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Evaluating Body Image Disturbance and Its Influencing Factors in Breast Cancer Patients Following Unilateral Mastectomy

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ABSTRACT

Background: Patients with unilateral breast loss after single mastectomy for breast cancer may have body image disorders such as surgical lymphedema, flap ischemia, and spinal deformity, resulting in negative emotions such as depression, inferiority, and social dysfunction. This study mainly investigated and analyzed the status quo and influencing factors of body image disorder in breast cancer patients after single mastectomy.

Methods: This study is a cross-sectional study. Breast cancer patients admitted from May 2023 to April 2024 were selected as the research subjects. Data were collected with a general information questionnaire, the Body Image Scale (BIS), the Self-Image Scale, the Self-Acceptance Questionnaire, and the Perceived Social Support Scale. Based on the scores, the research subjects were divided into a body image disturbance group and a non-disturbance group. Univariate and multiple logistic regression analyses were conducted to analyze the influencing factors of body image disturbances in breast cancer patients.

Results: One hundred fifty questionnaires were distributed in this study, and 146 valid questionnaires were collected. Among the 146 patients, 51 (34.93%) experienced body image disturbances after surgery, while 95 (65.07%) did not. The results of univariate and multiple logistic regression analyses showed that educational level, lymphedema in the affected limb, intimate relationships, self-image, self-acceptance, and perceived social support scores were independent risk factors for body image disturbances in breast cancer patients after surgery ($P < .05$).

Conclusion: Body image disturbances in breast cancer patients who undergo unilateral mastectomy need further improvement. Educational level, lymphedema in the affected limb, intimate relationships, self-image, self-acceptance, and perceived social support are the main influencing factors.

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INTRODUCTION

Breast cancer, as one of the most common malignancies among women, originates from the tissues of the breast, typically occurring in the nipple and areola region of the breast.[1-3] According to the 2020 global cancer statistics released by the International Agency for Research on Cancer, there were 19.3 million new cancer cases and nearly 10 million deaths worldwide in 2020. Among them, breast cancer accounted for 2.3 million new cases, with an incidence rate of 11.7%, and surpassed lung cancer with an incidence rate of 11.4%, making it the most common cancer globally. Furthermore, it is estimated that by 2040, the number of new cancer cases worldwide will increase by 47% in comparison to 2020, reaching 28.4 million cases.[4,5] In China, breast cancer is the most common malignant tumor among women, ranking first in the incidence rate and fourth in mortality rate among female malignancies.[6]

Currently, clinical treatments for breast cancer include tumor resection (such as breast-conserving surgery or total mastectomy), radiotherapy, chemotherapy, and targeted therapy. With advances in medical technology, the survival rate for breast cancer patients has reached 90%.[7] However, breast removal surgery not only compromises the integrity of the breast but also imposes a severe dual burden on patients, both physically and psychologically, with long-term negative psychological effects.[8,9]

Body image disturbance (BID), also known as body image dysphoria, refers to individuals' negative cognitive,

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emotional, and behavioral experiences regarding their bodies.[10] After unilateral mastectomy for breast cancer, patients experience the absence of 1 breast, which can lead to body image disturbances such as lymphedema on the affected side, flap ischemia, and spinal deformity. This may result in reluctance or avoidance of normal social activities, leading to negative emotions like depression, low self-esteem, and social impairment, exacerbating the degree of body image disturbance and even affecting the patients' physical and mental health.[11] A Turkish study on the quality of life of breast cancer patients after surgery pointed out that surgery will bring both physical and psychological harm to breast cancer patients. Breast resection will lead to significant changes in the patient's body image, thus affecting self-cognition and later quality of life.[12] Through research, we can deeply understand the status quo of patients' body image and provide a basis for formulating targeted interventions, so as to help patients better adapt to body changes and improve their quality of life.

The primary task of this study is to clarify the current situation of body image in breast cancer patients after a single mastectomy, to explore the incidence of body image disorder, and to identify the influencing factors of body image disorder. It is expected to provide important reference and guidance for improving the body image level and psychological status of breast cancer patients, help to optimize intervention strategies, and improve the long-term quality of life of patients.

