

RESEARCH ARTICLE

Determinants of Choice of Surgery in Asian Patients with Early Breast Cancer in A Middle Income Country

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Abstract

Background: Breast-conserving surgery (BCS) plus radiotherapy is equivalent to modified radical mastectomy (MRM) in terms of outcome. However there is wide variation in mastectomy rates dependent both on tumour and patient characteristics. **Objective:** This study aimed to assess the determinants of surgery choice in Asian patients with early breast cancer in a middle-income country. **Materials and Methods:** 184 patients with early breast cancer treated between Jan 2008 and Dec 2010 were recruited to complete a questionnaire. Chi-square test was used to analyze the association between surgery choice and demographic and tumour factors, surgeon recommendation, family member and partner opinions, fear of recurrence, avoidance of second surgery, fear of disfigurement, interference with sex life, fear of radiation and loss of femininity. **Results:** 85 (46%) had BCS while 99 (54%) had mastectomy. Age >60, Chinese ethnicity, lower education level, and larger tumour size were significantly associated with mastectomy. Surgeon recommendation was important in surgery choice. Although both groups did not place much importance on interference with sex life, 14.1% of the BCS group felt it was very important compared to 5.1% in the mastectomy group and this was statistically significant. There was no statistical difference between the two groups in terms of the other factors. When analyzed by ethnicity, significantly more Malay and Indian women considered partner and family member opinions very important and were more concerned about loss of femininity compared to Chinese women. There were no statistical differences between the three ethnic groups in terms of the other factors. **Conclusions:** When counseling on surgical options, the surgeon has to take into account the ethnicity, social background and education level, age and reliance on partner and family members. Decision-making is usually a collective effort rather than just between the patient and surgeon, and involving the whole family into the process early is important.

Keywords: Decision - making - early breast cancer - surgery type - middle - income country - Malaysia - Asia

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Introduction

The safety of breast-conserving surgery (BCS) and radiotherapy in comparison to modified radical mastectomy (MRM) for the treatment of early breast cancer has been proven in randomized controlled trials with long-term follow-up (Fisher et al., 2002; Veronesi et al., 2002; Yang et al., 2008; Roder et al., 2013). Despite that, western data show persistent high rates of mastectomy and wide geographic variation in surgical treatment for early breast (Morrow et al., 2001). Following the NIH Consensus Development Conference in 1990, the use of BCS increased and by 1995, 60% of women with Stage I and 39% of women with Stage II breast carcinoma received BCS. (Lazovich et al., 1999) However, numerous studies have shown that the use of BCS is variable and is not only dependent on tumour characteristics (size, nodal status, systemic risk), but also on patient characteristics such as age, race, patient socioeconomic status, and

education level. There are also variations in the use of BCS based on geographical distribution as well as surgeon specialty and practice volume (Lazovich et al., 1991; Albain et al., 1996; Hiotis et al., 2005).

Malaysia is a developing country with a population of 28.8 million. Breast cancer is the most common cancer among Malaysian women. In the Malaysian National Cancer Registry 2003-2005 report, the age standardized rate (ASR) was 46.4 per 100,000, but varied among the women from the three main ethnic groups, being 59.8 per 100,000 in the Chinese, followed by 54.1 per 100,000 in the Indians and 34.9 per 100,000 in the Malays.

The University Malaya Medical Centre (UMMC) is a tertiary referral centre in the capital of Malaysia serving a wide range of patients from the surrounding suburban area as well as patients from the rural areas. At this hospital, from 1993-1997, 67% of women presented with Stage 1-2 disease while 33% presented with Stage 3-4 disease. The median size was 4 cm and BCS was possible in only 16%

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of women. During this period the 5-year overall survival was 59.1% (Mohd et al., 2008). Comparing the 1993-1997 cohort with patients presenting in 1998-2002, there was no significant difference in the stage at presentation (Stage 3-4 comprised 30%); however the 5-year overall survival improved to 75%, mainly because of better treatment (Taib et al., 2011). Breast health awareness in Malaysia is still in its infancy. Women find themselves juggling work and family and will often delay seeking medical attention. Mastectomy is the most common surgery and many women equate the diagnosis of breast cancer with a mastectomy (Taib et al., 2013). With increasing awareness, patients are presenting earlier and it is important to understand the decision-making process of Malaysian women in the choice of surgery (Abdullah et al., 2013).

