

RESEARCH ARTICLE

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Quality of Life of Indonesian Breast Cancer Women Undergoing Various Surgery Techniques

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Abstract

Introduction: Breast cancer has the highest cancer rate among women in the world. The types of surgery that are often performed are mastectomy, breast conserving surgery (BCS) without reconstruction, and mastectomy or BCS with reconstruction. In this study, we wanted to assess the QoL in patients with mastectomy without reconstruction, BCS without reconstruction, and BCS or mastectomy with reconstruction in breast cancer patients in Indonesia. **Method:** This study was a retrospective cohort study that assessed patients' QoL after completing therapy with different types of surgery. The inclusion criteria were all breast cancer patients who did a follow-up medical check-up at outpatient clinics from 2018-2023. Patients were disease-free, had been free of therapy, and were tumor-free for more than 6 months at the time of the evaluation. The participants' QoL was assessed using the SF-36 questionnaire. Data were recorded quantitatively and analyzed through bivariate and multivariate methods. **Results:** A significant difference in the total QoL score was found in the three groups ($p=0.011$). Physical function with a p -value of 0.001 and vitality with a p -value of 0.015 were significantly different in the three groups. After we conducted a post hoc test on these 3 groups, it was found that patients who underwent breast reconstruction surgery generally reported the best total QoL score and better physical functions score. On the other hand, patients who had BCS had the lowest vitality scores compared to those who underwent mastectomy and breast reconstruction groups. **Conclusion:** This research shows that the QoL of the breast reconstruction group has the highest value in the total QoL score and the physical function domain as well. Meanwhile, in the vitality domain, the BCS group had a significantly lower score than the mastectomy group and reconstruction group.

Keywords: Quality of life- breast cancer- sf36- breast conserving surgery- mastectomy

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Introduction

QoL among breast cancer patients remains a significant concern. Despite the availability of numerous quantitative scales, qualitative studies can provide an in-depth understanding of the QoL experienced by individuals with breast cancer. Breast cancer is a complex condition, with physical, emotional, and practical implications, affecting approximately 2.3 million new cases each year and resulting in a 7% mortality rate [1]. It accounts for 1 in 4 cancer cases and 1 in 6 cancer-related deaths, ranking first in incidence in both developed and developing countries. According to the Indonesian Surgical Oncology Association (PERABOI), 4,959 new cases were found during 2014-2018 in Indonesia. A study in Surakarta,

Central Java, Indonesia found around 100 new cases each year with 66% of cases in advanced stages [2]. Breast cancer patients' QoL is substantially impacted by cancer-related symptoms and the side effects of therapy. Factors such as physical and psychosocial well-being, family life, relationships, and work capacity play pivotal roles in shaping the QoL of this patient population.

One of the primary treatment modalities for breast cancer is surgery, which contributes significantly to the healing process, accounting for approximately 70% of cancer remission in breast cancer patients. Surgical options include mastectomy and BCS with or without reconstruction. Patient satisfaction with these procedures varies. Several studies suggest that there is no significant difference in QoL between patients who undergo

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mastectomy and those who opt for BCS. In Indonesia, cultural differences between the eastern and western parts of the country can impact body image and clothing choices, which, in turn, may influence post-operative QoL.

Currently, there are ongoing advancements in breast reconstruction techniques. Some patients who have undergone mastectomy or BCS choose to have reconstruction surgery. To assess the impact of reconstructive surgery on QoL, we aim to analyze QoL in three distinct groups: patients who have had a mastectomy without reconstruction, patients who have undergone BCS without reconstruction, and patients who have had reconstruction following mastectomy or BCS surgery.

Materials and Methods

This study design is a retrospective cohort study involving 188 subjects. The subjects are grouped based on the type of surgery they underwent. The first group consists of patients who underwent mastectomy, the second group comprises patients who had BCS without reconstruction, and the third group includes patients who had lumpectomy or mastectomy with breast reconstruction using various techniques. This group covers reconstructive patients using autologous flaps, perforator flaps, or implants. In this group, patients have surgery to restore the shape of the breast. In all three groups, researchers collected basic data and subject characteristics. The entry point for this study is when the patient undergoes the operation, and the evaluation of QoL is conducted after the subjects have completed all therapy, including surgery, radiation, and chemotherapy for a minimum of 6 months.

