

Article

Effect of psychological nursing intervention on compliance, psychological state and self-care ability of patients after breast cancer surgery

Hongmei Tian^{1,*}, Xiaoqing Li², Zhi Yan³, Xiaoqing Wang³

¹ Nursing Department, Affiliated Hospital of Chuanbei Medical College, Nanchong 637000, China

² Department of Critical Care Medicine, Affiliated Hospital of North Sichuan Medical College, Nanchong 637000, China

³ Department of Breast Surgery, Affiliated Hospital of North Sichuan Medical College, Nanchong 637000, China

* Corresponding author: Hongmei Tian, 13908224459@163.com

CITATION

Tian H, Li X, Yan Z, Wang X. Effect of psychological nursing intervention on compliance, psychological state and self-care ability of patients after breast cancer surgery. *Psycho-Oncologie*. 2025; 19(4): 3703. <https://doi.org/10.18282/po3703>

ARTICLE INFO

Received: 9 July 2024

Revised: 27 December 2024

Accepted: 24 February 2025

Available online: 29 October 2025

COPYRIGHT



Copyright © 2025 by author(s).

Psycho-Oncologie is published by PiscoMed Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

<https://creativecommons.org/licenses/by/4.0/>

Abstract: Postoperative trauma and breast defects following radical mastectomy often lead to anxiety and depression, diminishing treatment compliance and adversely affecting both surgical outcomes and postoperative rehabilitation. Therefore, nursing interventions are critical for patients after radical mastectomy. This study investigates the effects of psychological versus conventional nursing interventions on treatment compliance, psychological well-being, self-care ability, complication rates, and patient satisfaction among patients with breast cancer treated at our hospital. The findings indicate that proactive psychological nursing interventions significantly enhance treatment compliance, alleviate negative emotions such as anxiety and depression, improve self-care capabilities, reduce complication risks, and foster a more positive nurse-patient relationship.

Keywords: breast cancer; complications; negative emotions; psychological nursing intervention; surgery; treatment compliance

1. Introduction

Breast cancer, a malignant tumor originating from the mammary gland, exhibits relatively high morbidity and mortality rates [1,2]. In its in situ form, breast cancer typically does not pose an immediate threat to patients' lives and health. However, when breast cells lose normal function, the cellular connections weaken, allowing the cells to detach and disseminate through the bloodstream and lymphatic system, significantly jeopardizing the patient's life [3–5]. Radical mastectomy remains the primary clinical treatment for breast cancer, effectively removing lesions, slowing disease progression, and improving survival rates, with well-established clinical efficacy [6].

With advancements in physiology, pathology, and medical technologies, alongside growing expectations for improved quality of life, breast cancer treatment has evolved. Surgical options have progressed from radical and extended radical surgeries to improved radical surgery and, more recently, to breast-conserving surgery and breast reconstruction. Comprehensive treatment now integrates neoadjuvant therapy, chemotherapy, radiotherapy, targeted therapy, and endocrine therapy. The combination of surgery and adjunctive therapies has significantly enhanced postoperative survival rates and overall patient outcomes.

While surgery prolongs survival for patients with breast cancer, it also means that many will enter the "survival with cancer" phase, which brings a range of challenges and profound physical and psychological effects. Following surgery, patients

experience breast loss and scarring, leading to body image disturbances, a decline in self-esteem, and feelings of diminished attractiveness. Additionally, patients may face postoperative numbness, weakness, and a loss of social roles. The inherent risk of cancer recurrence further exacerbates anxiety, as many patients live with the constant fear of relapse. These physical and emotional changes often lead to negative psychological responses, such as anger, anxiety, depression, avoidance, inferiority, and guilt. Such adverse psychological reactions can significantly impact disease management, prognosis, and overall quality of life. Consequently, nursing interventions following radical mastectomy are essential to address these multifaceted challenges.

Previous studies have indicated that patient satisfaction is influenced by various factors. For instance, elderly patients often require hospitalization and close communication with medical staff, with nurses assuming a pivotal role in daily care, psychological counseling, and professional medical services, particularly for individuals with cancer. As the primary healthcare providers in direct contact with patients, nurses have a significant impact on patient satisfaction with care [7]. Psychological nursing intervention, which is patient-centered and emphasizes humanistic care, involves evaluating and improving patients' mental health through targeted nursing measures. The goal is to alleviate negative emotions such as anxiety, depression, and fear while improving patients' coping abilities and quality of life. This approach is individualized and adapted to the patient's specific circumstances [8,9]. Psychological nursing intervention has been shown to effectively alleviate depression and anxiety in elderly patients with osteoporosis, thereby improving their psychological well-being [10]. Positive psychological interventions can increase neural sensitivity in various areas of the cerebral cortex, contributing to more sustained neural regulation [11]. Moreover, psychological interventions benefit the nervous system, enhancing cerebral cortical mechanisms, regulating endocrine and neural functions, and boosting immune response and treatment efficacy [12]. However, there is limited research on the impact of psychological nursing interventions on patient compliance following radical mastectomy. To address this gap, this study focused on 116 patients who underwent radical mastectomy at our hospital between March 2021 and February 2023, examining the effects of psychological nursing intervention on their post-surgical compliance. The findings aim to provide insights for improving surgical outcomes and supporting postoperative rehabilitation for patients with breast cancer.