The objective of this study is to understand the factors that influence the choice of surgery in Malaysian women with early stage breast cancer, to identify the factors that influence decision-making, to determine the extent of these influences, and to identify any differences or trends among ethnic groups. Understanding the factors that influence treatment decision-making will allow better provision of healthcare, decrease psychological morbidity and encourage greater compliance to treatment; and in turn enhance successful treatment results.

Materials and Methods

Database and sampling

From 2008 to 2010, out of 1448 new cases of breast cancer presenting at the UMMC, 76.4% patients presented with Stage 0-2 cancers. Of those with early stage disease who had surgery as the primary treatment, 27.1% had breast-conserving surgery. From this cohort of breast cancer patients, women who had Stage 1 or 2 breast cancers (T1/T2 and N0/N1) and had previously undergone surgery at UMMC, and had completed adjuvant treatment, were identified when they returned for their follow-up visit. Patients were given a questionnaire adapted with the aim to identify reasons for choosing the surgery type. (Appendix A) A research nurse was present to help patients understand and complete the questionnaire on a one-on-one basis. Interviews were carried out over a 1-year period from Jan to Dec 2011.

A total of 196 patients who had surgery between the years of Jan 2008 to Dec 2010 completed the questionnaire. Out of this number, patients who had excisional breast biopsy with positive margins at a different institution, or were of ethnicity other than Malay, Chinese or Indian were excluded, leaving 184 eligible patients for analysis.

Data collection

Patient demographics including age at diagnosis [recorded as a continuous variable and divided into three age groups (<40, 40-60, >60)], highest completed education level (primary, secondary/high school, tertiary), and marital status (never married, married, divorced/widowed) were recorded. Tumour size was recorded as a continuous variable and categorized into three groups (<2cm, 2-4cm, >4cm). The surgical treatment received (BCS or Mastectomy) was ascertained by self-report and

from the institution cancer registry database.

Patients were asked to recall whether the surgeon recommended a particular procedure. If the surgeon recommended mastectomy, patients were asked to recall the reason for the recommendation.

A five-point Likert scale (ranging from not at all important to very important) was used to measure how much importance the patient placed in the opinion of her partner and family members in her decision-making. This was recoded to three categories: not/a little important, somewhat important, and quite/very important.

A three-point Likert scale (ranging from not at all important to very important) was used to measure the level of agreement with the following items regarding the importance of factors influencing decision-making in surgery type: (a) fear of recurrence, (b) avoiding a second surgery, (c) fear of disfigurement, (d) interference with sex life, (e) fear of radiation exposure, and (f) loss of femininity

The questionnaire was designed based on prior studies (Lam et al., 2005; Hawley et al., 2009) augmented by local studies (Yip et al., 2006).

Analysis

Chi-square test was used to analyze the association between the choice of surgery and factors such as age, education level, size of lump and marital status. The association with other factors such as surgeon recommendation, opinion of family members and partner, fear of recurrence, avoiding second surgery, fear of disfigurement, interference with sex life, fear of radiation and loss of femininity were also analyzed.

Results

Patient demographics

A total of 184 patients were included in the final analysis. 91 patients (51%) presented with tumour size of <2 cm, 73 patients (41%) were 2-4 cm, and 16 patients (9%) presented with tumours >4cm.

Table 1 shows the sociodemographic and clinical characteristics of the sample population by ethnic group. The majority of patients (51.1%) were Chinese, while the rest were Malays (23.4%) and Indians (35.5%). There was no difference in the age distribution, marital status or tumour size in each ethnic group; however, the Malays were more likely to have received secondary or tertiary education.

Factors affecting the choice of surgery

85 (46%) had breast-conserving surgery while 99 (54%) had mastectomy as the initial surgical management.

