Aesth Plast Surg (2018) 42:1499–1505
https://doi.org/10.1007/s00266-018-1171-5

ORIGINAL ARTICLE BREAST SURGERY

Degree of Acceptance of Breast Reconstruction and the Associated Factors Among a Population of Chinese Women with Breast Cancer

Fengqiu Gong[1] · Liying Ding[1] · Xiaojun Chen[1] · Dianye Yao[1] · Yaoye Wu[1] · Lihong Xie[1] · Qiuyi Ouyang[1] · Ping Wang[1] · Gang Niu[2]

Received: 6 March 2018 / Accepted: 1 June 2018 / Published online: 12 June 2018

Abstract

Background Breast cancer is one of the most common female "malignancies" reported worldwide in recent years. This study is aimed to understand the degree of acceptance of breast reconstruction among breast cancer patients in Chinese women and to explore the related factors.

Methods Breast cancer patients were asked to fill in the demographic questionnaire, and consent for evaluation of Breast Reconstruction Acceptance Scale, Social Support Scale, and Functional Assessment of Cancer Therapy-breast Quality of Life Instrument (FACT-B). The data were assessed using multivariate logistic regression analysis for the correlations between the degree of acceptance of breast reconstruction and age, marital status, family monthly income, quality of life, and social support.

Results 57.5% of 715 patients were not familiar with breast reconstruction. Results showed correlation with the degree of acceptance of breast reconstruction. Multivariate analysis indicated that age (41–50 years old, OR: 0.25, 95% CI: 0.08–0.76; > 50, OR: 0.05, 95% CI: 0.02–0.15), marital status (married, OR: 0.15, 95% CI: 0.05–0.43; divorced/widowed, OR: 0.11, 95% CI: 0.03–0.42), family income (3–10 thousand RMB, OR: 2.01, 95% CI: 1.08–3.76; > 10 thousand RMB, OR: 2.14, 95% CI: 1.05–4.37), quality of life (fair, OR: 0.59, 95% CI: 0.39–0.91), and social support (excellent, OR: 0.50, 95% CI: 0.30–0.83) were all correlated with the degree of acceptance of breast reconstruction.

Conclusion Chinese breast cancer patients have a low degree of acceptance of breast reconstruction. The degree of acceptance was found to be correlated with age, marital status, family monthly income, quality of life, and social support.

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Keywords Breast cancer · Breast reconstruction · Degree of acceptance

Introduction

Breast cancer is one of the most common female malignancies, and its incidence rate has been increasing each year globally [1]. Postoperative survival of breast cancer patients is determined by various factors, which include demographic and clinicopathological features. Their basic health status in terms of metabolic disorders like obesity and diabetes, postoperative body image and social support may further promote the well-being of these patients [2]. Mastectomy is a commonly performed procedure in the treatment of breast cancer, but the absence of the breast destroys the natural body image. This is frequently associated with a sense of inferiority in the patients, severely

Fengqiu Gong and Liying Ding contributed equally to this work.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00266-018-1171-5) contains supplementary material, which is available to authorized users.

✉ Gang Niu
zsyysss@163.com

[1] Department of Operating Room, The First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China

[2] Department of Obstetrics and Gynecology, The First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China

affecting their physiological and psychological health, as well as their quality of life [3]. Breast reconstruction after mastectomy greatly improves breast cosmesis. Recently, Epstein et al. identified post-mastectomy women who underwent breast reconstruction from 2005 to 2014 using the American College of Surgeons National Surgical Quality Improvement Program database. The results showed that 60% of breast cancer patients underwent breast reconstruction after mastectomy in 2014 [4].

Although it is a widely accepted technique in the developed countries, the procedure is still in its infancy in China [5]. According to Zhang et al., the degree of acceptance of breast reconstruction is the primary factor that influences the reconstruction technique [6]. Therefore, this study aimed to investigate the degree of acceptance of breast reconstruction and its influential factors among Chinese breast cancer patients. The results should help improve the postoperative quality of life in breast cancer patients and provide evidence-based research for their postoperative psychological care and health education.

