Cross-Sectional Study

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# Factors influencing the decision-making process for breast surgery in women likely to face breast cancer: a cross-sectional study

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**Introduction:** Breast cancer (BC) is one of the main neoplasia affecting women worldwide. Breast conserving surgery (BCS) or modified radical mastectomy (Mx) are both applicable with no difference between patients treated by these surgeries in terms of quality of life, local recurrence rate, and overall survival. The surgical decision today favors the surgeon-patient dialog, in which the patient is involved in the therapeutic decision. Several factors influence the decision-making process. This study aims to investigate these factors in Lebanese women likely to face BC and before being operated on, unlike other studies that targeted patients who had already been operated on.

**Methods:** The authors conducted a study to investigate the factors influencing the choice of breast surgery. To be eligible for this study, participants had to be Lebanese women, with no age limit and willing to participate voluntarily. A questionnaire form was used to collect data related to patient demographics, health, surgery, and relevant factors. Data analysis was performed by statistical tests using IBM SPSS Statistics software (version 25) and Microsoft Excel spreadsheet (Microsoft 365). Significant factors (defined as $P < 0.05$) were than used to determine the factors that influenced women's decision-making.

**Results:** Data from 380 participants were analyzed. The majority of participants were young (41.58% were between 19 and 30 years old), living in Lebanon (93.3%), and had a bachelor's degree or higher (83.95%). Almost half of the women (55.26%) are married and have children (48.95%). Among the participants, 97.89% had no personal history of BC, and 95.79% had not undergone any breast surgery. The majority of participants indicated that their primary care physician and surgeon influenced their decision on the type of surgery they take (56.32 and 61.58%, respectively). Only 18.16% of respondents said they had no preference for Mx over BCS. While the others listed their reasons and concerns for choosing Mx, including: concern about recurrence (40.26%), concern about residual cancer (31.05%). 17.89% of the participants justify the reason for choosing Mx rather than BCS, by the fact that they lack information on BCS. Most of the participants confirmed the importance of clarifying all information about BC and treatment options before being affected by a malignancy (71.84%) of which 92.28% preferred to participate in the next online lectures about this topic. The assumption of equal variance is assumed. Indeed, according to the Levene Test ($F = 1.354$; $P < 0.05$), there is a significant difference between the age categories of the group that prefers Mx (2.08) and the group that does not prefer Mx over BCS (1.77). Based on an independent samples $t$-test ($t(380) = 2.200$; $P < 0.05$). On the other hand, the preference of Mx over BCS is statistically dependent on the choice of contralateral prophylactic mastectomy. Indeed, according to the $\chi^2$-test, the relationship between the two variables is significant ($\chi^2(2) = 8.345$; $P < 0.05$). The 'Phi' statistic measures the intensity of the relationship between the two variables in question ($\varphi = 0.148$); therefore, the relationship between the preference of Mx rather than BCS and the asking of contralateral prophylactic Mx is strong and significant ($P < 0.05$). However, there was no statistically significant dependence between the preference of Mx and the other factors studied ($P > 0.05$).

**Conclusion:** BC poses a problem for affected women, especially when they are asked to choose between a Mx or a BCS. Several complex factors affect and influence their decision and lead them to decide. Understanding these factors helps us to properly help these women choose. In this study, the authors demonstrated all the factors that can influence the choice of Lebanese women prospectively, and we stressed the need to explain all the modalities before being diagnosed.

**Keywords:** breast cancer, breast conserving surgery, lebanese population, mastectomy, oncoplastic surgery, surgical choice

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## Introduction

Breast cancer (BC) is a common neoplasia affecting patients worldwide[1], with more than 2 million new cases diagnosed in 2018[2]. Despite all the medical advances, its incidence continues to rise, affecting one in 20 women worldwide, and the rate jumps to one in eight in high-income countries[3]. For example, in the United States, 13% of the female population will be diagnosed with invasive BC at some point during their lifetimes[4]. However, the early detection of BC, thanks to the evolution of screening, has transformed this cancer into a curable entity[5].

