonstrated enhanced patient compliance with medication regimens, which is crucial for long-term treatment success. Furthermore, this study has some limitations. Firstly, the sample size is small, which may not fully account for individual differences and could affect the results. Future studies should include larger sample sizes to enhance the reliability and generalizability of the findings. Secondly, the follow-up period in this study is relatively short, focusing only on patient compliance and short-term quality of life improvements post-discharge. The long-term effects of comprehensive care interventions have not been adequately assessed. Future research should extend the follow-up period to evaluate the long-term outcomes and quality of life impacts of comprehensive care interventions. This study provides valuable insights for healthcare policy, suggesting that the integration of comprehensive nursing care into cancer treatment could be considered in clinical practice, especially when chemotherapy drugs known to induce HFS are involved.

In conclusion, comprehensive nursing care significantly alleviates symptoms of HFS, improves discomfort associated with skin pain, erythema, and itching, reduces negative emotions, and enhances both the quality of life and treatment compliance. This not only benefits the patients' long-term care but also facilitates the ongoing work of healthcare providers.

Conflict of interest

The authors have no conflicts of interest to declare.

Contribution of authors

SH and MW conceived and designed the study. PZ and LS provided study materials or patients. LZ and JZ were responsible for the collection and assembly of data. ZF conducted data analysis and interpretation. All authors contributed to manuscript writing and gave final approval of the manuscript.

References

1. Kwakman JJM, Elshot YS, Punt CJA and Koopman M. Management of cytotoxic chemotherapy-induced hand-foot syndrome. Oncol Rev 2020; 14(1):442.
2. Urakawa R, Tarutani M, Kubota K and Uejima E. Hand Foot Syndrome Has the Strongest Impact on QOL in Skin Toxicities of Chemotherapy. Cancer 2019; 10(20):4846-4851.
3. Kanbayashi Y, Taguchi T, Ishikawa T, Otsuji E and Takayama K. Risk Factors of Capecitabine-Induced Hand-Foot Syndrome: A Single-Institution, Retrospective Study. Oncology 2023; 101(7):407-414.
4. Hsu YH, Shen WC, Wang CH, Lin YF and Chen SC. Hand-foot syndrome and its impact on daily activities in breast cancer patients receiving docetaxel-based chemotherapy. Eur J Oncol Nurs 2019; 43:101670.
5. Takemura M, Ikemura K, Yoshinami T, Toyozumi Y, Shintani T, Ueda M, Shimazu K and Okuda M. Proton Pump Inhibitors Ameliorate Capecitabine-induced Hand-Foot Syndrome in Patients with Breast Cancer: A Retrospective Study. Anticancer Res 2022; 42(5):2591-2598.
6. Kewan T, Alomari M, Khazaaleh S, Covut F and Olayan M. Hand-foot Syndrome Secondary to Low-dose Docetaxel in a Breast Cancer Patient. Cureus 2019; 11(4):e4400.
7. Zheng YF, Fu X, Wang XX, Sun XJ and He XD. Utility of cooling patches to prevent hand-foot syndrome caused by pegylated liposomal doxorubicin in breast cancer patients. World J Clin Cases 2021; 9(33):10075-10087.