Materials and Methods

Subject

The study enrolled breast cancer patients who had undergone breast surgery in the in-patient department of the breast surgery clinic between February 2016 and May 2017. The inclusion criteria were as follows: female patients with (1) age range of 18–60 years; (2) cytological and histopathological diagnosis of breast cancer, or those with a preliminary clinical diagnosis of breast cancer as supported by preoperative imaging examinations (breast molybdenum target X-ray and B-type ultrasound) and a further postoperative pathological diagnosis of breast cancer confirmed by frozen and paraffin section staining; and (3) normal cognitive function and the ability to read and write, and who signed the informed consent and agreed to participate and cooperate with the investigation. Exclusion criteria were as follows: patients (1) with history of malignancies or complicating other malignancies; (2) with severe liver and renal insufficiency; (3) suffering from diabetes, cardiovascular and cerebrovascular diseases, systemic skin diseases and mental illness; (4) with other serious adverse physical conditions (shock, coma, etc.), which resulted in an inability to complete the scales; or (5) who had breast reconstruction previously.

Contents of Investigation

The research criteria and design in this study were comprised of a demographic questionnaire, the Breast Reconstruction acceptance Scale (Supplementary Table 1) [7], Social Support Scale [8, 9] and Functional Assessment of Cancer Therapy-breast Quality of Life Instrument (FACT-B) [10, 11]. After approval by patients, doctors and patients' family members, patients were enrolled in the study. Qualified health professionals who had passed the specific trainings and assessments were assigned to conduct the study in a face-to-face fashion, by adopting a set of unified standardized introductions and explanations to the questionnaire and scales. In this study, the degree of acceptance of breast reconstruction was defined as the degree and level in which a patient approves the breast reconstruction procedure [3, 5]. Each item of the Breast Reconstruction acceptance Scale could be graded into five levels (strongly disagree = 0 scores; disagree = 1 scores; true sometimes = 2 scores; agree = 3 scores; strongly agree = 4 scores). The Quality of Life Scale consisted of five dimensions, namely physical condition, social/family status, emotional status, functional status, and additional attention, and each of these could be further graded into five levels (strongly disagree = 0 scores; disagree = 1 scores; true sometimes = 2 scores; agree = 3 scores; strongly agree = 4 scores). The Social Support Scale constituted of three components: objective support (items 2, 6, 7), subjective support (items 1, 3, 4, 5), and availability of support (items 8, 9, 10). The scoring criteria of the Social Support Scale were: (1) items 1–4, 8–10 were single choice, option 1 = 1 scores, option 2 = 2 scores, option 3 = 3 scores, option 4 = 4 scores; (2) item 5 could be graded into four levels (No = 1 scores; A few = 2 scores; general = 3 scores; Full support = 4 scores); (3) items 6 and 7 were multiple choice, no one scored 0 scores, and the other options were one scores.

Statistical Analysis

All the collected scales were processed, whereas unqualified scales were excluded. Data from all the qualified scales were input by two individual staff members using the EpiData 3.1 software. The data were then exported into the SPSS database and analyzed by SPSS 19.0 software package. For statistics from the demographic scale, continuous variables were expressed as means ± standard deviations, whereas categorical variables were expressed as frequencies and composition ratios. Degrees of acceptance of breast reconstruction were classified as either "not accepting" (0–19 points) or "accepting" (20–40 points), whereas "not accepting" was used as the reference in the regression analysis. The total scores of the Social Support Scales and the FACT-B were divided into three grades (excellent, fair, and poor): excellent means 67–100% of total score, fair means 33–66% of the total score, and poor means 0–33% of the total score. Logistic analysis was used

for univariate analysis. Factors with significance ($P < 0.05$) in the univariate analysis were included into the multivariate logistic analysis to correct confounding factors and obtain the odds ratios (OR), as well as 95% confident intervals (CIs) after the correction. All the statistical analyses in the present study were carried out with the bilateral probability tests, with $\alpha = 0.05$ as the cutoff for significance.

Results

Information Regarding the Demographic Features and Degree of Acceptance in Patients with Breast Reconstruction

A total of 750 patients received the questionnaires, and all of them were collected by the study team. After verification, questionnaires from 715 patients were qualified and evaluated. Therefore, the retrieval rate was 100% and effective rate was 95.33%. The study predominantly involved patients of the age-group 41–50 years (37.8%); the majority of the patients were married (88.7%); approximately half of the patients had a low education level (41.7%); most of the patients belonged to the mid- to low-income family categories (79.2%); most of the study population paid medical costs on their own; and the predominant surgical approach for breast cancer patients was modified radical mastectomy (62.5%). The mean total scores of each dimension in the Breast Reconstruction Acceptance Scale showed 17.65 ± 8.08 points; 57.5% were not accepting breast reconstruction (Table 1).