The traditional diagnosis is based on a bimanual physical examination of the breast, axillae, collarbone, and breastbone; combined with mammography, and ultrasound. MRI is used in certain conditions for its high sensitivity[2,6]. Histopathological confirmation is essential[2]. BC will be subsequently divided into three categories: BC with hormone receptor expression, BC with HER2 + expression, and triple-negative BC[1]. Several prognostic and predictive biomarkers[1], and risk assessment models[3] have been integrated into the investigations. Thereafter, a decision of the therapeutic sequence will be established[6].

The diagnosis and management of BC require multidisciplinary collaboration between several specialties[6]. Surgery is still part of treatment for early stage BC[4], and preoperative neoadjuvant therapy may be used to reduce tumor size and the need for lymph node dissection[6]. The chronological sequence of systemic treatment and surgery is variable, but in most cases, at an early stage, surgery is the first[6].

Breast conserving therapy (BCS) or modified radical mastectomy (Mx) are both well involved; several studies have shown no difference between patients treated with these surgeries in terms of quality of life, local recurrence rate, and overall survival[4,6].

The surgical decision that was based on the paternalism of the surgeon has evolved towards the autonomous decision of the patient[4,7]. This system promotes the surgeon-patient dialog, where the patient is explained all the circumstances concerning the diagnosis and the treatment options, so that they be involved in the therapeutic decision[7]. Faced with this bad news, some patients will find themselves stressed and confused, and they will not be able to understand all the information given at once[2] and will feel that they are incapable of making decisions[4]. Si *et al*.[4] reported that the only prediction of optimism was the patient's prior knowledge of BC and treatment options. Therefore, patients sometimes regret their decision[7]. Hence, the need to explain well, in writing and verbally, and using a simple and easy to understand lexicon[2].

Several factors influence the decision-making process. Most articles dealing with this subject are intended for patients who have already undergone surgery and to see in hindsight why they chose this type of operation. This study aims to investigate the factors influencing the choice of surgery among Lebanese women likely to face BC and before being operated on.

### HIGHLIGHTS

- Breast cancer (BC) is one of the main neoplasia affecting women worldwide.
- This study aims to investigate factors that influence the decision-making process in Lebanese women likely to face BC and before being operated on.
- A significant difference between the age categories of the group that prefers modified radical mastectomy (Mx) and the group that does not prefer Mx over breast conserving surgery.
- The preference of Mx over breast conserving surgery is statistically dependent on the choice of contralateral prophylactic mastectomy.
- We emphasize the need to explain all modalities to women before being diagnosed with BC.

## Patients and methods

### Study design

We conducted a prospective study, to investigate the factors influencing the choice of breast surgery. This work has been reported in line with the strengthening the reporting of cohort studies in surgery (STROCSS) criteria[8]. To be eligible for this study, participants had to be Lebanese females, with no age limit and willing to participate voluntarily.

Participants for this study were randomly invited to participate. The questionnaire was left open for answers from 15 June until 31 July 2022.

### Data collection

An online survey written in English and Arabic has been prepared and divided into six sections.

The first section was an introduction describing the purpose and object of this study and asking the participant to consent to their voluntary participation in the online survey. This section was followed by the demographic part, asking participants to provide information on the variables presented in Table 1.

Section three was the health section, asking participants to self-assess their health status and answer selected questions listed in Table 2. The fourth section was the surgical one. It started with a briefing on the two main types of surgery: Mx and BCS. Key information with proper illustrations has been given to ensure that participants can fully understand the difference between these two surgeries, the pros and cons of each. Next, we asked the participant to select what may influence the decision on the type of surgery they choose, the main reason for choosing Mx over BCS, and other issues summarized in Table 3.

The last two sections consisted of asking the participant if she found it important to clarify all the information before being affected by a malignancy or if she preferred not to be pessimistic. In addition, if they wish to participate in future conferences on the subject.

Completing the survey took between 7 and 12 min, and respondents received no compensation.

