The Prevalence and Risk Factors of Persistent Pain after Mastectomy in Saudi Females

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ABSTRACT

Background: Chronic pain is known to develop after several surgeries including mastectomy. Mastectomy is the surgical treatment for breast cancer. The prevalence of chronic pain after breast surgery varied between different studies and several risk factors for developing pain were reported.

Aim: To investigate the prevalence of persistent pain and its possible risk factors after mastectomy.

Methods: This crosssectional study was performed by establishing online survey from October 2017 to December2017. The study included 380 female who performed unilateral mastectomy.

Results: Persistent pain was prevalent in 47.4% of participants whose mean age was 63±12.1 years old and mean BMI equal 28.9±5.2. Positive lymph node was more common in patients with pain 78.3%, more women with pain 60.5% received radiotherapy. ALND was more common in individuals without pain 67.5%, while SN was more common in patients with pain 46.7%.

Conclusion: The prevalence of persistent pain was high with moderate severity. Older age, high BMI, positive lymph node, radiation therapy and SN axillary procedure were risk factors for developing persistent pain after mastectomy.

Keywords: Persistent pain, Mastectomy, Saudi women.

INTRODUCTION

It has been accepted in the last decade that chronic pain can result from surgery as a complication [1,2], chronic pain was reported after several types of surgery including thoracotomy [3]. The large majority of women who diagnosed with breast cancer perform either mastectomy or breast conserving surgery [4].

Persistent pain after mastectomy was firstly described by **Wood *et al*.** during 1970s [5].The chronic pain can be defined by several aspects regarding persistence duration, site of development and its description. Persistent postoperative pain is defined as pain persist for more than 3 months after surgery and this pain is related to the surgical site [6]. International Association for Study of Pain (IASP) defined the chronic pain after mastectomy as experiencing chronic pain in the axilla, upper half of the arm and the anterior aspect of thorax , the pain begins after quadrantectomy or mastectomy and last over 3 months [7-9].

Chronic pain after mastectomy also described as dysesthesia or paroxysms of lancinating and sensation burning, it is neuropathic in character [10].The pain can develop either shortly after surgery or after several months of surgery [3].It was reported that the prevalence of chronic pain after breast surgery was 25-60% and it was a very common problem [6], with variation in the severity [11]. Chronic discomfort after surgery is attributed to complex and varied reasons, however the most common cause is nerve damage which is associated with axillary lymph node dissection, and it is associated with doubling in prevalence compared with cases who didn't perform this procedure [12].Several risk factors of chronic pain were reported and these risk factors can be pre-operative, intra-operative and postoperative, these factors including high BMI, young age, presence of severe acute pain postoperatively or preoperatively, chemotherapy, axillary surgery and radiotherapy [13]. Estimation of the pain prevalence after breast surgery is difficult as there are difference in methodology, methodological limitations and treatments received by the patients [14]. The present study aimed at assessing the prevalence and risk factors of the persistent pain after mastectomy.

MATERIALS AND METHODS

Study design and participants

This study was a cross sectional study which was conducted on Saudi women who underwent unilateral mastectomy. The study was carried out in the period from October 2017 to December2017 via internet survey to allow easy access to the largest number.

The exclusion criteria for this study included active breast cancer recurrence, metastasis, breast reconstruction and bilateral mastectomy. We obtained 490 surveys, 380 of them were included as they met the inclusion criteria and 110 were excluded.The questionnaire included several

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questions to investigate risk factors and pain they suffered.

The study was done after approval of ethical board of King Abdulaziz university.

Statistical analysis

Data were stored in excel sheet, Statistical Package for Social Studies (SPSS22;IBM Corp, NEW York, NY, USA) was used to analyze data. Student t-test was used for normally distributed continuous variables and Chi-square for categorical variables. P-value at<0.05 was considered statistically significant.

RESULTS

The present study included 380 females who performed unilateral mastectomy, the prevalence rate of persistent pain was 47.4%, while the large majority females didn't suffer pain 52.6%, the prevalence of pain between participants is shown in figure 1.

