Submitted: 04 July, 2024 Accepted: 03 September, 2024 Published: 15 December, 2024 DOI:10.22514/ejgo.2024.126

ORIGINAL RESEARCH

European Journal of Gynaecological Oncology

Research on the application of 4C continued nursing model in postoperative care of breast cancer patients

Xiaojie Wu[1], Li Lin[1], Yuelan Weng[2], Chunxi He[3], Li Huai[4], Ying He[1,*]

[1]Ambulatory Surgery Center, The Second Affiliated Hospital of Wenzhou Medical University, 325000 Wenzhou, Zhejiang, China
[2]Department of Cardiothoracic Surgery, The Second Affiliated Hospital of Wenzhou Medical University, 325000 Wenzhou, Zhejiang, China
[3]Department of Breast Surgery, The Second Affiliated Hospital of Wenzhou Medical University, 325000 Wenzhou, Zhejiang, China
[4]Gynecology Minimally Invasive, The Second Affiliated Hospital of Wenzhou Medical University, 325000 Wenzhou, Zhejiang, China

***Correspondence**
yhe3707@163.com
(Ying He)

Abstract

This study aimed to evaluate the effect of the 4C continued care model (refers to the nursing services of comprehensiveness, coordination, continuity and collaboration) in the continued care of breast cancer patients and its impact on postoperative complications. 180 breast cancer patients were divided into the conventional nursing group, and the 4C continued nursing group. The patient's mental state, self-efficacy, self-care ability, quality of life, nursing satisfaction, and the occurrence of postoperative complications under the two nursing modes before care and two months after discharge were compared. The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores of patients in the 4C continued care group were significantly lower than those of the conventional care group two months after discharge. The self-efficacy and self-care ability scores were significantly higher than those of the conventional care group. The scores in the five dimensions of quality of life were significantly higher than those of the conventional care group, and the differences were all statistically significant ($p < 0.05$). Satisfaction with care was also significantly higher in the 4C continued nursing group compared to the usual care group (93.33% *vs.* 81.11%, $p < 0.05$). The overall adverse event rate of subcutaneous effusion and lymphedema was significantly lower in the 4C continued care group (22.22% *vs.* 48.89%, $p < 0.001$). The clinical effect of the 4C nursing model of postoperative care of breast cancer patients was significant. The 4C nursing model can effectively improve patients' mental state, self-efficacy, self-care ability, quality of life and nursing care satisfaction, and reduce the occurrence of postoperative adverse reactions.

Keywords

Breast cancer; 4C continued care model; Ambulatory care; Nursing effect; Postoperative complications

1. Introduction

According to the 2022 National Cancer Center Report, breast cancer is the most common cancer in China's female population, with both incidence and fatality rates continuing to rise [1]. Previous studies have shown that people aged 45–55 years are the highest-incidence group of breast cancer. However, in recent years, with the change in people's lifestyle and the increase in life pressure, the incidence of breast cancer in China has been on the rise, and the proportion of young women with the disease has been increasing year by year [2, 3]. With the evolution of clinical treatment and nursing research, breast cancer treatment and care in China have made significant progress, but the five-year survival rate of breast cancer in China is still lower than that of developed countries, which may be attributed to the diagnosis rate of early-stage cancer and the irregularities in late-stage treatment and nursing care [4, 5]. Surgery (day surgery) is the preferred option for the treatment of breast cancer due to its lower cost, high efficiency and reduced risk of infection [6]. According to statistics, the number of day surgeries in the United States is more than twice that of inpatient surgeries [7]. As technology and medical techniques continue to advance, it is expected that the ambulatory surgery model will continue to be promoted and developed in the future. The development of ambulatory surgery presents numerous obstacles to nursing personnel. Studies have indicated that ambulatory surgery patients have a higher perception of risk. Follow-up after discharge can prevent recurrence of disease and pain [8, 9]. Many medical institutions in our country have carried out continued care after discharge. However, the form of its services is mostly confined to telephone follow-up, limited content and lack of standardization. The Omaha Home Visit Nurses Association recommends the 4C continuous nursing concept (comprehensive, coordination, cooperativeness and continuous) as a multidisciplinary comprehensive nursing approach [10]. The discharge preparation service model or 4C, is an extension of the nursing concept that emphasizes collaboration and coordination. It