### Data analysis

Data analysis was performed by statistical tests using IBM SPSS Statistics software (version 25) and Microsoft Excel spreadsheet software (Microsoft 365). The statistical analysis for the socio-demographic variables was based on a descriptive analysis, in addition to the tests are carried out: the Independent Samples *t*-Test and the Pearson's $\chi^2$-test.

For the relationship between the variables to be statistically significant, the *P* value must be less than or equal to 0.05.

**Table 1**
**Participants demographics**

| Category | Number of participants ($n = 380$) |
|---|---|
| Age | |
| Median (Range) | 32 (19–65) |
| Mean ± SD | 35.7 ± 10.5 |
| 19–30[a] | 158 (41.58) |
| 31–40 | 104 (27.37) |
| 41–50 | 72 (18.95) |
| 51–60 | 40 (10.53) |
| 61–69 | 5 (1.32) |
| Missing | 1 (0.26) |
| Living address[a] | |
| Inside Lebanon | 355 (93.42) |
| Outside Lebanon | 25 (6.58) |
| Living address characteristic[a] | |
| Urban | 211 (55.53) |
| Rural | 169 (44.47) |
| Level Of education[a] | |
| None | 0 (0) |
| Primary | 7 (1.84) |
| Secondary | 54 (14.21) |
| University | 319 (83.95) |
| Religion[a] | |
| Christianity | 279 (73.42) |
| Islam | 67 (17.63) |
| Druze | 19 (5.00) |
| Other | 1 (0.26) |
| I Prefer not to Answer | 14 (3.68) |
| Family income[a] | |
| < 100$ | 88 (23.16) |
| 100–500$ | 174 (45.79) |
| 501–1000$ | 52 (13.68) |
| > 1000$ | 66 (17.37) |
| Marital status | |
| Single | 163 (42.89) |
| Married | 210 (55.26) |
| Widowed | 3 (0.79) |
| Divorced | 4 (1.05) |
| Insurance status | |
| Medical insurance | 130 (34.21) |
| No or low coverage insurance | 250 (65.69) |
| Childbirth | |
| Yes | 186 (48.95) |
| No | 194 (51.05) |
| Are / or willing to be lactating mother | |
| Yes | 359 (94.47) |
| No | 21 (5.53) |

[a]n(%).

**Table 2**
**Participants health status**

| Category | Participants, *n* (%) |
|---|---|
| Self-rated health status | |
| Fair | 34 (8.95) |
| Good | 114 (30.00) |
| Very Good | 176 (46.32) |
| Excellent | 56 (14.74) |
| Menstrual status | |
| Premenopausal | 319 (83.95) |
| Postmenopausal | 61 (16.05) |
| Screening for breast cancer (Age) | |
| 30–39 | 139 (36.58) |
| 40 | 153 (40.26) |
| 41–50 | 33 (8.68) |
| Other | 55 (14.47) |
| Personal history of breast cancer | |
| Yes | 8 (2.11) |
| No | 372 (97.89) |
| Personal history of breast surgery | |
| BCS | 9 (2.11) |
| Mx | 3 (0.79) |
| Other | 5 (1.32) |
| No | 364 (95.79) |
| Family history of breast cancer | |
| Yes | 107 (28.16) |
| No | 273 (71.84) |
| Family history of breast surgery | |
| BCS | 22 (5.79) |
| Mx | 49 (12.89) |
| Other / 'Don't Know' | 30 (10.71) |
| No | 279 (73.42) |

## Results

A total of 383 responses were received for the survey after 40 days of initiation, three responses were excluded for double submission.

The median age of the participants was 32 years (19–65 years), with a mean of 35.7 ± 10.5 SD, and the majority were young (41.58% were between 19 and 30 years old). A participant preferred not to specify her age. Most of the respondents lived in Lebanon (93.3%) and had a bachelor's degree or higher (83.95%). Almost half of the women (55.26%) are married and have children (48.95%). Many participants have a low-income bracket (68.95% have less than $501 as income) with little coverage or no insurance (65.69%). Additional demographic data is presented in Table 1.