Table 2 shows the sociodemographic and clinical characteristics of the sample population comparing patients who had BCS to those who had mastectomy as their initial surgery. Patients who were more than 60 years old, of Chinese ethnicity, with lower education level, and larger tumour size were significantly more likely to receive mastectomy rather than BCS as the initial treatment. There was no significant difference in marital status in the choice of initial surgery.

Table 1. Sociodemographics and Clinical Characteristics by Ethnicity

| N=184 | Malay No. % | Chinese No. % | Indian No. % | Total No. % | p value |
|----------------|----------------|------------------|-----------------|----------------|---------|
| Age | | | | | |
| <40 | 8 (18.6) | 15 (16.0) | 3 (6.4) | 26 (14.1) | 0.26 |
| 40-60 | 28 (65.1) | 55 (58.5) | 29 (61.7) | 112 (60.9) | |
| >60 | 7 (16.3) | 24 (25.5) | 15 (31.9) | 46 (25.0) | |
| Marital status | | | | | |
| Married | 33 (76.7) | 65 (69.2) | 37 (78.7) | 135 (73.4) | 0.26 |
| Single | 4 (9.3) | 18 (19.1) | 3 (6.4) | 25 (13.6) | |
| Divorce/widow | 6 (14.0) | 11 (11.7) | 7 (14.9) | 24 (13.0) | |
| Education | | | | | |
| Primary/None | 2 (4.7) | 24 (25.5) | 14 (29.8) | 40 (21.7) | 0.03 |
| Secondary | 27 (62.8) | 43 (45.7) | 22 (46.8) | 92 (50.0) | |
| Tertiary | 14 (32.6) | 27 (28.7) | 10 (21.3) | 51 (27.7) | |
| Unknown | 0 (0.0) | 0 (0.0) | 1 (2.1) | 1 (0.6) | |
| Tumour size | | | | | |
| <2cm | 20 (46.5) | 50 (53.2) | 25 (53.2) | 95 (51.6) | 0.86 |
| 2-4cm | 20 (46.5) | 36 (38.3) | 17 (36.2) | 73 (39.7) | |
| >4cm | 3 (7.0) | 8 (8.5) | 5 (10.6) | 16 (8.7) | |

Table 2. Sociodemographics and Clinical Characteristics by Surgery Type

| N=184 | BCS | Mastectomy | Total | p value |
|----------------|------------|------------|-------|---------|
| Age <40 | 19 (73.0%) | 7 (27.0%) | 26 | <0.001 |
| 40-60 | 54 (48.0%) | 58 (52.0%) | 112 | |
| >60 | 12 (26.1%) | 34 (73.9%) | 46 | |
| Ethnicity | | | | |
| Malay | 27 (62.8%) | 16 (37.2%) | 43 | 0.01 |
| Chinese | 34 (36.2%) | 60 (63.8%) | 94 | |
| Indian | 24 (51.1%) | 23 (48.9%) | 47 | |
| Marital status | | | | |
| Married | 61 (46.2%) | 71 (53.8%) | 132 | 0.08 |
| Single | 17 (60.7%) | 11 (39.3%) | 28 | |
| Divorce/widow | 7 (29.2%) | 17 (70.8%) | 24 | |
| Education | | | | |
| Primary/None | 10 (25.0%) | 30 (75.0%) | 40 | 0.002 |
| Secondary | 42 (45.6%) | 50 (54.4%) | 92 | |
| Tertiary | 33 (64.7%) | 18 (35.3%) | 51 | |
| Unknown | 0 (0.0%) | 1 (100.0%) | 1 | |
| Tumour size | | | | |
| <2cm | 53 (55.8%) | 42 (44.2%) | 95 | 0.003 |
| 2-4cm | 30 (41.1%) | 43 (58.9%) | 73 | |
| >4cm | 2 (12.5%) | 14 (87.5%) | 16 | |

Factors that influence decision-making

Factors studied were surgeon's recommendation, opinion of family members and partner, fear of recurrence, avoiding second surgery, fear of disfigurement, interference with sex life, fear of radiation and loss of femininity.

