

RESEARCH ARTICLE

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Strong Factors to Preserve Breast in Surgery Preferences among Javanese Ethnicities of Breast Cancer Patients

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Abstract

Introduction: As breast cancer treatment advances, more breast cancer patients have the option to keep their breasts. This offers them more choices based on their preferences. However, not all eligible patients opt for Breast-Conserving Surgery (BCS) due to various factors. This study aims to examine patient-related factors in the selection of surgical procedures in Javanese breast cancer patients. **Methods:** Between July 2023 to October 2023, the researcher collected data on 407 Javanese ethnic breast cancer patients of stage 1 and stage 2 from the 2018-2022 database. These patients were then divided into 2 groups, those who opted for BCS or breast preservation and those who chose mastectomy without breast reconstruction. Then, data regarding factors that were considered to influence the patients' choice of surgery type were collected. The researchers collected complete data from the 240 respondents. The factors in these 2 groups were then analyzed univariately. Factors that tended to influence were analyzed in a multivariate way. The determined significance level was 0.05. **Results:** Of the 240 Javanese early breast cancer, 152 (66.2%) who were eligible for BCS, chose mastectomy, and 81 (33.8%) of them chose BCS. The multi-variate data showed that many patients who preferred BCS over mastectomy were in the group with small tumor sizes with OR 2.78 and P 0.01. The second strong factor was the small number of children with OR 2.74 and P 0.01. Other factors that also influenced were the patients' old age, single status, high education, and without neoadjuvant chemotherapy (NAC). **Conclusions:** Of all the Javanese early breast cancer patients, only 33.8% chose BCS. Factors that supported the choice of BCS were small tumor size, a small number of children, old age, single status, high education, and no NAC. But Tumor size was the strongest factor.

Keywords: Patient Preferences- breast surgery- breast cancer- Javanese ethnicities

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Introduction

Breast cancer is the most prevalent form of cancer among women worldwide. According to the GLOBOCAN 2018 report, it is estimated that there were 2.1 million cases of breast cancer globally in 2018, resulting in over 626.000 deaths [1]. While the incidence of breast cancer is slightly higher in developed countries, the mortality rate is higher in developing countries [2]. In a study conducted by Perhimpunan Bedah Onkologi Indonesia (PERABOI) in Indonesia, 4.959 breast cancer data were collected from every Center in Indonesia from 2014-2018 and 71% were diagnosed in late stages [3]. Study in Bali a significant number of breast cancer cases, as evidenced by research conducted in Denpasar Center, where 687 patients from 2003-2010 were studied. The findings revealed that 3% of the patients were in stage I, 28% in stage II, and 69% in advanced stages of the disease. The incidence rate in this

region is approximately 100 cases per year [4]. Similar results were obtained in a study conducted in Solo, Central Java, where approximately 100 new cases are reported annually and 66% at stage III [5]. In addition to a lack of knowledge, the fear of undergoing breast amputation when seeking treatment at hospitals is also a contributing factor to this breast cancer late-stage situation.

Our center is located in central Java province, and almost all of the patients consist of Javanese ethnic. Javanese ethnic concentrated on the island of Java, especially central Java, and numbering about 85 million in the early 21st century. The Javanese is one of the largest ethnic groups in Indonesia. Around 40.22% population in Indonesia are Javanese. Compared to the other 1.340 ethnicities in Indonesia, this ethnic group has unique characteristics in culture, language, also culinary [6].

Traditional Javanese women and culture, have the characteristics of steadfast, permissive, humble, loyal, or

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gentle. In Javanese tradition, women also have to be able to focus their attention on a terminology consisting of masak, macak, lan manak which means cooking, dressing up or preen, and delivering babies and raising children. Even though it looks like simple terms, the three words have deep meaning [7].