Table 1 Demographic features of the study subjects

Variables, *n* (%)	Patients (*n* = 715),
Age (years)	
20–40	225 (31.5%)
41–50	270 (37.8%)
> 50	220 (30.7%)
Marital status	
Unmarried	28 (3.9%)
Married	634 (88.7%)
Divorced/widowed	53 (7.4)
Education level	
Junior high school and below	298 (41.7%)
Vocational/senior high school	164 (22.9%)
College and above	253 (35.4%)
Husband's education level	
Junior high school and below	264 (41.6%)
Vocational/senior high school	145 (22.9%)
College and above	225 (35.5%)
Family monthly income (thousand)	
< 3	228 (31.9%)
3–10	338 (47.3%)
> 10	149 (20.8%)
Payment method	
Self-paid	88 (12.3%)
Health care/free medical treatment	627 (87.7%)
Surgical approach	
Classical radical mastectomy	109 (15.2%)
Modified radical mastectomy	447 (62.5%)
Simple mastectomy	107 (15.0%)
Partial mastectomy	52 (7.3%)
Acceptance of breast reconstruction	
Accepting	304 (42.5%)
Not accepting	411 (57.5%)

Univariate Analysis for the Degree of Acceptance of Breast Reconstruction

Results of the unadjusted univariate logistic analysis for the demographic features showed that age, marital status, education level, family monthly income, and payment method were all correlated with the degree of acceptance of breast reconstruction (all $P < 0.05$, Table 2).

Unadjusted analysis for the dimensions of the FACT-B indicated that different qualities of life were correlated with degree of acceptance of breast reconstruction ($P < 0.01$). The degree of acceptance of breast reconstruction was correlated with physiological and emotional status and additional attention (Table 3).

Results from the unadjusted analysis for the Social Support Scale demonstrated that in objective support ($P < 0.01$), subjective support ($P < 0.05$) and support for utilization ($P < 0.01$), all dimensions were correlated with the degree of acceptance of breast reconstruction. However, patients' degree of acceptance of breast reconstruction was not associated with the social support total scores, and other confounding factors could not be ruled out (Table 4).

Multivariate Analysis for the Degree of Acceptance of Breast Reconstruction

Factors such as age, marital status, education level, family monthly income, payment method, quality of life, and social support were included into the multivariate logistic regression analysis, and the results showed that age (41–50 years old, OR: 0.25, 95% CI: 0.08–0.76; > 50, OR: 0.05, 95% CI: 0.02–0.15), marital status (married, OR: 0.15, 95% CI: 0.05–0.43; divorced/widowed, OR: 0.11, 95% CI: 0.03–0.42), family income (3–10 thousand RMB,

Table 2 Univariate analysis for the correlation between degree of acceptance of breast reconstruction and patient demographic features

Variables, *n* (%)	Not accepting (*n* = 411)	Accepting (*n* = 304)	*P*
Age (year)			< 0.001
20–40	92 (22.4)	133 (43.8)	
41–50	143 (34.8)	127 (41.8)	
> 50	176 (42.8)	44 (14.4)	
Marital status			< 0.001
Unmarried	5 (1.2)	23 (7.6)	
Married	367 (89.1)	267 (88.1)	
Divorced/widowed	40 (9.7)	13 (4.3)	
Education level			0.001
Junior high school and below	200 (48.7)	98 (32.2)	
Vocational/senior high school	90 (21.9)	74 (24.3)	
College and above	121 (29.4)	132 (43.5)	
Husband's education level			0.363
Junior high school and below	197 (47.9)	67 (30.0)	
Vocational/senior high school	92 (22.4)	53 (23.8)	
College and above	122 (29.7)	103 (46.2)	
Family monthly income (thousand Yuan)			< 0.001
< 3	128 (31.1)	100 (32.9)	
3–10	214 (52.1)	124 (40.8)	
> 10	69 (16.8)	80 (26.3)	
Payment method for treatment			0.004
Self-paid	34 (8.9)	54 (16.3)	
Health care/free medical treatment	350 (91.1)	277 (83.7)	

OR: 2.01, 95% CI: 1.08–3.76; > 10 thousand RMB, OR: 2.14, 95% CI: 1.05–4.37), quality of life (fair, OR: 0.59, 95% CI: 0.39–0.91), and social support (excellent, OR: 0.50, 95% CI: 0.30–0.83) were all correlated with the degree of acceptance of breast reconstruction (Table 5).

