

Article

Effect of positive psychology and PDCA on PICC management in breast cancer

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Abstract: Objective: To analyze the effect of positive psychological intervention combined with PDCA circulation mode on the management of PICC catheterization in breast cancer patients undergoing chemotherapy. **Methods:** 140 patients with breast cancer who received PICC after surgery from June 2022 to July 2024 in our hospital were randomly divided into the control group and the observation group (70 cases each). **Result:** After intervention, the SAS and SDS scores of the observation group were significantly lower than those of the control group ($t = 6.122, P < 0.001$; $t = 8.632, P < 0.001$); The incidence of complications during catheterization in the observation group was 7.14%, significantly lower than the 18.57% in the control group ($\chi^2 = 4.080, P = 0.043$); Both groups of patients showed an improvement in FACT-B scores, with the observation group showing a more significant improvement compared to the control group ($t = 11.237, P < 0.001$); The nursing satisfaction score of the observation group was higher than that of the control group ($t = 8.149, P < 0.001$). **Conclusion:** Positive psychological intervention combined with PDCA circulation mode for patients with breast cancer undergoing PICC catheterization during chemotherapy can reduce their negative emotions, improve their quality of life, and reduce the incidence of complications of PICC catheterization.

Keywords: positive psychological intervention; PDCA cycle mode; breast cancer; chemotherapy; PICC; application effect

1. Introduction

Breast cancer is one of the most common malignant tumors in women, ranking first in incidence among female malignancies in China. The primary treatment regimen involves a combination of surgery and chemotherapy [1]. Due to the specific anatomical location of the lesion and postoperative changes in female characteristics caused by cancer and surgery, patients often experience significant negative emotions during postoperative chemotherapy, which may adversely affect clinical outcomes [2]. Peripherally inserted central catheter (PICC) is a widely used venous access method for administering hyperosmotic medications, long-term infusions, and chemotherapy. The insertion procedure is simple and safe, with convenient post-placement maintenance. Depending on the treatment regimen, the catheter can remain in place for 3 months to 1 year, reducing the impact of cytotoxic drugs on peripheral veins, mitigating vascular damage, and avoiding pain caused by repeated punctures [3]. Postoperative chemotherapy in breast cancer patients helps control disease progression and reduce recurrence rates, necessitating long-term chemotherapy drug

administration [4]. Thus, PICC provides a simple, safe, and efficient approach to ensure uninterrupted treatment. However, complications that may occur during PICC catheterization, such as catheter-related infections, phlebitis, thrombosis, etc., as well as negative emotions such as anxiety and depression caused by the disease and treatment, not only affect treatment compliance but may also reduce overall treatment effectiveness [5]. While conventional nursing interventions and psychological support have been applied separately, their combined use within a structured PDCA framework remains underexplored in breast cancer patients undergoing PICC chemotherapy. This study innovatively integrates positive psychological intervention with the PDCA cycle, aiming to synergistically improve both psychological resilience and catheterization outcomes in this high-risk population. Positive psychology fosters three core psychological capital elements - hope, self-efficacy, and optimism - which provide intrinsic motivation for the PDCA cycle implementation: during the Plan phase, patients' positive expectations enhance goal commitment; in the Do phase, psychological resilience helps overcome resistance to behavioral change; at the Check stage, a growth mindset enables patients to view feedback data more objectively; while in the Act phase, an optimistic explanatory style promotes continuous improvement intentions. Conversely, the PDCA cycle offers a structured implementation framework for positive psychological interventions: its quantitative monitoring system can precisely evaluate the effects of psychological interventions (such as changes in anxiety scale scores), and the standardized procedures ensure the systematic execution and iterative optimization of positive psychological strategies (e.g., strength identification, gratitude journaling, etc.). Therefore, how to optimize the quality of PICC catheterization nursing and improve the psychological state of patients through scientific and systematic management strategies has become an important topic in clinical nursing research. Positive psychological intervention focuses on addressing patients' negative emotions while promoting positive psychological adaptation, thereby helping patients develop a constructive mindset to cope with challenges [6,7]. The PDCA (Plan-Do-Check-Act) cycle is a quality management model that operates through four sequential stages—planning, implementation, evaluation, and corrective action—featuring detailed quantification, process monitoring, and continuous feedback control [8].

This study applies a combined intervention of positive psychological support and the PDCA cycle to breast cancer patients undergoing PICC chemotherapy after surgery, evaluating its clinical utility in this patient population.