They also are well-known for their smooth nature of speech. This ethnicity can be differentiated from other ethnic for the ability to speak in the Javanese language and birthplace [8]. In Indonesia, we have public health insurance that requires every patient to register at the health center closest to the place where the patient lives. So, this condition is possible for patients from one ethnicity to gather in one health center. In this research, we want to investigate things that influence Javanese women's desire to maintain their breasts and maintain their appearance. The approach to decision-making regarding therapy selection has changed over the last few decades from a paternalistic approach where the doctor decides to share decision-making preceded by providing information concerning the most effective treatment available in a particular situation, considering the needs and values held by the respondents, and deciding based on good respondent-doctor agreement (Ministry of Health Republic of Indonesia, 2015).

BCS has been recommended by the National Institutes of Health as the therapy choice for women with early-stage breast cancer since 1990. Various studies have shown that BCS and mastectomy have similar survival rates in early-stage breast cancer [9-11]. Numerous studies have been conducted to investigate the various factors that influence the selection of therapy. Among the demographic factors commonly examined are age, education, and ethnicity. One study found no difference in the choice of surgical therapy between younger and older individuals [12]. Conversely, women of Chinese ethnicity displayed a preference for mastectomy over breast-conserving surgery [9]. Additionally, several other studies have focused on the impact of distance to radiation therapy centers, revealing that greater distances are associated with a decreased likelihood of selecting breast-conserving surgery [13, 14].

Currently, there is a lack of research on the factors that affect the selection of therapy for early-stage breast cancer in Indonesia, especially in Javanese ethnicities. This study aims to investigate the factors that influence the choice of surgical therapy in respondents with early-stage breast cancer in Javanese ethnicities.

Materials and Methods

Research design

This research is an observational study with a cross-sectional design conducted on breast cancer patients. The study aims to analyze the factors that influence surgical decision-making in Javanese breast cancer patients. Javanese ethnicity is characterized by speaking Javanese, living and being born in Java. The researchers collected data on the patient's preferences for different types of surgery and examined the factors that influenced their decision-making process. The data used in the study was obtained from the researchers' primary patient data from

2018 to 2022. The eligibility criteria for the study included Javanese ethnicity patients with early-stage breast cancer who have complete information data for all variables. The data on patient surgery preference was documented before the patients underwent surgery. The patients received an explanation clearly about the advantages and disadvantages from the operator about various techniques before deciding to preserve their breasts or remove them. This procedure follows the hospital surgery protocols. This study was limited to demographic factors and the patients' desire to retain their breasts.

This study was approved by our institutional Research Ethics Committee under the ethical feasibility number 1.614/VIII/HREC/2023 and was carried out in our center located in Surakarta City, Central Java. Out of the 407 Javanese breast cancer patients, 240 participants were in stage I and stage II and had complete data. Before undergoing their surgery, all breast cancer patients in stages I and II got an explanation and were helped to determine their preference for breast preservation options, including breast-conserving surgery (BCS), BCS with reconstruction, or mastectomy with reconstruction. In the other group, mastectomy without reconstruction become patients' preference.

Data extraction

In this research, the participants were divided into two groups: those who desired mastectomy surgery and those who preferred breast-conserving surgery (BCS). The patients' preferences were recorded after receiving an explanation from the surgeons. The BCS group included patients who opted for BCS alone, BCS with reconstruction, and mastectomy with reconstruction. Mastectomy with reconstruction was offered to patients who were unable to undergo radiation or achieve radicality. These patients were included in the BCS group based on their desire to preserve their breasts. The study then examined the factors that influenced the choice of operation types for these two groups. The first factor was age, with participants divided into two groups: those aged 50 or below, and those above 50. The second factor was marital status, with the married group consisting of women with husbands, and the single group consisting of unmarried women and widows. The researchers categorized the patients' income into two groups: low income, which refers to income equal to or below \$167, and high income, which refers to income above \$167. Another factor that was considered was the size of the tumor, which was divided into two groups: tumors less than 3cm and tumors 3cm or larger. Other factors that were taken into account in influencing the patients' decision included the presence or absence of comorbidities such as pregnancy, history of radiation, tissue and skin diseases, lupus, scleroderma, and genetic predisposition to breast cancer. Patients who received neoadjuvant chemotherapy (NAC) before making a decision were also divided into two groups: patients without NAC and groups with NAC. In addition, the participants were categorized into two groups based on their work location: those who worked from home and those who worked outside. The number of children was also divided into two categories: individuals

with two or fewer children and those with more than two children. Similarly, the level of education was divided into two groups: individuals with low education (high school graduates or below) and individuals with high education (college graduates).

