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Original Article

Effect of WeChat platform based continuity of care on the quality of life and psychosocial competence in postoperative patients with breast cancer

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Abstract: Objective: To observe and analyze the effect of WeChat platform based continuity of care on the quality of life and psychosocial competence in postoperative patients of breast cancer. Methods: 86 patients with breast cancer were divided into the control group (n=43) and the study group (n=43) according to the randomized double-blind method. The control group received usual care, and the study group received WeChat platform-based continuity of care on the basis of usual care, which was carried out mainly by pushing nursing-related pictures and videos to WeChat group after patients discharge, and taking psychological care, teaching in WeChat group functional exercise guidance and so on. The function of the affected limb, the self-report psychosocial adjustment to illness scale (PAIS-SR: working ability, communication status, psychosocial health care, family relationship, psychological status, entertainment, sexual ability), quality of life (SF-36: physical function, physical pain, physiological function, emotional function, social function, mental health, energy, overall health), functional exercise compliance and nursing satisfaction were compared between the two groups before and after intervention. Results: After nursing, the effective rate of functional recovery, the functional exercise compliance and the nursing satisfaction of the affected limb of patients in the study group were significantly higher than those of patients in the control group ($P < 0.05$). After nursing, the scores of working ability, communication status, psychosocial health care, family relationship, psychological status and entertainment of patients in the study group were significantly better than those of patients in the control group ($P < 0.001$). Compared with pre-nursing, the physiological function, physical pain, role physical, emotional function, social function, mental health, energy and overall health of patients in the two groups were significantly increased after nursing ($P < 0.001$), and the improvement of the study group was significantly better ($P < 0.001$). Conclusion: Compared with the usual care, the intervention of WeChat platform-based continuity of care can significantly improve the function of affected limb in postoperative patients with breast cancer, the ability of psychosocial adjustment to illness scale, the functional exercise compliance, the quality of life, and patients' recognition of nursing services.

Keywords: WeChat platform based continuity of care, quality of life, ability of psychosocial adjustment to illness scale, function of the affected limb

Introduction

Breast cancer is a malignant tumor that occurs in breast epithelial tissue. Due to the loss of normal cell activity, the connection between breast cancer cells is loose and easy to fall off [1]. Once the cancer cells fall off, the free cancer cells will spread throughout the body with lymph fluid or blood, forming metastasis, causing life-threatening to the body [2]. Surgery is a common treatment for this disease. Through it, the breast lesions, together with the skin 5 cm around it, adipose tissue, fascia, pectoralis muscle lymph nodes, clavicle and axillary adipose tissue are removed in one piece [3]. This will also cause damage to the patient's limb structure and tissues, resulting in postoperative dysfunction of the affected limb, and seriously affecting the patient's quality of life. Postoperative functional training can increase local blood circulation, accelerate the repair of surrounding tissue injury, and prevent muscle atrophy, which is of great significance to the recovery of limbs [4]. However, due to the rela-

tive lack of nursing knowledge of patients and the influence of disease itself, most patients have an obvious negative attitude towards life and a low level of hope after operation. Therefore, there are also many problems in postoperative mental state, self-care and other items. Usual care may no longer meet the needs of such patients [5].

The continuity of care refers to the continuation care from the hospital to the family, including discharge plan, referrals, continuous follow-up and nursing care that provided by hospital after patients return to their families or communities. At present, the development of continuity of care is usually based on telephone follow-up, family follow-up and e-mail follow-up, etc. However, the above nursing methods mostly stay in the aspect of inquiry, and the content is simple without paying attention to patients' psychology and compliance behavior in detail. Therefore, the effect on the patients' rehabilitation is not outstanding. Zhou et al. have reported that application of continuity of care (in addition to regular telephone visits and inquiries, regular home follow-up and psychological intervention are added) after breast cancer surgery can significantly improve the psychological state of patients and improve their quality of life [6].

With the development of society, WeChat has become the main tool for people to obtain information. It can guide patients' post-discharge care through text, pictures, videos, etc. [7]. With the more convenient form, it can aid to acquire the current situation of patients anytime and anywhere. However, there are few clinical reports on the application of WeChat platform based continuity of care in breast cancer. In view of this, in order to further improve the quality of life of patients after surgery and promote the recovery of their affected limb function postoperation, this study used WeChat platform-based continuity of care to analyze and explore the quality of life and psychosocial competence in breast cancer patients after surgery.

