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Breast Reconstruction after Breast Cancer Surgery at Multiple Centers in Jakarta

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ABSTRACT

Background: Breast reconstruction in women with breast cancer has not been thoroughly investigated in Indonesia. A pioneering study is needed to identify the breast reconstruction rate, treatment outcomes, and factors influencing treatment in a smaller population.

Methods: The secondary data of 105 women with breast cancer who underwent reconstruction post-breast surgery at several cancer centers in Jakarta were collected retrospectively from 2020 to the first quarter of 2024. We performed Fisher's exact test, independent t-test, and multiple regression analyses to determine factors influencing the choice of breast reconstruction and surgical outcomes.

Results: The breast reconstruction rate at one center after 2 years was 56.8%, and the multicenter trend of breast reconstruction increased by 7.6% after 1 year. Plastic surgeons performed 36.8% of the total breast reconstructions, with DIEP-free flaps being the most performed type of reconstruction. The history of radiotherapy ($P=0.03$), type of breast surgery ($P<0.05$), and surgical site of the breast surgery ($P<0.05$) were significantly associated with the choice of breast reconstruction in women with breast cancer. Moreover, lymph node dissection ($P=0.03$), the timing of breast reconstruction ($P=0.05$), and the presence of complications ($P=0.002$) were significantly associated with the length of ICU stay.

Conclusion: The breast reconstruction rate in our study was higher than several centers across Asia (56.8%). However, further investigation is needed to evaluate the outcomes of therapy and factors influencing them.

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INTRODUCTION

Breast cancer has been one of the most prevalent cancers in Indonesian women, accounting for 30% of all malignancies in Indonesia based on the surveillance data of the Ministry of Health, Indonesia, in 2013.[1,2]

In general, Asian countries have a lower rate of postmastectomy reconstruction than other parts of the world. The rate of post-mastectomy reconstruction in Asian countries is approximately

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2.6–18% compared to that in Western populations, which accounts for 17–60%.[3–5] In Southeast Asia, a single-center Singaporean study reported that the rate of breast reconstruction decreased to 24.3% over a decade.[6] Meanwhile, in South Korea and Japan, the rates of breast reconstruction were 16% and 11.2%, respectively, which are lower than those in Singaporean studies.[6,7] However, the rates of breast reconstruction have not been thoroughly measured in Indonesia. The breast reconstruction rate needs to be measured based on socioeconomic and demographic factors, which may influence the decision-making of women. Hence, this study aimed to measure the breast reconstruction rate and demographics of women with breast cancer who underwent breast reconstruction after breast cancer surgery in multiple centers in Jakarta as the start of an epidemiological study of breast reconstruction procedures in Indonesia.

METHODS

Study design and sample criteria

This retrospective cohort study was performed at multiple centers in Jakarta (namely, Metropolitan Medical Center Hospital, Dr. Cipto Mangunkusumo National Hospital, and two other private hospitals) in 2020–1st quarter of 2024, with a total of 105 patients, some of whom had multiple breast reconstruction surgeries. This study was approved by the Research & Ethics Committee of the Faculty of Medicine, Universitas Indonesia, with protocol No. 23-07-1379. We collected secondary data retrospectively from these centers' electronic databases and medical records, which also included information on the socioeconomic and medical characteristics of women with breast cancer. We excluded breast reconstructions which were performed in women without breast cancer. This study employed pairwise deletion to handle missing data.

Outcomes

We identified the factors that might contribute to the success rate of the breast reconstruction, the choice of breast reconstruction surgery, the complications following the surgery, and the length of stay (total hospitalization & ICU). The factors included socioeconomic and medical characteristics of women with breast cancer such as age, ethnicity, education level, religion, type of breast surgery prior to the reconstruction, type of breast reconstruction procedure, adjuvants of chemotherapy and radiotherapy, surgical pathology result, cancerous molecular subtype, staging at diagnosis, lymph node dissection, and timing of the breast reconstruction procedure. The breast reconstruction success rate was identified according to the post-operative flap viability.