accomplishes this by assembling a team of nurses, led by a head nurse, who encourages specialty nurses to contribute to the patient's discharge procedures. This not only reflects the professionalism and core values of nurses, but also improves the precision and effectiveness of nursing interventions by focusing on comprehensive care. This approach addresses the shortcomings of the traditional nursing model and has demonstrated specific nursing effects in chronic obstructive pulmonary disease and stroke disease [11, 12]. Although there are studies on continued care in day surgery wards in Wenzhou, many still lack practical practice. Therefore, this study explores the continued care program that may be suitable for the day surgery ward in Wenzhou by comparing the nursing outcomes of the conventional nursing model and the 4C continued care model, aiming to provide supporting data for the standardization of the nursing service process.

2. Research information and methods

2.1 General information

Postoperative breast cancer patients of reproductive age admitted to our hospital from July 2022 to December 2023 were selected as the study subjects. They were sampled according to the purposive sampling method. Subjects from different age groups were selected to ensure a diverse representation of cases.

Inclusion criteria: ① Diagnosed with breast cancer by histopathology [13], and all were undergoing surgery for the first-time; ② Aged 18–50 years old; ③ Meeting the criteria for day surgery; ④ All gave informed consent and voluntarily signed the consent form.

Exclusion criteria: ① Patients with serious concomitant diseases, such as severe liver and kidney insufficiency, severe arrhythmia, heart failure, myocardial infarction, malignant tumor and diabetes mellitus; ② Patients with severe mental disorders; ③ Patients with severe heart, lung and other vital organ failure; ④ Those who refused to participate in this study. The 180 study subjects who met the inclusion criteria were divided into two groups based on their treatment methods: conventional care and 4C continuous care, with 90 patients in each group.

The general conditions of the 180 patients are shown in Table 1. From Table 1, it can be seen that the difference between the two groups in terms of average age, marital status, surgical method and Tumour Node Metastasis (TNM) staging data were not statistically significant. The study complied with the relevant standards of the Hospital Ethics Committee and was conducted after obtaining permission.

2.2 Research methods

All patients were given routine care and health education (including the causes of the disease, symptoms, treatment options, psychological guidance, discharge guidance and education, *etc.*, provided by the department staff during hospitalization) before discharge. The 4C continued care group was given the 4C continued care model, which included the establishment of a multidisciplinary 4C continued care team, the selection and use of the Internet platform, and post-discharge interventions and follow-ups. (1) The multidisciplinary 4C continued nursing team was consisted of the attending physician, a nursing supervisor, head nurse, nurse specialist for the relevant disease, nursing graduate student, psychological counselor and dietitian from the patient's department. The attending physician was responsible for all the diagnostic and therapeutic activities of the patient from hospital admission to discharge, while the nursing supervisor oversaw the overall nursing care after the admission.