During this treatment-free period, the subjects' QoL was assessed using the SF-36 questionnaire, a commonly used tool for monitoring cancer patients. The inclusion criteria for this research included breast cancer patients who underwent definitive breast surgery, whether mastectomy, BCS without reconstruction, BCS, or mastectomy using reconstruction. These patients had completed therapy including surgery, chemotherapy, and radiation. Patients with breast cancer stage 4, those who were undergoing chemotherapy or radiation treatment, and those with chronic diseases with routine treatment that may interfere with their QoL were excluded from the study. Data on QoL and the characteristics of the three groups were recorded nominally and then analyzed through bivariate and multivariate methods. The level of significance used in the analysis was set at 0.05%.

Results

In our data analysis, we conducted a comprehensive examination of various factors influencing the choice of breast cancer surgical procedures, focusing on the comparison of different patient groups. Here, we presented a summary of our findings (Figure 1):

From the data of characteristic age distribution in these 3 groups, patients under 50 years of age were more likely to undergo mastectomy, with 63.90% individuals in this category, compared to 21.69% who opted for BCS, and 14.40% for breast reconstruction. Notably, our

statistical analysis indicated a non-significant p-value of 0.356, suggesting that age was not significantly different in distribution in these 3 groups.

Next, we explored the role of education levels in the choice of surgery. Of a total of 63.20% of patients with a bachelor's or higher, 61.30% opted for a mastectomy, while 23.70% of the patients underwent BCS and 15.10% opted for reconstruction. The p-value for this analysis was 0.478, indicating that the level of education did not have a significant distribution on the choice of surgical procedure.

We also investigated the influence of marriage status on surgical choice type. Among those who were married, 61.20% of individuals opted for a mastectomy, 23.70% of them chose BCS, and 15.10% of subjects chose reconstruction. Our analysis revealed a significant association between marriage status and the type of surgery, with a p-value of 0.036, indicating that marital status played a role in the decision-making process.

In the comparison of the number of children, we found that patients with more than 2 children were more likely to undergo mastectomy, with 68.40% of subjects in this category. In the BCS group, 15.80% of patients with more than 2 children, and 15.80% in the reconstruction group. The p-value for this analysis was 0.111, suggesting that the number of children did not significantly have a different distribution on the type of surgical procedure. We assessed the other factors like work, comorbid, income, and stages as a potential factor that influenced QoL outcomes. The results were P 0.065, P 0.565, P 0.442, and P 0.175 respectively. The factors that were suspected to interfere with the assessment of QoL in the 3 groups of surgical procedure types did not have significantly different distribution in all groups. All the characteristic analyses showed that in these 3 groups, there were no demographic factors that were expected to affect the QoL results in these 3 groups. From the results of this characteristic analysis, only marital status had a significantly different distribution in the 3 surgical groups. Here, marital factors can possibly influence QoL assessments in these 3 groups. In this study, the type of surgery variables were not analyzed together because the influence of marital status on QoL was not yet clear (Figure 2).

Univariate Analysis

In our comprehensive bivariate analysis utilizing Kruskal-Wallis tests, we conducted a three-group difference test to assess the impact of different surgical procedures: mastectomy, BCS, and reconstruction on various domains of the SF-36 health survey. The p-values associated with each domain shed light on the statistical significance of the differences between the surgical groups (Table 1).

