Application of Graded Nursing for Hand-Foot Syndrome in Breast Cancer Chemotherapy Patients

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DOI: 10.32629/jcmr.v5i3.2645

Abstract: The purpose of this study is to demonstrate the clinical value of choosing "graded nursing for hand-foot syndrome" for breast cancer patients undergoing chemotherapy. The research period for this topic was from January 2023 to January 2024. Sixty hospitalized breast cancer patients undergoing chemotherapy were selected and divided into two groups based on differences in their nursing plans: a control group and an experimental group, each consisting of 30 cases. The nursing plans selected were basic care for the control group and graded nursing for hand-foot syndrome for the experimental group. The incidence of hand-foot syndrome and changes in quality of life were compared between the two groups. The results showed that the incidence of hand-foot syndrome in the experimental group was 30.00%, significantly lower than the 56.67% in the control group, with a notable difference ($P<0.05$). The quality of life scores of patients in the experimental group after intervention were significantly lower than those1 in the control group, showing a substantial difference ($P<0.05$). The implementation of the graded nursing plan for hand-foot syndrome in breast cancer chemotherapy patients can prevent the occurrence of hand-foot syndrome and improve the quality of life, demonstrating strong practical significance in its application.

***Keywords*:** hand-foot syndrome; graded nursing; breast cancer chemotherapy; application value

1. Introduction

Chemotherapy is a common treatment option in the clinical management of breast cancer patients; however, most patients experience side effects such as liver function impairment, gastrointestinal irritation, bone marrow suppression, and, due to cytotoxicity, the occurrence of hand-foot syndrome [1]. Clinical evidence suggests that the risk of hand-foot syndrome caused by chemotherapeutic agents such as liposomal doxorubicin is directly related to the chemotherapy cycle, with an incidence rate exceeding 45% in breast cancer patients. This condition negatively impacts patients' daily life and work and interferes with their standard treatment [2]. To address this issue, a graded nursing plan for hand-foot syndrome can be formulated, aimed at providing support for managing the risk, controlling the severity, and improving the quality of life for breast cancer chemotherapy patients. In the following, we explore this through a retrospective study.

2. Clinical Data and Research Methods

2.1 Clinical Data

The research period for this study was from January 2023 to January 2024. Sixty hospitalized breast cancer patients undergoing chemotherapy were selected and divided into two groups based on differences in their nursing plans: a control group and an experimental group, each consisting of 30 cases.

The experimental group: Age ranged from 20 to 70 years, with a median value of (49.12±0.74) years.

The control group: Age ranged from 22 to 72 years, with a median value of (50.03±1.13) years.

Statistical analysis of the above basic data of the two groups revealed no significant differences, $P<0.05$.

Inclusion criteria: Age ≥ 18 years; chemotherapy regimen of liposomal doxorubicin + cyclophosphamide + taxane drugs, each cycle lasting 3 weeks, totaling 3 cycles.

Exclusion criteria: ① Presence of mental disorders; ② Inability to communicate normally with language; ③ Severe dysfunctions of heart, lung, kidney, etc.; ④ Skin inflammation occurring during the first chemotherapy session; ⑤ Presence of contraindications such as microcirculation disorders.

2.2 Research Methods

The control group received routine nursing care, including explaining clinical treatment risks to patients before

chemotherapy, clarifying daily dietary requirements, and guiding patients on essential points of daily life. If signs of hand-foot syndrome were detected, targeted treatment was implemented according to medical advice, and consultations with dermatologists were arranged if necessary. Follow-up visits by healthcare personnel were arranged 3 days after discharge.

The experimental group received a graded nursing plan for hand-foot syndrome, which included:

① Developing a graded nursing plan for hand-foot syndrome. A multidisciplinary collaboration team was established with the participation of attending physicians from the oncology, dermatology, and traditional Chinese medicine departments. The team followed the "6S evidence-based medicine" principle to collect relevant literature and data. Based on clinical nursing guidelines for skin management and hand-foot syndrome, and in combination with the patient's specific situation, the final graded nursing plan was determined through group consultation [3].