The nursing supervisor was also responsible for encouraging the patient to participate in decision-making, providing preoperative and postoperative information, and assessing the risk of postoperative nausea and vomiting and its prevention. Graduate nursing students were responsible for creating patient information files during the study period and establishing a WeChat communication group to share knowledge about the disease. Psychological counselors used professional psychological assessment scales for the initial assessment of patients, facilitated stress-relief activities and conducted ongoing assessments, and follow-ups. The dietitian assessed the patient's nutritional status using the inpatient nutritional risk screening form, provided nutritional support to those at risk, arranged nutritional packages, and provided dietary guidance. The nurse manager oversaw the entire process and coordinated referrals with the attending physician for patients who had special conditions outside the hospital that they could not manage independently. Each team member focused on their respective working together to improve the patient's health. (2) Selection and formation of the Internet platform: A WeChat communication group was created as a platform for patients and their families (including team members) to communicate with each other. The platform was used to share the knowledge related to the disease, facilitate interactive Question And Answer (Q&A), receive patients' feedback, and provide a forum for learning and communication. Regularly video follow-up visits were also arranged. Nursing graduate students conducted video follow-up visits every two weeks (usually between 9:00–10:00 AM or 3:30–5:00, with each visit lasting 20 minutes) and pushed microblogging content (article and video) to the WeChat group after patients were discharged from the hospital. The articles were categorized into four modules: (A) Diet; (B) Wound care; (C) Disease-related knowledge; (D) Others topics.

During hospitalization, nursing interventions were centered around the 4C continued care model's principles of "comprehensiveness" and "cooperation". After discharge, the interventions were focused on "coordination" and "continuity". (i) 4C team members provided relevant content on a frequent basis, ensuring timely learning for patients. Family members were urged to support and supervise the patient's learning process. (ii) Patients were contacted on a regular basis using the WeChat video follow-up schedule. Intervention goals and techniques were developed based on survey results, allowing the patient to provide feedback and suggestions. (iii) Interactive Q&A within the WeChat group was conducted regularly to address the common problems raised by multiple patients during each video follow-up. The response to questions were summarized and compiled into a short article with illustrations and forwarded to the group. Questions not directly related to this

TABLE 1. Comparison of general data of 180 patients.

Group	Number of cases	Age	Married/ divorced	Surgical procedure			TNM staging	
				Modified radical mastectomy	Breast-conserving mastectomy	Simple mastectomy	Stage II	Stage III
Conventional care group	90	39.35 ± 5.34	59/31	54	17	19	56	34
4C Continued care group	90	39.06 ± 6.44	64/26	59	15	16	44	46
t/χ^2 value		0.327	0.642		0.603		3.240	
p-value		0.744	0.423		0.740		0.072	

TNM: Tumour Node Metastasis; 4C: comprehensive, coordination, cooperativeness and continuous.

study but relevant to the recovery period were answered by the researcher after consulting clinically experienced doctors or nurses.

2.3 Observation indicators

All patients were assessed for relevant conditions before care and two months after discharge.

2.3.1 Assessment of mental state

The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were used to measure the anxiety and depression status of the study subjects, respectively [14]. The SAS and SDS scales each contain 20 items, and each item is rated on a 4-point scale from 1 to 4, based on the frequency of symptoms, with 1 to 4 representing symptoms that do not occur or rarely occur, sometimes occur (a small portion of the time), most of the time or are always present, with no disappearance of the symptom, respectively. Both scales were calculated using a percentage system, and the total scores of the 20 items were finally counted, with symptoms severity being proportional to the scores. Anxiety was judged with a score of 50 as the threshold: scores below the 50 indicate no anxiety and belong to the normal group; scores of 50–60 were mild anxiety, 61–70 indicate moderate anxiety, and scores above 70 indicate severe anxiety. For depression, 53 points were used as the critical value: scores between 53–62 for mild depression, 63–72 moderate depression, and score higher than 72 meant severe depression.

2.3.2 General self-efficacy scale

The General Self-Efficacy Scale [15], which was translated and revised by Wang Caikang is a commonly used assessment tool for measuring general self-efficacy in China at present. The scale is relatively simple and consists of 10 items with Likert scoring: not at all correct, somewhat correct, mostly correct and completely correct, corresponding to a score of 1–4, and a score range of 10–40. The score is proportional to the level of self-efficacy, *i.e.*, the higher the score, the better the self-efficacy. It was verified that the Cronbach's alpha of the Chinese version of the General Self-Efficacy Scale was 0.842, demonstrating strong reliability.