Among the participants, 97.89% had no personal history of BC and 95.79% had not undergone any breast surgery. In accordance with international recommendations for the optimal age for BC screening, 40.26% said they had or wanted to start screening at the age of 40. Knowing that the majority is young, then 83.95% declare to be in a state of premenopause. Table 2 presents the health status of the participants.

As shown in Table 3, the majority of participants indicated that their primary care physician and surgeon influenced their decision on the type of surgery they take (56.32 and 61.58%, respectively). What is remarkable is that 107 of the 380 responders (28.16%) said they trust their personal opinion, nothing else, and a minority (3.16%) trust information provided by Internet services.

Only 18.16% of respondents said they had no preference for Mx over BCS. While the others listed their reasons and concerns for choosing Mx (Table 4), including: concern about recurrence (40.26%), concern about residual cancer (31.05%), the perception that health prevails over breast retention (19.47%), and the risk of second surgery for positive margins (16.58%). 17.89% of the participants justify the reason for choosing Mx rather than BCS, by the fact that they lack information on BCS.

Most of the participants confirmed the importance of clarifying all information about BC and treatment options before being affected by a malignancy (71.84%) of which 92.28% preferred to participate

**Table 3**

**Influences of participant's decision on the type of surgery**

| What influences your decision on the type of surgery you may choose? | *n* (%) |
|---|---|
| Just my personal opinion, nothing else | 107 (28.16) |
| I rely on information's on Internet (Google, Facebook,...) | 12 (3.16) |
| My conjoint opinion (spouse, boyfriend) | 66 (17.37) |
| My family opinion | 31 (8.16) |
| My friends and neighbors (I may benefit from their experience) | 11 (2.89) |
| My treating physician (Primary care physician) | 214 (56.32) |
| My treating Surgeon | 234 (61.58) |
| Other | 7 (1.84) |

in the next online lectures about this topic. 24.21% preferred not to think about this topic and be pessimistic, and the minority consider their information to be sufficient (3.95% only) (Table 5).

Table 6 summarizes the correlation between multiple factors and the decision of Mx over BCS. The assumption of equal variance is assumed. Indeed, according to the Levene Test ($F = 1.354$; $P < 0.05$), there is a significant difference between the age categories of the group that prefers Mx (2.08) and the group that does not prefer Mx over BCS (1.77). Based on an independent samples *t*-test ($t(380) = 2.200$; $\rho < 0.05$). On the other hand, the preference of Mx over BCS is statistically dependent on the choice of contralateral prophylactic mastectomy (CPMx). Indeed, according to the $\chi^2$-test, the relationship between the two variables is significant ($\chi^2$ (2) = 8.345; $P < 0.05$). The 'Phi' statistic measures the intensity of the relationship between the two variables in question ($\varphi = 0.148$); therefore, the relationship between the preference of Mx rather than BCS and the asking of contralateral prophylactic Mx is strong and significant ($P < 0.05$). However, there was no statistically significant dependence between the preference of Mx and the other factors studied ($P > 0.05$).

## Discussion

BC is the most common neoplasia in women[4], and this poses a dilemma for women when asked to choose which type of surgery they prefer to have, whether BCS or MX[6]. Despite this, she should be encouraged to participate in all decisions about the management of her cancer[2]. To do this, all information about BC, treatment options with the pros and cons of each[4], and evidence-based research must be told to the patient. Sometimes psychosocial support should be offered also[7].

**Table 4**

**Reasons for choosing Mx vs BCS**

| Main reasons for choosing mastectomy versus breast conserving surgery? | *n* (%) |
|---|---|
| Lack of information about breast conserving surgery | 68 (17.89) |
| Access to specialized health care (Specialized surgeon, radiotherapy availability) | 50 (13.16) |
| The cost of surgery and follow-up and the absence of health coverage | 42 (11.05) |
| Concern about residual cancer | 118 (31.05) |
| Concern about cancer recurrence | 153 (40.26) |
| Risk of second surgery for positive margins | 63 (16.58) |
| Side effects of radiotherapy | 46 (12.11) |
| Not concerned about body image and sexuality | 19 (5.00) |
| The perception that health outweighs breast retention | 74 (19.47) |
| None of the above (No mastectomy preference) | 69 (18.16) |
| Other | 5 (1.32) |