MATERIAL AND METHODS

Patients

This study is a cross-sectional study conducted among breast cancer patients. Convenient sampling was used to select patients admitted between May 2023 and April 2024 as the research subjects. The inclusion criteria were as follows: clinically and pathologically diagnosed with breast cancer; female aged 18 years or above; successfully completed single mastectomy for at least 3 months; clear consciousness, normal language communication; informed consent and voluntary participation in the study. The exclusion criteria were as follows: patients with concomitant other malignant tumors; unable to cooperate with investigators for various reasons. This study obtained approval from the hospital's Medical Ethics Committee.

MAIN POINTS

- The prevalence of body image disturbances in breast cancer patients after unilateral mastectomy is 34.93%.
- The occurrence of body image disturbances is associated with patients' educational level, social support, and personal psychological factors.
- Targeted nursing interventions can improve body image disturbances.

Sample Size Calculation Method

According to the calculation requirement in multivariable analysis, which suggests a sample size of 5-10 times the number of variables,[13] this study involved a total of 13 variables. Taking into account a 20% rate of invalid questionnaires, the estimated sample size ranged from 78 to 156 cases. Ultimately, a sample size of 150 cases was determined.

RESEARCH TOOLS

General Information Questionnaire: The researchers designed a self-administered questionnaire that included items on age, education level, marital status, reproductive history, employment status, average monthly family income, type of medical payment, disease staging, occurrence of lymphedema in the affected limb, and intimate relationship. The assessment of intimate relationships utilized the Locke–Wallace marital adjustment test (MAT), which consists of 15 items with a total score ranging from 2 to 158. Higher scores indicate a more intimate relationship, with a total score below 100 indicating marital adjustment problems and a score of 100 or above representing a good intimate relationship. The scale has good applicability in Chinese lymphoma patients and their spouses, and Cronbach's α coefficient is 0.902.[14]

Body Image Scale: Body Image Scale (BIS) was used to assess patients' body image disturbance. The scale consists of 10 items, each rated on a 4-point Likert scale ranging from 0 ("not at all") to 3 ("very much"). A score of 0 represents "not at all," 1 represents "a little," 2 represents "quite a lot," and 3 represents "very much." The total score ranges from 0 to 30, with higher scores indicating a greater presence of negative body image symptoms. The overall scale has good internal consistency and strong structural validity. The overall Cronbach's α coefficient for the scale was 0.93. According to the classification criteria of body image disorder by Weingarde.[15] and other scholars, a BIS score ≥10 points indicated that there was an obvious body image disorder, and the subjects were divided into a body image disorder group and a non-body image disorder group.

Body Image and Breast Cancer Questionnaire: Body Image and Breast Cancer Questionnaire (BIBCQ) was used to assess patients' body image disturbance. This questionnaire consists of 6 dimensions: body shame, disease susceptibility, functional limitations, transparency, body preoccupation, and arm preoccupation. It comprises a total of 53 items, each rated on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The total score ranges from 53 to 265, with higher scores indicating poorer self-image. The scale had good applicability in patients with breast cancer resection in Sweden, and the Cronbach's α coefficient was 0.9177.[16]

Self-Acceptance Questionnaire: Self-Acceptance Questionnaire (SAQ) was used to assess patients' level of self-acceptance. This questionnaire consists of 2 dimensions: self-acceptance and self-evaluation. It includes 16 items, each rated on a 4-point Likert scale, ranging from 1 ("very different") to 4 ("very similar"). Eight items are reverse-scored, and the sum of all item scores yields the total score, which ranges from 16 to 64. Higher scores indicate better self-acceptance. The scale had good applicability in Chinese breast cancer patients, and the Cronbach's α coefficient was 0.85.[17]

Perceived Social Support Scale: Perceived Social Support Scale (PSSS) was used to assess individuals' perceived social support from various sources. This scale consists of 12 items, each rated on a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The total score ranges from 12 to 84, with higher scores indicating higher levels of perceived social support. The scale had good applicability in Spanish cancer patients. The Cronbach's α coefficients for the different dimensions and the overall scale range from 0.813 to 0.840.[18]

Procedure

Two trained and qualified investigators conducted face-to-face interviews in a quiet examination room to survey eligible patients who met the inclusion criteria. Prior to the research, the researchers introduced the purpose and significance of the study to the patients and explained the method of questionnaire completion using standardized instructions. After obtaining the patients' consent, the questionnaires were distributed, and the patients were asked to fill them out. If any difficulties arose, the investigators provided assistance in completing the questionnaires. After the patients completed the questionnaires, the investigators checked for any errors and collected the completed questionnaires on the spot, excluding any invalid questionnaires. In this study, breast cancer patients admitted from May 2023 to April 2024 from Lishui Municipal Central voluntarily participated in the survey. The study was approved by the Ethics Committee of Lishui Municipal Central Hospital (Approval Number.: 2024-390).