2.3.3 Self-care ability measurement scale

Orem's self-care theory was introduced in China by Taiwanese scholars [16]. It involves four dimensions: self-care concept (items 1–8), self-care responsibility (items 9–14), self-care skills (items 15–26), and health literacy (items 27–43). The Cronbach's coefficient of the scale is 0.87, indicating strong reliability. Higher scores suggest that patients are more capable of self-care.

2.3.4 Quality of life assessment

The functional assessment of cancer therapy (FACT) scale [17] was used to measure patients' quality of life. It included 27 items measuring quality of life in terms of physical (7 items), social/family (a total of 7 items), emotional (6 items), and functional (7 items) domains. An additional 9 items measure breast cancer-specific concerns. All 36 items were scored on a 5-point scale from 0 to 4, where 0 indicates "not at all" and 4 indicates "very much". The total score was calculated, with higher scores indicating a better quality of life for breast cancer patients.

2.3.5 Nursing care satisfaction

Breast cancer nursing care satisfaction was surveyed using a questionnaire specifically designed for this study. Satisfaction (%) = (number of satisfied cases + number of basically satisfied cases)/total number of cases × 100% [18].

2.3.6 Occurrence of postoperative complications

Six months following the procedure, the patients' complications, such as subcutaneous effusion and lymphedema, were monitored and investigated. At the same time, the degree of edema was also assessed, including no edema with the elevated upper limb (stage I), no edema with elevated upper limb and moderate tissue fibrosis (stage II), and fibroadipose deposition with skin changes in the upper limb (stage III) [19].

2.4 Statistical methods

All data were statistically organized in tables, and SPSS 23.0 software (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Metrics that conformed to a normal distribution,

such as the average age of patients and the scores of the various questionnaires, were expressed as the mean ± standard deviation. Counts, such as marital status, surgical modalities, TNM stage, and satisfaction with nursing care, were expressed as the number of cases (percentage). These was tested using the independent samples *t*-test and chi-square test, respectively. A *p*-value of < 0.05 indicated that the difference was statistically significant.

3. Results

3.1 Comparison of mental status between the two groups

Two months after discharge, patients in both groups showed varying degrees of improvement. The SAS and SDS scores of the 4C continued care group decreased more significantly than those of the conventional care group, with a statistically significant difference ($p < 0.05$). The results are reported in Table 2.

3.2 Comparison of self-efficacy

Before care, the self-efficacy score of patients in the conventional care group was (82.90 ± 9.22), which increased to (97.04 ± 9.35) two months after discharge. The self-efficacy score of the 4C continued care group was (81.65 ± 8.37) before care and increased to (103.75 ± 11.24) two months after discharge. The comparison of scores between the two groups before care was not statistically significant ($t = 0.952$, $p = 0.342$), while the self-efficacy scores of the 4C continued care group were significantly higher than those of the conventional care group two months after discharge, with a statistically significant difference ($t = 4.355$, $p < 0.001$).

3.3 Comparison of self-care competence scores

The results of the self-care ability scores of the two groups of patients two months after discharge are shown in Table 3. The total self-care ability score of the 4C continued care group was (132.27 ± 12.19), which was significantly higher than that of the conventional care group (116.77 ± 10.00) with a statistically significant difference ($t = 9.327$, $p < 0.001$). Patients in the 4C continued care group showed statistically significant difference in self-care skills, self-care responsibility, self-care concepts and health literacy. The mean scores of these indicators were significantly higher than those of the conventional care group, and the differences were all statistically significant ($p < 0.05$).

3.4 Comparison of quality of life

There was no significant difference in the mean scores of the five components within the quality-of-life scale between the two patient groups before care ($t = 0.078, 0.726, 0.322, 1.166, 1.486$, $p = 0.938, 0.469, 0.748, 0.245, 0.139$). However, there was a significant difference in the mean scores of physical status, social/family status, emotional status, functional status, and additional concerns between the 4C continued care group and the conventional care group two months after discharge. These values were significantly higher in the 4C continued care group compared to the conventional care group and the differences were all statistically significant ($p < 0.05$). The results are detailed in Table 4.