Statistical analysis

We performed univariate analyses to determine the frequency of the demographic status, subsequently performing bivariate and multivariate analyses to determine the factors influencing the outcome of breast reconstruction using IBM SPSS Statistics software (version 25.0; SPSS, Inc., Chicago, Illinois). The type of bivariate analysis was determined by the distribution of socioeconomic factors (normality) and the type of study variables, leading to the choice of Fisher's Exact Test and Independent sample t-test in this study, alongside the relative risk calculation. The multivariate analysis consisted of Multiple Regression Analysis to identify whether the studied factors acted as covariates to one another.

RESULTS

The number of breast reconstruction surgeries at multiple centers increased over time, with a 7.6% difference in one year (2021 to 2022), while the overall rate of breast reconstruction after breast surgery at Hospital A in Jakarta was 56.8% in two years, with 36% of the reconstructions being performed by plastic surgeons and the rest by oncologic surgeons (Figure 1).

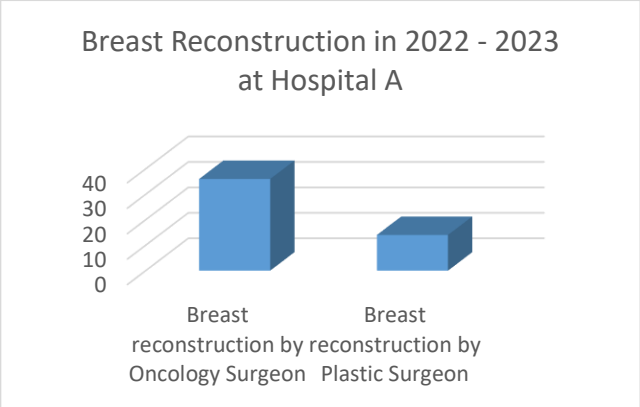

Figure 1. The overall breast reconstruction after breast surgery at Hospital A in 2022 – 2023

The distributions of the reconstructions performed by plastic surgeons and oncologic surgeons are presented in Table 1. Among more than 200 breast surgeries prior to reconstruction, 81.5% and 18.5% were mastectomies and breast-conserving surgeries, respectively. Most of the breast reconstructions were performed immediately after the breast surgeries (94.7%). Deep Inferior Epigastric Perforator (DIEP) free flaps were the most commonly performed type of breast reconstruction, accounting for 38.6% of the total surgeries. The flap success rate in the last three years was 90%. Breast reconstruction was also performed for women with stage II breast cancer

(20%) and women with benign breast tumors (15.2%).

Table 1. The characteristics of breast cancer women who underwent breast reconstruction by plastic surgeons.

Characteristics	Total Breast Reconstruction	
	Frequency	Percentage
Year of Breast Reconstruction Procedures		
2020	17	16,2
2021	17	16,2
2022	25	23,8
2023	38	26,2
2024 (first quarter)	8	7,6
Ethnicity		
Javanese	25	38,5
Sundanese	11	16,9
Sumateran	13	20,0
Chinese	12	18,5
Celebese	2	3,1
Others	2	3,1
Education Level		
High School Diploma	8	12,3
Vocational Diploma	3	4,6
Bachelor Degree	48	73,8
Master Degree	6	9,2
Religion		
Islam	46	70,8
Christian	7	10,8
Catholic	8	12,3
Buddha	3	4,6
Hindu	1	1,5
Chemotherapy		
Yes	38	59,4
No	26	40,6
Radiotherapy		
Yes	22	34,4
No	42	65,6
Complications		
No Complications	35	48,6
Hematoma	3	4,2
Infection	9	12,5
Wound Problem	7	9,7
Fat Necrosis	1	1,4
Pain	2	2,8
Others	15	20,8
Province		
Jakarta	28	45,2
Jawa Barat	22	35,5
Banten	3	4,8
Jawa Timur	4	6,5
Riau	3	4,8
Sumatera Selatan	2	3,2
Surgical Pathology		
Tumor phylloides	14	28,0
No Special Type (NST)	27	54,0
Silikonoma	1	2,0
Ductal Carcinoma In Situ (DCIS)	4	8,0
Fibroadenoma	2	4,0
Others	2	4,0
Molecular Subtype		
Luminal A	8	23,5
Luminal B	9	26,5
HER2 Positive	8	23,5
Triple Negative Breast Cancer	2	5,9
Triple Positive Breast Cancer	3	8,8
Others	4	11,8
Staging		
Stage I	1	1,0
Stage II	21	20,0
Stage III	16	15,2
Stage IV	6	5,7
Benign	16	15,2
Lymph Node Dissection		
Yes	65	66,3
No	33	33,7
Type of Breast Cancer Surgery		
Lumpectomy	15	18,5
Skin-Sparing Mastectomy	15	18,5
Nipple-sparing Mastectomy	6	7,4
Simple Mastectomy	5	6,2
Modified Radical Mastectomy	33	40,7
Wide Excision	4	4,9
Others	3	3,7
Type of Breast Reconstruction		
Oncoplastic Level 1	1	0,9
Oncoplastic Level 2	3	2,8
Volume Replacement	1	0,9
Deep Inferior Epigastric Perforator (DIEP) Free Flap	53	48,6
Latissimus Dorsi (LD) Flap	13	11,9
Implant	2	1,8
Nipple Area Complex (NAC) Reconstruction	5	4,6
Symmetrisation Procedures	4	3,7
Fat Graft	3	2,8
Anterolateral Thigh (ALT) Free Flap	5	4,6
Others	19	17,4
Timing		
Immediate	71	94,7
Delayed	4	5,3