2. Methods

2.1. Data collection

The power analysis and sample size calculation were performed using the power analysis and sample size (PASS11) software, determining a sample size of 58 cases per group. The study was conducted between March 2021 and February 2023, with retrospective analysis of clinical data. Inclusion criteria were as follows: (1) Patients met the diagnostic criteria for breast carcinoma; (2) Diagnosis was confirmed by pathological examination; (3) All patients underwent radical breast cancer surgery at our hospital; (4) The study was approved by the Hospital Ethics Committee. Exclusion

criteria were as follows: (1) Patients with severe mental illness or cognitive impairment; (2) Patients with tumor recurrence requiring secondary surgery; (3) Patients with incomplete clinical data; (4) Patients with other malignant tumors; and (5) Patients with significant heart, liver, or kidney dysfunction. A total of 116 patients with breast cancer were divided into a control group and a test group, with 58 patients in each. The mean age of the control group was 52.13 ± 3.13 years, with a mean disease duration of 7.10 ± 1.01 months; 10 patients were in clinical stage I, and 48 were in stage II. The test group had a mean age of 52.45 ± 3.22 years and a mean disease duration of 7.09 ± 0.98 months; 12 patients were in stage I, and 46 in stage II. No significant differences were observed in the baseline data between the two groups ($P > 0.05$) (**Table 1**). This study was approved by the hospital ethics committee (approval number: DW-2022015001).

Table 1. Analysis of the baseline data of the two groups.

Group	<i>n</i>	Age (years)	Disease course (month)	Clinical stage (I/II)	Family history of breast cancer	Menopause
Control group	58	52.13 ± 3.13	7.10 ± 1.01	10/48	21 (36.21)	13 (22.41)
Test group	58	52.45 ± 3.22	7.09 ± 0.98	12/46	19 (32.76)	11 (18.97)
χ^2 / t		0.581	0.091	0.353	0.153	0.210
<i>P</i>		0.562	0.928	0.552	0.696	0.647

2.2. Methods

Patients in the control group received routine clinical care, which included (1) Health education: Providing information on breast cancer, explaining the surgical procedure and its postoperative effects, and educating both patients and their families on the necessity of surgery to promote acceptance. Patients were also taught the purpose and significance of preoperative exams and preparations. Discharge education was conducted one day prior to discharge, covering incision care, exercise guidelines, and precautionary measures. (2) Dietary intervention: Pre-surgery, patients were advised to follow a high-protein, high-vitamin, high-calorie diet to maintain optimal physical condition for surgery. Post-surgery, patients were instructed on a balanced, easily digestible, high-nutrient diet, with an emphasis on hydration and measures to reduce constipation and bloating in bedridden patients. (3) Other interventions: Post-surgery, patients were guided through a step-by-step approach to functional exercises and instructed on proper wound care once healing occurred.

Psychological nursing interventions were applied to patients in the test group, encompassing the following components: (1) Mental state assessment: The Self-Rating Depression Scale (SDS) was employed upon admission to evaluate patients' psychological conditions. Nurses assessed the severity of the illness, the patient's family situation, and their psychological state to tailor appropriate care. (2) Mental health education: Patients with breast cancer were provided with essential information regarding the disease, treatment options, and dietary recommendations. Nurses actively engaged with patients, fostering a positive and supportive relationship while ensuring the provision of comprehensive clinical care to facilitate patient cooperation. (3) Cognitive psychological care: Many patients with breast cancer have limited

knowledge about the disease's etiology, treatment, and postoperative rehabilitation, often leading to feelings of despair and fear. Nurses aimed to educate patients about breast cancer prevention and treatment, helping them understand the entire clinical process, which in turn enhanced treatment compliance and facilitated recovery. (4) Psychological support: Targeted emotional care was provided to address negative emotions, enhance the ward environment, and familiarize patients with the surroundings and available facilities. This helped reduce anxiety and depression. Given the fluctuating psychological state of patients with breast cancer throughout hospitalization, continuous support was maintained until discharge. (5) Social support: Family members were encouraged to actively engage with the patients, providing emotional care and fostering communication. This support helped patients adopt a more positive attitude towards their condition.

2.3. Observation indicators

Treatment compliance: Categorized into three levels: complete compliance, partial compliance, and non-compliance. The overall treatment compliance rate was calculated as compliance rate (%) = (number of instances of complete compliance + number of instances of partial compliance)/total number of observed instances $\times$ 100%. (2) Negative emotions: Anxiety and depression levels were assessed using the Hamilton Anxiety Scale (HAMA) and Hamilton Depression Scale (HDMA). A HAMA score > 29 indicates severe anxiety, 22–29 indicates moderate anxiety, 14–21 indicates mild anxiety, and < 14 indicates normal. For HDMA, a score of 0–7 indicates normal, 7–16 suggests possible depression, 17–24 indicates depression, and > 24 indicates severe depression. The Cronbach's α coefficient for the HAMA was 0.897 and 0.832 for the HDMA, indicating both scales possess good reliability and validity. Higher scores correspond to greater levels of anxiety and depression. (3) Self-care ability: The Exercise of Self-care Agency Scale (ESCA) was used to assess self-care ability, encompassing four dimensions: self-care skills, health knowledge, self-responsibility, and self-concept. Each item was rated on a scale from 1 to 4, with a total possible score of 172. The Cronbach's α coefficient for the ESCA score was 0.825, indicating good reliability and validity. Higher scores reflect stronger self-care abilities. (4) Complications: Postoperative complications were closely monitored in both groups, with the total complication rate calculated. (5) Nursing satisfaction: Nursing satisfaction was compared between the two groups, categorized into three levels: highly satisfied, moderately satisfied, and dissatisfied. The total satisfaction rate was calculated as follows: Total satisfaction rate (%) = (high satisfaction instances + moderate satisfaction instances)/total observed instances $\times$ 100%.