Highly significant differences emerged in the "Physical_Function" domain ($p < 0.001$) among the three surgical groups, underscoring that the type of surgery significantly affected physical functioning. Conversely, "Physical limitations" ($p = 0.278$), "Body_Pain" ($p = 0.199$), "General_Health" ($p = 0.170$), and "Social_Function" ($p = 0.754$) did not exhibit statistically significant differences between the groups, suggesting that these domains might not be strongly influenced by

Table 1. Characteristic Demography in three groups of Surgery

Variable	Mastectomy N= 117		BCS N= 48		Reconstruction N=23		P value
	n	%	n	%	n	%	
Age							
< 50 years	62	63.90%	21	21.60%	14	14.40%	0.356
>= 50 years	55	60.40%	27	29.70%	9	9.90%	
Education							
< high school	60	63.20%	26	27.40%	9	9.50%	0.478
> high school	57	61.30%	22	23.70%	14	15.10%	
Mariage Status							
Single	24	66.70%	12	33.30%	0	0.00%	0.036
Married	93	61.20%	36	23.70%	23	15.10%	
No of children							
<= 2	78	59.50%	39	29.80%	14	10.70%	0.111
> 2	39	68.40%	9	15.80%	9	15.80%	
Work							
Unemployed	55	66.70%	20	19.20%	11	14.10%	0.065
Working	62	50.00%	28	36.70%	22	13.30%	
Other Disease							
Yes	85	63.00%	32	23.70%	18	13.30%	0.565
No	32	60.40%	16	30.20%	5	9.40%	
Income							
< 2 million IDR	38	60.40%	12	30.20%	5	9.40%	0.442
> 2 million IDR	79	59.40%	36	27.10%	18	13.50%	
Stages							
Stage (I)	12	46.20%	10	38.50%	4	15.40%	0.176
Stage (II-III)	105	64.80%	38	23.50%	19	11.70%	

the choice of surgical procedure. However, “Vitality” ($p = 0.015$) and “Total QoL Score” ($p = 0.011$) displayed statistically significant differences, signifying that the

type of surgery had a measurable impact on vitality and overall health-related QoL, respectively.

Moreover, “Emotional Limitations” ($p = 0.056$) and

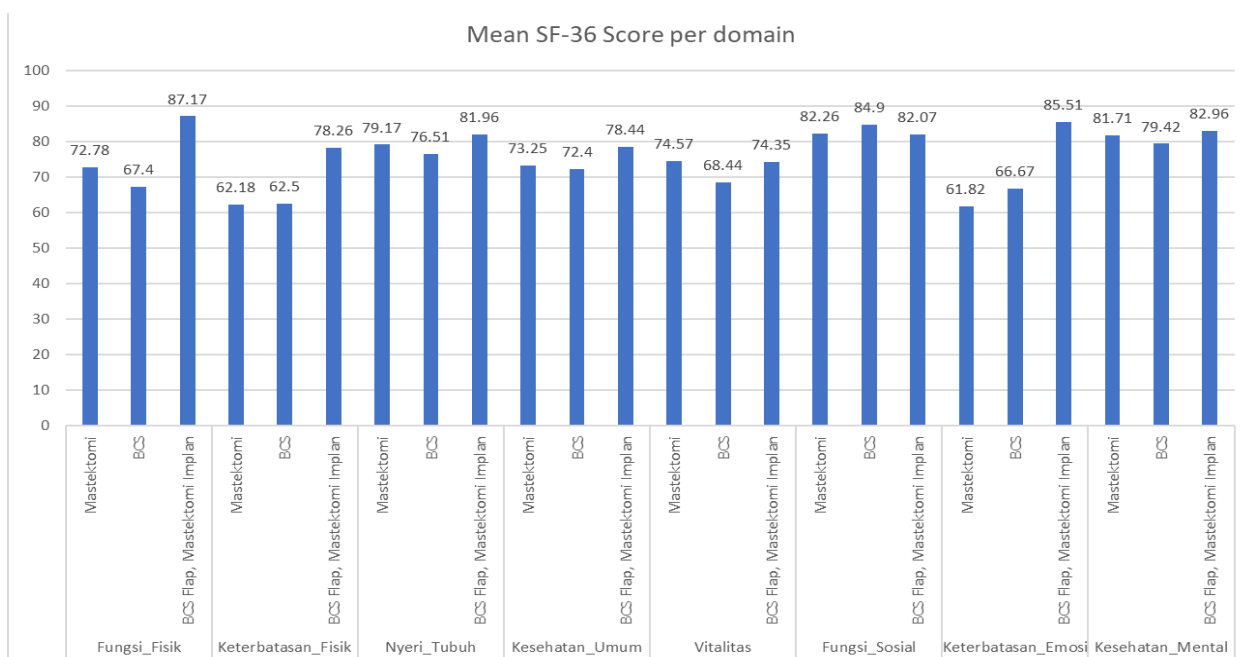


Figure 1. Comparison of Mean SF 36 Scores Per Domain

Table 2. Table of 3 group difference test to assess the impact of different surgical procedures: Mastectomy, BCS, and Reconstruction, to QoL and in every Domains