Materials and methods

Baseline data

According to the randomized double-blind method, 86 patients with breast cancer admitted in The First Affiliated Hospital of Wenzhou Medical University from December 2017 to December 2019 were included in this study. They were divided into the control group (n=43) and the study group (n=43). This study was approved by the medical Ethics Committee of The First Affiliated Hospital of Wenzhou Medical University. The baseline data of the two groups were compared, and the difference was not significant.

Inclusion criteria

(1) Inclusion criteria: 1) patients were over 18 years old; 2) patients with preliminary diagnosed breast cancer that meets the diagnostic criteria in the *CACA Guideline for Breast Cancer (2013 Edition)* [8]; 3) patients received modified radical mastectomy for breast cancer. The tumors were all single with the maximum diameter less than 3.0 cm and the distance to areola mammae greater than 2.0 cm. The results of postoperative pathology were confirmed to be breast cancer; 4) postoperative pathological staging was I-III; 5) the patients and their families signed the informed consent form. (2) Exclusion criteria: 1) patients complicated with phlebitis, thrombotic diseases, and other vascular diseases; 2) patients complicated with functional failure of other important organs such as heart, liver, kidney and so on. 3) Patients with other malignant tumors; 4) patients with lymph node or tumor metastasis; 5) patients in their course of lactation or pregnancy; 6) patients with consciousness disorder, mental illness, and so on that may affect the smooth implementation of the study.

Methods

The control group: Patients in the control group received the usual care. And they were followed up after operation, informed with the postoperative precautions, given timely psychological counseling to their bad mood, explained of successful cases with good postoperative prognosis and guided to perform functional exercise. Ward rounds was actively conducted to urge patients to take medicines and diet correctly, and to guide patients with functional exercise methods. Oral education was conducted again before discharge to inform patients of precautions needing attention in life. After discharge, the patients were given health education again when they were revisited in the outpatient clin-

Table 1. Comparison of baseline data ($\bar{x} \pm sd$, n)

Groups	Control group (n=43)	Study group (n=43)	t/χ^2	P
Age (year)	50.6±5.8	51.6±5.9	t=0.737	0.463
Course of disease (year)	0.6±0.3	0.5±0.1	t=1.313	0.193
TNM stage				
Stage I	14	13	χ^2=0.381	0.537
Stage II	20	19	χ^2=0.047	0.829
Stage III	9	13	χ^2=0.977	0.323
Pathological location				
Unilateral	29	32	χ^2=0.509	0.476
Bilateral	14	11	χ^2=0.508	0.476
Pathological type			χ^2=0.138	0.711
Infiltrating ductal carcinoma	40	38		
Others	3	5		
Complicated with basic diseases			χ^2=0.307	0.580
Diabetes	14	15		
High blood pressure	20	21		
Others	9	7		

ic. The daily life of patients depended on their self-management.

The study group: First, a WeChat group of nursing core team was built, and the head nurse served as the group leader and 5 nurses served as the nursing staff. Then, a WeChat group was established for each patient's family, and an education was conducted in the WeChat group at 10:00 every day after the patient was discharged from the hospital. The patient's daily performance and the interaction were carried out in the WeChat group at the same time, so as to reduce the patient's psychological pressure, and to deal with the patient's problems in a timely manner. A collective communication and discussion were conducted once a week by the nursing team to comprehensively evaluate the nursing implementation, nursing process and liaison work to find solutions to the problems arising in the WeChat nursing task, and guidance was given by the group leader. A WeChat public account was established, and 3 links about breast cancer knowledge were pushed every week. The WeChat nursing content mainly included: (1) Psychological care: patients were communicated by psychological counselors through WeChat, the mental state was evaluated according to the patient's personality and emotional response, and the personalized psychological counseling was also conducted. (2) Collective lectures: group lectures for patients and their families were held once a week. The treatments and nursing-related knowledge were taught in the WeChat group by the chief physician and head nurse, and the lecture content was sent to the WeChat group by video to let each patient study seriously and solve the problems encountered in the learning process in time. (3) Functional exercise: patients were guided regularly to carry out the functional training in the WeChat group, and were also guided to master functional training methods correctly through short videos, pictures, voices and other forms in the WeChat group. The patient's incorrect behaviors were corrected in time during the revisit. Combined with psychological counseling at the same time, the supervision and guidance were carried out through WeChat. The duration of nursing care was 3 months.