② Implementation of the nursing plan. For patients undergoing chemotherapy for the first time, nursing staff explained common clinical manifestations, grading strategies, and preventive measures related to hand-foot syndrome to enhance patients' awareness of related clinical symptoms. For these patients, Level 0 management was implemented: on the day of chemotherapy, cold compresses were applied to the hands and feet. If the patient tolerated it, medical ice gloves and ice socks were worn for 15 minutes from a quarter-hour before to a quarter-hour after chemotherapy, followed by 15 minutes of rest, repeating the cycle. If the patient could not tolerate it, thin cotton gloves or socks were worn before the medical ice gloves to prevent frostbite, and these were removed once the patient adapted to the cold environment. Patients were advised to avoid contact with hot objects for 1 day before and 3 days after chemotherapy, as this could affect the efficacy of cold therapy.

For patients undergoing multiple chemotherapy cycles, medical staff conducted an objective assessment of the severity of hand-foot syndrome approximately 4 hours after arrival at the hospital, followed by targeted interventions. If no signs of hand-foot syndrome were observed, Level 0 management and protection strategies were applied. If numbness or sensory disturbances were detected in the hands and feet, Level 1 management was implemented. Clinical physicians guided patients to apply moisturizing ointments to the affected skin, ensuring it remained moist. Sensory-impaired areas were massaged three times daily for 10 minutes each session, and the affected limbs were elevated to promote venous circulation [4].

If swelling and erythema were observed in the hands and feet, Level 2 management was applied. Following the Level 1 management principles, burn ointment was used twice daily, and patients were instructed to take dexamethasone (7.5 mg, twice daily for 3 days) and vitamin B6 (one tablet daily) until signs of swelling subsided.

For painful erythema and skin damage, Level 3 management was administered. Healthcare providers assessed the nature and severity of the pain using a pain assessment scale and promptly reported findings to clinical doctors. If the pain was mild, patients were advised to apply lidocaine cream to the skin, elevate the painful limb, or soak hands and feet in cool water to alleviate pain. For moderate to severe pain, patients were instructed, under medical guidance, to use diclofenac sodium (12.5 mg) and soak the affected areas in a traditional Chinese herbal bath (comprising sophora and purslane) prepared by boiling the herbs in 1000 ml of water, cooling it to 34-36°C, and soaking the hands and feet for 15 minutes twice daily for a week to achieve effects of clearing heat, cooling the blood, and detoxification.

If desquamation, blisters, or ulcers occurred on the hands and feet, Level 4 management was implemented. Based on Level 3 management, dermatologists were consulted to jointly discuss the pros and cons of continuing chemotherapy based on the patient’s specific condition; chemotherapy suspension was considered if necessary. Skin care was provided, and formed blisters were disinfected and covered with sterile gauze to prevent infection. Peeling skin should not be removed to avoid the risk of skin ulceration and infection. Local irrigation with saline was performed, scabs were trimmed with disinfected scissors, and exposed wounds were covered with sterile gauze, gloves, or cotton socks to prevent abrasions. Antibiotics were administered according to medical guidance if needed.

2.3 Indicator Organization

Three days after discharge, healthcare providers are required to conduct clinical follow-ups with patients, continuously assessing their clinical symptoms and flexibly adjusting the care plan based on the specific conditions. The implementation of clinical nursing intervention plans for patients must also be regularly evaluated, with immediate feedback provided. Any issues encountered by the patient should be promptly corrected and resolved.

The occurrence and grading of hand-foot syndrome between the two groups of patients were compared. The "WHO Adverse Reaction Evaluation Criteria" was used to grade hand-foot syndrome, including five levels: 0, 1, 2, 3, and 4.

Level 0: No abnormal clinical reactions or signs.

Level 1: Delayed or abnormal sensations in the hands and feet, with tingling sensations and occasional erythema. Histological findings reveal abnormal vasodilation of reticular epidermal tissue.

Level 2: No discomfort while holding objects or walking, without painful swelling or erythema.

Level 3: Painful erythema and swelling on the palms, heels, etc., with occasional skin fissures. Histological findings

indicate isolated necrosis of the keratin layer in the epidermis.

Level 4: Desquamation, ulcers, blisters, and severe pain, with histological findings showing complete necrosis of the epidermis.

Patients rated at Level 1 or above are generally diagnosed with "hand-foot syndrome."

The quality of life of the two groups of patients was compared. Evaluations were conducted using the Hand-Foot Skin Reaction Quality of Life Assessment Scale (HFQOL), which includes four dimensions: physical state, self-care level, social ability, and psychological state. Scores range from 0 to 4, with higher scores indicating a greater negative impact of hand-foot syndrome on the patient's quality of life and poorer overall quality of life.