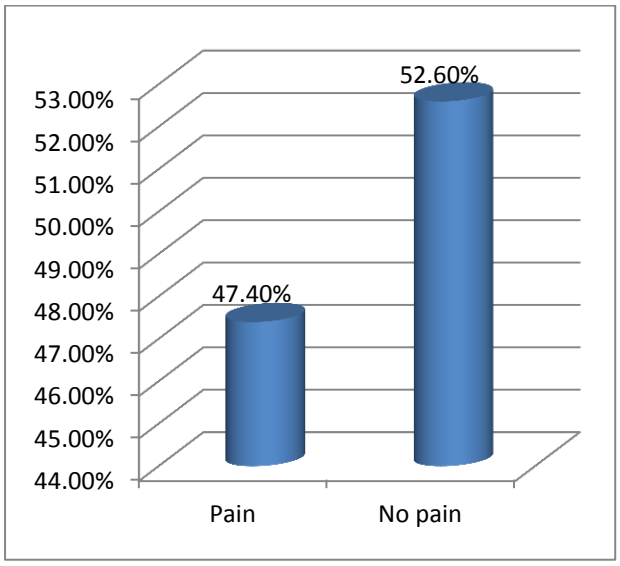

Fig 1: The prevalence of pain between participants

According to the presence of persistent pain, women were divided into 2 groups, the group who experienced persistent pain and the other group included women with no pain. The mean age of the first group was 63±12.1, while the mean age of the second group was 54±10, there was a significant difference between the two groups (P-value=0.008). Regarding to BMI, the mean of BMI for women with pain was 28.9±5.2 and the mean for women without pain was 26.4±4.3, significant difference was found between the two groups (P-value=0.03). Tumor in right breast was more common (55.6%) in females with pain than left one (44.4%), also in the second group the prevalence of tumor in right side was 58%, while in left side it represented 42%, there was no significant difference between the two groups (P-value=0.1).

Tumor size >20mm was present in 52.2% and 59% for women with and without pain respectively, while size≤20 mm was present in 47.7% and 41% in females with and without pain respectively with no significant difference between the two groups (P-value=0.1). Upper lateral quadrate tumor was less prevalent in the two groups with no significant difference, 29.4% of women with pain had upper lateral quadrate tumor, while 27.5% were reported in women without pain. Most of both groups had positive lymph node, 78.3% of females who suffered pain and 62% of females who had no pain had positive lymph node with a significant difference between the two groups (P-value=0.03).

There were 45% of women who had pain received chemotherapy, while 35.5% of women without pain did, there was no significance difference between the two groups (P-value=0.08). Regarding radiotherapy, there was a significant difference between those who suffered pain and females who didn't (P-value=0.004), where most of participants with pain (60.5%) reported receiving radiotherapy, while the large majority of the second group (58%) didn't receive radiotherapy. The large majority of women with pain (72.2%) and without pain (77%) received endocrine treatment, there was no significant difference (P-value=0.07).

Dominant hand same as side of surgery was more common in patients without pain (60.5%) than those with pain (43.3%), but with no significant difference (P-value=0.08). Axillary lymph node dissection (ALND) procedure was performed for 53.3% of women with pain and 67.5% of women without pain, 46.7% of the first group and 32.5% of the second group performed sentinel node procedure, there was a significant difference between the two groups (P-value=0.01).

Table1 summarizes the comparison between the two groups regarding different risk factors.

Table1: Comparison between females with and without pain regarding different risk factors

characteristics	With pain N=180(47.4%)	Without pain N=200 (52.6%)	P-value
Age	63±12.1	54±10	**0.008**
BMI	28.9±5.2	26.4±4.3	**0.03**
Tumor side			**0.1**
Left breast	80(44.4%)	84(42%)	
Right breast	100(55.6%)	116(58%)	
Tumor size			**0.1**
>20mm	94(52.2%)	118(59%)	
≤20 mm	86(47.7%)	82(41%)	
Tumor location			**0.4**
upper lateral quadrate	53(29.4%)	55(27.5%)	
All other locations	127(70.5%)	145(72.5%)	
Lymph nodes			**0.03**
Positive	141(78.3%)	124(62%)	
Negative	39(21.7%)	76(38%)	
Chemotherapy			**0.08**
Yes	81(45%)	71(35.5%)	
No	99(55%)	129(64.5%)	
Radiation therapy			**0.004**
Yes	109(60.5%)	84(42%)	
No	71(39.4%)	116(58%)	
Endocrine treatment			**0.07**
Yes	130(72.2%)	154(77%)	
No	50(27.8%)	46(33%)	
Dominant hand same as side of surgery			**0.08**
Yes	78(43.3%)	121(60.5%)	
No	102(56.7%)	79(39.5%)	
Axillary procedure			**0.01**
ALND	96(53.3%)	135(67.5%)	
SN	84(46.7%)	65(32.5%)	

BMI; Body Mass Index, ALND; Axillary Lymph Node Dissection, SN; Sentinel Node.