2.4. Statistical methods

Data analysis was conducted using SPSS 21.0. Enumeration data were expressed as n (%), and pairwise comparisons were performed using the χ^2 test. Measurement data that conformed to a normal distribution were presented as $(\bar{x} \pm s)$, with pairwise comparisons performed using independent sample t -tests. A P -value < 0.05 was considered statistically significant.

3. Results

3.1. Analysis of the compliance of the 2 treatment groups

The total treatment compliance rate for the control group was 79.31% (45/58), while the test group achieved a compliance rate of 98.28% (57/58), showing a significant difference between the two groups ($P < 0.05$) (Table 2, Figure 1).

Table 2. Comparison of compliance between the two groups [n (%)].

Group	n	Complete compliance	Partial compliance	Non-compliance	Total compliance rate
Control group	58	17 (29.31)	29 (50.00)	12 (20.69)	46 (79.31)
Test group	58	29 (50.00)	28 (48.28)	1 (1.72)	57 (98.28)
χ^2					10.482
P					0.001

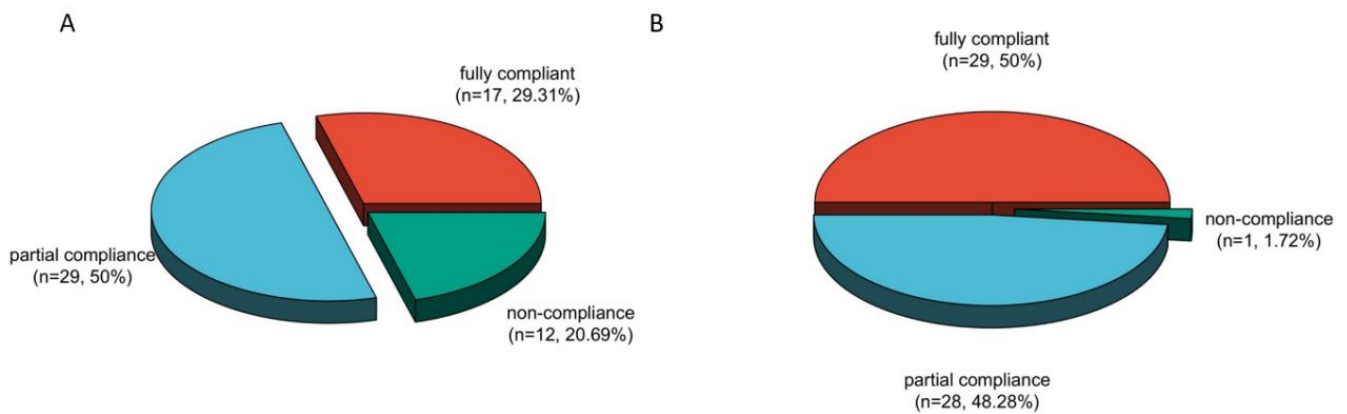


Figure 1. Distribution of treatment compliance in the two groups.

Note: (A): This panel shows the compliance distribution in the control group; (B): This panel shows the compliance distribution in the test group.

3.2. Analysis of the mental state of the two groups

Post-care, both HAMA and HDMA scores significantly decreased compared to pre-care ($P < 0.05$). Notably, the test group exhibited a more pronounced reduction in both HAMA and HDMA scores ($P < 0.05$) (Table 3, Figure 2).

Table 3. Comparison of HAMA score and HDMA score between the two groups ($x \pm s$).

Group	Time	HAMA score	HDMA score
Control group ($n = 58$)	Pre-care	13.98 ± 2.58	13.03 ± 3.28
	Post-care	$9.53 \pm 1.87^*$	$9.28 \pm 1.77^*$
Test group ($n = 58$)	Pre-care	14.03 ± 2.64	12.98 ± 3.43
	Post-care	$7.64 \pm 1.52^{*#}$	$7.03 \pm 1.24^{*#}$

Note: * indicates a comparison with pre-care, $P < 0.05$; # indicates a comparison with post-care, $P < 0.05$.