2.4 Statistical Analysis

The data collected in this study were statistically analyzed using SPSS 25.0 software. For quantitative indicators that follow a normal distribution, the data were expressed as mean ± standard deviation (x±s) and analyzed using t-tests. For quantitative indicators that do not follow a normal distribution, the data were expressed as medians and analyzed using non-parametric tests. Qualitative indicators were analyzed using frequency and percentage (n, %). If $P<0.05$, the differences were considered significant, warranting further statistical analysis.

3. Results

3.1 Comparison of Incidence and Grading of Hand-Foot Syndrome between Two Groups

After a period of nursing intervention, it was found that the incidence of hand-foot syndrome in the experimental group was 30.00%, significantly lower than the 56.67% in the control group, showing a significant difference between the groups ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of Incidence and Grading of Hand-Foot Syndrome between Two Groups (n, %)

Group	Cases	Incidence	Hand-Foot Syndrome Grading				
			0	1	2	3	4
Experimental Group	30	9（30.00）	21（70.00）	3（10.00）	3（10.00）	2（6.67）	1（3.33）
Control Group	30	17（56.67）	13（43.33）	4（13.33）	5（16.67）	5（16.67）	3（10.00）
T	7.025		-2.014				
P	0.011		0.005				

3.2 Comparison of Quality of Life Scores between Two Groups

According to statistical calculations, there was no significant difference in the quality of life scores between the two groups before graded nursing intervention ($P > 0.05$). After the intervention, the quality of life scores of both groups decreased significantly, with the scores in the experimental group being significantly lower than those in the control group, indicating a significant difference ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of Quality of Life Scores between Two Groups (x±s)

Indicator	Control Group		Experimental Group	
	Before	After	Before	After
Physical State	3.01±0.01	2.45±0.12	3.02±0.05	1.75±0.23
Self-Care Level	2.87±0.56	2.03±0.01	2.97±0.23	1.79±0.12
Social Ability	2.25±0.41	1.99±0.12	2.26±0.43	1.54±0.23
Psychological State	2.74±0.23	2.15±0.12	2.79±0.19	1.84±0.11

4. Discussion

4.1 Overview of Hand-Foot Syndrome

During chemotherapy for breast cancer patients, hand-foot syndrome is a typical dermatologic toxicity reaction caused by the cumulative dosage of chemotherapy drugs, which inevitably affects and damages patients' limbs to varying degrees. This condition can also impose psychological and economic pressures on patients and their families. Clinical studies suggest that the risk of developing this syndrome is unpredictable, and the conventional approach of "treating after onset" may lead to underestimating the syndrome's harmful effects, potentially causing patients to miss the optimal treatment window[5].

Therefore, actively exploring individualized and targeted treatment strategies holds positive significance in preventing hand-foot syndrome.

4.2 Overview of Graded Nursing for Hand-Foot Syndrome

With the continuous optimization of clinical nursing theories, the graded nursing management model has been widely used in the clinical care of chemotherapy patients and has achieved good results. For the prevention and treatment of hand-foot syndrome, implementing graded nursing management is crucial. Before developing a specific graded nursing management strategy, it is necessary to assess the risk of chemotherapy patients developing hand-foot syndrome to provide targeted and personalized intervention guidance. Additionally, during the implementation of graded nursing, dynamic adjustments to the nursing mechanism are required to maximize the satisfaction of various chemotherapy patients' actual nursing needs, thereby facilitating the early recovery of limb function and providing guidance[6].

4.3 Study Insights

The direct correlation between chemotherapy drugs and the incidence of hand-foot syndrome has not been uniformly defined clinically. However, discontinuing chemotherapy or reducing chemotherapy drug dosages are common graded management strategies currently used to prevent and treat hand-foot syndrome. Long-term practical research indicates that targeted prevention and treatment of hand-foot syndrome should focus on early identification and assessment, clinical education for patients, and the implementation of personalized supportive care strategies[7]. The findings of this study confirm this point: the incidence of hand-foot syndrome in the experimental group was 30.00%, significantly lower than the 56.67% in the control group, with a notable difference ($P < 0.05$). After the intervention, the quality of life scores of patients in the experimental group were significantly lower than those in the control group, showing a significant difference ($P < 0.05$), consistent with the conclusions of most scholars[8].