Statistical Methods

The data were analyzed with Statistical package for social sciences (SPSS) 27.0 software (IBM Corp., Armonk, NY, USA). All data were tested for normal distribution, and the measurement data conforming to a normal distribution were expressed as mean ± standard deviation. The independent sample *t*-test was used for comparison between groups. The measurement data of skewed distribution were expressed as median (M (Q1, Q3)), and the rank sum test was used for comparison between groups. The count data were expressed as n (%), and the Chi-square test was used for comparison. $P < .05$ was considered statistically significant. Receiver operating characteristic (ROC) curve was used to evaluate the best cut-off values of self-image, self-acceptance, and perceived social support. Multiple logistic regression analysis was conducted to identify the influencing factors of body image disturbance in breast cancer patients. The significance level was set at $\alpha = 0.05$.

RESULTS

General Information of Breast Cancer Patients

One hundred fifty questionnaires were distributed in this study, and 146 valid questionnaires were collected. Four questionnaires were deemed invalid due to such issues as consistent patterned responses. The effective response rate was 97.33%. The flow chart is shown in Figure 1. Among the 146 breast cancer patients, the age ranged from 37 to 67 years, with a mean age of (57.41 ± 10.92) years. The general information is as shown in Table 1.

Body Image Disturbance Occurrence in Postoperative Breast Cancer Patients

The average Body Image Scale (BIS) score among postoperative breast cancer patients was (22.21 ± 5.89). Using a cutoff score of 10 on the BIS, a score of ≥10 indicates the presence of significant body image disturbance. Among the 146 patients, 51 experienced body image disturbance postoperatively, accounting for 34.93% of the sample. On the other hand, 95 patients did not experience body image disturbance, accounting for 65.07% of the sample. The BID occurrence is shown in Figure 2.

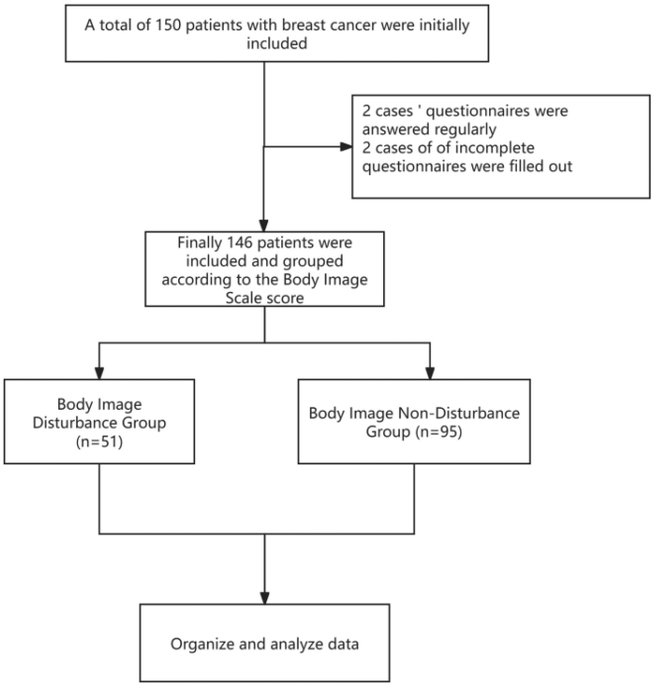

Figure 1. Case flow chart.

