ORIGINAL RESEARCH

Knowledge, Attitudes, and Practices of Chinese Breast Cancer Patients Towards Comprehensive Postoperative Self-Management: a Cross-Sectional Study

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Purpose: To comprehensively assess the knowledge, attitudes, and practices (KAP) of Chinese breast cancer (BC) patients regarding postoperative self-management (POSM) and identify factors influencing self-management behaviors.

Methods: Questionnaire surveys were administered to BC patients who underwent surgery. A total of 566 participants (98.94% female), mainly from rural areas (65.55%) and married (97.53%), were included. Knowledge was measured using 10 questions (score range: 0–20), attitude with 6 questions (score range: 6–30), and practice with 7 questions (score range: 6–30). Scores were categorized as inadequate (0%–39.99%), moderate (40%–70%), or satisfactory (>70% of maximum score). Demographic data were collected, and statistical analyses, including T-tests, ANOVA, non-parametric tests, and Spearman correlation, were used for comparisons and associations.

Results: The average knowledge score was 20.00 (100% of the maximum score), with correct answer rates ranging from 92.58% to 99.29%. Attitude scores averaged 29.00 (96.66% of maximum), with 95.93–98.76% of participants showing positive or very positive attitudes. The average practice score was 26.00 (86.66% of maximum), with notable gaps in seeking psychological support (28.27% negative responses) and lifestyle adjustments (41.34% negative responses). Pearson correlation analysis revealed positive associations between knowledge and attitude (r = 0.227, p < 0.001), and attitude and practice (r = 0.111, p = 0.008). Multivariable analysis found homemakers showed better practices compared to employed individuals (OR = 9.667, 95% CI = 2.483–37.643, p = 0.001), while those with "other" employment status had lower odds of practice (OR = 0.437, 95% CI = 0.206–0.927, p = 0.031). Patients with Stage II or III tumors had lower odds of practice compared to Stage I tumors (OR = 0.273, 95% CI = 0.110–0.677, p = 0.005; OR = 0.157, 95% CI = 0.060–0.410, p < 0.001, respectively).

Conclusion: This study highlights the importance of addressing gaps between knowledge, attitudes, and practices in BC patients undergoing postoperative recovery. Tailored interventions focusing on specific barriers identified in practice behaviors, such as seeking psychological support and lifestyle adjustments, are crucial to enhance overall postoperative care and improve health outcomes for BC patients.

Keywords: breast cancer, knowledge, attitude, practice, postoperative self-management

Introduction

Breast cancer (BC), characterized by the uncontrolled proliferation of abnormal cells in breast tissue, presents a significant global health challenge, with 2.3 million cases diagnosed and 670,000 deaths recorded in 2022 alone.[1] In China specifically, breast cancer has become the most commonly diagnosed cancer among women, with approximately 416,371 new cases and 117,174 deaths reported in 2020.[2] The age-standardized incidence rate has increased from 21.6 per 100,000 women in 2000 to 36.1 per 100,000 women in 2020.[3] Despite having a lower overall incidence compared to Western countries, China faces unique challenges in breast cancer management due to regional healthcare disparities and varying levels of awareness about the disease.[4] This malignancy typically originates within the milk ducts or lobules of the breast, progressing from non-life-threatening in situ lesions to invasive carcinomas capable of metastasizing to distant sites, thereby posing a grave threat to survival.[5] Management strategies are guided by tumor subtype and stage, with surgery serving as the leading treatment for early-stage and locally advanced disease,[6] despite recent efforts to de-escalate axillary surgery in the early stage.[7] Surgical interventions include lumpectomy, mastectomy, and axillary lymph node assessment, and require meticulous preoperative planning to mitigate associated risks.[8] Patients are usually most involved in the decision-making process.[9] However, research focusing on comprehensive postoperative self-management among BC patients remains limited, creating a notable gap in understanding their overall recovery needs.