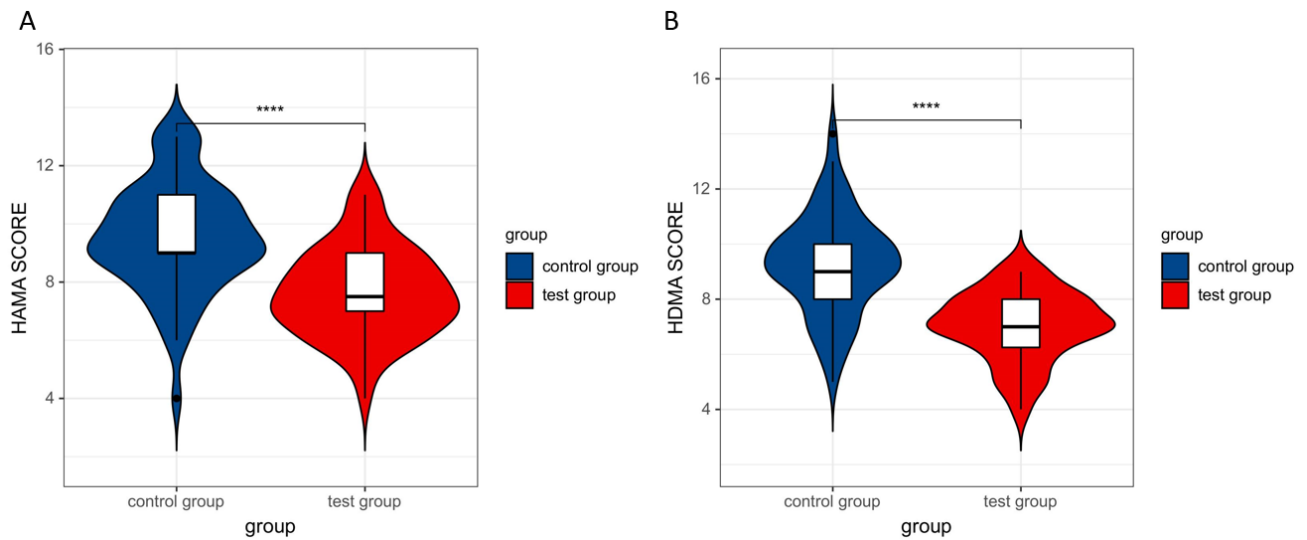


Figure 2. Analysis of the mental state of the two groups.

Note: (A): This panel shows the violin plot comparing HAMA scores between the control and test groups; (B): This panel shows the violin plot comparing HDMA scores between the control and test groups; **** indicates $P < 0.001$.

3.3. Analysis of self-protection ability of two groups

Post-care, health knowledge level, self-concept, self-responsibility, and self-care ability scores were significantly higher than pre-care scores ($P < 0.05$). Furthermore, the test group showed a more pronounced improvement in these scores compared to the control group ($P < 0.05$) (Table 4, Figure 3).

Table 4. Comparison of ESCA scores between the two groups.

Group	Time	Health knowledge level	Self-concept	Self-responsibility	Self-care ability
Control group ($n = 58$)	Pre-care	35.47 ± 4.50	21.24 ± 2.41	16.83 ± 2.56	27.48 ± 2.52
	Post-care	40.28 ± 4.73 *	26.84 ± 2.29 *	22.62 ± 2.87 *	32.64 ± 3.35 *
Test group ($n = 58$)	Pre-care	35.66 ± 4.67	21.24 ± 2.40	17.96 ± 2.60	27.66 ± 2.59
	Post-care	47.99 ± 5.14 *#	35.27 ± 3.40 *#	29.88 ± 3.19 *#	41.52 ± 4.11 *#

Note: * indicates a comparison with pre-care, $P < 0.05$; # indicates a comparison with post-care, $P < 0.05$.