Outcome measures

Main outcomes: (1) Function recovery of the affected limb 3 months after nursing: evaluation by measuring square plate and tape measure, the patient's shoulder joint can extend back 40-50°, flexion 70-90°, abduction 160-180°, internal rotation 70-90°, external rotation 40-50°, flexion and lifting 160-180°, elbow flexion 135-150°, pronation and supination 80-90°, and overextension 10° is considered to be excellent; patients can extend the shoulder joint back 30-39°, forward flexion 50-69°, abduction 140-160°, internal rotation 50-69°,

Table 2. Comparison of functional recovery of affected limbs (n, %)

Groups	Excellent	Good	General	Total effective rate
Control group (n=43)	16 (37.21)	14 (32.56)	13 (30.23)	30 (69.77)
Study group (n=43)	24 (55.82)	15 (34.88)	4 (9.30)	39 (90.69)
Z/χ^2		Z=2.258		χ^2=5.939
P		0.024		0.015

Table 3. Comparison of PAIS-SR scores ($\bar{x}$ ± sd, score)

Groups	Control group (n=43)	Study group (n=43)	t	P
Working ability				
Before nursing	12.86±1.32	13.41±1.56	1.765	0.081
After nursing	8.26±0.52***	6.51±0.31***	18.956	0.000
Communication status				
Before nursing	11.75±1.07	11.56±1.03	0.839	0.404
After nursing	7.68±0.46***	5.74±0.24***	24.519	0.000
Psychosocial health care				
Before nursing	16.74±1.95	16.49±1.77	0.623	0.535
After nursing	11.09±0.97***	8.53±0.55***	15.055	0.000
Family relationship				
Before nursing	13.95±1.62	14.18±1.69	0.644	0.521
After nursing	10.45±0.81***	7.12±0.42***	23.932	0.000
Psychological status				
Before nursing	16.59±1.79	17.06±1.88	1.187	0.239
After nursing	14.52±1.46***	11.14±1.01***	12.485	0.000
Entertainment status				
Before nursing	13.79±1.59	13.53±1.57	0.763	0.448
After nursing	9.17±0.62***	6.59±0.38***	23.265	0.000
Sexual ability				
Before nursing	15.45±1.53	15.34±1.47	0.340	0.735
After nursing	14.21±1.33	14.54±1.39	1.125	0.264

Note: Compared with this group before nursing, ***P < 0.001.

external rotation 30-39°, forward flexion and lift 130-159°, elbow joint flexion 110-134°, pronation and supination 60-79°, and excessive extension 5-9° is considered good; if the above-mentioned shoulder and elbow joint activities are less than excellent and good, the range of motion is normal. Total effective rate = (excellent + good)/n × 100%. (2) Psychosocial adjustment to illness scale before and 3 months after nursing: the self-report disease psychosocial adaptation scale (PAIS-SR) was used for evaluation [9]. The scale contains 7 dimensions and 46 items using a 0-3 scoring method. The total score is 132 points, which are working ability (0-18), communication status (0-15), psychosocial health care (0-21), family relationship (0-21), psychological status (0-21), entertainment (0-18) and sexual ability (0-18). The higher the score, the lower the level of psychosocial adaptation. (3) Quality of life before and 3 months after nursing: short form 36-item health survey questionnaire (SF-36) was used for evaluation [10]. The questionnaire contains 8 dimensions and 36 items, which are physiological function, physical pain, role physical, emotional function, social function, mental health, energy and overall health. The score is 0-100, and the higher the score, the higher the quality of life.