8. Hopman P, de Bruin SR, Forjaz MJ, Rodriguez-Blazquez C, Tonnara G, Lemmens LC, Onder G, Baan CA and Rijken M. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: A systematic literature review. Health Policy 2016;120(7):818-32.
9. Nagore E, Insa A and Sanmartín O. Antineoplastic therapy-induced palmar plantar erythrodysesthesia ('hand-foot') syndrome. Incidence, recognition and management. Am J Clin Dermatol 2000; 1(4):225-34.
10. Pandy JGP, Franco PIG and Li RK. Prophylactic strategies for hand-foot syndrome/skin reaction associated with systemic cancer treatment: a meta-analysis of randomized controlled trials. Support Care Cancer 2022; 30(11):8655-8666.
11. Santhosh A, Kumar A, Pramanik R, Gogia A, Prasad CP, Gupta I, Gupta N, Cheung WY, Pandey RM, Sharma A and Batra A. Randomized double-blind, placebo-controlled study of topical diclofenac in the prevention of hand-foot syndrome in patients receiving capecitabine (the D-TORCH study). Trials 2022; 23(1):420.
12. Rubio-Zarapuz A, Apolo-Arenas MD, Tornero-Aguilera JF, Parraca JA and Clemente-Suárez VJ. Comparative efficacy of neuromodulation and structured exercise program on pain and muscle oxygenation in fibromyalgia patients: a randomized crossover study. Front Physiol 2024; 15:1414100.
13. Murota H, Arima K, Yoshida T and Fujita H. Disease burden and treatment satisfaction in patients with prurigo nodularis in Japan. J Dermatol 2024; 51(2):223-233.
14. Blauvelt A, Eyerich K, Irvine AD, de Bruin-Weller M, Kwatra SG, Gooderham M, Kim B, Calimlim BM, Lee WJ, Raymundo EM, Liu Y, Ofori S, Platt AM and Silverberg JI. More Time Spent with Clear Skin and No Itch with Upadacitinib versus Dupilumab for Atopic Dermatitis. Dermatol Ther (Heidelb) 2024; 7.
15. Piérard GE, Piérard-Franchimont C and Scheen A. Critical assessment of diabetic xerosis. Expert Opin Med Diagn 2013; 7(2):201-7.
16. Held E, Lorentzen H, Agner T and Menné T. Comparison between visual score and erythema index (DermaSpectrometer) in evaluation of allergic patch tests. Skin Res Technol 1998; 4(4):188-91.
17. Qedair JT, Al Qurashi AA, Alamoudi S, Aga SS and Y Hakami A. Assessment of Quality of Life (QoL) of Colorectal Cancer Patients using QLQ-30 and QLQ-CR 29 at King Abdulaziz Medical City, Jeddah, Saudi Arabia. Int J Surg Oncol 2022; 2022:4745631.
18. Clavijo M, Yévenes F, Gallardo I, Contreras AM and Santos C. Escala de autoeficacia general: reevaluación de su evidencia de confiabilidad y validez en Chile [The general self-efficacy scale (GSES): Reevaluation of its reliability and validity evidence in Chile]. Rev Med Chil 2020;148(10):1452-1460. Spanish.
19. Tanaka M, Kawakami A, Maeda S, Kunisaki R and Morisky DE. Validity and Reliability of the Japanese Version of the Morisky Medication Adherence Scale-8 in Patients with Ulcerative Colitis. Gastroenterol Nurs 2021; 44(1):31-38.
20. Krebs-Smith SM, Pannucci TE, Subar AF, Kirkpatrick SI, Lerman JL, Tooze JA, Wilson MM and Reedy J. Update of the Healthy Eating Index: HEI-2015. J Acad Nutr Diet 2018; 118(9):1591-1602.
21. Krzemieniecki K, Zygulska AL, Kucharz J and Stokłosa. Better compliance with the guidelines on hand-foot syndrome in patients treated with capecitabine in colorectal and breast cancer as a result of nursing education. Przegl Lek 2016;73(7):460-4.
22. Son HS, Lee WY, Lee WS, Yun SH and Chun HK. Compliance and effective management of the hand-foot syndrome in colon cancer patients receiving capecitabine as adjuvant chemotherapy. Yonsei Med 2009; 50(6):796-802.
23. Gialaim Purcino Dos Reis FC, Menêses AG, Mazoni SR, Pereira Silveira RCC, Diniz Dos Reis PE and Vasques CI. Topical interventions for preventing hand-foot syndrome resulting from antineoplastic therapy: A scoping review. Rev Esc Enferm USP 2023; 57: e20220107.
24. Ahn HR, Lee SK, Youn HJ, Yun SK and Lee IJ. Stevens-Johnson syndrome and concurrent hand foot syndrome during treatment with capecitabine: A case report. World J Clin Cases 2021; 9(17):4279-4284.
25. Santhosh A, Kumar A, Pramanik R, Gogia A, Prasad CP, Gupta I, Gupta N, Cheung WY, Pandey RM, Sharma A and Batra A. Randomized double-blind, placebo-controlled study of topical diclofenac in the prevention of hand-foot syndrome in patients receiving capecitabine (the D-TORCH study). Trials 2022; 23(1):420.
26. Park S, Sato Y, Takita Y, Tamura N, Ninomiya A, Kosugi T, Sado M, Nakagawa A, Takahashi M, Hayashida T and Fujisawa D. Mindfulness-Based Cognitive Therapy for Psychological Distress, Fear of Cancer Recurrence, Fatigue, Spiritual Well-Being, and Quality of Life in Patients with Breast Cancer-A Randomized Controlled Trial. J Pain Symptom Manage 2020;60(2):381-389.
27. Wang X, Wang N, Zhong L, Wang S, Zheng Y, Yang B, Zhang J, Lin Y and Wang Z. Prognostic value of depression and anxiety on breast cancer recurrence and mortality: a systematic review and meta-analysis of 282,203 patients. Mol Psychiatry 2020;25(12):3186-3197.
28. Yang Y, Sun H, Luo X, Li W, Yang F, Xu W, Ding K, Zhou J, Liu W, Garg S, Jackson T, Chen Y and Xiang YT. Network connectivity between fear of cancer recurrence, anxiety, and depression in breast cancer patients. Affect Disord 2022; 309:358-367.
29. Bidstrup PE, Johansen C, Kroman N, Belmonte F, Duriaud H, Dalton SO, Andersen KG and Mertz B. Effect of a Nurse Navigation Intervention on Mental Symptoms in Patients with Psychological Vulnerability and Breast Cancer: The REBECCA Randomized Clinical Trial. JAMA Netw Open 2023; 6(6):e2319591.