The desire to utilize postmastectomy breast reconstruction in Saudi Arabian women

Predictors and barriers

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ABSTRACT

الأهداف: دراسة العوامل السكانية والاجتماعية والاقتصادية التي اثرت على رغبة المرضى للاستفادة من عملية اعادة بناء الثدي (ترميم الثدي). بالإضافة لذلك دراسة الأسباب المانعة لإجراء عملية إعادة بناء للثدي بعد القيام باستئصاله.

الطريقة: لقد قمنا بإجراء دراسة مقطعية مستعرضة في مركزين جراحيين في مدينة جدة بالمملكة العربية السعودية. لقد تم توزيع استبيان يتم تعبئته ذاتياً من قبل المرضى الذين حضروا للعيادة للمتابعة بعد اجراء عملية استئصال للثدي في الفترة ما بين يناير ومارس في عام 2013م. المعلومات التي جمعت عن طريق الاستبيان كانت معلومات بخصوص العوامل الديموغرافية والاجتماعية والاقتصادية التي قد تكون اثرت على رغبة المرضى في الاستفادة من عملية ترميم الثدي بعد القيام باستئصاله. كما تم استخدام الانحدار اللوجستي متعدد المتغيرات لتحديد العوامل الاكثر تأثيراً على رغبة المريضة لإجراء عملية بناء للثدي.

النتائج: بشكل عام، 16.5% من المرضى اللاتي خضعن لإجراء عملية استئصال للثدي اجروا عملية ترميم للثدي. صغر السن وارتفاع الحصيلة التعليمية كانت اكثر العوامل المنبئة المرتبطة ارتباطاً هاماً مع زيادة الرغبة في اجراء عملية إعادة بناء للثدي. بالإضافة لما سبق، من أهم الحواجز لإعادة بناء الثدي كانت عدم وجود معلومات كافية عن العملية (16.5%)، المخاوف من المضاعفات المحتملة من العملية(68%)، والاعتقاد الخاطئ أن عملية إعادة البناء قد تتدخل في الكشف عن عودة السرطان (54%).

الخاتمة: العمر والمستوى التعليمي كانت عوامل منبئة مهمة لرغبة المريضة في اجراء عملية بناء للثدي بعد استئصاله. علاوة على ذلك، الحواجز القابلة للتغيير شملت نقص المعرفة والمفاهيم الخاطئة حول العملية. معالجة هذه الحواجز قد تنتج ارتفاعاً في معدل عدد عمليات اعادة بناء الثدي في المملكة العربية السعودية.

Objectives: To study factors that influence the desire to utilize breast reconstruction after mastectomy, and to investigate the barriers to reconstruction among women in Saudi Arabia.

Methods: We conducted a cross-sectional study at 2 surgical centers in Jeddah, Saudi Arabia. A self-administered questionnaire was distributed to all breast cancer patients attending the surgery clinics for follow-up after mastectomy between January and March 2013. Ninety-one patients met the study inclusion criteria. The first part of the questionnaire covered the demographic and socioeconomic information regarding factors that might influence the desire to utilize breast reconstruction including possible barriers. Multivariate logistic regression was used to determine the significant predictors of the desire to undergo reconstruction.

Results: Overall, 16.5% of patients underwent breast reconstruction after mastectomy. Young age and high educational attainment were significantly associated with an increased desire to undergo reconstruction. The main barriers to reconstruction were the lack of adequate information on the procedure (63%), concerns on the complications of the procedure (68%), and concerns on the reconstruction interfering with the detection of recurrence (54%).

Conclusion: Age and educational level were significant predictors of the desire to utilize breast reconstruction. Furthermore, modifiable barriers included the lack of knowledge and misconceptions on the procedure. Addressing these issues may increase the rate of breast reconstruction in Saudi Arabia.