Secondary outcomes: (1) Compliance with functional exercise 3 months after nursing: the degree of functional exercise compliance of patients was divided into three levels: complete compliance, partial compliance and non-compliance. Complete compliance refers to the

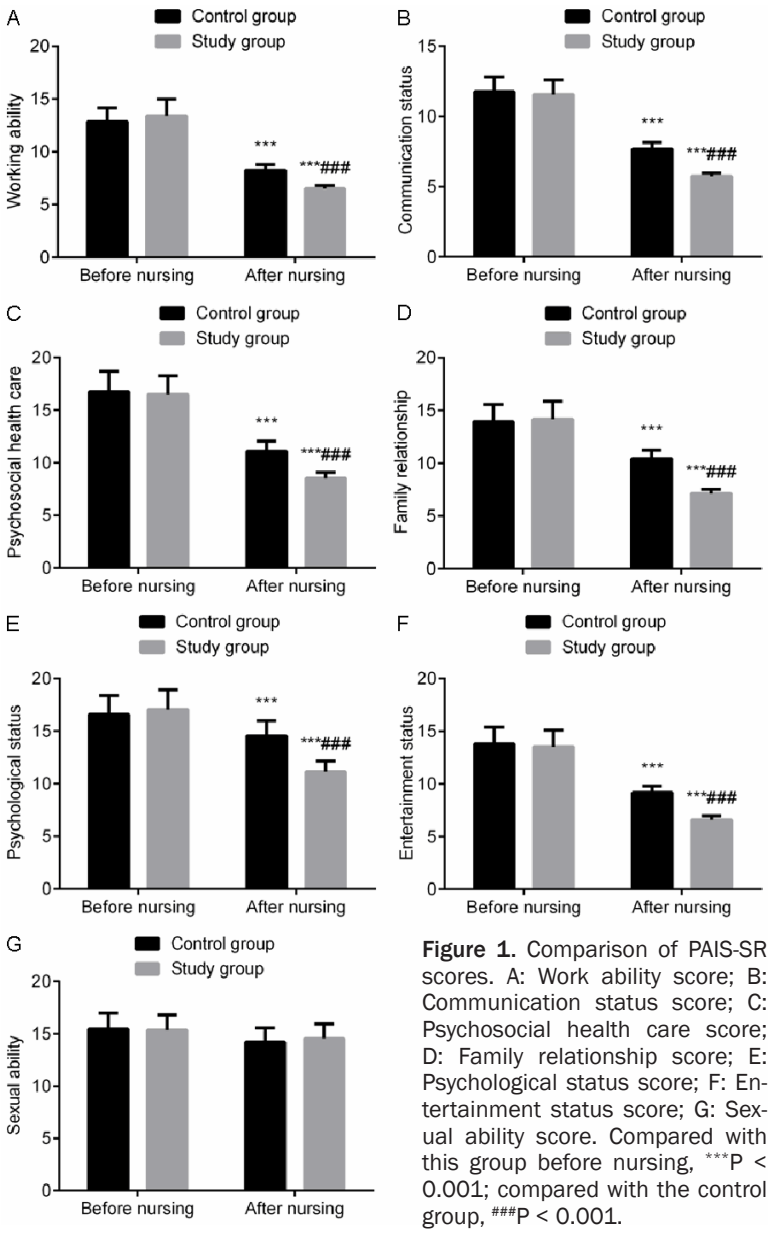

Figure 1. Comparison of PAIS-SR scores. A: Work ability score; B: Communication status score; C: Psychosocial health care score; D: Family relationship score; E: Psychological status score; F: Entertainment status score; G: Sexual ability score. Compared with this group before nursing, $^{***}P < 0.001$; compared with the control group, $^{###}P < 0.001$.

ability to autonomously complete the exercise steps customized by the nursing staff; partial compliance refers to the inability to complete the exercise steps autonomously and requires the supervision and reminder of the nursing staff or family members; non-compliance means that functional exercise is rarely performed, and the nursing staff prompts invalid or have no functional exercise at all. Total compliance rate = (complete compliance + partial compliance)/n × 100%. (2) Nursing satisfaction 3 months after nursing: a questionnaire survey was used for evaluation, and the Cronbach's α coefficient was 0.824. The content of the questionnaire involves nursing attitude, nursing skills, communication skills, exercise skills and health education. The 0-4 grade scoring method is adopted, and the scores are very satisfactory, satisfactory, general, dissatisfied, very dissatisfied, with a full score of 100. Ninety and above as very satisfactory, 80-89 as satisfactory, 70-79 as general, 60-69 as dissatisfied, and below 60 as very dissatisfied. Satisfaction = (very satisfied + satisfied)/n × 100%.