Statistical Analysis

The categorical variables were examined to analyze all of these factors. The type of surgery chosen by the patients was considered the dependent variable, while these factors were considered independent variables in a univariate analysis using the χ^2 test. The first mentioned variables on table were control groups while mentioned later were the case group. Afterward, a multivariate analysis was conducted to analyze the factors that influenced the outcome. The relationship between the factors in the two groups (breast-preserving surgery as a case group and mastectomy as a control group) was examined using multivariable logistic regression. Statistical analyses were performed using SPSS 20.0 software (SPSS Inc., Chicago). A p-value of less than 0.05 was considered to indicate a statistically significant difference.

Results

A total of 240 Javanese ethnicity breast cancer patients were included in this study, with 51% being older respondents. Among the older group, 39% preferred BCS, while in the younger group, 27.6% chose BCS. In terms of marital status, 87% of the respondents were married at the time of diagnosis. Among this group, only 31.1% opted for BCS, which was lower than the percentage of singles who chose BCS at 51.1%. In terms of income, 66.7% belonged to the high-income category, with 31.3% choosing BCS. This percentage was similar to the low-income group, where 38.8% chose BCS. Among those with small tumors, 71% chose BCS, with 39.1% opting for a higher level of BCS compared to 18% in the large tumor group. Additionally, 27.9% of the participants had other diseases, with 35.8% choosing BCS, while 32.9% did not have any comorbidities. About NAC, 34.2% of the participants who did not undergo NAC opted for BCS, while 23.2% of them chose BCS. Among those who underwent NAC, 39.2% chose BCS. The percentage of respondents with multiple children was 27.1%, with 21.5% of them choosing BCS. On the other hand, 38.3% of the respondents with few children chose BCS. Among the participants, 55% worked outside, with 31.8% of them choosing BCS. Among those who worked at home, 36.1% chose BCS. Furthermore, 35.4% of the respondents had higher education, with 45.9% of them choosing BCS. In contrast, only 27.1% of the low-education group chose BCS (Table 1).

Univariate analysis

Table 2 shows the results of both Univariate and Multivariate analyses. The analysis revealed that the differences in choosing BCS between the old and young groups were 39.5% and 27.6%, respectively, with a p-value of 0.051, indicating that the difference was not statistically significant. Similarly, there was no significant

difference observed in the data analysis between high and low-income groups, with a p-value of 0.247. Additionally, no significant difference was found in the data analysis between groups with and without comorbidities, with percentages of 35.8% and 32.9%, respectively, and a p-value of 0.673. Lastly, for the occupational group, whether working at home or outside, there was no significant difference observed, with a p-value of 0.484.

Meanwhile, in the data regarding marital status, significant differences were found. It was observed that single individuals exhibited a significantly higher interest in BCS, with 51.6% choosing this option, compared to married individuals, who had a rate of 31.1% at the time of diagnosis (p: 0.024). Among those with small tumor sizes, a larger proportion, 39.1%, opted for BCS, while only 18.0% of those with large tumors chose this option (p: 0.003). Significant differences were also observed between groups with a small number of children and those with many children, with 38.3% of individuals with few children selecting BCS, compared to 21.5% of those with a large number of children (p-value: 0.015). In terms of education, when divided into low and tertiary levels, respondents with higher education were much more inclined to choose BCS, with 45.9% selecting this option, compared to those with low education, who had a rate of 27.1% (p: 0.003) (Figure 1).

Multivariate analysis

In this study, the researchers were able to conduct further analysis on several variables that had a significant impact, particularly tumor size. It was observed that

Table 1. Baseline Characteristics of the Respondents (N=240). Distribution of demographic factors among patients with early breast cancer.