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Surgical resection (mastectomy) is considered the primary treatment for breast cancer. In the past decade, changing attitudes toward breast reconstruction among both patients and providers have led to an increasing number of women seeking breast reconstruction after mastectomy.[1] In 2009, there were approximately 86,000 breast reconstruction procedures performed in the United States.[2] There has been a significant rise in immediate reconstruction rates, attributable to a notable increase in implant use.[3] Many types of breast reconstruction are available including silicone and silane implants, tissue expanders, and pedicle and free musculocutaneous flaps.[4,5] Although these reconstruction options have been proven to be oncologically safe,[5] and many women still refuse breast reconstruction.[6] The choice to proceed with breast reconstruction after mastectomy is difficult, and is affected by many factors. Most breast reconstruction procedures are performed in women younger than 60 years of age.[7] The decision to proceed with reconstruction can be influenced by patient factors, physician factors, cancer related factors, and insurance status.[7-10] Patient factors include patient age, socioeconomic status, race, site of mastectomy, and patient preference.[1] Of these factors, age >50 years is the most common negative predictor of breast reconstruction after mastectomy.[8,9,11-13] According to the Saudi Cancer Registry,[14] breast cancer has been the most common cancer among Saudi females over the past 12 years. In a recent study, Ibrahim et al[15] estimated that the burden of breast cancer in Saudi Arabia will increase by approximately 350% by 2025. In a previously published study, almost half of the general surgeons surveyed reported that they had treated patients who refused breast reconstruction despite its availability.[4] Previous studies on the factors influencing postmastectomy breast reconstruction in the Middle East were conducted in Egypt[13,14] and we are not aware of any similar studies conducted in Saudi Arabia or the Gulf Region. The objectives of this exploratory study were to study the demographic and socioeconomic factors influencing the desire to utilize postmastectomy breast reconstruction and to evaluate the barriers to postmastectomy breast reconstruction among women in Saudi Arabia.

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Methods.

Study population and setting. We conducted this cross-sectional study at King Abdulaziz University Hospital (KAUH) and Bakhsh Hospital Group (BHG), Jeddah, Saudi Arabia. Jeddah is Saudi Arabia's second largest city, and KAUH is a multi-specialty adult and pediatric tertiary hospital and the main teaching institution in the western region. Bakhsh Hospital Group is one of the main private hospitals in the western region. The Ethical Review Committee at KAUH approved this study.

Inclusion criteria for patients were women ≥18 years of age, a breast cancer diagnosis ranging from stage I-III (American Joint Committee on Cancer),[11] presentation for a follow up appointment at the surgery clinic of KAUH or Bakhsh hospital between January and March 2013 after modified radical mastectomy, patient informed consent, and Arabic as the patient's native language. We excluded patients with advanced disease (stage IV) and those who had undergone lumpectomy or were still receiving radiotherapy. All patients were offered the option to undergo breast reconstruction pre-operatively, and for those considering reconstruction surgical options were discussed.

Questionnaire and data collection. We developed a questionnaire based on several published studies[9,10,16] as well as our expert insight. The questionnaire consisted of 2 main parts. The first part of the questionnaire covered the demographic and socioeconomic data such as age, educational attainment, marital status, working status, income, and geographic location (rural or urban). It also included type of treatment, site (unilateral or bilateral) and date of mastectomy, and the patient's level of desire to undergo breast reconstruction. The second part included 10 questions on perceived barriers to breast reconstruction including the patient's knowledge of the procedure, concerns on the complications of the procedure, concerns on the detection of recurrence, concerns on their age, and other chronic diseases, and lack of family support.

A pilot study was conducted on a convenient sample of 10 patients to determine the average time required to complete the questionnaire and to correct any difficulties that the patients might experience with the vocabulary of the questionnaire. The average time to complete the questionnaire was 10-15 minutes, and the structure and vocabulary of several questions were revised on the basis of this pilot study.