The efficacy of postoperative management in BC is known to depend on various factors, including tumor biology (tumor size, lymph node status), patient demographics (age, weight, diabetes mellitus, hypertension, smoking), and surgical techniques (use of electrocautery for flap dissection, length of operation time).[10,11] The quality of post-operative care has critical influence on the overall treatment outcome, and requires collaborative efforts among healthcare providers, patients, and their families.[12,13] Within this intricate interplay among healthcare providers, patients, and their support networks, proactive patient engagement emerges as pivotal to optimize postoperative results. In particular, the education of BC patients promotes adherence to the medical instructions and active participation in the recovery.[14]

Baseline data on knowledge, attitudes, and practices (KAP) towards healthcare issues can be facilitated by the KAP survey methodology.[15] The information collected constitutes a valuable source for the development and implementation of public health interventions aimed at addressing identified challenges and barriers.[15] While postoperative care is crucial for BC patients, current research on Knowledge, Attitude, and Practice (KAP) towards postoperative self-management (POSM) remains fragmented. Existing studies, both in China and internationally, have primarily concentrated on specific complications such as lymphedema,[16–18] neglecting the broader spectrum of postoperative experiences and self-management needs. This narrow focus has created a significant knowledge gap in understanding how BC patients navigate their overall postoperative recovery journey.

After surgery, poor management of symptoms has been denoted as a significant obstacle to postoperative recovery and patient contentment.[19,20] Patients are often discharged home solely based on the results of the procedure, rather than their capacity for self-care at home. However, patients and their families who effectively engage in self-management experience enhanced health outcomes.[21] While several studies have examined specific aspects of post-operative care, such as lymphedema management[18] or wound healing,[13] comprehensive research on general post-operative self-management behaviors among Chinese breast cancer patients remains limited. Given the relevance of adequate POSM, particularly after BC surgery, we aimed to investigate, for the first time, the KAP of Chinese general BC patients towards POSM. By filling a notable gap in existing literature on BC POSM, this study seeks to inform tailored interventions that optimize postoperative recovery and enhance overall quality of care for BC patients. Findings from this study will inform the development of targeted educational programs and interventions tailored to the Chinese healthcare context. Previous research has demonstrated that culturally appropriate interventions significantly improve self-management behaviors and health outcomes in cancer patients.[22] Our research provides a foundation for future studies exploring implementation strategies for postoperative care improvement programs that address the specific needs identified in this population.

Methods

Study Design and Participants

This cross-sectional study was conducted from September 1, 2023, to January 7, 2024, at The First Affiliated Hospital of Bengbu Medical University and Bengbu Hospital of Shanghai General Hospital (The Second Affiliated Hospital of Bengbu Medical University). The study participants were breast cancer patients who had undergone surgical treatment. This study received ethical approval from the Medical Ethics Committee of the Second Affiliated Hospital of Bengbu Medical University, and obtained informed consent from the participants before questionnaire collection.

The inclusion criteria comprised individuals who met the following conditions: 1) Breast cancer patients undergoing surgical treatment; 2) Patients demonstrating clear consciousness, normal cognitive function, absence of communication barriers, and capability to complete the questionnaire survey; 3) Voluntary consent for participation in the study and willingness to engage in the survey following informed consent. Specifically, the study included breast cancer patients over 18 years old who underwent different types of surgical procedures, including radical mastectomy, modified radical mastectomy, nipple-areola complex sparing mastectomy with simple mastectomy, total mastectomy with sentinel lymph node biopsy, and breast-conserving surgery with sentinel lymph node biopsy. Patients with different tumor stages (Stage I, II, III, and IV) were included to ensure comprehensive representation.

Patients were excluded from participation if they met any of the following conditions: 1) Inability to complete the questionnaire survey; 2) Withdrawal from the questionnaire survey midway; 3) Presence of severe heart, lung, kidney, liver, or other organ diseases; 4) Diagnosis of mental disorders; 5) Primary malignant tumors in other parts of the body.