Table 1 displays the distribution of the socioeconomic and medical characteristics of the

women with breast cancer who underwent breast reconstruction after breast surgery. Most of the women with breast cancer were Javanese (38.5%) or Sumatran (20%). More than 73.8% of women with breast cancer had at least a bachelor's degree or higher, and most of them practiced Islam (70.8%). The mean age of the women with breast cancer was 45 years.

The relative risk analysis revealed that women who initially received chemotherapy and radiotherapy were 0.97% and 0.9% more likely, respectively, to have a successful breast reconstruction than women who did not receive therapy. Fisher's test showed that chemotherapy status, radiotherapy status, type of surgical pathology, molecular subtype, cancer stage, and type of breast surgery had no statistically significant effect on the success rate of breast reconstruction. The rest of the factors influencing the breast reconstruction rate are presented in Table 3.

Age and breast reconstruction rate analysis were performed using an independent sample t-test. The average age of the vital flap group ($\bar{x}$ = 45.89, s = 1.30) was greater than that of the nonvital flap group ($\bar{x}$ = 46.50, s = 3.10); however, the associations between these variables were not statistically significant (t(76) = 0.2, P = 0.84). The distribution of age in the vital and nonvital flap groups is presented with a boxplot in Figure 2.

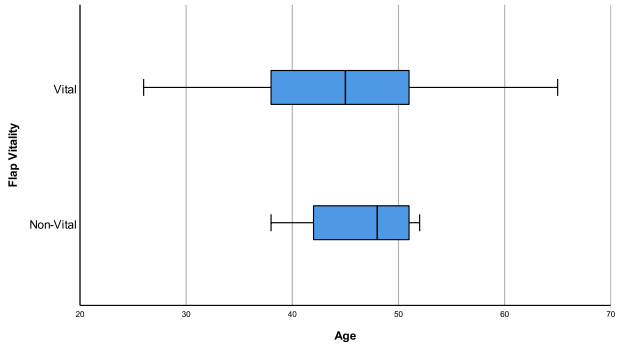

Figure 2. The distribution of age in vital and non-vital flap groups

Bivariate analysis of the presence of complications with other risk factors was also performed to identify the statistical relationships between those factors. The complications that we studied were hematoma, infection, wound problems, fat necrosis, pain, and abdominal bulging. Only some patients with complications required flap salvation (N=7). Fisher's test showed that the type of breast surgery was significantly associated with the occurrence of complications ($\chi^2(1) = 4.12$, P=0.05). The relative risk showed that women who underwent mastectomy before breast reconstruction were 0.35 times more likely to have complications than women who underwent breast-conserving surgery. The type of breast reconstruction appeared to have an insignificant relationship with the occurrence of complications ($\chi^2(1) = 1.17$, P = 0.32). The rest of the bivariate analysis is presented in Table 4.