Statistical methods

SPSS 23.0 software was used for analysis, and the measurement data were expressed by mean ± standard deviation ($\bar{x} \pm sd$). The independent sample t-test was used for the comparison between the two groups, and the paired t-test was used for the comparison within the group. The counting data was expressed as percentage and analyzed by χ^2 test, and rank data was analyzed by rank sum test. $P < 0.05$ indicates that the difference is statistically significant.

Results

Baseline data

There was no statistically significant difference between the two groups in general data such as age, course of disease, TNM staging, and pathological location ($P > 0.05$). It can be seen that the general data of the two groups are comparable. See **Table 1**.

Functional recovery of the affected limb

The effective rate of functional recovery of the affected limb in the study group was higher than that in the control group ($P < 0.05$). It can be seen that WeChat platform based continuity

Table 4. Comparison of SF-36 scores ($\bar{x} \pm sd$, score)

Groups	Control group (n=43)	Study group (n=43)	t/χ^2	P
Physical function				
Before nursing	51.95±5.12	52.17±5.09	0.200	0.842
After nursing	71.45±7.46***	80.45±8.21***	5.320	0.000
Physical pain				
Before nursing	71.75±7.47	71.06±7.38	0.431	0.668
After nursing	76.68±8.66***	86.14±8.84***	5.013	0.000
Physiological function				
Before nursing	65.79±6.56	64.53±6.47	0.897	0.372
After nursing	74.17±7.67***	81.87±8.28***	4.474	0.000
Emotional function				
Before nursing	62.45±6.63	62.34±6.76	0.076	0.940
After nursing	74.21±7.33***	81.54±8.21***	4.367	0.000
Social function				
Before nursing	54.34±5.53	53.77±5.51	0.479	0.633
After nursing	72.36±7.51***	81.65±8.30***	5.442	0.000
Mental health				
Before nursing	70.59±7.18	69.06±7.08	0.995	0.323
After nursing	80.84±8.19***	86.37±8.45***	3.082	0.003
Energy				
Before nursing	53.48±5.56	52.32±5.71	0.854	0.343
After nursing	76.41±7.24***	83.53±8.76***	4.108	0.000
Overall health				
Before nursing	52.59±5.47	51.44±5.36	0.985	0.328
After nursing	73.49±7.14***	82.33±8.19***	5.335	0.000

Note: Compared with this group before nursing, ***P < 0.001.

of care is more conducive to improving the functional recovery of the affected limb of patients of mammary cancer after radical mastectomy. See **Table 2**.

PAIS-SR score

Before nursing, there was no significant difference in PAIS-SR score between the two groups (P > 0.05); after nursing, the scores of working ability, communication status, psychosocial health care, family relationship, psychological status and entertainment status in the two groups decreased (P < 0.001), and the improvement of which in the study group was better (P < 0.001). There was no significant difference in the score of sexual ability compared with that before nursing and between the two groups (P > 0.05). See **Table 3**. It can be seen that WeChat platform based continuity of care is more conducive to improving the psychosocial competence of patients of mammary cancer after radical mastectomy. See **Table 3** and **Figure 1**.

SF-36 score

Before nursing, there was no significant difference in SF-36 score between the two groups (P > 0.05). After nursing, the scores of physiological function, physical pain, physiological limitation, emotional function, social function, mental health, energy and overall health increased in both groups (P < 0.001), and the study group had a better improvement (P < 0.001). See **Table 4**. It can be seen that WeChat platform based continuity of care is more conducive to improving the quality of life of patients with breast cancer after radical mastectomy. See **Table 4** and **Figure 2**.