Variables		Frequency (N)	Percentage (%)
Age	<50yo	116	48.3
	>50yo	124	51.7
Marriage	Married	209	87.1
	Single	31	12.9
Income	Low	80	33.3
	High	160	66.7
Tumor size	> 3cm	61	25.4
	< 3cm	179	74.6
Comorbidity	No	173	72.1
	Yes	67	27.9
NAC	Yes	82	34.2
	No	158	65.8
Job status	Working at home	108	45.0
	Working outside	132	55.0
Number of children	> 2	65	27.1
	< 2	175	72.9
Education	Low	155	64.6
	High	85	35.4
Type of Surgery	Mastectomy	159	66.2
	BCS	81	33.8

Table 2. Univariate and Multivariate Analysis Results

Variables		Univariate			Multivariate		
		OR	CI 95%	p	OR	95% CI	p
Age	<50yo	1.71	0.99-2.95	0.051	2.19	1.19-4.00	0.011
	>50						
Marriage	Married	2.38	0.19-0.90	0.024	2.08	0.17-0.95	0.039
	Single						
Income	Low	1.41	0.41-1.25	0.247			
	High						
Tumor size	>3cm	2.94	0.16-0.70	0.003	2.78	0.17-0.78	0.010
	<3cm						
Comorbidity	Yes	1.13	0.62-2.05	0.673			
	No						
NAC	Yes	2.17	0.25-0.85	0.013	2.08	0.25-0.91	0.027
	No						
Job status	Working at home	0.82	0.48-1.41	0.484			
	Working outside						
Number of children	> 2	2.27	0.22-0.86	0.015	2.74	0.17-0.75	0.006
	< 2						
Education	Low	2.28	1.31-3.97	0.003	2.07	1.13-3.78	0.017
	High						

patients with tumors smaller than 3cm were more inclined to choose breast-conserving surgery (BCS) compared to those with tumors larger than 3cm, with an odds ratio (OR) of 2.78 and a p-value of 0.010. Age was identified as the second influential factor, with older individuals showing a preference for BCS, as indicated by an OR of 2.19 and a p-value of 0.011. The presence of children also played a role, as respondents with two or fewer children were more likely to choose BCS with an OR

of 2.74 and a p-value of 0.006. Marital status was the fourth factor, with single individuals tending to choose BCS with an OR of 2.08 and a p-value of 0.039. The fifth factor was whether or not patients underwent neoadjuvant chemotherapy (NAC) before surgery. Patients who did not receive NAC were more likely to choose BCS with an OR of 2.08 and a p-value of 0.027. The sixth factor was the respondents' level of education, with higher education levels influencing the choice of BCS with an OR of 2.07



Figure 1. a Patient post BCS with TDAP flap, b. Patient post akin sparing mastectomy with TRAM flap, c. patient post BCS with glandular mat Rix flap, d. Patient post nipple sparing mastectomy using implant.

and a p-value of 0.017.

Discussion

In this study, the authors collected a large amount of data from Javanese ethnicities with breast cancer and analyzed it. The size of the tumor was found to be the most important factor in determining the type of surgery. This finding supports the existing theory. Patients with small tumors tended to choose breast preservation, while those with tumors measuring 3cm or more were less inclined to preserve their breasts, even though mastectomy with reconstruction was still an option. The results of this study demonstrate that tumor size significantly influences the choice of surgery. This aligns with a previous study by Moiel D et al. [15], which categorized tumor sizes into different ranges and found that larger tumors were associated with a decreased preference for breast conservation surgery compared to mastectomy. The age of the respondents was another factor that influenced their preference for breast cancer surgery. Those over 50 years old were more likely to choose breast-conserving surgery (BCS) compared to those below 50 years old. In the past, older respondents were less concerned about cosmetic results and more concerned about the impact of radiotherapy on their bodies. Therefore, they were more willing to choose mastectomy. However, recent research has shown that younger patients now prefer mastectomy due to fear of recurrence. The interviews conducted by the researchers revealed that the main reason for this preference among young people was the time required for radiation therapy after surgery, which was a burden for those who were still working and taking care of children. Another study also found a significant increase in mastectomy rates among patients aged 30-49 compared to those over 70 and the 50-69 age group with $p=0.008$. The choice of mastectomy was more common among young patients [16]. The third factor identified was that respondents with a small number of children tended to choose BCS more frequently. Previous studies have not explored this specific number of children. A study conducted in 2020 by Pan et al. [17] IW found that respondents with young children, under the age of 7, were more likely to miss a radiotherapy session after undergoing BCS compared to patients with older children. The fourth factor was marital status, which indicated that being married decreased the inclination to undergo BCS. On the other hand, unmarried individuals may have concerns about the potential difficulties in finding a partner in the future if they undergo a mastectomy. A study titled "Marriage Is Associated with Choice of Mastectomy in Patients Eligible for Breast Conservation Therapy" by A.S. Reese in [18] also demonstrated that marriage influenced patients to opt for mastectomy instead of BCS. The fifth factor, which is receiving chemotherapy before surgery, resulted in a decrease in the number of respondents choosing breast-conserving surgery (BCS). This can be attributed to the reluctance of respondents who underwent chemotherapy to undergo further radiotherapy, as stated by the respondents themselves. On the other hand, respondents with higher education were more inclined