The KAP questionnaire was distributed to the study participants through the Wenjuanxing platform (https://www.wjx.cn/app/survey.aspx). Before questionnaire collection, research assistants received uniform standardized training, including the purpose, approach, methods, and communication skills of the survey. They diligently familiarized themselves with the questionnaire content and employed consistent language to explain the purpose, significance, filling procedure, and precautions of the survey to the patients. This study was conducted with the consent of the hospital and departmental cooperation, and strictly adhered to predefined inclusion and exclusion criteria for participant selection. Respecting the privacy of the respondent, the survey was carried out anonymously, with timing tailored to their convenience. Patients unable to independently complete the questionnaire were provided with impartial explanations and assistance to ensure data objectivity. Following questionnaire completion, prompt retrieval and follow-up procedures were implemented to address any oversights or deficiencies.

Questionnaire Design and Scoring

The questionnaire design was based on relevant guidelines and previous literature.[18,23,24] Following the initial design phase, feedback from three clinical nursing experts was sought and integrated into modifications, leading to the creation of the first draft. Subsequently, the questionnaire was pilot-tested with 38 respondents. Pre-experimental feedback indicated a Cronbach's α coefficient of 0.751, suggesting good overall reliability of the study instrument. Cronbach's alpha is a measure of internal consistency that indicates how closely related a set of items are as a group, with values above 0.7 generally considered acceptable for confirming the reliability of the scale. The final questionnaire comprised four dimensions: demographic data, knowledge dimension, attitude dimension, and practice dimension. The knowledge dimension consisted of 10 questions covering topics such as diet, exercise, and medication. Participants received 2 points for correct answers, 1 point for incorrect answers, and 0 points for unclear responses, with a score range of 0 to 20 points. The attitude dimension included 6 questions employing a five-point Likert scale ranging from "very positive" (5 points) to "very negative" (1 point), with a score range of 6 to 30 points. The practice dimension comprised 7 questions, with questions 1 to 6 also utilizing a Likert scale ranging from "always" (5 points) to "never" (1 point), with a score range of 6 to 30 points. The scores of each of the three KAP dimensions were categorized into three levels: inadequate (0–39.99% of the top scoring), moderate (40–70% of the top scoring), and satisfactory (>70% of the top scoring).

Statistical Methods

Descriptive analysis was conducted for the demographic data and the KAP scores of the participants. Continuous variables were expressed using the mean ± standard deviation along with quartiles, while categorical variables, including various demographic characteristics and responses to each question, were presented as frequencies (%). The knowledge, attitude, and practice dimension scores among participants with different demographic characteristics were compared. *t*-test, or analysis of variance, or non-parametric tests were performed to compare differences across groups. Furthermore, considering female patients exclusively, Pearson's correlation was utilized to assess the relationships between knowledge, attitude, and practice scores. Additionally, multiple regression analysis was conducted, with the practice score as the dependent variable. This analysis aimed to explore the relationship between demographic data, knowledge, and attitude with practice. Practice scores were categorized based on their distribution, using the 60th percentile as the cutoff point. In the multiple regression analysis, forward selection was applied, gradually integrating variables with p-values less than 0.1 from single-factor analysis into the model. Throughout the analysis, p-values were reported to three decimal places, and variables with p-values less than 0.05 were considered statistically significant. For data processing and analysis, statistical software such as SPSS 22 and AMOS 22 were used.

Results

Baseline Characteristics

A total of 588 questionnaires were collected. Seven cases were excluded for selecting option A for all KAP dimensions, and 15 cases were excluded due to logical errors in responses. As a result, 566 valid questionnaires remained, yielding an effective response rate of 96%. The effective response rate was 96%. Table 1 shows the baseline characteristics of the participants. Among them, the vast majority were females (560/566, 98.94%). Most respondents lived in rural areas (371/566, 65.55%) and were married (552/566, 97.53%), while half of the sample had a primary school or below educational level (296/566, 52.30%). No age or employment status was particularly predominant.

Table 1 Basic Information of Participants and KAP Score

Baseline	N	%	Knowledge Score			Attitude Score			Practice Score		
			Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P
Total	566		20.00	20.00, 20.00		29.00	27.00, 30.00		26.00	24.00, 29.00	
Age											
≤45	141	24.91	20.00	20.00, 20.00	0.451	29.00	27.00, 30.00	0.146	26.00	24.00, 29.00	0.183
45–50	103	18.20	20.00	20.00, 20.00		29.00	27.00, 30.00		27.00	24.00, 30.00	
50–55	129	22.79	20.00	20.00, 20.00		28.00	27.00, 30.00		27.00	24.00, 30.00	
>55	193	34.10	20.00	20.00, 20.00		28.00	26.00, 30.00		26.00	24.00, 28.00	
Gender											
Male	6	1.05	20.00	19.00, 20.00	0.772	29.00	27.50, 29.00	0.889	26.83	3.43	0.531
Female	560	98.94	20.00	20.00, 20.00		29.00	27.00, 30.00		26.05	3.03	

(Continued)

Table 1 (Continued).