3.5 Comparison of nursing satisfaction

The nursing satisfaction in the 4C continued care group was 93.33% which was significantly higher than the 81.11% in the conventional care group. The difference was statistically significant (χ^2 value = 12.264, $p < 0.05$), as shown in Table 5.

3.6 Comparison of complications

There were 13 patients with subcutaneous effusion and 31 cases of lymphedema in the conventional care group, with 15 cases of Stage I, 10 cases of Stage II, and 6 cases of Stage III resulting in a total adverse event rate of 48.89%. There were 5 patients with subcutaneous effusion and 15 cases of lymphedema in the 4C continued care group, of which there were 10 cases of Stage I, 4 cases of Stage II and 2 cases of Stage III patients, with a total adverse event rate of 22.22%. This rate was significantly lower than that of the conventional care group (χ^2 value = 13.966, $p < 0.001$).

4. Discussion

In addition to the physical and psychological pain caused by breast cancer, adverse reaction to chemotherapeutic agents during treatment, changes in somatic morphology, and the occurrence of postoperative complications significantly affect the quality of life of patients [20]. Foreign experts originally recommended continued care, which was implemented in China in 2001. Research demonstrates that continued care in the clinic, including telephone follow-up and home visits, can enhance the patient satisfaction with nursing care [21]. In recent years, research has demonstrated that the drawback of telephone follow-up is the high percentage of missed visits, which limits the effectiveness of continued treatment [22]. The 4C continued care model provides continuous out-of-hospital extended care guidance and home care follow-up to patients after discharge, highlighting the coordination, comprehensiveness, and benefits of the application of cooperation and continuity in nursing care [23]. In China, this model has achieved notable results in the clinical research on diabetic retinopathy, early cervical cancer, and postpartum women [24–26].

In this study, the postoperative conventional nursing model of breast cancer was used as the control, and the 4C continued nursing model was used as the intervention. The two groups were compared in terms of anxiety and depression status, self-efficacy, self-care ability, post-discharge quality of life, nursing care satisfaction and the occurrence of complications to investigate the clinical effectiveness and safety of their nursing care models. The results of this study found that the SDS and SAS scores of patients in the 4C continuity care group were significantly lower than those in the post-discharge conventional care group, indicating that the 4C continued care model is beneficial to alleviating patients' anxiety and depression after discharge. The reason may lie in the fact that the 4C

TABLE 2. Comparison of mental status ($\bar{x} \pm s$).

Group	Number of cases		SAS	SDS
Routine care group	90	Before care	62.53 ± 4.94	61.60 ± 5.20
		2 months after discharge	51.13 ± 4.92	51.25 ± 4.37
4C Continued care group	90	Before care	63.06 ± 5.73	61.77 ± 4.82
		2 months after discharge	44.02 ± 3.66	43.25 ± 4.29
t			10.989	12.386
p			<0.001	<0.001

SAS: self-rating anxiety scale; SDS: self-rating depression scale; 4C: comprehensive, coordination, cooperativeness and continuous.

TABLE 3. Comparison of self-care competency scores.

Group	Number of cases	Self-care skills	Self-care accountability	Self-care concepts	Level of health literacy
Routine care group	90	26.86 ± 3.48	17.37 ± 2.78	20.99 ± 3.70	48.83 ± 6.04
4C Continued care group	90	28.49 ± 3.46	22.92 ± 3.16	22.09 ± 3.17	51.86 ± 4.82
t		3.147	12.521	2.147	3.721
p		0.002	<0.001	0.033	<0.001

4C: comprehensive, coordination, cooperativeness and continuous.

TABLE 4. Comparison of quality of life.