All patients presenting in one of the surgery clinics for follow-up after mastectomy who met the inclusion criteria were approached for inclusion in the study. After explaining the purpose of the study and obtaining informed consent, the surgical interns and clinic nurses

administered the questionnaires to the patients. Patients were asked to complete the survey in the designated patient waiting area and to return it to the registration nurse upon completion. Out of the 132 patients, 91 completed the questionnaire, with a response rate of 69%.

Statistical analysis. Descriptive statistics were calculated to summarize the characteristics of the study population. The desire to utilize breast reconstruction was recorded as a dichotomous variable coded as "Yes=1" or "No=0". The Chi-square test was used to assess the relationship between demographic, socio-economic, and disease/treatment profile variables and the desire to utilize breast reconstruction. The predictors of the desire to utilize breast reconstruction were determined using multivariate logistic regression, which yielded odds ratios (OR), 95% confidence intervals, and *p*-values. All statistical analyses were performed using R-Studio™ IDE, Version 3 (RStudio, Boston, MA, USA) and a *p*-value of ≤0.05 was considered statistically significant.

Results. The median age of respondents was 51 years old (interquartile range [IQR] = 19.5, range, 27-80 years). Among the respondents, 25% had high educational attainment (bachelor degree or higher), and 68% lived in urban areas. Most of the respondents were housewives (72%). and more than 50% were married (57%). The median time since the patient had undergone mastectomy was 30 months (IQR=33.5). Overall, 15 (16.5%) patients underwent breast reconstruction after mastectomy. Among them, 7 (47%) underwent autologous breast reconstruction, and 8 (53%) had implant-based breast reconstruction.

Results of the bivariate analysis of all predictors and the desire to undergo breast reconstruction are displayed in **Table 1**. Results showed that age and educational attainment were significant predictors of the desire to utilize reconstruction ($p<0.001$). There was no significant relationship between other socio-demographic and disease/treatment profile variables and the desire to utilize breast reconstruction. The results of the multivariate logistic model are displayed in **Table 2**. After adjusting for other variables, age and educational level were significant predictors of the desire to utilize breast reconstruction. Older women had 0.02 times the odds (95% CI 0.001-0.160; $p=0.001$) of desiring reconstruction in comparison with younger women, adjusting for other variables. Moreover, women with high education attainment had 21.65 times the odds (95% CI 2.52-296.88, $p=0.010$), and women with low educational attainment had 7.99 times the odds (95% CI 1.34-71.90, $p=0.035$) of desiring reconstruction in comparison with women with no education, adjusting for other variables.

Table 3 illustrates the barriers to utilizing breast reconstruction among patients who did not undergo reconstruction. Approximately, two-thirds of the patients reported that they did not have enough information on the procedure and 68% stated that they were concerned regarding the potential complications of the procedure. In addition, 54% of respondents reported that they were concerned that reconstruction might influence the detection of recurrence.

Table 1 - The association between demographic and socioeconomic factors and the desire to utilize breast reconstruction among 91 breast cancer patients.

Variables	Desire to undergo reconstruction n (%)			*P*-value
	Yes	No	Total	
Age (years)				<0.001†
<40	12 (85)	2 (15)	**14**	
40-59	32 (64)	18 (36)	**50**	
>60	5 (19)	22 (81)	**27**	
*Educational attainment**				
None	3 (16)	16 (84)	**19**	<0.001†
Low	27 (55)	22 (45)	**49**	
High	19 (83)	4 (17)	**23**	
Social status				
Married	30 (58)	22 (43)	**52**	0.10
Single	5 (71)	2 (29)	**7**	
Divorced	8 (57)	6 (43)	**14**	
Widowed	5 (28)	13 (72)	**18**	
Place of residence				0.71
Urban	34 (55)	28 (45)	**62**	
Rural	14 (48)	15 (52)	**29**	
Work status				0.54
Employee	8 (67)	4 (33)	**12**	
Retired	4 (57)	3 (43)	**7**	
Housewife	36 (50)	36 (50)	**72**	
Income per month (SR)				0.96
<10,000	32 (52)	29 (48)	**61**	
10,000-20,000	10 (56)	8 (44)	**18**	
>20,000	7 (58)	5 (42)	**12**	
Site of mastectomy				0.84
Unilateral	43 (54)	37 (46)	**80**	
Bilateral	5 (45)	6 (55)	**11**	
Chemotherapy treatment				0.99
Yes	37 (52)	34 (48)	**71**	
No	11 (55)	9 (45)	**20**	
Radiotherapy treatment				0.20
Yes	25 (46)	29 (54)	**54**	
No	23 (62)	14 (38)	**37**	