Discussion

The present study showed that 42.5% of Chinese female patients with breast cancer were accepting breast reconstruction following mastectomy, which was lower than that of Western countries. This may be associated with the following facts that Chinese females (1) are rather conservative, (2) have a fear of undergoing a secondary surgery, (3) lack knowledge regarding the breast reconstruction procedure, (4) have concerns with respect to the immaturity of the breast reconstruction procedure as it affects postoperative treatments and results in cancer recurrence, and (5) lack publicity regarding breast reconstruction. Concerns over surgical risks are considered the main reason for opposition.

In this study, Chinese female patients lack acceptance of breast reconstruction; this may be because the patients were not well-informed about breast reconstruction [12]. A nationwide survey in China showed that mastectomy continues to account for 88.8% of surgery for primary breast cancer. An explanation for the low frequency of breast-conserving surgery in China is a shortage of resources for radiation therapy (which needs to be given as part of breast-conserving surgery), most notably in less-developed regions of the country. In addition, using a multivariate logistic regression model, we analyzed the correlations between the degree of acceptance of breast reconstruction and the total score of social support, quality of life, and significant demographic features. Our results showed that five factors were associated with the degree of acceptance of breast reconstruction such as age, marital status, family income, quality of life, and social support in this population. Of these, a study in the USA also found that age was a factor related to the use of breast reconstruction [13]. Another study from Australia found that age and income were influencing factors [14]. A ten-year review in the USA identified age as a related factor, but also reported differences in the use of breast reconstruction according to race, with Asian women less likely to undergo the procedure than Hispanic women [15], suggesting that some factors relating to degree of acceptance of breast reconstruction are likely to be race specific.

Table 3 Univariate analysis for the correlation between degree of acceptance of breast reconstruction and each dimension from Functional Assessment of Cancer Therapy-breast Quality of Life Instrument

Variables, *n* (%)	Not accepting (*n* = 411)	Accepting (*n* = 304)	*P*
Physiological status			< 0.001
Poor	133 (32.4)	101 (33.2)	
Fair	162 (39.4)	84 (27.6)	
Excellent	116 (28.2)	119 (39.2)	
Social/family status			0.340
Poor	92 (22.4)	55 (18.1)	
Fair	178 (43.3)	134 (44.1)	
Excellent	141 (34.3)	115 (37.8)	
Functional status			0.139
Poor	121 (29.2)	93 (30.8)	
Fair	150 (36.2)	116 (38.5)	
Excellent	143 (34.5)	92 (30.7)	
Emotional status			0.011
Poor	92 (31.8)	91 (21.4)	
Fair	109 (37.7)	136 (31.9)	
Excellent	88 (30.5)	199 (46.7)	
Additional attention			< 0.001
Poor	190 (46.1)	62 (20.5)	
Fair	117 (28.4)	116 (38.3)	
Excellent	105 (25.5)	125 (41.2)	
Total score of quality of life			< 0.001
Poor	137 (33.3)	93 (30.6)	
Fair	152 (37.0)	89 (29.3)	
Excellent	122 (29.7)	122 (40.1)	

Table 4 Univariate analysis for the correlation between degree of acceptance of breast reconstruction and each dimension of Social Support Scale