Functional exercise compliance

The functional exercise compliance of the study group was higher than that of the control group (P < 0.05). It can be seen that WeChat platform based continuity of care is more conducive to

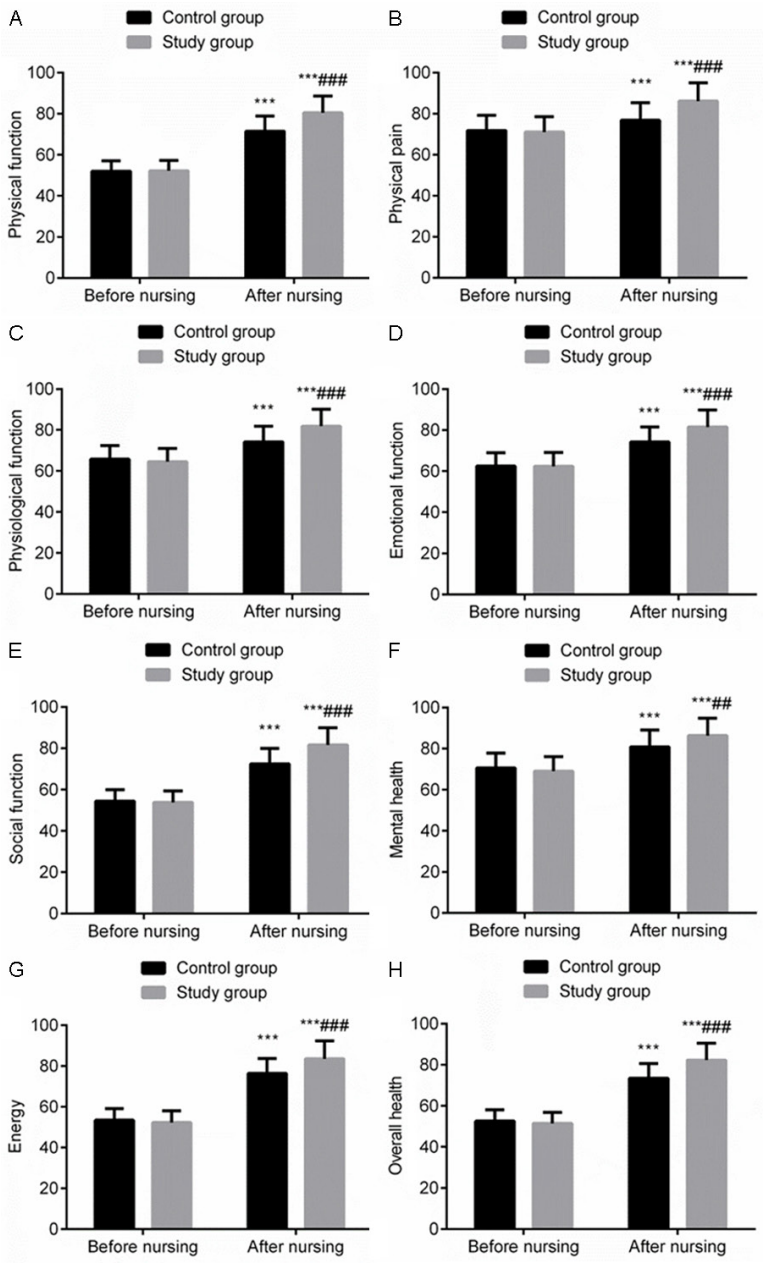

Figure 2. Comparison of SF-36 scores. A: Physical function; B: Physical pain; C: Physiological function; D: Emotional function; E: Social function; F: Mental health; G: Energy; H: Overall health. Compared with this group before nursing, ***P < 0.001; compared with the control group, ##P < 0.01, ###P < 0.001.

improving the functional exercise compliance of patients of mammary cancer after radical mastectomy. See **Table 5**.

Nursing satisfaction

The nursing satisfaction of the study group was higher than that of the control group (P < 0.01). It can be seen that WeChat platform based continuity of care is more conducive to improving the nursing satisfaction of patients of mammary cancer after radical mastectomy. See **Table 6**.

Discussion

As we all know, chemotherapy, radiotherapy and surgery are still the main treatment measures for most cancers and they can cause great pain to patients in the treatment process, with only temporarily disease control of the most patients. Only a small number of patients with early breast cancer can be treated successfully [11]. And in the process of treatment, due to the lack of awareness of the disease, patients have a low level of subjective hope and negative response, which makes them suffer not only pathologically, but also psychologically [12, 13]. The conventional nursing model pays more attention to the patients' pathological, physiological and psychological reactions during hospitalization, while usually neglects the post-discharge care. Therefore it leads to the inability to continue post-discharge care and affects the prognosis.