Table 2. The factors influencing the breast cancer women's choice of the type of breast reconstruction surgery

Risk Factors	Breast reconstruction surgery type		P-values
	DIEP Free Flap	Others	
Ethnicity			0.44
Javanese	15 (23.4%)	10 (15.6%)	
Sundanese	8 (12.5%)	3 (4.7%)	
Sumateran	4 (6.3%)	8 (12.5%)	
Chinese	6 (9.4%)	6 (9.4%)	
Celebese	0 (0%)	2 (3.1%)	
Others	1 (1.6%)	1 (1.6%)	
Education level			0.54
High School Diploma	5 (7.7%)	3 (4.6%)	
Vocational Diploma	2)3.1%)	1 (1.5%)	
Bachelor Degree	26 (40%)	22 (33.8%)	
Master Degree	1 (1.5%)	5 (7.7%)	
Religion			0.35
Islam	26 (40%)	20 (30.8%)	
Christian	2 (3.1%)	5 (7,7%)	
Catholic	5 (7.7%)	3 (4.6%)	
Buddha	1 (1.5%)	2 (3.1%)	
Hindu	0 (0%)	1 (1.5%)	
Chemotherapy			0.65
Yes	20 (31.3%)	18 (28.1%)	
No	14 (21.9%)	12 (18.8%)	
Radiotherapy			0.03
Yes	9 (14.1%)	13 (20.3%)	
No	25 (39.1%)	17 (26.6%)	
Surgical site			<0.05
Unilateral	51 (49%)	45 (43.2%)	
Bilateral	1 (1%)	7 (6.7%)	
Type of Breast Cancer Surgery			<0.05
Lumpectomy	1 (1%)	14 (13.9%)	
Skin-Sparing Mastectomy	14 (13.9%)	1 (1%)	
Nipple-sparing Mastectomy	4 (4%)	2 (2%)	
Simple Mastectomy	5 (5%)	0 (0%)	
Modified Radical Mastectomy	25 (24.8%)	8 (7.9%)	
Wide Excision	0 (0%)	4 (4%)	
Others	0 (0%)	23 (22.8%)	

The age of the women was not significantly related to the occurrence of complications (t(60) = 1.32, P=0.19), although the mean age of the group with complications was greater (47.46) than that of

the group without any complications (44.26), as shown in Figure 4.

The length of hospitalization is one of the outcomes that needs to be considered after breast reconstruction surgery.

Table 3. The factors influencing the success rate of Breast Reconstruction

Risk Factors	Flap Vitality		Test Statistic	P-values	RR
	Vital	Non-Vital			
Chemotherapy					0.97 (95%
Present priorly	34 (55.9%)	2 (3.4%)	$\chi^2(1) = 0.18$	1.00	CI 0.84 -
Absent priorly	22 (37.3%)	2 (3.4%)			1.12)
Radiotherapy					0.90 (95%
Present priorly	21 (35.0%)	0 (0%)	$\chi^2(1) = 3.60$	0.287	CI 0.81 -
Absent priorly	35 (58.3%)	4 (6.7%)			1.00)
Surgical Pathology					0.95 (95%
Tumor phylloides	12 (25.5%)	1 (2.1%)	$\chi^2(1) = 5.09$	1.00	CI 0.80 -
Other	33 (70.2%)	1 (2.1%)			1.12)
Molecular Subtype					1.00 (95%
Luminal A / B	16 (18.4%)	1 (1.1%)	$\chi^2(1) = 6.72$	0.193	CI 0.87 -
Others	66 (75.9%)	4 (4.6%)			1.14)
Staging					0.94 (95%
Stage I and 2	18 (43.9%)	2 (4.9%)	$\chi^2(1) = 3.69$	0.466	CI 0.80 -
Stage 3 and 4	20 (48.8%)	1 (2.4%)			1.12)
Lymph Node Dissection					1.08 (95%
Present	59 (92.2%)	5 (7.8%)	$\chi^2(1) = 2.57$	0.581	CI 1.01 -
Absent	18 (100%)	0 (0%)			1.165)
Type of Breast Surgery					1.07 (95%
Breast-conserving surgery	15 (19.2%)	0 (0%)	$\chi^2(1) = 5.03$	0.723	CI 1.01 -
Mastectomy	58 (74.3%)	5 (6.4%)			1.17)
Type of Breast Reconstruction					0.95 (95%
DIEP free flap	46 (52.9%)	4 (4.6%)	$\chi^2(1) = 5.77$	0.850	CI 0.86 -
Others	36 (41.4%)	1 (1.1%)			1.05)
Timing					0.93 (95%
Immediate	65 (79.3%)	5 (6.1%)	$\chi^2(1) = 0.36$	1.000	CI 0.87 -
Delayed	12 (14.6%)	0 (0%)			0.99)