**Table 5**

**Importance of information clarification before being affected by malignancy**

| It is important to clarify all information before being affected by malignancy or you prefer not to be pessimistic? | *n* (%) |
|---|---|
| I prefer not to be pessimistic and not to think about it | 92 (24.21) |
| It is important to clarify all information before being affected | 273 (71.84) |
| I consider my information on the subject sufficient | 15 (3.95) |

Multiple and complex factors influence the decision-making processes, several studies have shown that clinical and nonclinical factors influence this choice[8]. It is important to identify these factors to improve this process mainly in the choice of surgical type[7]. By reviewing the literature, we found several studies on the factors influencing the choice of type of breast surgery in women who have already undergone BC surgery[9,10]. One study was conducted prospectively, before being diagnosed and operated on for BC, on a selected homogeneous population, which was not generalizable to all BC patients[11], whereas our study was the first to explore these factors on the general population without selection criteria, and the first study from Lebanon to explore the factors that influence women likely to have BC to choose an Mx over a BCS.

Nowadays, there is a tendency to choose Mx by young women[10,12]. In our study, we found a correlation between age groups and the choice of type of surgery. No other sociodemographic factor influenced their choice. Gumus *et al.*[9] reported that young married women were found to prefer Mx to BCS, also did Dicks *et al.*[12]. However, Chen *et al.*[13] reported that older patients tend to choose Mx by ignorance of their physical appearance and fear of the side effects of radiotherapy, whereas Bleicher *et al.*[14] did not find a change in age-based decision. They demonstrated that older women, in particular, lack sufficient knowledge to be able to decide which type of surgery to choose[14].

Lebanon is considered a small country, so generally there is no problem for access to specialized centers, which is why it is not surprising that there is no correlation between the address of residence and the choice of type of surgery. on the other hand, in Canada, the second largest country in the world, residents of rural and in a long way from all cities, need more time to travel to the radiation therapy facility in the province, which was an important predictor of the choice of the type of surgery[12]. A recent study conducted in the United States of more than 60 000 patients, showed that the distance a person must travel to get to the radiotherapy center influences not only the surgical decision, but also their decision to receive radiation therapy post BCS, they are more likely to have incomplete treatment, especially in the elderly and vulnerable patients[15]. Chen *et al.*[13 ]indicated that rural residents were more likely to choose Mx over BCS.

Patient education was not a factor influencing choice of surgery in our study, as previously reported in another one[8]. However, some studies have shown that a low level of education is associated with a preference for Mx[7–10,12,13,16], and that it is difficult to teach them new modalities and types of treatment[13]. The use of an online questionnaire in our study introduced