Therefore, the study confirms that choosing a graded management model for hand-foot syndrome can help reduce its incidence among breast cancer chemotherapy patients and effectively control the severity. In the experimental group, healthcare providers conducted clinical education and guidance for patients, enabling them to quickly understand the identification methods of such diseases, supporting early identification and judgment, enhancing patients' awareness of daily skin care, and significantly improving clinical compliance. Through dynamic evaluation and analysis, healthcare providers can comprehensively understand the patients' disease progression characteristics, implementing graded prevention and treatment based on their actual conditions, achieving timely intervention and prevention[9]. In this experiment, patients underwent hand and foot cryotherapy on the day of chemotherapy, aimed at inducing local vasoconstriction in the hands and feet, reducing blood flow, controlling cellular metabolism, and preventing the accumulation of chemotherapy drugs in the palms, heels, and other areas to prevent hand-foot syndrome. Furthermore, the multidisciplinary collaboration model adopted by the experimental group allowed medical staff from various departments to work together, leveraging the advantages of collaborative diagnosis, treatment, and care, thereby enhancing the management of complex patient conditions[10].

In conclusion, based on the evidence from this study, the graded nursing scheme for hand-foot syndrome has positive implications for improving the quality of life of breast cancer chemotherapy patients. Therefore, this nursing scheme holds substantial practical value and is worth widespread clinical implementation.

References

[1] Chu Yanxiang, Deng Yan, Xiong Huan. Application of Graded Nursing in Breast Cancer Patients with Hand-Foot Syndrome during Chemotherapy [J]. Chinese Nursing Journal, 2023, 58 (21): 2583-2588.

[2] Chen Li, Qian Rong, Chen Ying, Lin Zhenmeng. Study on the Efficacy of Cryotherapy for Chemotherapy-Induced Peripheral Neuropathy and Hand-Foot Syndrome in Cervical Cancer Patients [J]. Modern Medicine & Health, 2023, 39 (02): 245-249.

[3] Yang Jing, Zhang Liquan, Zhu Chunlan. Evidence-Based Practice in the Prevention and Management of Hand-Foot Syndrome in Breast Cancer Patients Receiving Chemotherapy [J]. Qilu Nursing Journal, 2024, 30 (01): 105-108.

[4] Deng Lan, Li Zhiming, Wu Huiyuan, Jiang Mo. Analysis of Influencing Factors and Prevention Measures for Hand-Foot Syndrome Induced by Antineoplastic Drugs [J]. Modern Diagnosis and Treatment, 2022, 33 (17): 2591-2593.

[5] Hou Ting, Song Qiong, Ren Taijuan, He Lian. Comparative Study of Two Nursing Methods for Capecitabine-Induced Hand-Foot Syndrome [J]. Journal of Molecular Imaging, 2017, 40 (02): 239-241.

[6] Zhu Haiting. Observation of the Efficacy of Integrated Traditional Chinese and Western Nursing in Hand-Foot Syndrome in Patients with Malignant Tumors Undergoing Chemotherapy [J]. Health Literature, 2023, 24 (15): 145-148.

[7] Wang Wenxun, Zheng Ailin, Li Zhenzhen. Clinical Observation and Nursing of Apatinib Mesylate-Induced Hand-Foot

Syndrome [J]. General Nursing, 2018, 16 (20): 2511-2512.
[8] Chang Rui, Gu Feng, Geng Junying. Efficacy and Nursing Strategies of Kangfuxin Liquid in the Treatment of Chemotherapy-Related Hand-Foot Syndrome [J]. Journal of Integrated Traditional Chinese and Western Medicine Nursing (Bilingual), 2019, 5 (3): 162-164.
[9] Zhang Qing, Xiao Jianlei, Tang Ying, Zhang Xiu, Lin Ye, Gan Lin. Effect of Case Tracking Management Model on the Incidence of Hand-Foot Syndrome and the Quality of Life, Anxiety, and Depression in Breast Cancer Patients Undergoing Chemotherapy [J]. Health Vocational Education, 2024, 42 (06): 137-141.
[10] Chen Ting, Shi Xin. Analysis of Integrated Traditional Chinese and Western Nursing Interventions in Improving Symptoms and Quality of Life in Cancer Patients with Hand-Foot Syndrome during Chemotherapy [J]. Practical Clinical Nursing Electronic Journal, 2022, 7 (41): 50-52,43.