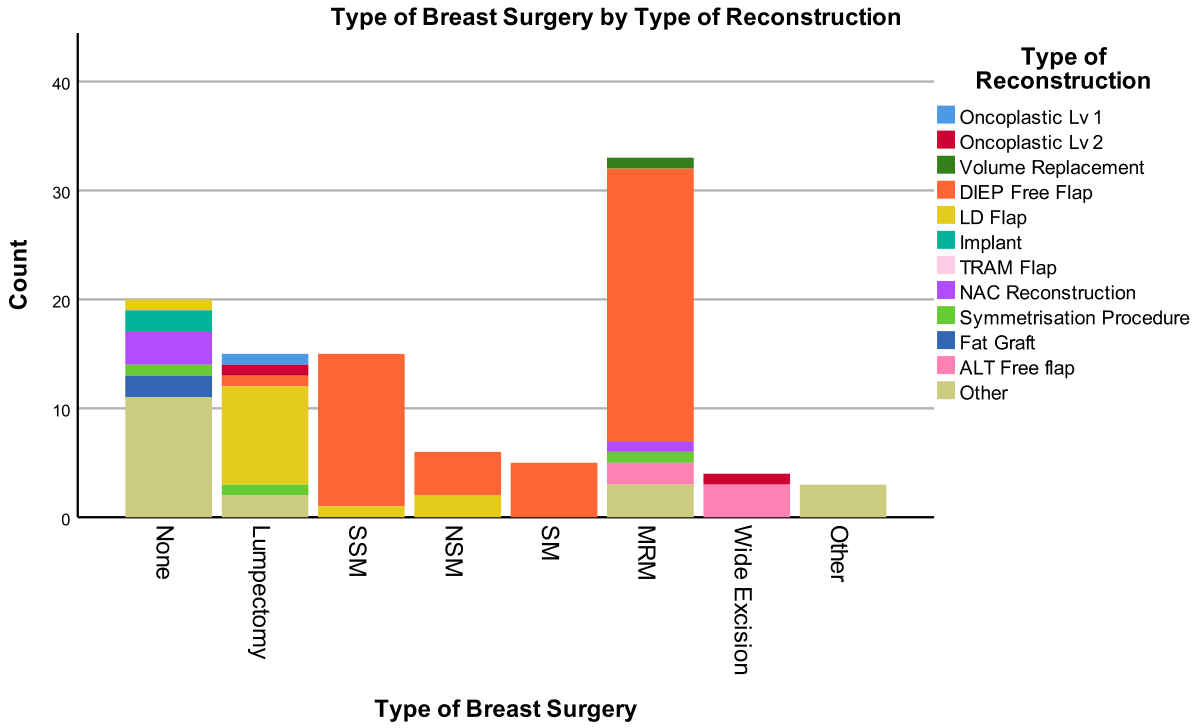

Figure 3. Distribution of breast reconstruction type according to the prior breast surgery