Table 1. General Information of Breast Cancer Patients (n = 146)

Variable	Category	Number	Percentage (%)
Age	18~39 years	36	24.66
	40~60 years	57	39.04
	> 60 years	53	36.30
Educational level	Primary school or below	55	37.67
	Secondary school or vocational high school	40	27.40
	College or above	51	34.93
Marital status	Married	121	82.88
	Unmarried, divorced, or other	25	17.12
Parity	Have given birth	108	73.97
	Have not given birth	38	26.03
Employment status	Employed	92	63.01
	Unemployed or retired	54	36.99
Average monthly household income	≤ 5000 RMB	47	32.19
	> 5000 RMB	99	67.81
Medical payment type	Medical insurance	122	83.56
	Out-of-pocket	24	16.44
Disease stage	Stage I	10	6.85
	Stage II	113	77.40
	Stage III	23	15.75
Occurrence oflLymphedema in operated limb	Yes	45	30.82
	No	101	69.18
Intimate relationship	Dysfunctional	41	28.08
	Normal	105	71.92

RMB, Renminbi

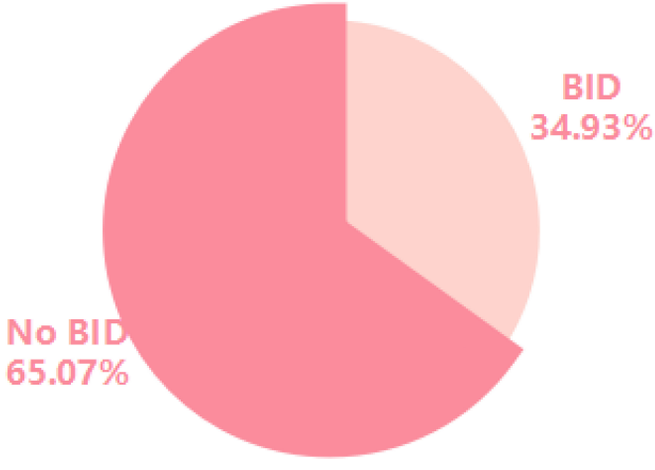

Figure 2. BID Occurrence in Postoperative Breast Cancer Patients. Note: BID stands for Body Image Disturbance.

Scores of Self-Image, Self-Acceptance, and Perceived Social Support in Breast Cancer Patients

The total scores for self-image, self-acceptance, and perceived social support among the 146 breast cancer patients were (108.19 ± 13.25), (40.15 ± 6.84), and (67.65 ± 5.41), respectively. See Table 2 for details.

Univariate Analysis of Factors Influencing Postoperative Body Image Disturbance in Breast Cancer Patients

The results of the univariate analysis revealed statistically significant differences ($P < .05$) between the body image disturbance group and the body image non-disturbance group in terms of education level, occurrence of lymphedema in the operated limb, intimate relationship, scores on the self-image scale, self-acceptance scale, and perceived social support scale. See Table 3 for details.

Determination of Cutoff Values for Continuous Variables

To facilitate clinical use, all continuous variables with statistical significance in the univariate analysis were transformed into categorical variables. Taking the occurrence of body image disturbance in breast cancer patients as the outcome variable, the maximum Youden's index of the ROC curve was used to determine the optimal cutoff values for each variable. These cutoff values were rounded to integers, and the continuous variables, namely self-image, self-acceptance, and perceived social support, were transformed into binary categorical variables using these cutoff values. See Table 4 for details.

Multiple Logistic Regression Analysis of Factors Influencing Postoperative Body Image Disturbance in Breast Cancer Patients

Using the occurrence of body image disturbance in breast cancer patients after surgery as the dependent variable, the variables that showed statistically significant differences in the univariate analysis were selected as independent variables for the multiple logistic regression analysis. The assignment of values to the independent variables can be seen in Table 5. The results of the multiple logistic regression analysis revealed that education level, occurrence of lymphedema in the operated limb, intimate relationship, self-image score, self-acceptance score,

Table 2. Scores of Self-Image, Self-Acceptance, and Perceived Social Support in Breast Cancer Patients (Points, $\bar{X} \pm s$)

Scale	Number of Items	Score Range	Total Score	Mean of Item Score
Self-image	53	53-265	108.19 ± 13.25	2.08 ± 0.45
Self-acceptance	16	16-64	40.15 ± 6.84	2.47 ± 0.38
Perceived social support	12	12-84	67.65 ± 5.41	4.97 ± 0.52