SF 36 domains	Operation Type	N	Mean	P	SD	Minimum	Maximum
Physical_Function	Mastectomy	117	72.78	<0.001	20.48	10	100
	BCS	48	67.4		22.76	10	100
	Reconstruction	23	87.17		21,20	10	100
Physical limitations	Mastectomy	117	62.18	0.278	42.75	0	100
	BCS	48	62.5		43.76	0	100
	Reconstruction	23	78.26		37.92	0	100
Body_Pain	Mastectomy	117	79.17	0.199	18.92	10	100
	BCS	48	76.51		14.93	57.5	100
	Reconstruction	23	81.96		20.27	32.5	100
General_Health	Mastectomy	117	73.25	0.17	15.2	25	100
	BCS	48	72.4		14.19	37.5	100
	Reconstruction	23	78.44		16.65	37.5	100
Vitality	Mastectomy	117	74.57	0.015	16.16	10	100
	BCS	48	68.44		14.85	35	100
	Reconstruction	23	74.35		18,11	15	90
Social_Function	Mastectomy	117	82.26	0.754	17.08	37.5	100
	BCS	48	84.9		14,11	50	100
	Reconstruction	23	82.07		22.56	37.5	100
Emotional_Limitations	Mastectomy	117	61.82	0.056	44.05	0	100
	BCS	48	66.67		42.39	0	100
	Reconstruction	23	85.51		26.26	33.3	100
Mental health	Mastectomy	117	81.71	0.122	15.11	40	100
	BCS	48	79.42		14.62	48	100
	Reconstruction	23	82.96		24.04	0	100
Total QoL Score	Mastectomy	117	587.75	0.011	136.6	207	800
	BCS	48	578.53		128.07	357.7	785.8
	Reconstruction	23	651.47		143.57	188.3	777

“Mental health” (p = 0.122) demonstrated moderate levels of significance, implying that emotional well-being and mental health, to some extent, might be influenced by the choice of surgical procedure. These findings underscored the importance of considering the specific domains of the SF-36 health survey when evaluating the impact of various breast cancer surgeries on patients’ QoL and well-being.

In our data analysis, Mann-Whitney tests were conducted to assess differences among three surgical groups: 1 (mastectomy), 2 (BCS - Breast-Conserving Surgery), and 3 (BCS Flap). Subsequently, post-hoc tests were employed to further scrutinize specific domain disparities between these groups, with corresponding p-values for each comparison. For the “Physical_

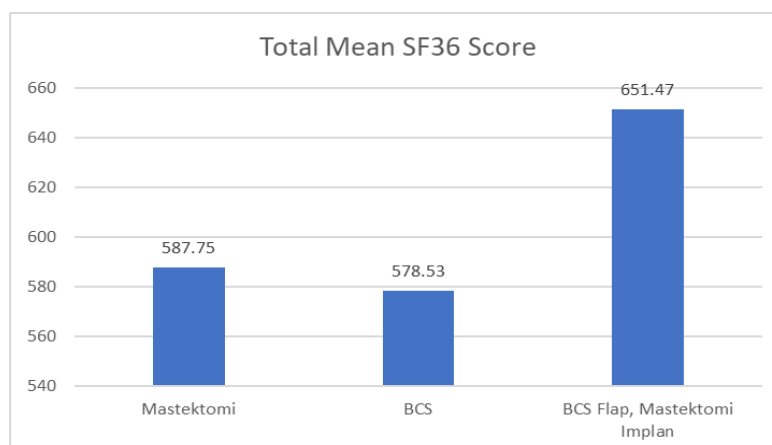


Figure 2. Comparison of Mean Total SF 36 Scores

Table 3. Post-Hoc Test for These 3 Types of Surgery Group

Sf 36 domains	P value		
	1 VS 2	1 VS 3	2 VS 3
Physical_Function	0.171	<0.001	<0.001
Vitality	0.01	0.79	0.008
Total_Average_Score	0.45	0.008	0.004