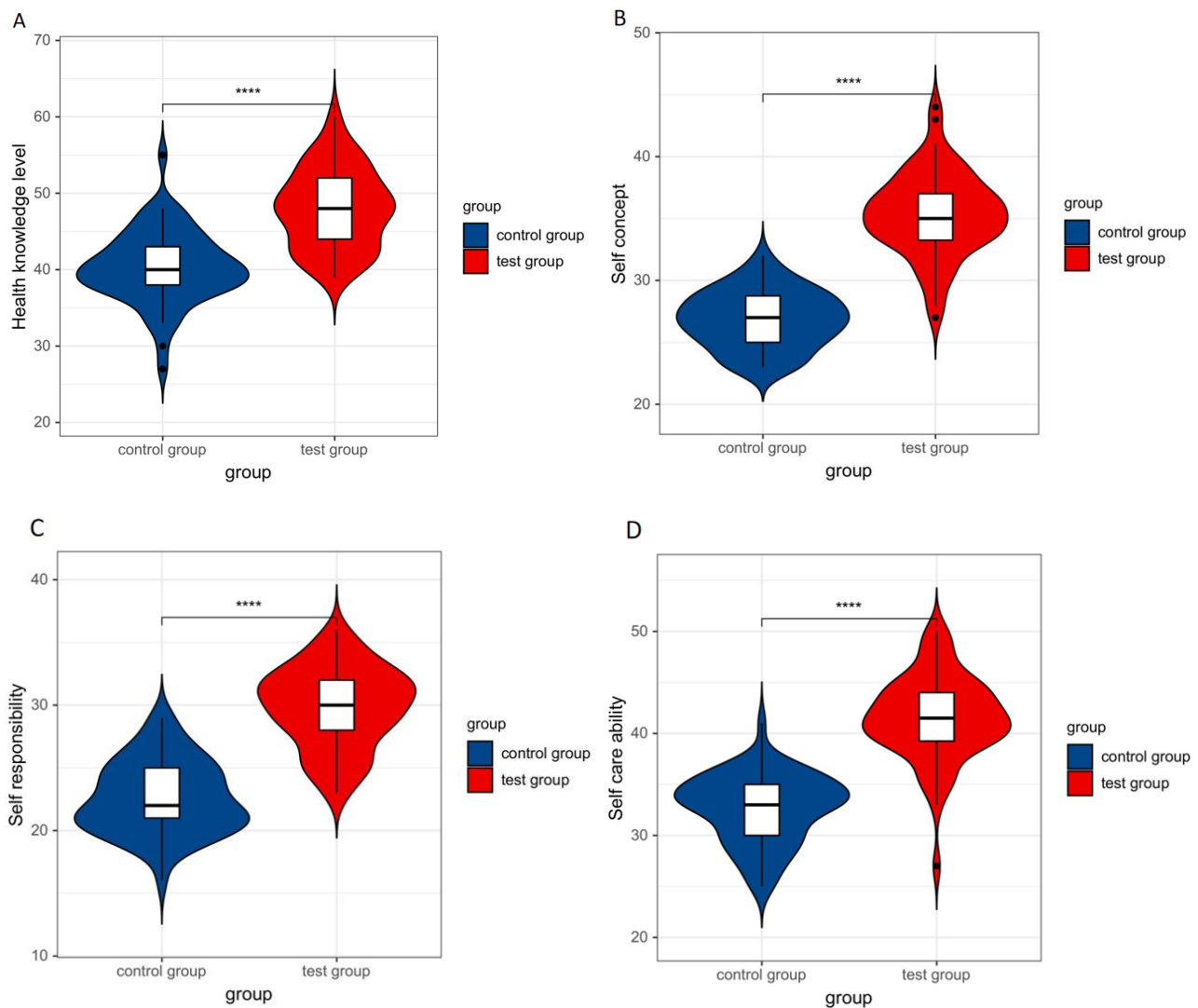


Figure 3. Comparison of ESCA scores between the two groups.

Note: (A): This panel shows the violin plot comparing health knowledge scores between the control and test groups; (B): This panel shows the violin plot comparing self-concept scores between the control and test groups; (C): This panel shows the violin plot comparing self-responsibility scores between the control and test groups; (D): This panel shows the violin plot comparing self-care ability scores between the control and test groups; **** indicates $P < 0.001$.

3.4. Analysis of the occurrence of complications in the 2 groups

In the test group, complications included 3 cases of subcutaneous effusion and 1 case of upper limb edema, resulting in a total complication rate of 6.90% (4/58). In the control group, there were 4 cases of skin flap necrosis, 3 cases of subcutaneous effusion, 3 cases of upper limb edema, and 3 cases of incision infection, with a total complication rate of 24.14% (14/58). The complication rate in the test group was significantly lower than that in the control group ($P < 0.05$) (Table 5).

Table 5. Comparison of frequency of complications between the two groups n (%).

Group	n	Flap necrosis	Subcutaneous fluid	Upper extremity edema	Incision infection	Always happen
Control group	58	4 (6.90)	3 (5.17)	4 (6.90)	3 (5.17)	14 (24.14)

Test group	58	0 (0.00)	3 (5.17)	1 (1.72)	0 (0.00)	4 (6.90)
χ^2						6.576
P						0.010

3.5. Nursing satisfaction survey of two groups.

In the test group, 40 cases reported high satisfaction, and 17 cases were moderately satisfied, resulting in an overall nursing satisfaction rate of 98.27% (57/58). In the control group, 28 cases reported high satisfaction, and 15 cases were moderately satisfied, with a total nursing satisfaction rate of 74.14% (43/58). A significant difference in overall nursing satisfaction was observed between the two groups ($P < 0.15$) (Table 6, Figure 4).

Table 6. Comparison of care satisfaction between the two groups n (%).

Group	n	High satisfaction	Moderate satisfaction	Dissatisfaction	Total satisfaction
Control group	58	28 (48.28)	15 (25.86)	15 (25.86)	43 (74.14)
Test group	58	40 (68.97)	17 (29.31)	1 (1.72)	57 (98.27)
χ^2					22.368
P					0.000

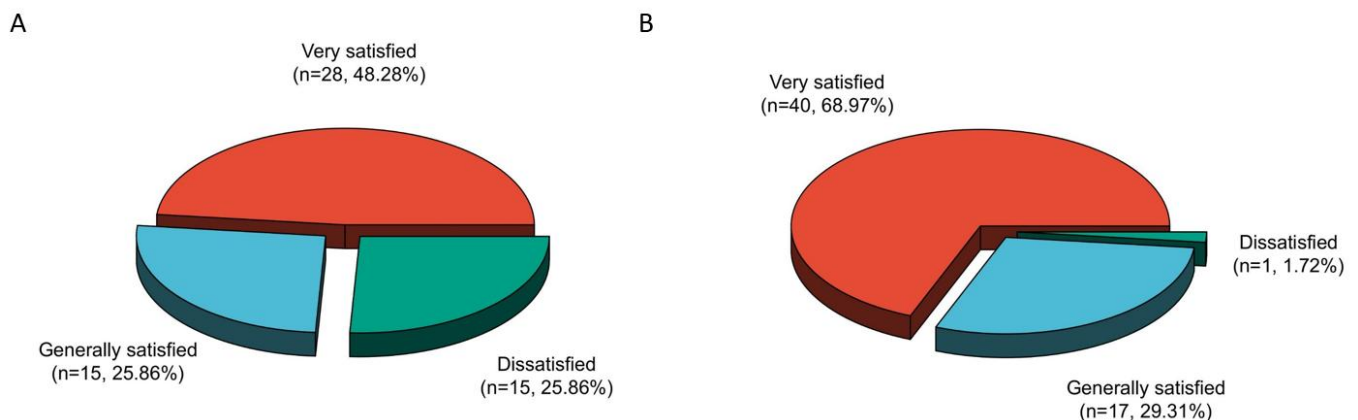


Figure 4. Distribution of nursing satisfaction between the two groups.

Note: (A): This panel illustrates the distribution of care satisfaction in the control group, and (B): This panel depicts the distribution in the test group.