2. Materials and methods

2.1. Patient characteristics

A total of 140 breast cancer patients who underwent postoperative chemotherapy with PICC at our hospital between June 2022 and July 2024 were randomly allocated into either the control group ($n = 70$) or the intervention group ($n = 70$).

Inclusion criteria:

- 1) Pathologically confirmed breast cancer (postoperative gold-standard diagnosis) with TNM stage I–III [9];
- 2) Willingness to undergo PICC placement;

- 3) Expected survival >6 months post-surgery;
- 4) Absence of cognitive, communicative, or comprehension impairments.

Exclusion criteria:

- 1) Severe dysfunction of other organ systems;
- 2) History of psychiatric disorders;
- 3) Hematologic abnormalities;
- 4) Previous exposure to psychological interventions.

This study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants and their families.

Group Demographics Intervention group: Sex: All female Age: 26–66 years (mean: 46.81 ± 7.62).TNM stage: Stage I ($n = 13$), Stage II ($n = 42$), Stage III ($n = 15$).Surgery type: Breast-conserving surgery ($n = 11$), Modified radical mastectomy ($n = 59$).Education level: Primary/junior high ($n = 9$), Senior high/vocational school ($n = 38$), College or above ($n = 23$).Marital status: Single ($n = 12$), Married ($n = 58$)

Control group: Sex: All female Age: 26–67 years (mean: 47.04 ± 7.12) TNM stage: Stage I ($n = 15$), Stage II ($n = 40$), Stage III ($n = 15$).Surgery type: Breast-conserving surgery ($n = 14$), Modified radical mastectomy ($n = 56$) .Education level: Primary/junior high ($n = 7$), Senior high/vocational school ($n = 39$), College or above ($n = 24$).Marital status: Single ($n = 10$), Married ($n = 60$)

Baseline characteristics (e.g., age, TNM stage, surgery type) showed no statistically significant differences ($P > 0.05$) between groups (Table 1).

Table 1. Baseline characteristics of study participants.

Group	Age (years) mean $\pm$ SD	TNM stage (n)			Surgical type (n)		Education level (n)			Marital status (n)	
		I	II	III	Breast-conserving surgery	Modified radical mastectomy	Primary/junior high school	High school/vocational education	College+	Single	Married
Intervention ($n = 70$)	46.81 ± 7.62	13	42	15	11	59	9	38	23	12	58
Control ($n = 70$)	47.04 ± 7.12	15	40	15	14	56	7	39	24	10	60
t/χ^2	0.184	0.192			0.438		0.286			0.216	
p -value	0.853	0.909			0.508		0.868			0.642	

2.2. Methods

All patients in both groups underwent PICC catheterization performed by the same nurse certified in PICC placement, with successful insertion achieved in a single attempt for all cases. The basilic vein was selected as the puncture site for every patient. The catheters used were of the same model and specifications, all manufactured by Bard Medical (USA). Both groups received standardized clinical treatment plans and nursing care, including health education, psychological support, ward management, dietary guidance, activity recommendations, daily care, and complication prevention. The two groups were housed in separate wards with no overlap in nursing staff. Additionally, the control group did not participate in any PDCA cycle-related training or meetings.

On the basis of the basic intervention model, the observation group adopted a model combining positive psychological intervention with PDCA (Plan-Do-Check-Act) cycle management. The specific measures were as follows: 1) Positive psychological intervention included: a. Disease education: Detailed explanations were provided on breast cancer, chemotherapy regimens, and PICC catheterization to help patients develop accurate perceptions of their condition and treatment, fostering a proactive attitude. Medical staff addressed patient concerns, corrected misconceptions, and emphasized the role of mental well-being in recovery. b. Encouragement & skill-building: Patients were taught PICC self-care techniques early on to improve treatment compliance and self-management. c. Motivation reinforcement: After mastering basic care, patients were encouraged to share positive experiences from self-care, reinforcing optimism and perseverance. 2) The PDCA cycle management model consisted of the following stages: a. Planning stage: A dedicated team was formed, including a head nurse (team leader), seven senior nurses, and an associate chief physician (medical advisor). All members completed one week of training. b. Implementation stage: (1) Fist-clenching exercises began 24 h post-catheterization, using handgrip dynamometers or elastic balls (25 reps/min, 2 min/session, 5 min intervals; total 30 min/session, 4 sessions/day). (2) Patients received tailored advice based on their health status and comprehension level, with regular progress feedback to alleviate stress. (3) Nurses provided one-on-one PICC maintenance and breast cancer education to patients and families, using clear language. Catheter equipment was rigorously sterilized, with strict adherence to aseptic protocols for flushing and dressing changes. (4) An in-house therapist conducted sessions to address cognitive biases, identify patient needs, and cultivate positive coping strategies. 3) Inspection stage: The head nurse assessed puncture sites and limb mobility during rounds, reinforcing education. Weekly audits evaluated PICC usage and patient/family knowledge. Discharged patients received phone calls to monitor catheter status and encourage self-checks. Identified issues were documented for analysis. 4) Treatment stage: The team reviewed audit findings, celebrated successes, and addressed gaps. Root causes of deficiencies were analyzed, and corrective measures (e.g., additional training, protocol updates) were integrated into the next PDCA cycle.