to choose BCS over mastectomy. This can be explained by the fact that respondents with higher education had a better understanding of the effects and benefits of radiotherapy, making them more willing to undergo it after surgery. This issue of radiotherapy also emerged in other studies. A study conducted by Baldwin LM et al. [19] found that patients who opted for BCS required consultation with a radiation oncologist five times more often than patients who did not choose BCS. Additionally, patients who had a consultation with a radiation oncologist before surgery were 6.7 times more likely to choose BCS over mastectomy. The distance to a radiation center also played a role in the choice of surgery. Patients who lived within 15 miles of a radiation center were more likely to choose BCS, while those who lived more than 40 miles away often missed the necessary radiation therapy. The decision to undergo breast-conserving surgery (BCS) or mastectomy may also be influenced by long waiting times for BCS [20]. Additionally, Liu et al. [21] examined other factors such as income in this choice. A descriptive study conducted in Spain in 2002 and 2006 by Bride et al. [22] revealed that women residing in areas with higher economic and educational levels were more likely to opt for BCS compared to those in areas with lower economic and educational levels. Interestingly, while education was found to have an influence, income did not appear to play a significant role, possibly due to minimal differences in respondents' income levels. Although BCS offered advantages in terms of appearance, body image, and sexual satisfaction for participants [23], many women who met the criteria for BCS still opted for mastectomy [23]. This was particularly true in developing countries where access to advanced healthcare facilities, including radiotherapy, was limited, and socio-economic factors and individual characteristics of the participants also played a role [23]. The marital status of the participants was found to significantly impact their choice of breast cancer treatment. Single participants tended to choose BCS, possibly because they wanted to preserve their breasts in anticipation of marriage, whereas married participants were more inclined to choose mastectomy. Our study revealed that marital status had a significant influence on the selection of breast cancer therapy. However, this research had several limitations, such as the absence of demographic characteristics like customs, race, and religion. It is recommended that future studies consider these additional factors that may influence the treatment choices of individuals with breast cancer. In conclusion, Out of all the Javanese ethnic breast cancer patients, only 33.8% selected breast preserving surgery as their choice. The decision to choose BCS was influenced by various factors such as having a small tumor size, a low number of children, being older, being single, having a higher level of education, and not receiving NAC. However, the most significant factor was the size of the tumor.

In this manuscript, the author try to show in Figure 1, various surgery methods used to preserve their breast in breast cancer patients in our center. Including quadrant mastectomy with autologous flap, simple tumor excision, simple reconstruction such as matrix flap or nipple sparing mastectomy with implant reconstruction.

Author Contribution Statement

Kristanto Yuli Yarso developed the concept, wrote, and provided data. Meirisa Ardianti collected the data. Ahmad Azmiardi conducted statistical data analysis. Danendra Rafi Noval Yarsa translate and proof reading. All authors reviewed and approved the final version of the manuscript.

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Abbreviation

BCS: Breast Conserving Surgery
NAC : Neoadjuvant chemotherapy
SPSS : Statistical Program of Social Science

Conflict of Interest

All authors declare no conflict of interest

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