*Educational attainment was categorized as: none, low (elementary, intermediate, or secondary school degree) and high (bachelor or higher degree), †Chi-square test: $p<0.001$

Table 2 - Multivariate logistic regression model of the predictors of the desire to utilize postmastectomy breast reconstruction among breast cancer patients.

Variable	Odds ratio	95% Confidence Intervals	*P*-value
Age (years)			
<40	Ref.		
40-59	0.17	0.01 - 1.10	0.095
>60	0.02	0.001 - 0.16	0.001†
*Educational attainment**			
None	Ref.		-
Low	7.99	1.34 - 71.90	0.035†
High	21.65	2.52 - 296.88	0.01†
Place of residence			
Urban	Ref.		-
Rural	1.37	0.38 - 5.32	0.62
Social status			
Married	Ref.		-
Single	8.13	0.82 - 140.28	0.1
Divorced	3.4	0.74 - 20.18	0.13
Widowed	2.25	0.36 - 17.76	0.4
Work status			
Employee	Ref.	-	-
Retired	0.97	0.08 - 11.78	0.98
House wife	1.83	0.27 - 11.99	0.51
Income per month (SR)			
<10,000	Ref.		
10,000-20,000	0.18	0.30 - 5.00	0.79
> 20,000	0.25	0.10 - 6.55	0.80
Site of mastectomy			
Unilateral	Ref.	-	-
Bilateral	1.72	0.29 - 11.01	0.54
Chemotherapy			
Yes	Ref.	-	-
No	0.89	0.15 - 5.03	0.9
Radiotherapy			
Yes	Ref.	-	-
No	2.11	0.56 - 8.80	0.27

Ref - reference group.
*Educational attainment was categorized as: none, low (elementary, intermediate, or secondary school degree) and high (bachelor or higher degree), †Wald Chi-square test: $p<0.05$

Table 3 - Barriers to the utilization of postmastectomy breast reconstruction among breast cancer patients who did not undergo reconstruction (n=76).

Barriers to the utilization of breast reconstruction	Yes n (%)	No n (%)
My cancer treatment is not completed	26 (34)	50 (66)
I think it is not important physically and psychologically	33 (43)	43 (57)
I do not have enough information on the procedure	48 (63)	28 (37)
I think I am too old for such a procedure	30 (39)	46 (61)
I do not have enough family support	25 (33)	51(67)
I am concerned about the complications of the procedure	52 (68)	24 (32)
I am concerned that reconstruction will influence the detection of recurrence	41 (54)	35 (46)
I have other chronic diseases	18 (24)	58 (76)
The breast surgeon did not explain the procedure to me	20 (26)	56 (74)
I think it is too late because I am in a late stage	21 (28)	55 (72)

Discussion. We found that age and education levels influence the decision to undergo breast reconstruction. In addition, several barriers to breast reconstruction were reported including the lack of knowledge and misconceptions on the procedure. The proportion of women that underwent breast reconstruction in this study was 16.5%, which is similar to that reported in England between 2006-2009.[17] However, studies conducted in Denmark reported reconstruction rates of 14% (1999-2006)[18] and in Australia 9% (1982-2000).[19] In the United States, studies have reported high reconstruction rates. A study in California found that the reconstruction rate increased from 24.8% in 2003 to 29.2% in 2007.[20] Other studies in the United States have also reported immediate and delayed reconstruction rates as high as 59%.[21,22] In the United States, the rate of breast reconstruction increased primarily after the Women's Health and Cancer Rights Act passed in 1998,[23] which required individual health insurance policies to pay for breast reconstruction after mastectomy. Although the reasons behind these different rates in different countries could be attributed to cultural differences, we argue that lack of knowledge and accessibility to health care providers are the primary reasons for the low breast reconstruction rate in Saudi Arabia.