Intervention fidelity monitoring

This study adopts the following methods to ensure the standardization of intervention implementation:

(1) Process recording: Use the “PDCA Execution Log” to record the completion status of each cycle;

(2) Random verification: 20% of the intervention processes were randomly checked by quality control nurses who did not participate in the study (through video review);

(3) Patient feedback: Monthly questionnaires are conducted to assess the completeness of the implementation of intervention measures (such as “Did the nurse guide the first clenching exercise as planned?”). A fidelity of 85% or more is considered qualified.

2.3. Observation indicators

(1) Psychological Status Score: Before the intervention and at the 6-month follow-up, the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) were used to assess the patients' negative psychological emotions. The Self-Rating Anxiety Scale (SAS) serves as an assessment tool for clinical anxiety symptoms [10]. Its assessment system consists of 20 items, and each item adopts a four-level scoring standard (1–4 points). After the assessment, the sum of the scores of each item is multiplied by the conversion coefficient of 1.25 to obtain the standard score. The specific clinical cut-off values are as follows: a standard score in the range of 50–59 points indicate a mild anxiety state, 60–69 points represent moderate anxiety symptoms, and a score of ≥ 70 points meet the diagnostic criteria for severe anxiety. Correspondingly, the Self-Rating Depression Scale (SDS) focuses on the clinical assessment of depressive symptoms. The scale structure also includes 20 assessment items, and each item uses a four-level evaluation method. According to relevant studies, after standardizing the original total score by multiplying it by the coefficient of 1.25, the clinical diagnostic thresholds of this scale are: A score in the range of 53–62 points correspond to mild depression, 63–72 points represent moderate depression, and a score of ≥ 73 points meet the diagnostic criteria for severe depression. It should be specifically noted that the scoring systems of the two scales have a positive correlation characteristic, that is, the higher the assessment score, the more significant the severity of the clinical symptoms of the subjects.

(2) Incidence of Catheterization Complications: Count and record the occurrence of complications during the catheterization period in both groups of patients. The catheterization complications include mechanical phlebitis, catheter blockage, infection, and venous thrombosis. Among them, mechanical phlebitis is evaluated according to the judgment criteria for mechanical phlebitis set by the Infusion Nurses Society of the United States; catheter blockage is divided into partial blockage and complete blockage. Partial blockage means that the medicinal solution can be infused, but it is difficult to aspirate blood back, while complete blockage means that neither the medicinal solution can be infused nor blood can be aspirated back; infection is judged based on the combination of clinical examination results and the diagnosis made by physicians; venous thrombosis is diagnosed according to the “Chinese Expert Consensus on the Prevention and Treatment of Infusion Catheter-related Venous Thrombosis (2020 Edition)” [11].

(3) Quality of Life Score: The Functional Assessment of Cancer Therapy-Breast (FACT-B) scale was used for evaluation [12]. This scale has a total of 36 items in 5 dimensions for assessment. Each item is scored from 0 to 4 points according to the choices, and a higher score indicates a better quality of life for the patient.

(4) Nursing Satisfaction Score: In this study, a self-developed nursing satisfaction assessment tool was adopted. This scale was completed under the joint guidance of the nursing management team, clinical department directors, etc. The reliability and validity test showed that the Cronbach's α coefficient reached 0.883. The assessment work was carried out in stages at the initial stage of the patient's admission and before discharge. The scale covers three core dimensions, namely the inpatient environment, professional skills, and the quality of nursing services, and sets 20 assessment items.