Baseline	N	%	Knowledge Score			Attitude Score			Practice Score		
			Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P
Residence											
Urban	195	34.45	20.00	20.00, 20.00	0.537	29.00	27.00, 30.00	0.034	27.00	24.00, 29.00	0.281
Rural	371	65.55	20.00	20.00, 20.00		28.00	27.00, 30.00		26.00	24.00, 29.00	
Education											
Primary school and below	296	52.30	20.00	20.00, 20.00	0.382	28.00	26.00, 30.00	0.006	26.00	24.00, 29.00	0.280
Junior high school	178	31.45	20.00	20.00, 20.00		28.50	27.00, 30.00		26.00	24.00, 29.00	
High school/ technical school	49	8.66	20.00	20.00, 20.00		29.00	27.00, 30.00		26.00	24.00, 27.00	
College and above	43	7.60	20.00	20.00, 20.00		30.00	28.00, 30.00		27.00	24.00, 30.00	
Marital status											
Married	552	97.53	20.00	20.00, 20.00	0.022	27.97	2.21	0.948	26.04	3.04	0.241
Other	14	2.47	20.00	18.75, 20.00		27.93	2.02		27.00	2.75	
Employment status											
Employed	41	7.24	20.00	20.00, 20.00	<0.001	29.00	27.00, 30.00	0.234	27.00	24.00, 30.00	<0.001
Unemployed	115	20.32	20.00	20.00, 20.00		29.00	26.00, 30.00		25.00	24.00, 30.00	
Retired	64	11.31	20.00	20.00, 20.00		29.00	27.00, 30.00		26.00	24.00, 30.00	
Self-employed	19	3.36	20.00	19.00, 20.00		30.00	26.00, 30.00		28.00	25.00, 30.00	
Homemaker	74	13.07	20.00	19.00, 20.00		30.00	25.00, 30.00		30.00	27.00, 30.00	
Other	253	44.70	20.00	20.00, 20.00		28.00	27.00, 30.00		25.00	23.00, 30.00	
Average Monthly Family Income (CNY)											
<5000	413	72.97	20.00	20.00, 20.00	0.694	28.00	26.00, 30.00	0.007	26.00	24.00, 29.00	0.381
≥5000	153	27.03	20.00	20.00, 20.00		29.00	27.50, 30.00		26.00	24.00, 29.00	
Type of Breast Cancer Surgery											
Radical Mastectomy	29	5.12	20.00	18.00, 20.00	0.008	27.69	2.90	0.364	28.28	2.52	<0.001
Modified Radical Mastectomy	301	53.18	20.00	20.00, 20.00		27.87	2.29		26.26	2.98	
Nipple-Areola Complex Sparing Mastectomy + Simple Mastectomy	12	2.12	20.00	20.00, 20.00		27.17	3.43		26.67	3.82	
Total Mastectomy + Sentinel Lymph Node Biopsy	150	26.50	20.00	20.00, 20.00		28.09	1.86		25.25	2.92	
Breast-Conserving Surgery + Sentinel Lymph Node Biopsy	68	12.01	20.00	20.00, 20.00		28.37	1.86		25.82	3.12	
Unclear	6	1.06	20.00	19.25, 20.00		28.17	2.56		27.00	2.00	

(*Continued*)

Table 1 (Continued).