Our results suggest that patient age influenced the desire to utilize breast reconstruction. This finding is consistent with the previous studies in the United States.[24] A study from a national cancer database was conducted from 1985-1990 and found that patients >50 years of age had a 4.3-fold increased likelihood of having reconstruction than their older counterparts.[8] This is partly due to the increasing complication rates, and comorbidities associated with older age. However, reconstruction has been shown to be a safe option in older women.[25,26] August et al[5] compared the morbidity of breast reconstruction in women over and under the age of 60, and observed fewer complications in older women after prosthetic reconstruction than in their younger counterparts. Post breast reconstruction morbidity and complications can be reduced by careful choice of reconstructive technique based on the patient's individual circumstances.[4] We also found that patients with higher educational attainment were more likely to desire breast reconstruction. Some authors have reported that education and economic

factors predispose a woman to opt for postmastectomy reconstruction.[7,8] Although these factors influence the patient's decision making process, they are not decisive in the final decision-making process.[7,8,10] The desire to utilize reconstruction was not significantly different between patients living in rural and urban areas, which might be a reflection of the fact that women in Saudi Arabia have access to universal health care and reconstruction irrespective of their geographic location. We found that income was not a significant barrier to reconstructive surgery, which is consistent with data from Canada that showed that this might be a reflection of the universality of the Canadian national health care system.[9] Similarly, given the universal public health care provided in Saudi Arabia, household income might not have a strong influence on the decision to undergo breast reconstruction. However, studies in the United States consistently find that income influences the rate of postmastectomy reconstruction.[7,10,16,20]

The results of the current study suggest possible barriers to breast reconstruction. One of the most significant barriers was a lack of adequate information on the procedure. Some authors relate the psychological obstacles of woman in choosing reconstruction due to lack of information.[23] Barnsley et al[9] related a lack of information to socioeconomic indicators in their study in Nova Scotia, Canada, and stated that lower socioeconomic level and social isolation can have a significant effect.

Our findings indicate that for many breast cancer patients, misinformation can be a barrier to reconstruction. A previously published survey[4] reported the concern of general surgeons in Saudi Arabia that breast reconstruction might mask breast cancer recurrence, despite a lack of evidence for this in the literature.[4] Moreover, less than half of the surgeons referred their cases for breast reconstruction.[4] This might explain the lack of information available to patients regarding the procedure and the widespread misconception among patients and physicians that breast reconstruction can mask cancer recurrence. Sufficient and accurate information has the potential to allow many women to overcome psychological impediments to postmastectomy breast reconstruction.

There are several limitations to our study. The patients were chosen from 2 of the largest public and private hospitals in Jeddah, Saudi Arabia; thus, generalizations must be made cautiously. In addition, although the questionnaire was developed based on published studies and expert knowledge, its validity and reliability have not been tested.

Our study fills an information gap on postmastectomy breast reconstruction among women in Saudi Arabia. Overall, we found that patient-related factors such as young age and high educational attainment were associated with more desire to undergo breast reconstruction. Furthermore, modifiable barriers to breast reconstruction exist in Saudi Arabia including lack of knowledge and persistent misconceptions on the procedure among patients. Thus, relevant educational programs and campaigns to educate women regarding the benefits of breast reconstruction are needed to increase the rate of this procedure. We recommend a greater focus on breast reconstruction education along with breast cancer counseling. These programs should address the misconceptions regarding the procedure, its complications, its lack of impact on detection and recurrence rates, and its psychological benefits.

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