The Likert five-level scoring model (1–5 points) was used for data collection. After the scores of each dimension were calculated by weighting, they were converted into a comprehensive evaluation system on a 100-point scale. The total score range is 0–100 points, and the scoring grade is positively correlated with the degree of satisfaction with the nursing service.

2.4. Statistical methods

All data were recorded in Excel spreadsheets and analyzed using IBM SPSS Statistics 26.0. Categorical variables were expressed as percentages (%) and compared using χ^2 tests. Normally distributed continuous variables were presented as mean $\pm$ standard deviation (SD) and analyzed with Student's t-tests. A two-tailed P -value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of psychological status between groups

The intervention group demonstrated lower scores than the control group for both scales ($P < 0.05$) **Table 2**.

Table 2. Psychological assessment scores (mean $\pm$ SD).

Group	SAS score		SDS score	
	Pre intervention	post intervention	Pre intervention	post intervention
Intervention ($n = 70$)	57.64 $\pm$ 5.28	35.50 $\pm$ 6.24*	58.61 $\pm$ 4.97	42.29 $\pm$ 5.81*
Control ($n = 70$)	57.43 $\pm$ 5.37	42.25 $\pm$ 6.70*	58.90 $\pm$ 4.64	50.28 $\pm$ 5.12*
t	0.233	6.122	0.356	8.632
p -value	0.815	< 0.001	0.721	< 0.001

Note: Compared with before intervention in the same group (* $P < 0.05$).

3.2. Comparison of the incidence of catheterization complications between the two groups of patients

The incidence of catheterization complications in the observation group was 7.14%, which was significantly lower than 18.57% in the control group. The difference between the two groups was statistically significant ($P < 0.05$), **Table 3**.

Table 3. Comparison of the incidence of postoperative complications between the two groups [n , %].

Group	Mechanical phlebitis	Catheter occlusion	Infection	Thrombosis	Total
Intervention ($n = 70$)	2 (2.85)	1 (1.42)	1 (1.42)	1 (1.42)	5 (7.14)
Control ($n = 70$)	4 (5.71)	6 (8.57)	2 (2.85)	1 (1.42)	13 (18.57)
χ^2	-	-	-	-	4.080
p -value	-	-	-	-	0.043

3.3. Comparison of quality of life scores between two groups of patients

The FACT-B scores of the observation group were higher than those of the control group ($P < 0.05$), **Tables 4** and **5**.

Table 4. Comparison of FAET-B scores between two groups (mean $\pm$ SD).

Group	Physical well-being		Social and family status		Emotional	
	Pre intervention	post intervention	Pre intervention	post intervention	Pre intervention	post intervention
Intervention ($n = 70$)	14.77 $\pm$ 2.42	19.24 $\pm$ 4.87*	12.14 $\pm$ 2.19	17.84 $\pm$ 3.76*	11.45 $\pm$ 1.10	14.97 $\pm$ 2.87*
Control ($n = 70$)	14.74 $\pm$ 2.48	16.98 $\pm$ 3.54*	12.11 $\pm$ 2.26	15.54 $\pm$ 3.81*	11.46 $\pm$ 1.11	13.10 $\pm$ 2.43*
t	0.072	3.140	0.026	3.594	0.428	4.160
p -value	0.942	0.002	0.978	< 0.001	0.669	< 0.001

Note: Compared with before intervention in the same group (* $P < 0.05$).

Table 5. Comparison of FACT-B Scores (Functional, Additional Concerns, and Total) between Two Groups (mean $\pm$ SD).

Group	Functional		Additional concerns		Total score	
	Pre intervention	post intervention	Pre intervention	post intervention	Pre intervention	post intervention
Intervention ($n = 70$)	12.25 $\pm$ 0.64	17.12 $\pm$ 2.65*	19.37 $\pm$ 3.37	25.79 $\pm$ 4.58*	68.97 $\pm$ 8.51	93.88 $\pm$ 5.43*
Control ($n = 70$)	12.21 $\pm$ 0.81	14.83 $\pm$ 2.67*	19.36 $\pm$ 3.39	21.54 $\pm$ 4.47*	68.14 $\pm$ 8.66	81.53 $\pm$ 7.42*
t	0.324	5.093	0.017	5.556	0.571	11.237
p -value	0.746	< 0.001	0.986	< 0.001	0.568	< 0.001

Note: Compared with before intervention in the same group (* $P < 0.05$).