Table 4. Risk factors influencing the complications of breast reconstruction

Risk Factors	Complications		Test Statistic	P-values	RR
	Present	Absent			
Chemotherapy					
Present priorly	18 (29.0%)	20 (32.3%)	$\chi^2(1) = 0.58$	0.60	0.80 (95% CI 0.43 - 1.46)
Absent priorly	9 (14.5%)	15 (24.2%)			
Radiotherapy					
Present priorly	10 (16.1%)	12 (19.4%)	$\chi^2(1) = 0.05$	1.00	0.93 (95% CI 0.52 - 1.67)
Absent priorly	17 (27.4%)	23 (37.1%)			
Surgical Pathology					
Tumor phylloides	3 (7.00%)	7 (16.3%)	$\chi^2(1) = 1.85$	0.28	0.55 (95% CI 0.20 - 1.49)
Other	18 (41.9%)	15 (34.8%)			
Molecular Subtype					
Luminal A / B	10 (15.6%)	7 (11.0%)	$\chi^2(1) = 1.70$	0.26	1.45 (95% CI 0.86 - 2.47)
Others	19 (29.7%)	28 (43.8%)			
Staging					
Stage I and 2	9 (22.5%)	12 (30%)	$\chi^2(1) = 0.90$	0.53	0.74 (95% CI 0.40 - 1.38)
Stage 3 and 4	11 (27.5%)	8 (20%)			
Lymph Node Dissection					
Present	4 (6.3%)	12 (18.8%)	$\chi^2(1) = 3.55$	0.08	0.48 (95% CI 0.20 - 1.17)
Absent	25 (39.1%)	23 (35.9%)			
Type of Breast Surgery					
Breast-conserving surgery	2 (3.6%)	9 (16.3%)	$\chi^2(1) = 4.12$	0.05*	0.35 (95% CI 0.10 - 1.26)
Mastectomy	23 (41.8%)	21 (38.2%)			
Type of Breast Reconstruction					
DIEP free flap	18 (28.1%)	17 (26.6%)	$\chi^2(1) = 1.17$	0.32	1.36 (95% CI 0.77 - 2.39)
Others	11 (17.1%)	18 (28.1%)			
Timing					
Immediate	24 (38.1%)	30 (47.6%)	$\chi^2(1) = 0.72$	0.72	0.80 (95% CI 0.41 - 1.54)
Delayed	5 (7.9%)	4 (6.3%)			

Bivariate analysis of the possible risk factors contributing to the length of hospitalization revealed that the stage of breast cancer (P=0.03) and the presence of complications (P=0.01) were significantly associated with the length of hospitalization.

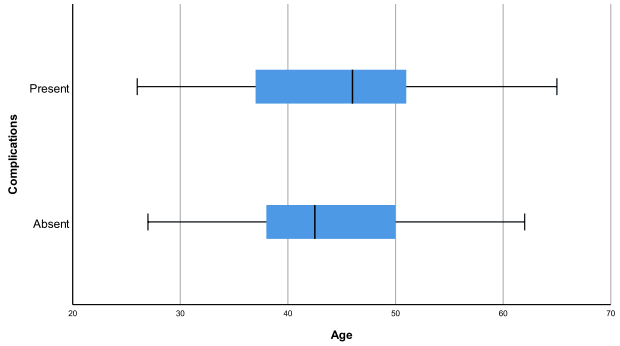

Figure 4. The distribution of age between women with and without complications

On average, women with Stage 3 and above disease had longer hospitalization (8.31 ± 1.22 days) than did those with Stage I and 2 disease (5.88 ± 2.62 days). However, women without any complications experienced shorter hospitalization (6.88 ± 1.36 days) than those with complications (8.64 ± 3.52 days). The results of the rest of the risk factor analysis are presented in Table 5.

Moreover, bivariate analysis using an independent t-test of the possible risk factors contributing to the length of ICU stay revealed that lymph node dissection (P=0.03), the timing of breast reconstruction (P=0.05), and the presence of complications (P=0.002) were significantly associated with the length of ICU stay. On average, women who underwent lymph node dissection had longer ICU stays (8.31 ± 1.22 days) than those who did not undergo this procedure (5.88 ± 2.62 days). The mean ICU stay of the women who underwent immediate breast reconstruction was longer (1.38 ± 1.11 days) than that of the women who underwent delayed breast reconstruction (0.35 ± 0.50 days). The average number of days spent in the ICU for women with complications post-breast reconstruction was more (1.93 ± 1.40 days) than that of women without complications (0.85 ± 0.54 days). The rest of the risk factor analysis results are presented in Table 6.

The multivariate analysis using the Multiple Regression Analysis shows no significant interactions between the observed factors influencing the success rate, complication occurrence, and length of hospital stay/ICU. However, the differences in success rate,

complications, and length of stay of each observed factor appear to be insignificant.