Group	Number of cases	Time	Physiological condition	Social/family Status	Emotional Status	Functional Status	Additional Concerns
Routine care	90	Before care	12.85 ± 1.84	15.21 ± 1.54	13.04 ± 1.58	11.45 ± 2.33	16.78 ± 2.11
		2 months after discharge	16.09 ± 2.59	17.62 ± 1.39	15.91 ± 1.63	15.41 ± 2.00	20.70 ± 2.42
Group	90	Before care	12.87 ± 1.58	15.38 ± 1.54	13.11 ± 1.34	11.80 ± 1.65	16.33 ± 1.95
		2 months after discharge	18.33 ± 1.42	20.15 ± 1.52	17.62 ± 1.67	16.50 ± 1.80	23.24 ± 2.38
t value			7.199	11.641	6.942	3.847	7.120
p-value			<0.001	<0.001	<0.001	0.003	<0.001

TABLE 5. Satisfaction survey (n (%)).

Group	Number of cases	Satisfaction	Basic Satisfaction	Dissatisfaction	Satisfaction
Conventional Care Group	90	31 (34.44)	42 (46.67)	17 (18.89)	81.11%
4C Continued Care Group	90	54 (60.00)	28 (31.11)	8 (7.79)	93.33%
χ^2 value					12.264
p-value					0.002

4C: comprehensive, coordination, cooperativeness and continuous.

nursing model group included a psychological counselor, who conducted a regular psychological assessment of patients, provided timely intervention for patients who may have negative psychology and developed targeted continued care. Secondly, the formation and content promotion of the Internet platform in this care model facilitated information exchange and improved patient knowledge about their disease. Patients were able to support and encourage each other through the WeChat group. This model not only helps to understand the current situation of the patient, but it also provides timely and accurate solutions to ensure continued related care services. Nursing satisfaction in the 4C continuity of care group is 93.33%, significantly higher than the (81.11%) in the conventional group, showing that this approach is more widely accepted by patients. Breast cancer patients who return to their families after surgery frequently face a number of issues such as social adaptation, functional exercise and psychological adjustment due to significantly lowered quality of life [27]. Rehabilitation advice on diet,

medicine, exercise, and psychological counseling provided by healthcare specialists is crucial for enhancing the quality of life [28]. The online Q&A within the WeChat group not only effectively pushed for good health education work, but also played an important significant role in improving patient compliance. The results of this study showed that, in addition to the significant improvement in patients' quality of life, their self-efficacy and self-care ability also improved significantly, which may be related to the structural composition of the 4C continued care model. Postoperative lymphedema and subcutaneous effusion are common complications after breast cancer surgery, and their occurrence seriously threatens patients' quality of life [29, 30]. The results of this study found that supervised exercise through scientific health guidance can not only effectively promote functional recovery but also significantly reduce the incidence of postoperative complications. This study confirms the clinical effects of this program in terms of patients' mental status, quality of life, self-efficacy, self-care ability and postoperative complications; however, its impact on patients' serological indices is not yet known. Therefore, it is necessary to expand the scope of the study and increase the sample size for further research. A limitation of this study is the small sample size. To further confirm the efficacy of 4C continued care, the sample size should be increased in future research.

5. Conclusions

The mental health, quality of life and self-care ability of breast cancer patients after discharge from the hospital are of great clinical significance in evaluating the therapeutic efficacy and prognosis. Compared with the usual care model, the 4C continued care model does not increase the economic burden of patients, and can effectively improve the mental status of breast cancer patients after discharge, as well as their self-efficacy, self-care ability and quality of life. It also has the potential to enhance patient satisfaction and prevent the occurrence of postoperative problems.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

XJW, YH—designed the study and carried them out; prepared the manuscript for publication and reviewed the draft of the manuscript. XJW, LL, YLW, CXH, LH—supervised the data collection, analyzed the data, interpreted the data. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of the Second Affiliated Hospital of Wenzhou Medical University (Approval no. 2024-K-095-02). Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

ACKNOWLEDGMENT

Not applicable.