3.4. Comparison of nursing satisfaction scores between two groups of patients

At discharge, the nursing satisfaction score of the observation group was higher than that of the control group, and the difference was statistically significant ($P < 0.05$), **Table 6**.

Table 6. Comparison of nursing satisfaction scores between two groups (mean $\pm$ SD).

Group	Pre intervention	At discharge
Intervention ($n = 70$)	80.81 $\pm$ 6.26	95.29 $\pm$ 4.34*
Control ($n = 70$)	80.69 $\pm$ 6.25	88.64 $\pm$ 5.27*
t	0.113	8.149
p -value	0.909	< 0.001

Note: Compared with before intervention in the same group (* $P < 0.05$).

4. Discussion

In recent years, China has witnessed a marked increase in breast cancer incidence, with surgical resection followed by adjuvant chemotherapy emerging as the standard therapeutic approach [13]. Given the inherent vaso-irritant properties of chemotherapeutic agents and the clinical contraindication of reusing previously accessed veins, peripherally inserted central catheter (PICC) placement has become the vascular access modality of choice for most chemotherapy patients. This approach effectively minimizes vascular irritation, reduces trauma from repeated venipuncture, and enhances overall treatment safety [14,15]. For breast cancer patients in particular, PICC offers distinct clinical advantages: its procedural simplicity, high safety profile, and extended indwelling duration (typically 3–12 months) not only facilitate safe

administration of chemotherapeutic agents but also significantly mitigate risks of serious complications such as extravasation-induced phlebitis or tissue necrosis, thereby substantially improving treatment tolerance [16]. Nevertheless, the unique anatomical considerations of breast cancer, coupled with postoperative physical alterations and protracted treatment regimens, collectively predispose patients to considerable psychological distress. Current research demonstrates a disproportionately high prevalence of mood disorders, particularly anxiety and depression, among postoperative breast cancer patients [17]. While conventional psychological interventions—including health education, counseling sessions, and empathetic nursing care—may provide transient relief of negative emotions, they frequently prove inadequate in mobilizing patients' intrinsic psychological resilience. This limitation ultimately compromises their long-term therapeutic efficacy [18,19]. Furthermore, as an invasive procedure, PICC placement carries inherent procedural risks. Technical inexperience may precipitate insertion-site hemorrhage or elevate the likelihood of mechanical phlebitis. Suboptimal post-procedural catheter maintenance can lead to complications ranging from catheter migration to potentially life-threatening venous thrombosis [20].

In recent years, the application of positive psychological interventions in patients with chronic diseases and malignancies has gained increasing attention. Grounded in positive psychology theory, this intervention modality enhances patients' coping mechanisms against disease-related stress by cultivating optimism, psychological resilience, and self-efficacy [21]. Empirical evidence demonstrates that such interventions significantly alleviate anxiety and depressive symptoms in cancer patients while improving treatment adherence and quality of life [22]. However, standalone psychological interventions often lack systematic implementation and sustainability in clinical settings, limiting their integration with complex therapeutic regimens. The PDCA (Plan-Do-Check-Act) cycle, as an established quality management framework, enables continuous optimization of nursing processes through its iterative, closed-loop structure [23]. When applied to PICC management, this model standardizes operational protocols, reduces complication risks, and enhances nursing efficiency. Nevertheless, conventional PDCA implementations frequently prioritize technical refinements over patients' psychological wellbeing, potentially compromising overall care effectiveness. Currently, there remains a paucity of research regarding the combined application of positive psychology and PDCA cycles in PICC management for breast cancer patients undergoing chemotherapy.

This study proposes an integrated intervention combining positive psychology with PDCA cycles to address three key objectives: (1) improving psychological wellbeing, (2) reducing PICC-related complications, and (3) enhancing overall quality of life. The positive psychology component, derived from positive psychology theory, focuses on cultivating patients' happiness, personal strengths, and positive attributes. By addressing negative affect while simultaneously developing psychological resources, this approach facilitates adaptive coping strategies and emotional regulation [24,25]. For breast cancer patients particularly vulnerable to psychological distress due to disease- and treatment-related bodily changes, such interventions prove critical for optimal therapeutic outcomes [26]. Concurrently, the PDCA framework ensures

rigorous quality control throughout the PICC management process. Its cyclical nature allows for timely identification of clinical issues, root cause analysis, and evidence-based protocol adjustments [27,28]. This proves especially valuable given the extended PICC indwelling periods (often coinciding with chemotherapy) that predispose patients to vascular irritation, hypercoagulability-related thrombosis, and infection risks [29,30]. Through iterative PDCA implementation, nursing protocols become increasingly refined and scientifically validated.