Table 3. Univariate Analysis of Factors Influencing Postoperative Body Image Disturbance in Breast Cancer Patients

Variable	Category	Number of Cases	Body Image Disturbance Group (n = 51)	Body Image Non-Disturbance Group (n = 95)	*P*
Age	18~39 years	36	12 (23.53)	24 (25.26)	.926
	40~60 years	57	21 (41.18)	36 (37.89)	
	> 60 years	53	18 (35.29)	35 (36.84)	
Educational level	Primary school or below	55	27 (52.94)	28 (29.47)	< .001
	Secondary school or vocational high school	40	19 (37.25)	21 (22.11)	
	College or above	51	5 (9.80)	46 (48.42)	
Marital status	Married	121	40 (78.43)	81 (85.26)	.296
	Unmarried, divorced, or other	25	11 (21.57)	14 (14.74)	
Parity	Have given birth	108	36 (70.59)	72 (75.79)	.495
	Have not given birth	38	15 (29.41)	23 (24.21)	
Employment status	Employed	92	32 (62.75)	60 (63.16)	.961
	Unemployed or retired	54	19 (37.25)	35 (36.84)	
Average monthly household income	≤ 5000 RMB	47	20 (39.22)	27 (28.42)	.183
	> 5000 RMB	99	31 (60.78)	68 (71.58)	
Medical payment type	Medical insurance	122	43 (84.31)	79 (83.16)	.857
	Out-of-pocket	24	8 (15.69)	16 (16.84)	
Disease stage	Stage I	10	5 (9.80)	5 (5.26)	.582
	Stage II	113	38 (74.51)	75 (78.95)	
	Stage III	23	8 (15.69)	15 (15.79)	
Occurrence of lymphedema in operated limb	Yes	45	25 (49.02)	20 (21.05)	.001
	No	101	26 (50.98)	75 (78.95)	
Intimate relationship	Dysfunctional	41	30 (58.82)	11 (11.58)	< .001
	Normal	105	21 (41.18)	84 (88.42)	
Self-image score (Points, $\bar{X} \pm s$)			139.18 ± 18.29	98.27 ± 10.62	< .001
Self-Aacceptance score (Points, $\bar{X} \pm s$)			36.52 ± 7.84	47.41 ± 6.42	< .001
Self-acceptance score (Points, $\bar{X} \pm s$)			58.95 ± 6.38	74.11 ± 5.42	< .001

RMB, Renminbi

and perceived social support score were independent risk factors for postoperative body image disturbance in breast cancer patients ($P < .001$). See Table 6 for details.

DISCUSSION

Current Status of Body Image Disturbance in Breast Cancer Patients after Unilateral Mastectomy

In this study, 146 breast cancer patients were included, among whom 51 (34.93%) experienced body image disturbance after surgery. This proportion is consistent with the findings reported by Du et al,[19] indicating that body image disturbance after unilateral mastectomy in breast cancer patients should still be a concern for clinical healthcare professionals. A survey conducted among Tunisian women with breast cancer revealed that 45% of patients experienced body image disturbance after surgery, which was often associated with changes in their postoperative physical appearance.[20] Previous studies have indicated that breast cancer patients face significant challenges regarding body image disturbance, which can lead to increased anxiety, depression, and social avoidance.[21] Therefore, early identification of factors

Table 4. Determination of Cutoff Values for Continuous Variables

Variable	Cut-Off Value (Score)	Sensitivity	1-Specificity	Youden's Index	*P*
Self-image score	118	0.756	0.317	0.439	< .001
Self-acceptance score	42	0.798	0.171	0.627	< .001
Perceived social support score	66	0.721	0.285	0.436	< .001

Table 5. Assignment of Variable Values

Variable	Value Assignment
Educational level	College or higher (Z1 = 0, Z2 = 0), Technical school or senior high school (Z1 = 1, Z2 = 0), Junior high school or below (Z1 = 0, Z2 = 1)
Occurrence of lymphedema in the operated limb	Yes = 1, No = 0
Intimate relationship	Dysfunctional = 1, Normal = 0
Self-image score	≥ 118 points = 1, < 118 points = 0
Self-acceptance score	≤ 42 points = 1, > 42 points = 0
Perceived social support score	≤ 66 points = 1, > 66 points = 0

influencing body image disturbance in breast cancer patients after unilateral mastectomy is crucial for their prognosis and recovery.