FUNDING

This work was supported by Zhejiang Province city and county science and technology plan project (Grant No. 2023Y1023).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Jiang J, Jiang S, Ahumada-Canale A, Chen Z, Si L, Jiang Y, *et al*. Breast cancer screening should embrace precision medicine: evidence by reviewing economic evaluations in China. Advances in Therapy. 2023; 40: 1393–1417.

[2] Wang YJ, Wang F, Yu LX, Xiang YJ, Zhou F, Huang SY, *et al*. Worldwide review with meta-analysis of women's awareness about breast cancer. Patient Education and Counseling. 2022; 105: 1818–1827.

[3] Li X, Song F, Liu X, Shan A, Huang Y, Yang Z, *et al*. Perfluoroalkyl substances (PFASs) as risk factors for breast cancer: a case-control study in Chinese population. Environmental Health. 2022; 21: 83.

[4] Zhang J, Sun X, Zhang F, Guo L. Perioperative nursing of patients with breast cancer undergoing modified radical mastectomy. Asian Journal of Surgery. 2023; 46: 1385–1386.

[5] He P, Zhang B, Shen S. Effects of out-of-hospital continuous nursing on postoperative breast cancer patients by medical big data. Journal of Healthcare Engineering. 2022; 2022: 9506915.

[6] Bagatin D, Bagatin T, Šakić K, Deutsch J, Nemrava J, Šimičević D. Optimal analgesia for breast surgery enhanced recovery in day surgery. Acta Clinica Croatica. 2022; 61: 49–56.

[7] Goodwin PJ, Chen BE, Gelmon KA, Whelan TJ, Ennis M, Lemieux J, *et al*. Effect of metformin *vs* placebo on invasive disease-free survival in patients with breast cancer the MA.32 randomized clinical trial. Journal of the American Medical Association. 2022; 327: 1963–1973.

[8] La J, Alqaydi A, Wei X, Shellenberger J, Digby GC, Brogly SB, *et al*. Variation in opioid filling after same-day breast surgery in Ontario, Canada: a population-based cohort study. CMAJ Open. 2023; 11: E208–E218.

[9] Bogach J, Cordeiro E, Reel E, Cil TD. Axillary surgery and complication rates after mastectomy and reconstruction for breast cancer: an analysis of the NSQIP database. Breast Cancer Research and Treatment. 2022; 192: 501–508.

[10] Knight SR, Gupta RK, Ho A, Pius R, Buchan I, Carson G, *et al*. Prospective validation of the 4C prognostic models for adults hospitalised with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol. Thorax. 2022; 77: 606–615.

[11] Zhang J, Gu LL, Xu Y, Zhao BB, Li D, Xiao C. Integrated medical care and the continuous 4C nursing model to improve nursing quality and clinical treatment of patients with acute stroke: based on a retrospective case-control study. Contrast Media & Molecular Imaging. 2022; 2022: 4810280.

[12] Williams CN, Hall TA, Francoeur C, Kurz J, Rasmussen L, Hartman ME, *et al*. Continuing care for critically ill children beyond hospital discharge: current state of follow-up. Hospital Pediatrics. 2022; 12: 359–393.

[13] Burstein HJ, Curigliano G, Thürlimann B, Weber WP, Poortmans P, Regan MM, *et al*. Customizing local and systemic therapies for women with early breast cancer: the St. Gallen international consensus guidelines

for treatment of early breast cancer 2021. Annals of Oncology. 2021; 32: 1216–1235.

[14] Tong QY, Liu R, Gao Y, Zhang K, Ma W, Shen WD. Effect of electroacupuncture based on ERAS for preoperative anxiety in breast cancer surgery: a single-center, randomized, controlled trial. Clinical Breast Cancer. 2022; 22: 724–736.

[15] Sirhan Z, Thyagarajan A, Sahu RP. The efficacy of tucatinib-based therapeutic approaches for HER2-positive breast cancer. Military Medical Research. 2022; 9: 39.