Baseline	N	%	Knowledge Score			Attitude Score			Practice Score		
			Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P	Mean/ Median	SD/ Quartile	P
Tumor Stage											
Stage I	48	8.48	20.00	19.25, 20.00,	0.030	28.31	2.28	0.034	28.06	2.35	<0.001
Stage II	384	67.84	20.00	20.00, 20.00		28.07	2.10		26.07	3.03	
Stage III	126	22.26	20.00	20.00, 20.00		27.62	2.40		25.24	3.01	
Stage IV	8	1.41	20.00	18.25, 20.00		26.50	2.51		26.50	2.20	

Distribution of Knowledge, Attitude, and Practice Scores

The mean knowledge score of the study population was 20.00 (SD/quartile = 20.00, 20.00) out of 20 points, reaching a clear satisfactory level (100.00%). There was a very high rate of correct answers among the respondents, ranging from 92.58% to 99.29% (Table 2). The questions with the most frequent right answers were 6 "During the recovery period, strenuous physical activities should be avoided" and 10 "Regular follow-up examinations and appointments are necessary postoperatively" (both 99.29%). Significant differences in the knowledge levels were detected depending on the marital status (p = 0.022), the employment situation (p < 0.001), the type of breast surgery (p = 0.008), and the tumor stage (p = 0.030), (Table 1).

At the attitude level, the mean score among the participants was 29.00 (SD/quartile = 27.00, 30.00) out of 30 points, displaying also a strong satisfactory level (96.66%). All six enquired statements received "very positive" responses from the majority of the participants, with a proportion ranging from 51.94% to 83.92%. Item 1 "I believe that self-management after surgery is crucial for the recovery from breast cancer" was at the top of the "very positive" responses (83.92%). The percentages of the "very positive" and "positive" outcomes were even higher when combined (95.93 to 98.76%) (Table 3). In particular, the patients showed significant differences in attitude according their residence location (p = 0.034), education (p = 0.006), average monthly family income (p = 0.007), and tumor stage (p = 0.034), (Table 1).

In the Practice dimension, the mean score was 26.00 (SD/quartile = 24.00, 29.00) out of 30 points, reaching a satisfactory level (86.66%). In comparison to the knowledge and attitude dimensions, the satisfactory level was lower, and not all the enquires displayed "very positive" outcomes from the majority of the respondents (Table 4).

Table 2 Knowledge Dimension of the Participants

	N (%)
	Correct
1. After surgery, it is important to pay attention to diet and maintain healthy eating habits.	559(98.76)
2. Failure to engage in functional exercises postoperatively may lead to scar contracture, with severe cases resulting in the inability to lift the upper limb.	551(97.35)
3. Six hours after surgery, finger and wrist joint movements can be performed in bed.	554(97.88)
4. Elbow movements can be initiated three days after surgery.	553(97.70)
5. Upper arm movements can gradually begin one week after surgery.	555(98.26)
6. During the recovery period, strenuous physical activities should be avoided.	562(99.29)
7. Herbal supplements or health products can be used at one's discretion.	524(92.58)
8. It is essential to adhere to the prescribed medication regimen postoperatively.	555(98.06)
9. Regular breast self-examination is necessary after surgery.	558(98.59)
10. Regular follow-up examinations and appointments are necessary postoperatively.	562(99.29)

Table 3 Attitude Dimension of the Participants

Attitude	N (%)				
	Very Positive	**Positive**	**Neutral**	**Negative**	**Very Negative**
1. I believe that self-management after surgery is crucial for the recovery from breast cancer.	475(83.92)	80(14.13)	10(1.77)	1(0.18)	0
2. I am willing to actively participate in and take charge of my own recovery process.	435(76.86)	122(21.55)	9(1.59)	0	0
3. I believe that self-management can alleviate discomfort and side effects after breast cancer surgery.	374(66.08)	177(31.27)	15(2.65)	0	0
4. I believe that self-management can enhance the success rate of breast cancer recovery.	328(57.95)	227(40.11)	11(1.94)	0	0
5. My family provides sufficient support for my self-management process after breast cancer surgery.	422(74.56)	137(24.20)	6(1.06)	1(0.18)	0
6. Social support positively impacts and assists in my breast cancer recovery process.	294(51.94)	249(43.99)	20(3.53)	2(0.35)	1(0.18)