Influencing Factors of Body Image Disturbance in Breast Cancer Patients after Unilateral Mastectomy

After conducting single-factor and multiple logistic regression analyses, the results of this study showed that educational level, lymphedema in the affected limb, intimate relationships, self-image, self-acceptance, and perceived social support scores were independent risk factors for body image disturbance in breast cancer patients after surgery. The educational level determines the patients' level of disease awareness, including attitudes toward the disease and knowledge of treatment and rehabilitation methods. Studies have found that patients with higher education levels may have a deeper understanding of breast cancer and its treatment, enabling them to handle postoperative physical changes and image issues more rationally. Additionally, individuals with higher educational levels typically possess stronger psychological coping abilities and self-regulation skills, allowing them to better manage the emotional and body image issues that may arise after surgery.[22] The occurrence rate of lymphedema after unilateral mastectomy has been reported to range from 13.5% to 41.1%. Severe lymphedema can lead to visible swelling, limited upper limb function, and abnormal enlargement, significantly impacting patients' daily activities and causing body image concerns.[23] Spouses serve as the primary source of emotional support for breast cancer patients. A supportive and intimate relationship can provide emotional support and understanding, helping patients better accept and adapt to physical changes. Research by Unukovych et al[24] highlighted the importance of intimate relationships on sexual life, as the quality and satisfaction of sexual life between patients and their partners may be affected by the physical changes resulting from breast cancer treatment. Other studies have also indicated that body image disturbance after breast cancer surgery can increase stress in the marital relationship, as patients may be unable to communicate their feelings about breast loss to their spouse, further exacerbating body image concerns.[25] Studies have shown that changes in body image resulting from breast removal are a major source of psychological distress for patients.[26] Chen et al[27] found that the level of acceptance of body shape changes significantly affects the psychological well-being of postoperative breast cancer patients. Patients who have a higher acceptance level of body shape changes tend to experience less impact on their physical and mental well-being, thereby contributing to better psychological health. After breast cancer surgery, patients often feel that their normal lives have been disrupted and may become overly concerned about their physical appearance, potentially leading to social avoidance.[28] Research has also demonstrated a positive correlation between patients' perception of social support and body image after radical mastectomy. Effective social support can significantly alleviate the distress and negative impact caused by body image disturbance.[29]

The above-mentioned influencing factors suggest that clinical healthcare professionals can develop targeted interventions to improve body image disturbance in breast cancer patients. Such interventions as post-cancer body image restoration, exercise therapy, individual psychological interventions, social support interventions,

Table 6. Multiple Logistic Regression Analysis of Factors Influencing Postoperative Body Image Disturbance in Breast Cancer Patients

Factor		β	SE	Ward χ^2	OR	95% CI
Educational level	College or higher	−0.118	0.042	7.848	0.889	0.819~0.965
	Technical school or senior high school	0.027	0.151	0.031	1.027	0.764~1.381
	Junior high school or below	0.691	0.336	4.225	1.995	1.033~3.854
Occurrence of lymphedema in the operated limb		0.862	0.308	7.841	2.369	1.295~4.333
Intimate relationship		1.100	0.331	11.050	3.005	1.571~5.749
Self-image score		1.341	0.477	7.898	3.821	1.500~9.732
Self-acceptance score		1.302	0.462	7.937	3.675	1.486~9.089
Perceived social support score		1.364	0.354	14.847	3.912	1.955~7.829

$P < 0.001$. CI, confidence interval; OR, odds ratio; SE, standard error.

and peer education can be implemented to help breast cancer patients improve their body image and enhance their long-term quality of life.

This study is a single-center cross-sectional study, and there is currently no consensus on the diagnostic criteria for body image disturbance, which may introduce some biases in the research results. In the future, expanding the sample size and including more variables will allow for a deeper analysis of the mechanisms underlying body image disturbance in breast cancer patients. Additionally, it is necessary to conduct a long-term follow-up study on the long-term body image changes of breast cancer patients after surgery to evaluate their continuous impact on quality of life.