**Table 6**

**Correlation between multiple factor and decision of Mx over BCS**

| Characteristics | Choosing Mx versus BCS | No Mx preference | *P* |
|---|---|---|---|
| Age | | | |
| Median (Range) | 32 (19–65) | 30 (20–63) | |
| Mean ± SD | 35.7 ± 10.5 | 33.45 ± 9.52 | |
| | Participants, *n*(%) | | |
| | 311 (81.84) | 69 (18.16) | |
| Age categories | | | |
| 19–30a | 122 (39.23) | 36 (52.17) | **0.028** |
| 31–40 | 85 (27.33) | 19 (27.54) | |
| 41–50 | 63 (20.26) | 9 (13.04) | |
| 51–60 | 36 (11.58) | 4 (5.80) | |
| 61–69 | 4 (1.29) | 1 (1.45) | |
| Missing | 1 (0.32) | 0 (0) | |
| Living address | | | |
| Rural | 138 (44.37) | 28 (40.58) | 0.465 |
| Urban | 173 (55.63) | 41 (59.42) | |
| Within Lebanon | 289 (92.92) | 66 (95.65) | 0.409 |
| Outside Lebanon | 22 (7.07) | 3 (4.35) | |
| Level Of education | | | 0.696 |
| Bachelor's degree or above | 260 (83.60) | 59 (85.51) | |
| Other | 51 (16.40) | 10 (14.49) | |
| Religion | | | 0.287 |
| Christianity | 233 (74.92) | 46 (66.67) | |
| Islam | 54 (17.36) | 13 (18.84) | |
| Druze | 14 (4.5) | 5 (7.25) | |
| Other/no answer | 10 (3.21) | 5 (7.25) | |
| Family income | | | 0.264 |
| < 100$ | 71 (22.83) | 17 (24.64) | |
| 100–500$ | 148 (47.59) | 26 (37.68) | |
| 501–1000$ | 38 (12.22) | 14 (20.29) | |
| > 1000$ | 54 (17.36) | 12 (17.39) | |
| Marital status | | | 0.769 |
| Single | 129 (41.48) | 34 (49.28) | |
| Married | 175 (56.27) | 35 (50.72) | |
| Other | 7 (2.25) | 0 (0) | |
| Insurance status | | | 0.176 |
| Medical insurance | 101 (32.48) | 29 (42.03) | |
| No or low coverage insurance | 210 (67.52) | 40 (57.97) | |
| Childbirth | | | 0.460 |
| Present | 155 (49.84) | 31 (44.92) | |
| Absent | 156 (50.16) | 38 (55.07) | |
| Are / or willing to be lactating mother | | | 0.913 |
| Yes | 294 (94.53) | 65 (94.20) | |
| No | 17 (5.47) | 4 (5.80) | |
| Menstrual status | | | 0.265 |
| Premenopausal | 258 (82.96) | 61 (88.41) | |
| Postmenopausal | 53 (17.04) | 8 (11.59) | |
| Personal history of BC | | | 0.675 |
| Yes | 7 (2.25) | 1 (1.45) | |
| No | 304 (97.75) | 68 (98.55) | |
| Family history of BC | | | 0.447 |
| Yes | 85 (27.33) | 22 (31.88) | |
| No | 226 (72.67) | 47 (68.12) | |
| Personal history of breast surgery | | | 0.682 |
| Yes | 10 (3.22) | 2 (2.90) | |
| BCS | 7 (2.25) | 2 (100) | |
| Mx | 3 (0.97) | 0 (0) | |
| No/Other | 301 (96.78) | 67 (97.10) | |
| Ask for Prophylactic contralateral mastectomy | | | **0.015** |
| Yes | 84 (27.01) | 8 (11.59) | |
| No | 78 (25.08) | 25 (36.23) | |
| Do not know | 149 (47.91) | 36 (52.17) | |
| Ask for reconstruction post mastectomy | | | 0.376 |

**Table 6**

**(*Continued*)**

| Characteristics | Choosing Mx versus BCS | No Mx preference | *P* |
|---|---|---|---|
| Yes | 198 (63.67) | 8 (11.59) | |
| No | 18 (5.79) | 25 (36.23) | |
| Do not Know | 95 (30.55) | 36 (52.17) | |
| Importance to clarify all information before being affected | | | 0.673 |
| Prefer not to be pessimistic | 77 (24.76) | 16 (23.19) | |
| Information sufficient | 11 (3.54) | 4 (5.80) | |
| importance to clarify all information | 223 (71.70) | 49 (71.01) | |

Significant *P*-values are in bold type.

a selection bias on the level of education, therefore, illiterate and less educated people were not/less reachable.

Ethnically, the Lebanese are a mixture of elements, but what can be an influencing factor to study are the different communities divided according to religion. We did not find a correlation between religion and the choice of operation, but this factor was also a limitation of the study since the results do not reflect the reality of the Lebanese distribution. The only study found in the literature that investigates the relationship between religion and breast surgery found that faith affects patients' perception and decision of BC surgery[17].