Four out of the six questions had percentages from 62.01% to 93.29% of "very positive" practice, with "Have you adhered to regular check-ups and screenings as advised by your doctor?" showing the highest rate. There were some questions with notable percentages of negative practice, namely 3 "Have you proactively sought information and remained vigilant about potential complications and warning signs postoperatively?" (34.45%), 5 "Have you sought psychological support and services related to mental health after breast cancer surgery?" (28.27%), and 6 "Have you adjusted your lifestyle, such as dietary habits, exercise routines, and sleep patterns, to promote postoperative recovery?" (41.34%). The demographic factors associated with significant differences in the practice levels were employment status ($p < 0.001$), type of BC surgery ($p < 0.001$) and tumor stage ($p < 0.001$).

Correlation Analysis of Knowledge, Attitude, and Practice Among Female Participants Only

Pearson correlation analysis of the KAP scores in women only revealed positive associations between knowledge and attitude ($r = 0.227$, $p < 0.001$), and attitude and practice ($r = 0.111$, $p = 0.008$), (Table 5).

Table 4 Practice Dimension of the Participants

Practice	N (%)			
	Very positive	**Positive**	**Neutral**	**Negative**
1. During the recovery period after surgery, have you actively engaged in physical activities and exercise?	500(88.34)	56(9.89)	3(0.53)	7(1.24)
2. Have you followed the proper wound care and dressing change instructions?	512(90.46)	52(9.19)	1(0.18)	1(0.18)
3. Have you proactively sought information and remained vigilant about potential complications and warning signs postoperatively?	280(49.47)	82(14.49)	9(1.59)	195(34.45)
4. Have you adhered to regular check-ups and screenings as advised by your doctor?	528(93.29)	37(6.54)	1(0.18)	0
5. Have you sought psychological support and services related to mental health after breast cancer surgery?	351(62.01)	37(6.54)	18(3.18)	160(28.27)
6. Have you adjusted your lifestyle, such as dietary habits, exercise routines, and sleep patterns, to promote postoperative recovery?	248(43.82)	57(10.07)	27(4.77)	234(41.34)

Table 5 Correlation Analysis of KAP Scores

	Knowledge	**Attitude**	**Practice**
Knowledge	1		
Attitude	0.227 (P<0.001)	1	
Practice	0.001 (P=0.985)	0.111 (P=0.008)	1

Multiple Factor Analysis of Practice Among Female Patients Only

As shown in Table 6, multivariable analysis the participants who were homemakers (vs employed) showed a strongly positive association with better practices (OR = 9.667, 95% CI = 2.483–37.643, P = 0.001). Conversely, those with "other" employment status, had lower odds of practice (vs employed, OR = 0.437, 95% CI = 0.206–0.927, P = 0.031). Patients with Stage II or Stage III tumors had lower odds of practice versus those with Stage I tumors (OR = 0.273, 95% CI = 0.110–0.677, P = 0.005, and OR = 0.157, 95% CI = 0.060–0.410, P < 0.001; respectively).

Discussion

This study investigated the KAP of BC patients towards POSM in a Chinese population. The findings revealed high levels of knowledge and positive attitudes among participants, the majority of whom recognized the importance of self-management for postoperative recovery. However, the practice dimension exhibited some gaps, with notable percentages of negative practice reported in certain areas, such as seeking psychological support and adjusting lifestyle habits. Importantly, correlations were found between knowledge and attitude, as well as attitude and practice among female participants. Multiple factor analysis highlighted associations between demographic factors and practice, indicating that employment status and tumor stage significantly influenced practice behavior. Clinically, these results underscore the importance of tailored interventions to bridge the gap between positive attitudes and actual practice behaviors in BC patients undergoing postoperative recovery. Healthcare providers should prioritize education and support services aimed at promoting proactive self-management strategies, particularly targeting areas where practice behaviors may be lacking.