Patients' recall on surgeon recommendation for surgery found that 81 (44.0%) were recommended mastectomy, 67 (36.4%) BCS, and 36 (19.6%) had the option of either mastectomy or BCS.

Of the 81 patients who were strongly recommended mastectomy, 6 patients (7.5%) decided that they wanted BCS. When patients were asked why the surgeon recommended a mastectomy, only 59 (72%) were able to give the reason for the recommendation (unfavourable tumour:breast size ratio in 33 patients, multifocal tumour in 12 patients, and central tumour in 14 patients).

Of the 67 patients who were strongly recommended BCS, 5 patients (7.5%) wanted mastectomy. 36 patients reported that they were not recommended one procedure over the other, and of these women 17 chose BCS while 19 chose mastectomy.

Table 3. Factors Influencing Decision-Making

| | BCS | Mastectomy | p value |
|---|------------|------------|---------|
| Importance of partners opinion (n=136, Married patients only) | | | |
| Not at all important | 13 (20.3%) | 26 (36.1%) | 0.13 |
| Somewhat important | 7 (10.9%) | 6 (8.3%) | |
| Very important | 44 (68.8%) | 40 (55.6%) | |
| Importance of family member opinion (n=184) | | | |
| Not at all important | 29 (34.1%) | 42 (42.4%) | 0.45 |
| Somewhat important | 6 (7.1%) | 8 (8.1%) | |
| Very important | 50 (58.8%) | 49 (49.5%) | |
| Fear of recurrence (n=184) | | | |
| Not at all important | 7 (8.2%) | 10 (10.1%) | 0.91 |
| Somewhat important | 10 (11.8%) | 11 (11.1%) | |
| Very important | 68 (80.0%) | 78 (78.8%) | |
| Avoiding 2 nd surgery (n=184) | | | |
| Not at all important | 5 (5.9%) | 10 (10.1%) | 0.37 |
| Somewhat important | 14 (16.5%) | 11 (11.1%) | |
| Very important | 66 (77.6%) | 78 (78.8%) | |
| Fear of disfigurement (n=184) | | | |
| Not at all important | 35 (41.2%) | 47 (47.5%) | 0.35 |
| Somewhat important | 24 (28.2%) | 31 (31.3%) | |
| Very important | 26 (30.6%) | 21 (21.2%) | |
| Interference with sex life (n=184) | | | |
| Not at all important | 52 (61.2%) | 77 (77.8%) | 0.03 |
| Somewhat important | 21 (24.7%) | 17 (17.2%) | |
| Very important | 12 (14.1%) | 5 (5.1%) | |
| Fear of radiation exposure (n=184) | | | |
| Not at all important | 21 (24.7%) | 16 (16.2%) | 0.13 |
| Somewhat important | 30 (35.3%) | 30 (30.3%) | |
| Very important | 34 (40.0%) | 50 (50.5%) | |
| Loss of femininity (n=184) | | | |
| Not at all important | 33 (17.9%) | 53 (53.5%) | 0.1 |
| Somewhat important | 24 (28.2%) | 25 (25.3%) | |
| Very important | 28 (32.9%) | 21 (21.2%) | |