The results showed that after nursing, the score of psychosocial competence of patients in the study group was lower than that of the control group, and the function exercise compliance of the patients in the study group was higher than that of patients in the control group, suggesting that WeChat platform based continuity of care has good benefits for the maintenance of physical and mental health after breast cancer surgery. With the gradual optimization of nursing services, continuity of care has gradually become an important nursing model in clinic, which can provide patients with healthier, reasonable and

Table 5. Comparison of functional exercise compliance (n, %)

Groups	Complete compliance	Partial compliance	Non-compliance	Total compliance rate
Control group (n=43)	16 (37.21)	12 (27.91)	15 (34.88)	28 (65.12)
Study group (n=43)	22 (56.41)	14 (35.90)	3 (7.69)	36 (92.31)
χ^2	1.697			5.571
P	0.193			0.018

Table 6. Comparison of nursing satisfaction (n, %)

Groups	Very Satisfactory	Satisfactory	General	Dissatisfied	Very dissatisfied	Total satisfaction
Control group (n=43)	12 (27.91)	18 (41.86)	11 (25.81)	1 (2.33)	1 (2.33)	30 (69.77)
Study group (n=43)	24 (55.81)	16 (37.21)	2 (4.65)	1 (2.33)	0 (0.00)	40 (93.02)
χ^2	6.880					7.679
P	0.009					0.006

humanized nursing services and improve the quality of life [14]. Through the use of convenient communication advantages, this model establishes a WeChat group to provide continuity of care for patients after discharge. By establishing a WeChat public account for patients to subscribe, it can regularly push the knowledge about breast cancer. Otherwise the nursing staff can conduct knowledge promotion in WeChat groups, patients can learn more about the disease and improve their awareness of health knowledge, thus promoting a better and healthier life [15]. Communicating with patients through WeChat, their mental state will be evaluated, and psychological interventions will be conducted in need. With the using of psychoanalytic therapy, it can help patients to reduce their pessimistic and helpless psychology, reduce mental stress, and establish patients' inner safety zone [16]. Through the in time guidance, the patients were communicated with their inner distress and explain by the disease knowledge, it can establish their correct disease cognition and self-awareness, enhance treatment confidence and postoperative exercise enthusiasm and compliance [17]. Through creating a good and warm family atmosphere, it plays an important role in increasing the patients' hope level. Providing family members with health education and psychological counseling can alleviate their bad mood and prevent their mental state from affecting patients [18]. Through sending short videos, pictures, voices and other forms to WeChat groups, it can encourage patients to correctly master functional training methods, which is of great significance for improving patients' affected limbs. Liu et al. [19] have reported that WeChat follow-up nursing care and functional exercises were given according to the specific conditions of the patients after discharge, and it increased the function score of the affected limb from 50.8±1.8 pre-nursing to 80.3±2.1 after nursing, suggesting that WeChat follow-up care can help improve the function of the affected limb after breast cancer surgery [20, 21]. The results show that the quality of life in the study group is better than that in the control group, which further indicates that WeChat platform based continuity of care is of great significance to the improvement of limb function and quality of life after breast cancer surgery. In addition, this study investigated the patients' nursing satisfaction and found that the nursing satisfaction of the study group was higher than that of the control group, indicating that the nursing model extended care to all aspects of life through WeChat, and received feedback from patients and their families in a timely manner. Compared with the traditional outpatient nursing, it can better realize the sharing of information, facilitate the interaction between patients and health care staff, and know the progress of patients' condition in the first time, thereby promoting a healthy life of patients and more recognition of nursing work.

In summary, WeChat platform based continuity of care intervention can significantly improve the function of the patient's affected limb after breast cancer surgery, improve the psychosocial competence of the disease, improve

functional exercises compliance and the quality of life, and encourage patients to recognize more nursing services. However, the sample size of this study is small, and the results may be biased. In the future, the number of samples can be expanded for further discussion.

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Disclosure of conflict of interest

None.

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