4. Discussion

The etiology of breast cancer is believed to be associated with factors such as prolonged estrogen use, excessive alcohol consumption, radiation exposure, and genetic predisposition. However, the precise mechanisms underlying its onset and progression remain incompletely elucidated [13,14]. Recent epidemiological data indicate a continuous rise in breast cancer incidence, with a concerning trend toward earlier onset, posing a significant threat to women's health and well-being [15,16]. Radical mastectomy remains the most effective treatment strategy, markedly improving patient survival rates. However, adverse effects induced by postoperative adjuvant therapy frequently lead to anxiety and depression, negatively impacting treatment adherence and hindering postoperative recovery [17,18]. Thus, addressing

the psychological well-being of postoperative patients with breast cancer through targeted psychological nursing interventions is crucial.

Conventional nursing approaches provide symptomatic relief to a certain extent, yet their standardized and nonspecific nature often fails to align with the individualized needs of postoperative patients. Moreover, these methods are insufficient in mitigating psychological distress, potentially leading to suboptimal recovery outcomes and inefficient allocation of nursing resources [19–21]. With advancements in medical care and evolving nursing paradigms, psychological nursing has emerged as a refined approach that systematically evaluates patients' psychological status and quality of life. This model delivers targeted emotional support while providing guidance on diet, chemotherapy, and rehabilitation exercises [22–24]. Additionally, psychological nursing fosters social and familial support, significantly alleviating anxiety and depressive symptoms [25–28]. Studies have demonstrated that psychological health education enhances breast cancer awareness, helps patients overcome psychological barriers, bolsters self-confidence, and promotes active treatment adherence, ultimately contributing to prolonged survival [29–32].

Patients with severe mental illness may exhibit markedly different responses to treatment, potentially compromising the accurate assessment of treatment efficacy. Excluding these patients from the study ensured the reliability and validity of the findings. The results demonstrated a significant difference in overall compliance rates between the test group (98.28%, 57/58) and the control group (79.31%, 45/58) ($P < 0.05$), indicating that psychological nursing intervention effectively enhances postoperative treatment adherence in patients with breast cancer. This improvement may be attributed to the structured dietary guidance provided by this nursing model, which supports patient tolerance to subsequent treatments. Additionally, disease education and comprehensive clinical nursing services facilitate a deeper understanding of the treatment process, encouraging active cooperation with clinical protocols and improving overall treatment compliance. Furthermore, psychological intervention promotes the recovery of the cerebral cortex nervous system, positively influencing emotional regulation by enhancing cortical function. This modulation induces a state of psychological well-being, triggers neuroendocrine adjustments, and may even contribute to functional repair within the limbic system, which plays a pivotal role in regulating visceral physiological functions. Moreover, anxiety and depression assessments revealed significant reductions in HAMA and HDMA scores post-nursing in both groups, with a more pronounced decline in the test group ($P < 0.05$). These findings underscore the pivotal role of psychological nursing intervention in alleviating postoperative emotional distress in patients with breast cancer. This effect may be attributed to the model's provision of targeted emotional support, fostering a resilient psychological state that bolsters patient confidence in facing the disease. Additionally, family care and support contribute to positive psychological reinforcement, playing a critical role in alleviating psychological distress in patients. Self-care ability assessments revealed that post-care improvements in health knowledge, self-concept, self-responsibility, and self-care ability scores were significantly greater in the test group than in the control group ($P < 0.05$). These findings indicate that psychological nursing intervention enhances postoperative self-

care ability in patients with breast cancer. This effect may be attributed to the intervention's role in improving patients' disease-related cognition and understanding, facilitating emotional recovery, fostering a positive treatment attitude, and ultimately contributing to prolonged survival. Moreover, the study found a significantly lower incidence of postoperative complications in the test group (6.90%, 4/58) compared to the control group (24.14%, 14/58) ($P < 0.05$), suggesting that psychological nursing intervention mitigates postoperative complication risks in patients with breast cancer. Hospital-administered satisfaction surveys further demonstrated a notable difference in overall nursing satisfaction between the two groups, with rates of 98.27% (57/58) in the test group and 74.14% (43/58) in the control group ($P < 0.15$). These results suggest that psychological nursing intervention fosters closer nurse-patient relationships and enhances patient satisfaction. This aligns with findings from Taylor et al. [31], which indicated that psychological care effectively reduces psychological stress associated with disease adaptation. However, Bidstrup et al. [32] reported that psychological intervention did not significantly alleviate psychological distress in highly vulnerable patients with breast cancer but showed a more pronounced effect in younger patients, those with lower motivation or education levels, and individuals with limited social support.

A deeper analysis of these findings suggests that psychological nursing intervention extends beyond short-term emotional regulation, serving as a critical component in facilitating comprehensive patient recovery. A stable psychological state enhances patients' ability to understand and accept treatment, thereby improving adherence and self-care capabilities. Integrating psychological nursing intervention into routine care can be achieved by training nursing staff in psychological support techniques, enabling them to recognize and address patients' psychological needs in daily care. Upon hospital admission, psychological assessments should be conducted to develop personalized psychological care plans tailored to each patient's specific needs. Throughout treatment, regular evaluations of psychological status should be performed, with nursing interventions dynamically adjusted to ensure sustained support. Beyond immediate postoperative benefits, psychological nursing intervention may contribute to reduced recurrence rates and improved long-term quality of life. By fostering positive coping mechanisms and resilience, it strengthens patients' psychological endurance against disease progression. Additionally, enhanced psychological well-being and higher treatment compliance may lead to more efficient utilization of medical resources, potentially lowering healthcare costs and yielding economic benefits for the medical system.