Table 4. Determinants by Ethnicity

| | Malay No. % | Chinese No. % | Indian No. % | p value No. % |
|---|----------------|------------------|-----------------|------------------|
| Importance of partners opinion (n=136, Married patients only) | | | | |
| Not at all important | 3 (9.1) | 23 (33.8) | 13 (37.1) | 0.008 |
| Somewhat important | 2 (6.1) | 10 (14.7) | 1 (2.9) | |
| Very important | 28 (84.8) | 35 (51.5) | 21 (60.0) | |
| Importance of family member opinion (n=184) | | | | |
| Not at all important | 10 (23.3) | 46 (48.9) | 15 (31.9) | 0.001 |
| Somewhat important | 2 (4.7) | 11 (11.7) | 1 (2.1) | |
| Very important | 31 (72.1) | 37 (39.4) | 31 (66.0) | |
| Fear of Recurrence (n=184) | | | | |
| Not at all important | 0 (0.0) | 12 (12.8) | 5 (10.6) | 0.99 |
| Somewhat important | 5 (11.6) | 13 (13.8) | 3 (6.4) | |
| Very important | 38 (88.4) | 69 (73.4) | 39 (83.0) | |
| Avoiding 2 nd Surgery (n=184) | | | | |
| Not at all important | 1 (2.3) | 12 (12.8) | 2 (4.3) | 0.18 |
| Somewhat important | 7 (16.3) | 13 (13.8) | 5 (10.6) | |
| Very important | 35 (81.4) | 69 (73.4) | 40 (85.1) | |
| Fear of Disfigurement (n=184) | | | | |
| Not at all important | 21 (48.8) | 45 (47.9) | 16 (34.0) | 0.19 |
| Somewhat important | 10 (23.3) | 31 (33.0) | 14 (29.8) | |
| Very important | 12 (27.9) | 18 (19.1) | 17 (36.2) | |
| Interference with Sex Life (n=184) | | | | |
| Not at all important | 29 (67.4) | 66 (70.2) | 34 (72.3) | 0.4 |
| Somewhat important | 7 (16.3) | 22 (23.4) | 9 (19.1) | |
| Very important | 7 (16.3) | 6 (6.4) | 4 (8.5) | |
| Fear of Radiation Exposure (n=184) | | | | |
| Not at all important | 7 (16.3) | 18 (19.1) | 12 (25.5) | 0.47 |
| Somewhat important | 16 (37.2) | 33 (35.1) | 11 (23.4) | |
| Very important | 20 (46.5) | 42 (44.7) | 22 (46.8) | |
| Loss of Femininity (n=184) | | | | |
| Not at all important | 15 (34.9) | 53 (56.4) | 18 (38.3) | <0.001 |
| Somewhat important | 11 (25.6) | 30 (31.9) | 8 (17.0) | |
| Very important | 17 (39.5) | 11 (11.7) | 21 (44.7) | |

In both groups, family member opinion was important in decision-making and most women who were married placed a lot of importance in the opinion of their partners, however this did not reach statistical significance. Both groups also placed a lot of importance on fear of recurrence and avoiding a second surgery. Fear of disfigurement and fear of radiation exposure were not important in both groups with no statistical difference between the two groups. Although both groups did not place much importance on interference with sex life, 14.1% of the BCS group felt that it was very important compared to 5.1% in the mastectomy group and this was statistically significant. Both groups did not find loss of femininity a very important consideration, with no statistical difference between the two. However 53.5% of the mastectomy group did not consider loss of femininity important at all, compared to only 17.9% of the BCS group (Table 3).

When these factors were analyzed by ethnicity, it was interesting to note that 84.8% and 72.1% of Malay women considered the opinion of their partners and family members respectively very important, compared to 35% and 39.4% of Chinese women respectively, and this was statistically significant. Malay and Indian women were also significantly more concerned about loss of femininity compared to the Chinese women. There were no statistical differences between the three ethnic groups in fear of recurrence, avoiding a second surgery, fear of disfigurement, interference with sexual life and fear of radiation exposure (Table 4).

Discussion

Contraindications to breast-conserving surgery are well studied. The decision for BCS or mastectomy is initially made by the surgeon, based on tumour size in relation to breast size, and multicentricity. Centrally-located tumours are a relative contraindication, and with oncoplastic breast-conserving techniques, are no longer considered a contraindication. Access and compliance to radiotherapy are also an important consideration before the surgeon offers the option to the patient (Kaufmann et al., 2010).

In this study, the surgeon recommended mastectomy in 44% of patients, which indicates that there were unfavourable tumour characteristics requiring a mastectomy, of which the main reason cited by patients was unfavourable tumour:breast size ratio. This reflects the fact that in a middle-income country that does not implement population-based mammographic screening, most women with early breast cancer present with palpable lesions that may be too big for breast conservation. This may also reflect the smaller average breast volume among Asian women.