The severity of pain was investigated between the women who suffered pain, moderate pain was the most common (66.7%) followed by mild pain (20%) then severe pain (13.3%), the prevalence of pain severity is shown in figure2.

5 areas were investigated for pain and duration of pain in each area. In the area of missing breast, all frequencies of pain was most common in case of mild and moderate pain 41.7% and 48.3% respectively, while all frequencies and every day were equally experienced in patients who suffered severe pain. In the axilla area and side of the thorax, all frequencies were the dominant duration of pain experienced by women who suffered mild and moderate pain, women who suffered severe pain experienced all frequencies in the axilla, whereas in the side of the thorax, severe pain was experienced in all frequencies and every day in equal rate.

In mastectomy scare, mild pain and moderate pain were most experienced all frequencies 44.5% and 41.7% for mild and moderate pain respectively while severe pain was experienced equally every day, 1-3 times weekly, less than once a week and all frequencies, 25% for each duration. In the arm, the three degrees of pain were experienced the most in all frequencies; 50% for mild, 54.2% for moderate and 58.3% for severe pain, table2.

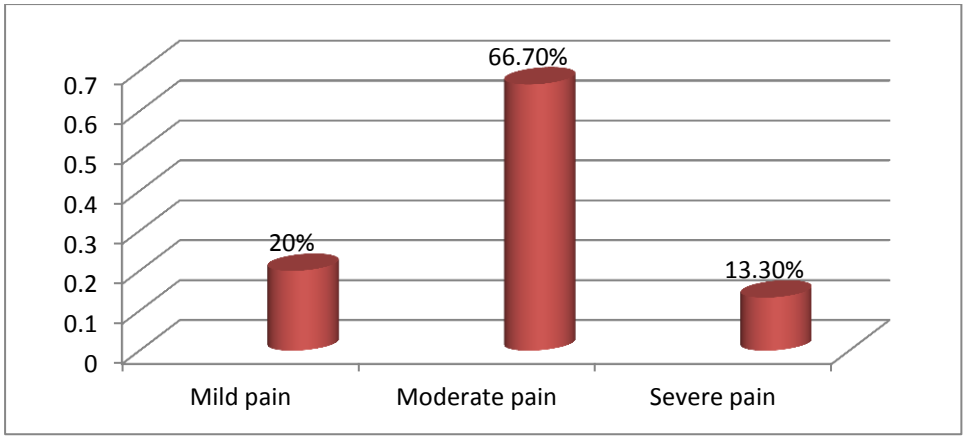

Fig 2: Prevalence of pain according to severity

Table2: Distribution of pain degrees with duration

Investigated areas	Women with pain (N=180)		
	Mild N=36 (20%)	Moderate N=120 (66.7%)	Severe N=24 (13.3%)
-In the area of the missing breast			
Every day or almost every day	4(11.1%)	44(36.7%)	12(50%)
1–3 Times weekly	7(19.4%)	10(8.3%)	0(0%)
Less than once a week	10(27.8%)	8(6.7%)	0(0%)
All frequencies	15(41.7%)	58(48.3%)	12(50%)
In the axilla			
Every day or almost every day	4(11.1%)	38(31.7%)	7(29.2%)
1–3 Times weekly	8(22.2%)	12(10%)	3(12.5%)
Less than once a week	3(8.3%)	8(6.7%)	0(0%)
All frequencies	21(58.4%)	62(51.6%)	14(58.3%)
Side of the thorax			
Every day or almost every day	9(25%)	40(33.3%)	12(50%)
1–3 Times weekly	3(8.3%)	14(11.6%)	0(0%)
Less than once a week	7(19.5%)	7(5.8%)	0(0%)
All frequencies	17(47.2%)	59(49.3%)	12(50%)
In the mastectomy scar			
Every day or almost every day	4(11.1%)	35(29.2%)	6(25%)
1–3 Times weekly	4(11.1%)	22(18.3%)	6(25%)
Less than once a week	12(33.3%)	13(10.8%)	6(25%)
All frequencies	16(44.5%)	50(41.7%)	6(25%)
In the arm			
Every day or almost every day	6(16.7%)	28(23.3%)	4(16.7%)
1–3 Times weekly	8(22.2%)	18(15%)	3(12.5%)
Less than once a week	4(11.1%)	9(7.5%)	3(12.5%)
All frequencies	18(50%)	65(54.2%)	14(58.3%)