Table 5. Risk factors contributing to the length of hospitalization

Risk Factors	Mean differences	p-value
Chemotherapy		0.837
Present priorly	8.56 ± 3.33 days	
Absent priorly	6.50 ± 1.05 days	
Radiotherapy		0.500
Present priorly	7.60 ± 0.73 days	
Absent priorly	8.33 ± 1.03 days	
Surgical Pathology		0.512
Tumor phyllodes	6.88 ± 1.35 days	
Other	8.05 ± 3.07 days	
Molecular Subtype		0.610
Luminal A / B	8.11 ± 1.54 days	
Others	7.92 ± 3.77 days	
Staging		0.029*
Stage I and 2	5.88 ± 2.62 days	
Stages 3 and 4	8.31 ± 1.22 days	
Lymph Node		0.361
Dissection	8.00 ± 3.00 days	
Present	6.88 ± 1.35 days	
Absent		
Type of Breast		0.130
Surgery	6.00 ± 1.41 days	
Breast-conserving	8.20 ± 3.07 days	
surgery		
Mastectomy		
Type of Breast		0.891
Reconstruction	7.95 ± 2.94 days	
DIEP free flap	8.33 ± 4.16 days	
Others		
Timing		0.637
Immediate	7.29 ± 4.32 days	
Delayed	6.25 ± 4.03 days	
Complications		0.011
Present	8.64 ± 3.52 days	
Absent	6.88 ± 1.36 days	

DISCUSSION

Currently, Indonesia does not have a well-documented breast reconstruction after breast surgery registry. Our study aimed to develop a nationwide breast reconstruction registry by increasing the awareness of healthcare personnel and medical records officers. In the cancer registry owned by one of our centers, Hospital B, there were 3250 cases of breast cancer in 2008–2012, with 41.7% of the patients having nonspecific type (NST) surgical pathology and 34.3% of the patients having stage III–IV breast cancer.[1,2] It was also noted in the cancer registry of the mentioned hospitals that more than 30% of breast cancer patients aged 45-54 years were diagnosed.[2] The breast reconstruction rate in one of our centers appeared to be 56.8%, which is comparably higher than that of a single center in Singapore (24.3%), the nationwide rate in Korea (16.0%), and over 1300 hospitals in Japan (11.2%).[4,6,7]

Table 6. Risk factors contributing to the length of ICU stay

Risk Factors	Mean differences	P-value
Chemotherapy		0.224
Present priorly	6.50 ± 1.05 days	
Absent priorly	1.94 ± 0.30 days	
Radiotherapy		0.763
Present priorly	1.70 ± 1.42 days	
Absent priorly	1.58 ± 0.90 days	
Surgical Pathology		0.556
Tumor phyllodes	6.88 ± 1.35 days	
Other	1.67 ± 1.15 days	
Molecular Subtype		0.839
Luminal A / B	1.44 ± 0.73 days	
Others	1.77 ± 1.36 days	
Staging		0.145
Stage I and 2	1.12 ± 1.22 days	
Stages 3 and 4	1.69 ± 0.95 days	
Lymph Node		0.027*
Dissection	1.64 ± 1.14 days	
Present	0.64 ± 0.51 days	
Absent		
Type of Breast Surgery		0.170
Breast-conserving	0.50 ± 0.71 days	
surgery	1.75 ± 1.12 days	
Mastectomy		
Type of Breast		0.139
Reconstruction	1.68 ± 1.11 days	
DIEP free flap	1.33 ± 1.53 days	
Others		
Timing		0.052*
Immediate	1.38 ± 1.11 days	
Delayed	0.35 ± 0.50 days	
Complications		0.002*
Present	1.93 ± 1.40 days	
Absent	0.85 ± 0.54 days	