In the Asian society, patients follow doctor recommendations out of respect for the doctor's status as a figure of authority (Tam et al., 2003). This is seen in this study where very few (less than 10%) will disagree with the recommendation for either BCS or mastectomy. This compares well with studies that show that surgeon's recommendation is highly influential in the choice of surgery (Mastaglia and Kristjanson 2001; Lam et al.,

2005).

However, when the surgeon does not recommend either procedure, that is, the patient has been given both BCS and mastectomy as possible options, about half will choose mastectomy over BCS. Univariate analysis showed that ethnicity, age, and education level are significantly related to choice of surgery, (Hiotis et al., 2005; Mac et al., 2013) where younger, more highly educated and Malay women were more likely to have BCS. Chinese women were more likely to have a mastectomy, and this compares well with a paper from Hong Kong where Chinese women tend to choose mastectomy, as they perceive it to be more effective (Lam et al., 2005).

The majority of patients were concerned about the oncological outcome regardless of the type of surgery they underwent, with almost 80% in both groups rating this as very important. This is also seen in other studies (Lam et al., 2005). Patients who underwent BCS were more likely to place greater importance in the physical outcome of surgery. This is reflected in the fact that the fear of interference with sex life was found to be a significant factor that influenced patient decision for BCS. While not statistically significant, more women who had BCS reported that the fear of disfigurement and loss of femininity were important factors that determined their decision on surgery than those who underwent mastectomy. On the other hand, there was a trend for patients who chose mastectomy to place more importance in the fear of radiation exposure in their decision-making, which is also similar to other studies (Hawley et al., 2009).

The influence of partners and family members on choice of surgery is very much linked to ethnicity and culture. Western studies have shown that in ethnic minorities, partners and family play an important role in decision-making (Maly et al., 2006; Hawley et al., 2009). The Asian culture is a family-oriented one as reflected in our study where most women placed importance in the opinions of their partners as well as other family members. While this study showed that there was no difference in the weight of importance of partners or family members in influencing the type of surgery, there was a trend for patients who underwent BCS to place more importance in their partners' opinion. In this study, Malay and Indian patients placed more importance in the opinions of partners and family members and were more concerned about loss of femininity compared to the Chinese women. Hence, this study demonstrated the complex interplay between clinical, cultural and socioeconomic factors that influence decision-making. These factors include influence of patient's significant other or family members, culture or traditional practices, and medical pluralism (Taib et al., 2013). This is especially true among women of Malay and Indian ethnicity compared to the Chinese. This may reflect the degree of emancipation among the women of the three races, with Chinese women adopting a more autonomous approach in decision-making. Women from more traditional societies tend to lack individualistic and autonomous decision-making and tend to play the role of dutiful wife and daughter, and have heavy reliance on the opinions of partner and family members. This highlights the need for sensitivity of surgeons and health practitioners

when counseling patients on treatment options.

Limitation, this is a retrospective study and hence there may be recall bias due to passage of time and post-treatment experiences.

In conclusions, the primary determinant for surgery type in this study is unfavorable tumour characteristics, mainly large size at presentation. This highlights the fact that detection of breast cancer at smaller sizes is important to allow more women to be treated with breast-conserving surgery. Surgeon recommendation is probably the most important factor that influences decision-making as reflected by the small percentage of discordance between chosen surgery and surgeon recommendation. This is followed by a complex interplay of ethnicity, age, influence of partner and family members, and education level.

The diagnosis of cancer is a life-changing experience for patients. Not only are they faced with a lot of new information that is given to aid in their decision-making, but they have to also consider the impact of their diagnosis and treatment decision on themselves and their family members.

Therefore, when counseling on surgical options, the surgeon has to take into account the ethnicity, social background and education level, age and reliance on partner and family members. The surgeon has to bear in mind that decision-making is usually a collective effort rather than just between the patient and the surgeon, and early involvement of the family and significant others into the process is imperative. The value placed by each individual on different concerns requires the clinician to be aware of these concerns to provide support so that the patient can make an informed decision.

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