[16] Cheng L, Wang S, Sun J. Effect analysis of continuous care model in the management of chronic diseases in the elderly. Minerva Medica. 2024; 115: 225–227.

[17] Md Yusof K, Mahmud R, Abdullah M, Avery-Kiejda KA, Rosli R. Cross-cultural adaptation of the functional assessment of cancer therapy-breast (FACT-B) in Malaysian breast cancer survivors. Asian Pacific Journal of Cancer Prevention. 2021; 22: 1055–1061.

[18] Teicher S, Whitney RL, Liu R. Breast cancer survivors? Satisfaction and information recall of telehealth survivorship care plan appointments during the COVID-19 pandemic. Oncology Nursing Forum. 2022; 49: 223–231.

[19] Sierla R, Dylke ES, Shaw T, Poon S, Kilbreath SL. Clinician assessment of upper limb lymphedema: an observational study. Lymphatic Research and Biology. 2021; 19: 159–164.

[20] Ben-Dror J, Shalamov M, Sonnenblick A. The history of early breast cancer treatment. Genes. 2022; 13: 960.

[21] McKay JR. Digital approaches to continuing care. Current Opinion in Psychiatry. 2022; 35: 259–264.

[22] Hussain Rawther SC, Pai MS, Fernandes DJ, Mathew S, Chakrabarty J, Devi ES. Specialist nurse initiated interventions in breast cancer care: a systematic review of randomised controlled trials. Journal of Clinical Nursing. 2020; 29: 2161–2180.

[23] Gao T, Luo JL, Guo P, Hu XW, Wei XY, Hu Y. Impact of continuous care on cardiac function in patients with lung cancer complicated by coronary heart disease. World Journal of Clinical Cases. 2024; 12: 314–321.

[24] Vujosevic S, Limoli C, Luzi L, Nucci P. Digital innovations for retinal care in diabetic retinopathy. Acta Diabetologica. 2022; 59: 1521–1530.

[25] Sawaya GF, Dorismond VG. Avoiding low-value care and patient financial harm in cervical cancer screening. Cancer Prevention Research. 2023; 16: 363–364.

[26] Saldanha IJ, Adam GP, Kanaan G, Zahradnik ML, Steele DW, Chen KK, *et al*. Delivery strategies for postpartum care a systematic review and meta-analysis. Obstetrics and Gynecology. 2023; 142: 529–542.

[27] Abdo J, Ortman H, Rodriguez N, Tillman R, Riordan EO, Seydel A. Quality of life issues following breast cancer treatment. Surgical Clinics of North America. 2023; 103: 155–167.

[28] Sun FK, Lu CY, Yao Y, Chiang CY. Social functioning, depression, and quality of life among breast cancer patients: a path analysis. European Journal of Oncology Nursing. 2023; 62: 102237.

[29] Oh SH, Kim JH, Seong ST, Park JY, Lee JH, Kim GC, *et al.* Lymphoscintigraphy in patients with breast cancer-related lymphedema after sentinel lymph node dissection and axillary radiation therapy. Medicine. 2022; 101: e31985.

[30] Veverkova L, Koleckova M, Vomackova K, Zlamalova N, Lowova L. Ultrasonographic signs as predictors of metastatic involvement in the axillary lymph nodes in breast cancer patients: from minimal changes to the appearance of the pathological lymph node. A retrospective analysis. Biomedical Papers of the Medical Faculty of the University Palacký, Olomouc, Czechoslovakia. 2024; 168: 216–222.

How to cite this article: Xiaojie Wu, Li Lin, Yuelan Weng, Chunxi He, Li Huai, Ying He. Research on the application of 4C continued nursing model in postoperative care of breast cancer patients. European Journal of Gynaecological Oncology. 2024; 45(6): 134-140. doi: 10.22514/ejgo.2024.126.