CONCLUSION

Body image disturbance in breast cancer patients undergoing unilateral mastectomy requires further improvement. Educational level, lymphedema in the affected limb, intimate relationships, self-image, self-acceptance, and perceived social support were identified as the main influencing factors. Healthcare professionals should regularly assess patients' postoperative body image disturbance and develop targeted interventions to reduce the occurrence rate of body image disturbance and improve patients' quality of life.

Data Availability Statement: The data in this study are available from the corresponding author upon reasonable request.

Ethics Committee Approval: This study was approved by the Ethics Committee of Lishui Municipal Central Hospital (Approval No.: 2024-390, Date: 2024-08-23).

Informed Consent: Verbal informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer reviewed.

Author Contributions: Concept – W.X., X.X., L.Z.; Design – W.X., X.X., C.Z., L.Y.; Supervision – W.X., L.Y.; Resources – L.Z., C.Z.; Materials – L.Y.; Data Collection and/or Processing – W.X., X.X., C.Z.; Analysis and/or Interpretation – L.Z., L.Y.; Literature Search – X.X.; Writing – W.X., X.X., C.Z.; Critical Review – L.Z., L.Y.

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REFERENCES

1. Rouhani M, Ramshini S, Omidi M. The Psychiatric Drug Lithium Increases DNA Damage and Decreases Cell Survival in MCF-7 and MDA-MB-231 Breast Cancer Cell Lines Expos ed to Ionizing Radiation. *Curr Mol Pharmacol*. 2019;12(4):301-310. [CrossRef]
2. LIU J, PANG K, HE F. Weighted gene co-expression network analysis identifies a novel immune-related gene signature and nomogram to predict the survival and immune infiltration status of breast cancer. *BIOCELL*. 2022;46(7):1661-1673. [CrossRef]
3. Naeimzadeh Y, Heidari Z, Razban V, Khajeh S. Deregulated MicroRNAs involved in P53 Signaling Pathway in Breast Cancer with Focus on Triple-negative Breast Cancer. *Curr Mol Pharmacol*. 2024;17(1):e18761429263841. [CrossRef]
4. Hashemi F, Zarrabi A, Zabolian A, et al. Novel Strategy in Breast Cancer Therapy: Revealing The Bright Side of Ginsenosides. *Curr Mol Pharmacol*. 2021;14(6):1093-1111. [CrossRef]
5. FAN K, WENG J. The progress of combination therapy with immune checkpoint inhibitors in breast cancer. *BIOCELL*. 2023;47(6):1199-1211. [CrossRef]
6. Cao W, Chen HD, Yu YW, Li N, Chen WQ. Changing profiles of cancer burden worldwide and in China: a secondary analysis of the global cancer statistics 2020. *Chin Med J (Engl)*. 2021;134(7):783-791. [CrossRef]
7. Ben-Dror J, Shalamov M, Sonnenblick A. The history of early breast cancer treatment. *Genes (Basel)*. 2022;13(6):960. [CrossRef]
8. Schenker RA, Schenker M, Stovicek PO, et al. Comprehensive preoperative psychological assessment of breast cancer patients. *Psychol Health Med*. 2023;28(2):359-374. [CrossRef]
9. Reangsing C, Punsuwun S, Keller K. Effects of mindfulness-based interventions on depression in patients with breast cancer: a systematic review and meta-analysis. *Integr Cancer Ther*. 2023;22:15347354231220617. [CrossRef]
10. Rhoten BA. Body image disturbance in adults treated for cancer - a concept analysis. *J Adv Nurs*. 2016;72(5):1001-1011. [CrossRef]
11. Zhu F, Liu C, Zhang W, Qiang W, Yin X, Lu Q. The mediating effect of coping styles between self-compassion and body image disturbance in young breast cancer survivors: a cross-sectional study. *BMC Nurs*. 2023;22(1):178. [CrossRef]
12. Altınok P, Tekçe E, Kızıltan HŞ, Gücin Z, Mayadağlı A. Impact of radiotherapy volumes on late-term cosmetic outcomes and quality of life in patients with unifocal and multifocal/multicentric breast cancer after breast-conserving surgery. *Eur J Breast Health*. 2023;19(4):287-296. [CrossRef]
13. Forcino FL, Leighton LR, Twerdy P, Cahill JF. Reexamining sample size requirements for multivariate, abundance-based community research: when resources are limited, the research does not have to be. *PLoS One*. 2015;10(6):e0128379. [CrossRef]
14. An H, Chen C, Du R, Cheng C, Wang P, Dong S. Self-efficacy, psychological distress, and marital quality in young and middle-aged couples facing lymphoma: the mediating effect of dyadic coping. *Psychooncology*. 2021;30(9):1492-1501. [CrossRef]
15. Weingarden H, Laky ZE, Ladis I, Austen WG Jr, Wilhelm S. Body image after mastectomy Scale: a new measure of body image behaviors and beliefs in women following mastectomy. *J Womens Health (Larchmt)*. 2022;31(1):47-54. [CrossRef]