Table 6 Factors of Practice Based Univariable and Multivariable Logistic Regression

	Univariable		**Multivariable (Forward, P<0.1)**	
	OR (95% CI)	**P**	**OR (95% CI)**	**P**
Knowledge score	0.945(0.817 1.092)	0.441		
Attitude score	1.051(0.974 1.134)	0.203		
Age				
≤45	ref.			
45–50	1.210(0.716 2.045)	0.476		
50–55	1.184(0.724 1.936)	0.501		
>55	0.958(0.616 1.491)	0.851		
Residence				
Urban	ref.			
Rural	0.763(0.532 1.093)	0.140		
Education				
Primary school and below	ref.			
Junior high school	1.013(0.693 1.481)	0.946		
High school/ technical school	1.158(0.619 2.164)	0.646		
College and above	1.551(0.777 3.096)	0.213		
Marital status				
Married	ref.			
Other	1.157(0.383 3.499)	0.796		

(*Continued*)

Table 6 (Continued).

	Univariable		Multivariable (Forward, P<0.1)	
	OR (95% CI)	P	OR (95% CI)	P
Employment status				
Employed	ref.		ref.	
Unemployed	0.429(0.196 0.938)	0.034	0.476(0.214 1.059)	0.069
Retired	0.536(0.229 1.256)	0.151	0.656(0.275 1.567)	0.343
Self-employed	1.956(0.476 8.038)	0.352	2.010(0.477 8.460)	0.341
Homemaker	8.678(2.59 33.342)	0.002	9.667(2.483 37.643)	0.001
Other	0.375(0.180 0.782)	0.009	0.437(0.206 0.927)	0.031
Average Monthly Family Income (CNY)				
<5000	ref.			
≥5000	0.822(0.564 1.198)	0.308		
Type of Breast Cancer Surgery				
Radical Mastectomy	ref.			
Modified Radical Mastectomy	0.282(0.096 0.831)	0.022		
Nipple-Areola Complex Sparing Mastectomy + Simple Mastectomy	0.320(0.065 1.582)	0.162		
Total Mastectomy + Sentinel Lymph Node Biopsy	0.160(0.053 0.482)	0.001		
Breast-Conserving Surgery + Sentinel Lymph Node Biopsy	0.229(0.072 0.730)	0.013		
Unclear	0.800(0.073 8.752)	0.855		
Tumor Stage				
Stage I	ref.		ref.	
Stage II	0.230(0.096 0.555)	0.001	0.273(0.110 0.677)	0.005
Stage III	0.130(0.052 0.327)	<0.001	0.157(0.060 0.410)	<0.001
Stage IV	0.429(0.070 2.631)	0.360	0.484(0.072 3.251)	0.455

To the best of our knowledge, this is the first study to analyze the KAP of BC patients towards POSM considering a general postoperative experience. While comparable literature is lacking, previous research has examined the KAP of BC patients specifically concerning POSM related to lymphedema. For instance, a recent cross-sectional study conducted in the Shanghai area highlighted that patients exhibited a moderate level of knowledge, attitude, and practice towards lymphedema complications following BC surgery[18] surgery. Conversely, similar research on postoperative lymphedema prevention in China revealed poor knowledge levels among patients in the Lianyungang region,[25] which markedly lagged behind the global median knowledge rate on this malady.[26] Subsequent interviews with Chinese BC patients and healthcare practitioners underscored the necessity for healthcare professionals to offer expanded educational initiatives and holistic assistance to strengthen the POSM of patients toward lymphedema.[27] The high KAP levels observed in this study underscore the existence of regional disparities in related KAP scores throughout China. These differences necessitate careful consideration in the planning and implementation of educational campaigns.

In contrast to research demonstrating a positive correlation between knowledge and improved self-management after BC surgery,[18] our investigation revealed some divergence between the knowledge/attitudes of the patients and their actual POSM practices. Although every KAP dimension reached a satisfactory overall level, self-reported scores indicated lower levels of self-management behavior compared to knowledge and attitudinal measures. After the multi-variate regression analysis, no significant associations were detected between practice and knowledge or attitude. Given the observed gap between knowledge/attitudes and actual practice, providers should focus on translating educational content into practical skills through hands-on training and consistent follow-up support.