Social support, *n* (%)	Not accepting (*n* = 411)	Accepting (*n* = 304)	*P*
Objective support			0.022
Poor	138 (33.4)	112 (37.0)	
Fair	83 (20.1)	93 (30.7)	
Excellent	191 (46.5)	98 (32.3)	
Subjective support			0.011
Poor	155 (37.7)	67 (22.0)	
Fair	111 (27.0)	144 (47.4)	
Excellent	145 (35.3)	93 (30.6)	
Support for utilization			0.010
Poor	195 (49.1)	93 (29.2)	
Fair	116 (29.2)	124 (39.0)	
Excellent	86 (21.7)	101 (31.8)	
Total score of social support			0.738
Poor	137 (33.4)	91 (29.8)	
Fair	133 (32.4)	120 (39.4)	
Excellent	140 (34.2)	94 (30.8)	

In this study, age > 50 years was associated with a lower degree of acceptance. In China, most employed females generally retire from jobs at around the age of 50, which is more close to their menopausal symptoms, making the age an important factor related to breast reconstruction. Divorced or widowed women were associated with a lower degree of acceptance of breast reconstruction. Unmarried females may express a higher requirement for a positive body image and social communication, and this may lead to a greater demand for

Table 5 Multivariate analysis for the degree of acceptance of breast reconstruction

Variables	Odds ratio (95% CI)	*P*
Age (year)		
20–40*	1.00	
41–50	0.25 (0.08–0.76)	0.015
> 50	0.05 (0.02–0.15)	< 0.001
Marital status		
Unmarried*	1.00	
Married	0.15 (0.05–0.43)	0.001
Divorced/widowed	0.11 (0.03–0.42)	0.001
Education level		
Junior high school and below*	1.00	
Vocational/senior high school	0.84 (0.55–1.30)	0.445
College and above	1.26 (0.85–1.87)	0.259
Family monthly income (thousand Yuan)		
< 3*	1.00	
3–10	2.01 (1.08–3.76)	0.028
> 10	2.14 (1.05–4.37)	0.036
Payment method		
Self-paid*	1.00	
Health care/free medical treatment	0.47 (0.15–1.54)	0.215
Quality of life		
Poor*	1.00	
Fair	0.59 (0.39–0.91)	0.002
Excellent	1.45 (0.92–2.28)	0.107
Social support		
Poor*	1.00	
Fair	1.33 (0.83–2.17)	0.443
Excellent	0.50 (0.30–0.83)	0.008

*Indicates a reference group

breast reconstruction. Although married females showed a lower degree of acceptance compared to unmarried women, mastectomy could significantly affect their sex life and breast reconstruction may improve their sex life in terms of both quality and quantity [16]. Patients from a higher-income family showed a greater concern for their breasts and had a more reluctant attitude toward the absence of their breasts. Thus, a higher family income may be one of the motives for pursuing a breast reconstruction procedure among Chinese breast cancer patients [17]. Patients with a fair quality of life demonstrated a higher degree of acceptance of breast reconstruction than those with a poor quality of life. We believe this might be associated with a poor quality of life resulting from continuous postoperative concerns of cancer recurrence, poor adaptation toward psychological statuses, and adverse effects of chemotherapy. Such patients might even lose confidence, and this might result in poorer quality of life postoperatively. In these cases, the women were reluctant to plan for breast reconstruction, which in turn resulted in a low degree of acceptance of breast reconstruction. Patients with excellent social support demonstrated a lower degree of acceptance of breast reconstruction, although no significant difference was found in the degree of acceptance between patients with fair and poor social support. Social support improves patients' ability to tolerate the adverse events, alleviates their psychological burdens, and impacts upon their pursuits of body image. Therefore, social support is an important influencing factor for patients' degree of acceptance of breast reconstruction, as it reduces patient's stress, improves patient's psychological status, and reduces the requirement for breast reconstruction. It is believed that social support can ameliorate the patient's quality of life even if a patient cannot undergo breast reconstruction due to other factors [18].

There are some limitations in the present study. Firstly, this study did not include patients undergoing adjuvant radiation, and no data were collected about the stage of breast cancer, which may be a significant impact on satisfaction of breast reconstruction. Secondly, this study did

not investigate the breast reconstruction rates, surgeries performed on various Chinese populations and the attitudes for breast reconstruction in Chinese general surgeons and adjuvant personnel. Additional studies are necessary to confirm these issues.

Conclusion

In conclusion, these findings suggest that the degree of acceptance of breast reconstruction could be low in Chinese breast cancer patients and may be associated with their age, marital status, family monthly income, quality of life, and social support.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Research Involving Human Participants All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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