DISCUSSION

In the present study, the prevalence of persistent pain of women was 47.4%.In one study [15]it was found that chronic pain was prevalent in 39.2%at postoperative 3rd month and then decreased to 18.3% at 6th month regardless the breast surgery was for cancer or not. Other several studies reported prevalence of chronic pain at the rates of 13-43% in breast cancer patients following mastectomy within the first year orlater [16-18]. Lower prevalence of chronic pain 8.2% was reported by one study, however this low rate can be attributed to the exclusion of patients who had simultaneous axillary lymph node dissection [19].The current study showed that older age and higher BMI were associated with developing persistent pain, where significant

differences were found between females with and without persistent pain regarding age (P-value=0.008) and BMI (P-value=0.03). These findings are in agreement with those of a previous study [15] where it was found that there was a significant association between older age and increase in chronic pain, also increase in BMI was significantly associated with developing chronic pain. Also **Sipila *et al.*** [13]demonstrated that the incidence of chronic pain increases with aging in patients with breast cancer surgery. **Juhl *et al.*** [20] showed that older age was associated with persistent pain. On the contrary, it was reported that increased age reduces the risk of chronic pain and pain increases in young patients as tumors may be bigger, the prevalence of chronic pain according to age was reported as 26% in patients over 70 years, 40% in those with age range 50-69 years and higher percent 65% was reported in patients with age range of 30-49 years after mastectomy [18]. Several studies reported the association between increased BMI and chronic pain after breast cancer surgery[13,18,19,21] and another study [20]reported that BMI ≥30 kg/m2 was the only factor which independently associated with persistent pain.**Macdonal,*et al*.** [22] demonstrated that higher body weight, was associated with persistent pain. In contrast to this association, there were several studies reported no association between the persistent pain and BMI [12,23,24]. Women who suffers overweight requires more extensive surgery as a resultof larger breast and difficulty in axillary dissection and this can explain the association between BMI and persistent pain [20].Size, side and location of tumor didn't affect experiencing chronic pain in the participants of this study. These findings are similar to that reported by **Juhl *et al.*** [20]. A study from US revealed that size, stage and histological grade of tumor weren't associated with developing pain [25].In this study, positive lymph nodes were more prevalent in both group of participants, however higher percent was found in women with chronic pain with significant difference (P-value=0.03).

Previous studies demonstrated that treatment strategies beside surgery may increase the risk of persistent pain such as radiotherapy and chemotherapy [26,27].Other studies [23,28] showed no association between radiotherapy and chronic pain.In our study, the presence of chronic pain was significantly affected by receiving radiotherapy (P-value=0.004), where more women with pain had received radiotherapy, however chemotherapy and endocrine treatment had no significant effect on developing persistent pain (P-value=0.08,0.07 for chemotherapy and endocrine treatment respectively). There were 2 studies showed that chemotherapy and endocrine treatment weren't associated with chronic pain [20,25].Previous study [15] demonstrated a significant correlation between the prevalence of chronic pain and radiotherapy and chemotherapy.In agreement with our study, a national study in Denmark [29] revealed that chemotherapy wasn't associated with developing persistent pain.Radiotherapy damage Brachial plexus which lying in the field of radiation and stimulates local fibrosis and chronic inflammation, this effect of radiotherapy can explain such association [30].Dominant hand same as side of surgery had no significant effect on experiencing chronic pain in this study (P-value=0.08). This was in agreement with a previous study carried by **Juhl *et al.*** [20].Previous studies [3,29,31] reported association between persistent pain and ALND, where SN targets sampling of few nodes, while ALND causes more damage to axilla tissues including nerves [30].The current study showed that SN of axillary surgery was significantly associated with developing chronic pain (P-value=0.01).Regarding degree of pain, the most common pain degree in this study was moderate pain followed by mild and then severe pain.According to the area where pain was developed, we found that the three degrees of pain were experienced more in all frequencies in the 5 area investigated for pain. The same findings were reported by previous study [20].The limitations of this study including that we didn't investigate the duration of pain appearance after surgery and we classified degrees of pain according to the opinions of participants not according to scoring system.

CONCLUSION

The prevalence of persistent pain was higher than what previously reported and the most common pain was moderate in severity. The risk factors of developing persistent pain included older age, high BMI, positive lymph node, radiation therapy and SN axillary procedure.

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