1, Mastectomy; 2, BCS; 3, Rekonstruksi

Function” domain, the Mann-Whitney test indicated no significant difference between groups 1 and 2 ($p = 0.171$). However, a highly significant difference was observed between groups 1 and 3 ($p < 0.001$) and between groups 2 and 3 ($p < 0.001$), suggesting that generally patients who underwent BCS Flap reported better physical function than those who had mastectomy or BCS.

In the “Vitality” domain, the Mann-Whitney test revealed a significant difference between groups 1 and 2 ($p = 0.010$), and between groups 2 and 3 ($p = 0.008$) indicating that patients who had mastectomy and BCS had higher vitality scores compared to those who underwent BCS. However, no significant differences were observed between groups 1 and 3 ($p = 0.790$). This showed that BCS had the lowest value compared to the mastectomy and reconstruction groups.

Regarding the “Total_Average_Score,” the Mann-Whitney test found no significant differences between groups 1 and 2 ($p = 0.450$). However, significant differences were noted between groups 1 and 3 ($p = 0.008$) and between groups 2 and 3 ($p = 0.004$), signifying that patients who had reconstruction had the highest score, reflecting an overall best health-related QoL, compared to patients who underwent mastectomy or BCS. These findings underscored the substantial impact of the choice of surgical procedure on specific aspects of a patient’s QoL, particularly in the domains of physical function, vitality, and the overall average score (Tables 2, 3).

Discussion

Breast cancer is characterized by the uncontrolled growth of abnormal cells within the breast, leading to the formation of tumors. As of 2020, the global burden of breast cancer reached staggering proportions, with 2.3 million women worldwide receiving a breast cancer diagnosis and 685,000 succumbing to the disease. Furthermore, at the close of 2020, an estimated 7.8 million women previously diagnosed with breast cancer within the past five years were still alive, making it one of the most prevalent cancers globally. Breast cancer transcends geographic boundaries, affecting women across the world, regardless of age, with an increased incidence as women grow older [3].

Data from PERABOI showed that from 2014-2018, 4,959 patients were recruited to participate in this study, in which 995 women (20.1%) were diagnosed with stage 4.. Meanwhile, for primary tumors in the breast with data, namely size <2cm 3.8%, more than 2-5cm 21.5%, tumors more than 5cm 31.7%, and tumors attached to the skin or chest wall as much as 43.1%. So in Indonesia, the

possibility of BCS with or without reconstruction is quite small considering that some patients come in advanced stages [4].

Breast cancer treatment is optimally approached through the collaboration of a specialized Multidisciplinary Team (MDT) within dedicated breast centers. This interdisciplinary team includes various professionals, such as psychologists and physiotherapists, who work together to ensure comprehensive patient care. Surgery continues to play a pivotal and curative role in breast cancer treatment. The choice of surgical procedure is of paramount importance as it can significantly influence a patient’s QoL and overall treatment experience. Various surgical options are available, ranging from mastectomy or BCS with or without reconstruction. Recent research indicates that survival rates for patients undergoing mastectomy and BCS do not significantly differ. The condition allows patients to personalize their choices based on preferences and needs. Interestingly, research from Indonesia suggests a higher prevalence of mastectomy among patients under the age of 50, who prioritize a faster treatment process and a swift return to their daily routines. In contrast, studies from Western countries reveal that younger patients often opt for BCS. The influence of the surgical procedure on a patient’s QoL varies across regions, with Western research indicating that mastectomy may lead to a lower QoL compared to BCS. However, in Indonesia and other Eastern cultures, the choice of surgical procedure may not exert as pronounced an influence on patients’ daily activities and overall QoL.