This study focused on postoperative patients with breast cancer and demonstrated significant improvements in treatment compliance, psychological well-being, and self-care ability following psychological nursing intervention. Given the common psychological and physical challenges faced by cancer individuals, these findings likely have broader applicability to individuals with other malignancies. Furthermore, the impact of psychological nursing intervention may extend beyond oncology, benefiting patients with chronic diseases who experience psychological distress and adherence difficulties. Implementing similar psychological interventions across different patient populations may thus offer substantial clinical and therapeutic advantages.

This study further examined the impact of psychological nursing intervention on treatment compliance, psychological well-being, and self-care ability in postoperative patients with breast cancer. Psychological health plays a pivotal role in cancer treatment, particularly during postoperative recovery. The findings not only confirm the efficacy of psychological nursing intervention in enhancing compliance and alleviating psychological distress but also underscore its pivotal role in improving self-care ability. Future research should extend this investigation to patients with different cancer types and explore its applicability across diverse clinical settings. Additionally, developing a comprehensive theoretical framework to guide the design and implementation of psychological nursing interventions will provide a more robust foundation for clinical practice. Long-term evaluations of psychological intervention outcomes and their impact on quality of life should also be prioritized, contributing to the advancement of holistic cancer care.

Theoretical and practical contribution and limitations

However, this study was conducted within a single hospital, and resource limitations may introduce potential bias. To enhance the generalizability of these findings, future research should incorporate larger, multi-center cohorts with extended follow-up periods for further validation.

5. Conclusion

In conclusion, structured and targeted psychological nursing interventions significantly enhance treatment adherence, mitigate anxiety and depression, improve self-care ability, and reduce postoperative complication risks in patients with breast cancer. Moreover, these interventions foster a more positive nurse-patient relationship, ultimately contributing to improved overall patient outcomes.

This study was conducted by a team of esteemed experts in oncology and psychology, whose extensive clinical experience and academic expertise ensured a comprehensive analysis of psychological nursing interventions for postoperative patients with breast cancer. The study not only delineates effective implementation strategies but also rigorously validates the intervention's impact on patient compliance through scientifically robust methodologies. These findings provide a novel perspective and strategic direction for the comprehensive management of breast cancer post-surgery, offering significant clinical application and translational potential.

Author contributions: Conceptualization, HT; experiment, XL; resources, XL; writing—review and editing, ZY and XW. All authors have read and agreed to the published version of the manuscript.

Acknowledgments: We extend our gratitude to the members of the Affiliated Hospital of Chuanbei Medical College for their valuable discussions.

Availability of data and materials: The datasets used and analyzed in this study are available from the corresponding author upon reasonable request.

Ethical approval: This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by the Ethics Committee of the Affiliated Hospital of Chuanbei Medical College (NSMC[2025]001).

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Conflict of interest: The authors declare no conflict of interest.

References

1. Han Y, Katayama S, Futakuchi M, et al. Targeting c-Jun is a potential therapy for luminal breast cancer bone metastasis. *Molecular Cancer Research*. 2023; 21(9): 908–921.
2. Zeng Y, Pan Z, Yuan J, et al. Inhibiting Osteolytic Breast Cancer Bone Metastasis by Bone-Targeted Nanoagent via Remodeling the Bone Tumor Microenvironment Combined with NIR-II Photothermal Therapy. *Small*. 2023; 19(8): e2301003.
3. Karavasiloglou N, Matthes KL, Pestoni G, et al. Risk for Invasive Cancers in Women with Breast Cancer in Situ: Results from a Population Not Covered by Organized Mammographic Screening. *Frontiers in Oncology*. 2021; 11: 606747.
4. El Masri J, Phadke S. Breast Cancer Epidemiology and Contemporary Breast Cancer Care: A Review of the Literature and Clinical Applications. *Clinical Obstetrics and Gynecology*. 2022; 65(3): 461–481.
5. Jokar N, Velikyan I, Ahmadzadehfar H, et al. Theranostic Approach in Breast Cancer: A Treasured Tailor for Future Oncology. *Clinical Nuclear Medicine*. 2021; 46(8): e410–e420.
6. Silverthorne C, Daniels J, Thompson M, et al. Health professionals' perspectives on psychological distress and meeting patients' support needs in rheumatology care settings: A qualitative study. *Musculoskeletal Care*. 2023; 21(2): 537–544.
7. He H, Zhu N, Lyu B, Zhai S. Relationship between nurses' psychological capital and satisfaction of elderly cancer patients during the COVID-19 pandemic. *Frontiers in Psychology*. 2023; 14: 1121636. doi: 10.3389/fpsyg.2023.1121636
8. Lores T, Goess C, Mikocka-Walus A, et al. Integrated Psychological Care Reduces Health Care Costs at a Hospital-Based Inflammatory Bowel Disease Service. *Clinical Gastroenterology and Hepatology*. 2021; 19(1): 96–103.e3.
9. Faija CL, Connell J, Welsh C, et al. What influences practitioners' readiness to deliver psychological interventions by telephone? A qualitative study of behaviour change using the Theoretical Domains Framework. *BMC Psychiatry*. 2020; 20(1): 371.
10. Huang L, Zhang C, Xu J, et al. Function of a Psychological Nursing Intervention on Depression, Anxiety, and Quality of Life in Older Adult Patients with Osteoporotic Fracture. *Worldviews on Evidence-Based Nursing*. 2021; 18(4): 290–298.
11. Dedoncker J, Baeken C, De Raedt R, Vanderhasselt MA. Combined transcranial direct current stimulation and psychological interventions: State of the art and promising perspectives for clinical psychology. *Biological Psychology*. 2021; 158: 107991.
12. Flor H. Psychological pain interventions and neurophysiology: Implications for a mechanism-based approach. *American Psychologist*. 2014; 69(2): 188–196.
13. Roy M, Fowler AM, Ulaner GA, Mahajan A. Molecular Classification of Breast Cancer. *PET Clinics*. 2023; 18(4): 441–458.
14. Ahn S, Park JH, Grimm SL, et al. Metabolomic Rewiring Promotes Endocrine Therapy Resistance in Breast Cancer. *Cancer Research*. 2024; 84(2): 291–304.
15. Li W, Xu Y, Luo X, et al. Alleviating Excessive Worries Improves Co-Occurring Depression and Pain in Adolescent and Young Adult Cancer Patients: A Network Approach. *Neuropsychiatric Disease and Treatment*. 2022; 18: 1843–1854.
16. Yu J, Du Y, Liu C, et al. Low GPR81 in ER+ breast cancer cells drives tamoxifen resistance through inducing PPAR α -mediated fatty acid oxidation. *Life Sciences*. 2024; 350: 122763.
17. Zamanian MY, Golmohammadi M, Nili-Ahmadabadi A, Alameri AA, Al-Hassan M, Alshahrani SH, Hasan MS, Ramírez-Coronel AA, Qasim QA, Heidari M, Verma A. Targeting autophagy with tamoxifen in breast cancer: From molecular mechanisms to targeted therapy. *Fundamental & Clinical Pharmacology*. 2023; 37(6): 1092–1108.
18. Yang Y, Sun H, Luo X, et al. Network connectivity between fear of cancer recurrence, anxiety, and depression in breast cancer patients. *Journal of Affective Disorders*. 2022; 309: 358–367.
19. Liu W, Liu J, Ma L, Chen J. Effect of mindfulness yoga on anxiety and depression in early breast cancer patients received adjuvant chemotherapy: A randomized clinical trial. *Journal of Cancer Research and Clinical Oncology*. 2022; 148(9): 2549–