16. Phoosuwan N, Lundberg PC. Life satisfaction, body image and associated factors among women with breast cancer after mastectomy. *Psychooncology*. 2023;32(4):610-618. [CrossRef]
17. Chen SQ, Liu JE, Zhang ZX, Li Z. Self-acceptance and associated factors among Chinese women with breast cancer. *J Clin Nurs*. 2017;26(11-12):1516-1523. [CrossRef]
18. Calderón C, Ferrando PJ, Lorenzo-Seva U, et al. Multidimensional Scale of Perceived Social Support (MSPSS) in cancer patients: psychometric properties and measurement invariance. *Psicothema*. 2021;33(1):131-138. [CrossRef]
19. Du H, Chen C, Yuan F, Hu A, Han J. Correlation analysis of body image level and female sexual dysfunction in young patients with postoperative breast cancer. *J Cancer Res Ther*. 2022;18(5):1360-1371. [CrossRef]
20. Faten E, Nader M, Raies H, Sana M, Amel M, Fadhel MM. Le trouble de l'image du corps chez 100 femmes tunisiennes atteintes d'un cancer du sein [Body image disorder in 100 Tunisian female breast cancer patients]. *Bull Cancer*. 2018;105(4):350-356. [CrossRef]
21. Archangelo SCV, Sabino Neto M, Veiga DF, Garcia EB, Ferreira LM. Sexuality, depression and body image after breast reconstruction. *Clinics (Sao Paulo)*. 2019;74:e883. [CrossRef]
22. Li S, Li L, Zheng H, et al. Relationship between multifaceted body image and negative affect among women undergoing mastectomy for breast cancer: a longitudinal study. *Arch Womens Ment Health*. 2018;21(6):681-688. [CrossRef]
23. DiSipio T, Rye S, Newman B, Hayes S. Incidence of unilateral arm lymphoedema after breast cancer: a systematic review and meta-analysis. *Lancet Oncol*. 2013;14(6):500-515. [CrossRef]
24. Unukovych D, Sandelin K, Liljegren A, et al. Contralateral prophylactic mastectomy in breast cancer patients with a family history: a prospective 2-years follow-up study of health related quality of life, sexuality and body image. *Eur J Cancer*. 2012;48(17):3150-3156. [CrossRef]
25. Chopra D, De La Garza R 2nd, Lacourt TE. Clinical relevance of a Body Image Scale cut point of 10 as an indicator of psychological distress in cancer patients: results from a psychiatric oncology clinic. *Support Care Cancer*. 2021;29(1):231-237. [CrossRef]
26. Thakur M, Sharma R, Mishra AK, Singh KR. Prevalence and psychobiological correlates of depression among breast cancer patients. *Indian J Surg Oncol*. 2021;12(2):251-257. [CrossRef]
27. Chen SQ, Sun N, Ge W, Su JE, Li QR. The development process of self-acceptance among Chinese women with breast cancer. *Jpn J Nurs Sci*. 2020;17(2):e12308. [CrossRef]
28. Weingarden H, Wilhelm S, Jacobs JM, et al. Prospective examination of psychological risk and maintenance factors for body image distress after mastectomy with immediate breast reconstruction. *Body Image*. 2022;42:120-125. [CrossRef]
29. Trindade IA, Marta-Simões J, Ferreira C, Pinto-Gouveia J. Chronic illness-related cognitive fusion explains the impact of body dissatisfaction and shame on depression symptoms in breast cancer patients. *Clin Psychol Psychother*. 2018;25(6):886-893. [CrossRef]