On the other hand, our analysis suggests that factors such as employment status, tumor stage, and homemaker role influence the implementation of self-management strategies. However, previous research concerning POSM of lymphedema have shown inconsistencies in the significant influence of educational level, age and employment status on good KAP scoring.[18,26] Our findings revealed that employment status significantly influenced practice behaviors, with

homemakers showing notably better practice scores compared to employed individuals. This may be attributed to homemakers having more flexible time management for self-care activities and potentially greater engagement with healthcare information due to fewer competing professional demands. Conversely, the lower practice scores among employed individuals might reflect the challenges of balancing work commitments with postoperative self-management routines. The association between tumor stage and practice scores, where patients with Stage II or III tumors demonstrated lower practice levels compared to Stage I, could be explained by several factors. Advanced-stage patients might face more complex treatment regimens, increased psychological burden, and potentially more severe symptoms, all of which could impact their ability or motivation to engage in comprehensive self-management practices.[28] Additionally, the psychological impact of a more advanced diagnosis might affect patients' self-efficacy and consequently their engagement with self-management activities. Additionally, variations in sample demographics like socioeconomic status or disease severity might influence results. These results suggest that indicate the need for integrated care pathways that combine physical recovery support with mental health services and lifestyle coaching. For advanced-stage patients who demonstrated lower practice scores, providers should consider implementing more intensive support programs with frequent check-ins and simplified self-management protocols that account for their increased symptom burden. Additionally, targeted interventions designed to address specific barriers faced by different patient subgroups (eg, employed vs homemaker) could be developed. To address the needs of employed patients, flexible support programs including evening clinics and online consultations could improve engagement with self-management activities.

Strengths of this study include its cross-sectional design, which enhances the generalizability of findings to other patient populations. Additionally, the rigorous methodology, including standardized questionnaire administration and statistical analysis, strengthens the validity of results. However, several limitations should be noted. First, the significant gender imbalance in our sample, with only six male participants (1.05%), limits the generalizability of our findings to male BC patients. While BC predominantly affects females, with males accounting for approximately 1% of all BC cases globally, future studies should attempt to include a larger male cohort to better understand their specific postoperative self-management needs and challenges. Second, the reliance on self-reported data could introduce social desirability bias. Third, the exclusion of certain patient groups, such as those with severe comorbidities or mental health conditions, may affect the comprehensiveness of our findings. Additionally, our study did not collect data on tumor grade or specific adjuvant treatment types such as hormone therapy or radiation therapy, which may have influenced patients' knowledge, attitudes, and practices toward postoperative self-management. Furthermore, the study focus on Chinese BC patients may limit the generalizability of findings to other cultural or geographical contexts. Our study's cross-sectional design prevents establishing causal relationships between variables. Self-reported data may introduce recall and social desirability bias. Additionally, data collection in the Bengbu area may not represent the diversity of healthcare experiences across different Chinese provinces with varying medical resources. Future research should include longitudinal designs to track KAP changes over time, intervention studies testing educational programs, and multi-center approaches across different regions of China. Qualitative studies could explore the reasons behind lower practice scores versus knowledge and attitude.

Conclusion

In summary, this study provides valuable insights into the KAP of BC patients towards POSM, highlighting areas for intervention and improvement in postoperative care delivery. Moving forward, efforts should focus on developing tailored interventions that address specific barriers to practice adherence, particularly in areas such as psychological support and lifestyle modification. Collaborative efforts between healthcare providers, patients, and support networks are essential to optimize postoperative recovery and enhance overall quality of care for BC patients. Future research should explore innovative approaches to patient education and support services, leveraging technology and community resources to empower patients in their self-management journey. Practical applications include developing targeted preoperative education emphasizing psychological support and lifestyle modifications, creating accessible digital support resources for patients after discharge, implementing tiered support systems based on tumor stage, and training healthcare providers to help patients translate knowledge into practice behaviors. By addressing the holistic needs of BC patients during postoperative recovery, we can improve health outcomes and quality of life for individuals affected by this disease.

Data Sharing Statement

All data generated or analysed during this study are included in this published article.

Ethics Approval

This study was performed in line with the principles of the Declaration of Helsinki. This study received ethical approval from the Medical Ethics Committee of the Second Affiliated Hospital of Bengbu Medical University (AF/SC-08/04.2). The study obtained informed consent from the participants before questionnaire collection.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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