Despite the poor coverage of the associations between breast reconstruction and the factors influencing it in our study, one systematic review revealed several factors that had statistical associations with the decision to perform the procedure. The influencing factors were income disparity, ethnicity, geographic location (urban vs rural), cancer stage, radiation therapy, and physician characteristics.[8] In their study, Morrow *et al.* reported that women in the US with a family income of more than $40,000 were twice as likely to undergo breast reconstruction, and another study reported lower rates of breast reconstruction in the two lowest quartiles of household income.[9] Ethnicity also plays a role in the rate of breast reconstruction, with black women being more likely to have breast reconstruction than white women.[9,10] Jeevan *et al.* also noted that urban areas had a greater rate of reconstruction than rural areas (4.8% vs 3.7%, respectively).[11] The breast cancer stage at the time of the procedure was associated with

the rate of breast reconstruction in the US, with patients with stage 1 disease being more likely to undergo breast reconstruction, whereas another study noted that radiation therapy was associated with decreased odds of breast reconstruction.[8,12]

One recent study in the Netherlands revealed the risk factors influencing breast reconstruction after mastectomy. Several risk factors were medical history of hypertension and diabetes mellitus (P=0.001), BMI of women (P=0.015), ASA classification (P<0.001), stage (P=0.035), nodal management (P<0.001), adjuvant radiotherapy (P=0.007), and adjuvant chemotherapy (P=0.001).[8] Another study in Melbourne, Australia, revealed that several factors, such as the site of surgery (bilateral or unilateral, P<0.001), age at surgery (P=0.046), level of home/work responsibilities (P=0.042), and the effect of the plastic surgeon (P<0.001), were statistically significant for performing breast reconstruction after mastectomy.[13]

The factors influencing the choice of breast reconstruction, whether the timing or the type of breast reconstruction, are still poorly understood worldwide. In our study, a history of radiotherapy (P = 0.03), type of breast surgery (P<0.05), and surgical site of the breast surgery (P<0.05) were significantly associated with the choice of breast reconstruction in women with breast cancer. However, a multivariate logistic regression model by Wang *et al.* showed that patients' dissatisfaction with their current body image (P=0.035) and body mass index (P<0.001) were factors influencing their decision regarding breast reconstruction options.[14]

The length of hospitalization after breast reconstruction has been investigated in several centers. Chen *et al.* noted that the mean length of hospitalization in the total mastectomy group (7 days) was greater than that in the breast-conserving surgery group. The findings were also found to be statistically significant (P<0.001).[5] In our study, despite the lack of statistical significance, the mean survival time was 8 days in the mastectomy group compared to that in the BCS group, with an average of 6 days. A study by Vemula *et al*. reported that the average length of stay after performing DIEP free flaps for breast reconstruction was 3.89±0.62 days at specialty surgery hospitals and 4.41±1.15 days at tertiary care facilities.[15] The hospitalization duration for DIEP free flaps in this study was shorter than that in our study (7.95 ± 2.94 days). The reason for these findings was the decision of plastic surgeons to identify the possible complications of DIEP-free flaps until the 5th day of hospitalization since the procedure is relatively new in Indonesia.

A meta-analysis by Matar *et al.* investigated the complications of breast reconstruction after mastectomy between immediate and delayed reconstruction. The study revealed no significant differences in complications between these subgroups of women, which was in line with the findings of our study (P=0.72).[16] The same meta-analysis also noted a statistically nonsignificant difference in hospitalization length between the two subgroups, similar to the findings of our study. [16]

CONCLUSION

The breast reconstruction rate in this study was comparable to that in studies in neighboring countries, possibly leading to a similar nationwide rate. However, a national cancer registry needs to investigate the actual rate of breast reconstruction and identify the outcomes of breast reconstruction nationwide. With the special demographic characteristics of women with breast cancer, an investigation of the factors influencing the outcomes and decisions regarding reconstruction type is imperative for improving breast reconstruction management in Indonesia.

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CONFLICT OF INTERESTS

The authors in this study have no relevant financial or non-financial interests to disclose.

DATA AVAILABILITY

Raw data were generated and stored at Division of Plastic Reconstructive Surgery, Department of Surgery, Faculty of Medicine, Universitas Indonesia. The data are not publicly available due to the presence of the patients' private information. Derived data supporting the findings are available from the corresponding author, MRR, upon reasonable request.

ETHICAL CONSIDERATIONS

The study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Indonesia (Ethical Approval No. 23-07-1379)

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