The data analysis in this study was focused on comparing the impact of various breast cancer surgical procedures on patients’ QoL across different domains assessed by the SF-36 health survey. The surgical groups examined included mastectomy (Group 1), BCS (Group 2), and BCS or mastectomy with reconstruction (Group 3). The analysis began with Mann-Whitney tests and was followed by post-hoc tests to explore specific domain differences. The results highlighted the significant influence of the type of surgery on various aspects of patients’ QoL.

Within the “Physical_Function” domain, patients who underwent reconstruction reported significantly better physical function compared to those who underwent mastectomy or BCS. These findings align with prior research emphasizing the potential for BCS approaches to offer more favorable outcomes in terms of physical function and preservation of the breast’s natural shape [1]. In the “Vitality” domain, patients who had mastectomy and reconstruction reported higher vitality scores compared to those who underwent BCS, with no significant differences observed between these 2 groups. This suggests that mastectomy might lead to a perception of improved vitality, potentially due to reduced anxiety related to breast cancer recurrence. However, these results contradict previous studies revealing that BCS can be associated with better psychosocial outcomes [5]. In the “Total_Average_Score” domain, patients who underwent reconstruction achieved a higher average score, indicating a better overall health-related QoL compared to patients who underwent mastectomy or BCS. These results were

consistent with findings by Spear et al. [6], who reported that BCS, especially when combined with reconstructive techniques like BCS Flap, can lead to improved cosmetic outcomes and subsequently enhance overall QoL for many patients.

BCS or mastectomy with reconstruction emerges as a promising option for patients who prioritize physical function and overall health-related QoL. However, it is essential to consider individual patient preferences, tumor characteristics, and other factors when selecting the most appropriate surgical approach. The notable differences observed in the “Physical_Function,” “Vitality,” and “Total_Average_Score” domains, with the “BCS or mastectomy with reconstruction” group demonstrating superiority compared to the “mastectomy” and “BCS” groups, can be attributed to several key factors: Reconstruction-Related Satisfaction: Patients who undergo a combination of BCS or mastectomy with reconstruction may experience greater satisfaction with the aesthetic outcomes of their surgery. Breast reconstruction using implants can provide a more symmetrical appearance and a sense of wholeness, positively impacting patients’ body image and physical well-being [6]. Preservation of Natural Breast Shape: BCS flap with mastectomy implant aims to preserve the natural breast shape to a significant extent. This approach contributes to a better body image, as patients may feel more “whole” and experience fewer visible changes in their appearance. In contrast, traditional mastectomy can result in a more significant alteration of breast shape [7]. Psychosocial and Emotional Well-Being: The emotional and psychological impact of breast reconstruction is well-documented. Patients who undergo successful reconstruction, such as BCS flap with mastectomy implant, may experience improved emotional well-being and overall vitality [8]. This sense of emotional and physical recovery can be empowering. Body Image and Self-Confidence: The “Vitality” domain is closely linked to a positive body image and self-confidence. Breast reconstruction significantly enhances body image, making patients feel more vital, confident, and in control of their lives [9]. Selection Bias: It is important to consider that the selection of the “BCS or mastectomy with reconstruction” group may involve patients with specific characteristics or preferences. Those who opt for this surgical approach may have a stronger desire for breast reconstruction and a more proactive attitude toward managing their post-surgery well-being. This may have caused the mastectomy and reconstruction group to have significantly higher scores than the BCS group.

In conclusion, the superiority of the “BCS or mastectomy with reconstruction” group in the “Physical_Function,” “Vitality,” and “Total_Average_Score” domains can be attributed to the positive impact of breast reconstruction on body image, self-confidence, and emotional well-being. These findings underscored the importance of tailoring surgical options to meet individual patients’ needs and preferences, thereby optimizing post-operative QoL. The absence of significant differences in both the “Physical_Function” domain and the “Total_Average_Score” between the mastectomy and BCS groups

may be attributed to several contributing factors:

Similar Postoperative Rehabilitation: Both mastectomy and BCS patients typically receive postoperative rehabilitation aimed at restoring physical function and overall well-being. The commonality in postoperative care may lead to comparable improvements in physical function for both groups. Short-Term Assessment: The assessment may primarily capture the short-term impact of surgery on physical function and overall QoL. In the immediate postoperative period, the differences between the two surgical groups may not be as pronounced. However, over a longer time frame, more significant differences might emerge. Cultural and Psychosocial Factors: Cultural and psychosocial factors can play a significant role in how patients perceive and report their physical function and QoL. These factors may be consistent across both surgical groups, further diminishing the observed differences. Specific Domains Evaluated: The domains evaluated, such as “Physical_Function,” may not fully capture the nuances of physical function that differ between the two surgical groups. Other domains or more specialized assessments might be needed to detect such differences.