Key findings demonstrate the intervention's multidimensional efficacy: Psychological outcomes: The observation group showed significantly lower SAS and SDS scores ($P < 0.05$), indicating superior anxiety and depression management. The positive psychology component's emphasis on cognitive restructuring and resilience-building facilitated a transition from passive endurance to active psychological adaptation. Clinical outcomes: The observation group's complication rate (7.14%) was markedly lower than controls (18.57%, $P < 0.05$). The PDCA cycle's structured quality control enabled early problem detection and protocol optimization, particularly regarding limb exercises and catheter maintenance. Quality-of-life measures: FACT-B scores were significantly higher in the intervention group ($P < 0.05$), reflecting the model's synergistic benefits on both physical and psychological wellbeing. Patient satisfaction: Significantly higher satisfaction scores ($P < 0.05$) underscored the intervention's success in delivering patient-centered care through standardized yet adaptable protocols. This integrative model exemplifies how combining psychological support with systematic quality improvement can transform oncology nursing practice. By simultaneously addressing technical and emotional needs, it establishes a new paradigm for comprehensive cancer care - one that is scientifically rigorous yet profoundly humanistic in its execution.

However, this study has certain limitations: for example: 1) This article is a single-center study: all patients are from the same tertiary grade A hospital, and the professional level of the nursing team is relatively high, which may not fully represent the implementation conditions of grassroots hospitals; 2) Follow-up period: Only the patients were followed up for 6 months, and the incidence of long-term complications of PICC (such as advanced venous thrombosis) could not be evaluated. 3) Sample characteristics: All included patients were female and had TNM stages of I-III. The results may not be applicable to male breast cancer patients or those with advanced (stage IV) breast cancer. 4) Measurement bias: The use of self-developed scales for nursing satisfaction, although tested for reliability and validity, has not been widely verified in other studies, etc. Future research can be improved in the following aspects: (1) Conduct multi-center randomized controlled trials involving patients from medical institutions at different levels; (2) Extend the follow-up period to more than 12 months to evaluate the long-term effect of the intervention measures; (3) Develop digital management tools (such as apps) to further enhance the execution efficiency of the PDCA cycle. Despite the above limitations, the results of this study still have the following generalization value: (1) Population applicability: The sample covered female patients of different age groups, educational levels and marital status from 26 to 67 years old, which is consistent with the epidemiological characteristics of breast cancer in China; (2) Technical accessibility: The PDCA cycle and positive psychological intervention do not require special equipment, and their standardized

operation procedures are easy for other medical institutions to draw on. (3) Cross-cultural potential: Core intervention measures (such as fist clenching exercises and psychological counseling) have been proven effective in multiple international studies, but the details need to be adjusted in accordance with local care norms.

5. Conclusion

This study combines positive psychological intervention with the PDCA cycle model to construct a new PICC placement management strategy. By using the PDCA cycle system framework, psychological intervention measures are embedded into various stages of management, forming a dual dimensional management model of “technology psychology”. This joint intervention model is expected to achieve the following goals: (1) reduce the incidence of PICC related complications and prolong the lifespan of catheters through the PDCA cycle; (2) Relieve patients’ negative emotions and enhance self-management abilities through positive psychological intervention; (3) Through the synergistic effect of both, the treatment experience and quality of life of patients are ultimately improved. At present, the research on the application of positive psychological intervention combined with PDCA circulation in PICC management of breast cancer patients undergoing chemotherapy is relatively limited at home and abroad. This study explores the clinical application effect of this combined model, providing new ideas for optimizing the management of intravenous therapy for cancer patients. The research results not only provide evidence-based support for clinical nursing practice, but also may provide reference for long-term treatment and management strategies for other chronic disease patients. Through scientific evaluation of the impact of this model on patients’ physiological indicators, psychological status and satisfaction, we expect to establish a set of standardized management scheme that can be popularized and replicated, so as to improve the overall nursing service level and help breast cancer patients recover comprehensively.

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Conflict of interest: The authors declare no conflict of interest

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