- 2560.
20. Guo Y, Zhang Y, Guo X, et al. The comparison between experimental nursing and routine nursing interventions on the quality of life of stoma patients: A systematic review and meta-analysis. *International Wound Journal*. 2023; 20(3): 861–870.
 21. Levey N, Krishna I. Breast Cancer in Pregnancy: Caring for the Very Young Breast Cancer Patient from Diagnosis Through Survivorship. *Obstetrics and Gynecology Clinics of North America*. 2022; 49(1): 181–193.
 22. He X, Ng MSN, Choi KC, So WKW. Effects of a 16-week dance intervention on the symptom cluster of fatigue-sleep disturbance-depression and quality of life among patients with breast cancer undergoing adjuvant chemotherapy: A randomized controlled trial. *International Journal of Nursing Studies*. 2022; 133: 104317.
 23. Salahuddin NH, Schütz A, Pitschel-Walz G, et al. Psychological and psychosocial interventions for treatment-resistant schizophrenia: a systematic review and network meta-analysis. *The Lancet Psychiatry*. 2024; 11(7): 545–553.
 24. Mehta LS, Churchwell K, Coleman D, et al. Fostering Psychological Safety and Supporting Mental Health Among Cardiovascular Health Care Workers: A Science Advisory from the American Heart Association. *Circulation*. 2024; 150(2): e51–e61.
 25. Navarro-Carrillo G, Torres-Marín J, Corbacho-Lobato JM, Carretero-Dios H. The effect of humour on nursing professionals' psychological well-being goes beyond the influence of empathy: A cross-sectional study. *Scandinavian Journal of Caring Sciences*. 2020; 34(2): 474–483.
 26. Ambrosio L, Navarta-Sánchez MV, Portillo MC, et al. Psychosocial Adjustment to Illness Scale in family caregivers of patients with Parkinson's Disease: Spanish validation study. *Health & Social Care in the Community*. 2021; 29(4): 1030–1040.
 27. Ransing R, Kukreti P, Raghuveer P, et al. Development of a brief psychological intervention for perinatal depression (BIND-P). *Asia-Pacific Psychiatry*. 2021; 13(1): e12436.
 28. Davison TE, Bhar S, Wells Y, et al. Psychological therapies for depression in older adults residing in long-term care settings. *Cochrane Database of Systematic Reviews*. 2024; 3(3).
 29. Berry K, Raphael J, Wilson H, et al. A cluster randomised controlled trial of a ward-based intervention to improve access to psychologically-informed care and psychological therapy for mental health in-patients. *BMC Psychiatry*. 2022; 22(1): 82.
 30. Wang X, Liu J, Wu Y, et al. Enhancing the effectiveness of infectious disease health education for children and adolescents in China: A national multicenter school-based trial. *BMC Public Health*. 2023; 23(1): 1161.
 31. Taylor Miller PG, Sinclair M, Gillen P, et al. Early psychological interventions for prevention and treatment of post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms in post-partum women: A systematic review and meta-analysis. *PLOS ONE*. 2021; 16(11): e0258170.
 32. Bidstrup PE, Johansen C, Kroman N, et al. Effect of a Nurse Navigation Intervention on Mental Symptoms in Patients with Psychological Vulnerability and Breast Cancer: The REBECCA Randomized Clinical Trial. *JAMA Network Open*. 2023; 6(6): e2319591.