The lack of significant differences in the “Physical_Function” domain and the “Total_Average_Score” between the mastectomy and BCS groups may be explained by a combination of factors, including similar postoperative rehabilitation, the short-term focus of the assessment, individual heterogeneity, cultural and psychosocial influences, and the specific domains evaluated. These results emphasized the complexity of evaluating the impact of different surgical procedures on various aspects of a patient’s QoL, which might not always be immediately apparent in short-term assessments. The cultural differences between the eastern and western parts of the country could have a significant impact on body image and clothing choices, which, in turn, might influence post-operative QoL for breast cancer patients. This discussion aimed to explore the potential cultural factors that played a role in shaping these differences and their consequences for patient well-being.

In many Eastern cultures, there is a strong emphasis on modesty and traditional clothing that often covers most of the body. This cultural norm can profoundly influence the way individuals perceive their bodies, potentially resulting in heightened concerns about body image following breast surgery. In contrast, Western cultures often promote more revealing and body-revealing clothing styles, which can lead to different expectations and norms regarding body image. The impact of cultural norms becomes particularly pronounced in the context of breast cancer surgery. Patients in the East may have distinct expectations concerning the appearance of their breasts post-surgery, with a preference for outcomes that align with their cultural clothing norms. This, in turn, may affect their satisfaction with the surgical results and, consequently, their post-operative QoL. In Western cultures, where clothing styles tend to be more revealing, patients may hold different concerns and expectations regarding breast appearance post-surgery.

Furthermore, the concept of beauty and femininity can

vary significantly between Eastern and Western cultures, influencing how patients perceive themselves and their body image following breast surgery. These cultural variations in beauty standards can impact self-esteem, self-worth, and overall QoL post-surgery. Research conducted by Lee et al. [10] emphasizes the cultural dimensions of body image and clothing choices in Asian breast cancer survivors. Their study revealed that cultural values and clothing preferences significantly influence body image and self-esteem among Asian survivors. Similarly, research by Harcourt et al. [11] highlighted the influence of cultural factors on body image and self-esteem in Western breast cancer survivors. The impact of cultural differences on body image and clothing choices should not be underestimated within the context of breast cancer surgery. Understanding and addressing these cultural variations are vital for healthcare providers to offer comprehensive and culturally sensitive care. Tailoring surgical approaches to align with patients' cultural expectations and addressing their specific concerns can significantly contribute to improving post-operative QoL.

In conclusion, this comprehensive analysis of different breast cancer surgical procedures and their impact on patients' QoL has revealed valuable insights.

Our findings highlight that the choice of surgical procedure can significantly affect specific aspects of a patient's QoL. Notably, patients who underwent the breast reconstruction group, referred to as the "BCS or mastectomy with reconstruction", exhibited superior outcomes in total QoL score and physical function domain score compared to 2 other groups. This underscores the role of breast reconstruction in improving body image, self-confidence, and emotional well-being.

Conversely, the comparison between BCS demonstrated the lowest significant differences in the "Vitality" compared to the other 2 groups: mastectomy and reconstruction. This suggests that, in the short term, both surgical approaches yield similar outcomes in terms of physical vitality. However, the nuanced effects of these surgeries may require more specialized assessments or consideration of long-term factors, such as patient heterogeneity and cultural influences.

Author Contribution Statement

Kristanto Yuli Yarso: Corresponding author, writing, conceptualizing, sample collecting, analyzing. Suyatmi Suyatmi: Ethical review. Ahmad Azmiardi: Data analysis. Monica Bellynda: Data collection, subject interview. Kamila Muyasarah: Data collection, subject interview. Danendra Yarsa: Translating, proofreading.

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