Lebanon has been facing a deteriorating economic crisis since 2019, leading to a decline in monthly household income. Nearly 70% of participants have a monthly income of $500 or less, and 65% have low or no health coverage insurance. However, these factors do not yet influence the choice of surgery. Other studies have reported that patients with low family income and without general insurance are more likely to prefer Mx to BCS[13]. Greenup showed that the cost of the operation is significant, especially in low-income groups, and is more important than breast preservation and physical appearance[18]. Fear of cancer recurrence and increased cost of treatment is also one of the reasons for choosing Mx among low-income women[19].

The presence of an intimate partner has been shown to be a primary influencing factor in decision-making regarding primary breast treatment, thus women in a relationship most often request a BCS operation, to maintain their sexual appeal and the intimacy with their partner[20]. In our study, there was no influence of this factor, moreover, only 17% of the participants were informed that their conjoint opinion can influence their decision on the type of surgery they may choose. Another study also showed that the spouse's opinion was the third most important influence in Mx's decision-making[10].

Although Gumus *et al.*[9] reported that patients with a child and a history of breastfeeding chose Mx, in our study, childbirth and being a breastfeeding mother were not correlated with the decision of the patient about surgery. On the other hand, the menstrual state had no relation neither in our study nor in another published before[12].

Personal and family history of BC were not documented as an influential factor in our study. Lee *et al.*[10] demonstrated that 71% of the patients studied do not find a family history at all important in the decision to choose Mx or BCS, similarly, Gumus*et al.* confirmed that this correlation does not exist[9]. We did not find any other study that investigated the correlation between personal history and the choice.

The bilateral Mx rate for unilateral stage 1 cancer increased compared to BCS[21]. An obvious percentage of patients who can benefit from simple BCS choose to have a Mx[7], but also a CPMx, driven by the distress of recurrence or developing a new cancer[6,11,12]. Our study showed a significant correlation between the patients who choose to do a CPMx and the choice of the type of surgery ($P = 0.015$).

Most participants in our study said they needed to have more information about BC and surgical treatment modalities, before being affected by neoplasia. A previous study showed that patients feel scared and anxious once they know the diagnosis, and at that point they can no longer understand or remember the information given by the medical staff[17], they panic and ask to remove the whole breast to suppress this attack[13] and 'get rid of all the cancer'[17] and have peace of mind[10].

They reported also that the concern for recurrence (40.26%) and residual cancer (31.05%) on the one hand, and the opinion of their attending physician (56.32%) and their surgeon (61.58%) were the factors influencing their decision on the type of surgery. These results agree with studies in the literature[11,13,18]. In some cases, the patient's personal preference may conflict with the physician's recommendation[17].

Body image and sexuality were not a priority among the participants in our study, while some of them specified that the perception of health takes precedence over breast retention. Similarly, Dicks *et al.*[12] showed that they did not find a great concern and influence of body image and sexuality on the surgical choice.

## Conclusion

BC poses a problem for affected women, especially when they are asked to choose between a Mx or a BCS. Several complex factors affect and influence their decision and lead them to decide. Understanding these factors helps us to properly help these women choose. In our study, we demonstrated all the factors that can influence the choice of Lebanese women prospectively, and we stressed the need to explain all the modalities before being diagnosed.

## Ethical approval

The study type is exempt from ethical approval.

## Consent

Informed consent was obtained from the participants prior to filling the survey.


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## Author contribution

Both authors contributed equally to this work.

## Conflicts of interest disclosure

This article has no conflict of interest with any parties. Both authors declare that they have no competing interests.

## Research registration unique identifying number (UIN)

1. Name of the registry: ClinicalTrials.gov
2. Unique Identifying number or registration ID: NCT05604677
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): Factor Influencing Breast Surgery Type Decision-Making - Full Text View - ClinicalTrials.gov

## Guarantor

Dr Etienne El-Helou.

## Provenance and Peer Review

Not commissioned, externally peer reviewed.

## Study limitations

The study was conducted as an online survey, which may introduce selection bias regarding age, level of education, living address, and religion.

## External validity

Random sampling was used during this study, so that the results can be generalized and applied to the studied population.


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