



Body Mass Index and Other Factors Related to Mastalgia: A Cross Sectional Study

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Abstract

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BACKGROUND: Mastalgia is a common complaint in females aged 30–50 years. Mastalgia varies in degrees of severity. The quality of life of women may be adversely affected by severe mastalgia. It was associated with disturbance in sexual, social, and physical activities and behaviors.

AIM: The main objective of this study is to investigate factors affecting mastalgia.

METHODS: This is an analytical cross-sectional study. Conducted on 148 females attending the Family Medicine outpatient clinic. Mastalgia was assessed by new breast pain score.

RESULTS: The mean age of patients was 32.6 and their mean body mass index (BMI) was 24.8. The majority of the cases were highly educated 48% and working 58.1%. There was a highly statistically significant difference between females with mild pain and those of moderate to severe pain regarding to BMI as the mean of BMI in patient with mild pain was 22.7 ± 2.5 while it was 27.6 ± 3.1 , there was highly statistically significant difference between both groups as regards to the type of the contraception used that means females who used hormonal contraception had more pain. After logistic regression the only remaining significant factor was BMI 0.001.

CONCLUSION: There are many factors affecting mastalgia as BMI, type of contraception, menstrual regularity, menstrual duration, breast pain duration, and premenstrual symptoms. But BMI is the most important factor affecting mastalgia.

Introduction

Mastalgia is pain that occurs in the tissue of the breast. Mastalgia during the fertile phase is known to be the most common benign breast condition in females. In women aged 30–50 years, it is most prevalent. Around 70% of females feel it throughout their lives. During the premenstrual cycle, mild breast pain is a common occurrence (45%); however, about 25% of women report moderate to extreme pain for five or more days during each menstrual cycle [1].

Cyclical and non-cyclical are two predominant forms of mastalgia, depending on its relation with the menstrual cycle. The most common form is cyclical mastalgia, which occurs in the luteal phase of the menstrual cycle. Symptoms include breast pain, tenderness, and heaviness [2].

Mastalgia is variable in degrees of severity, it may cause some degree of pain or anxiety in some patients that need frequent investigations to be done and in the other category [3].

Theories about the pathophysiology of mastalgia are increased estrogen, increased prolactin,

reduced progesterone levels, or changes in the estrogen/progesterone ratio. Breast pain is associated with menstrual disorders, oral contraceptives, hormone therapy, psychotropic medications, psychosocial causes, and emotional stress [4]. The quality of life of women may be adversely affected by extreme mastalgia [5].

The most significant initial workups for mastalgia are reassurance and workups that exclude cancer. Medical care in the form of analgesics that could be used locally or systemically has been studied and has been shown to be beneficial in mild to moderate mastalgia. Hormonal therapies are also used in cases of serious mastalgia and failure of first-line therapy [6].

The purpose of the present study was to investigate the factors affecting mastalgia.

Methodology

This is an analytical cross-sectional study. It conducted on 148 females attending the Family

Medicine outpatient clinic at Cairo university and Cancer Prevention and Early Detection unit of National Cancer Institute from October 2019 to April 2020. Premenopausal females, aged 18–55 years old, experiencing cyclic mastalgia (bilateral breast pain defined as heaviness or dullness lasting for at least 3 months approximately 1 week/month around the menstrual cycle) were invited to participate in the study. The exclusion criteria include pregnant and lactating females, those with a recent history of breast abscess or inflammation, those with a history of cancer breast or breast surgery, females who use medications that can influence the pain score, such as (Non-steroidal anti-inflammatory drugs, analgesics, aspirin, acetaminophen).

Sample size

Based on the previous study in Egypt where the recorded prevalence of mastalgia in Egypt was 26% (Eladawi *et al.*, 2014) [7] and considering a total population of (approximately 400 patients in 6 months attending family medicine outpatient clinic under an error 5%, confidence interval level of 0.95 and at least 90% power for analysis. A minimal sample size of 148 participants was required to achieve the study objectives (per the Epi info 7), thus 148 participants were interviewed.

Data collection tools and steps

Informed written consent was taken from the participants after explaining the steps of the study. Then a structured questionnaire for patients was constructed to cover the following items:

- Socio-demographic data: including age, residency, education, occupation, and marital status
- History of duration and intensity of mastalgia, history of breast mass and nipple discharge, history of recent breast abscess, history of past breast illness, history of breast cancer, lactational history, and family history of breast pain or breast cancer
- Reproductive history: included menstrual history (age at first menstruation, regularity of menstruation, duration, amount, and premenstrual symptoms (PMS), obstetric history (number of pregnancies, age at first pregnancy), gynecological history (vaginal bleeding, vaginal discharge, pelvic pain) and contraceptive history (if she uses a contraception and which type)
- Weight, Height, and body mass index (BMI) was measured. Then full breast examination includes Breast mass (unilateral or bilateral, site, number, and size), nipple discharge, and lymph nodes examination
- Mastalgia was assessed by new breast pain score (BPS), which is a graph used to measure

the pain score of the woman, in the context of a visual linear analog rating scale from 0 to 10, the patient reports' pain severity regularly. The patient also reports pain score on a different section of the graph during her menstruation, which makes this graph more advantageous than other breast pain graphs as this enables us to imagine the severity of pain of the full month in an uncomplicated manner, with an objective calculation of the overall pain score over the entire month. It is feasible to sum the scores of a full month and compute its mean, median, standard deviation, or 95% confidence interval. Hence, participants were asked to assess her pain by means of 10 cm visual analog scale (VAS) as mild (1–4 cm), intermediate (5–7), and severe (8–10 cm) and write the number in the chart that was given to her to assess pain. The patients were remembered weekly to record the score or any new symptom.

Statistical analysis

All data were collected and statistically analyzed using SPSS 26.0 for windows. Quantitative data were expressed as the mean \pm SD and median (range), and qualitative data were expressed as absolute frequencies (number) and relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Person correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation and (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation and values near 0 indicate weak correlation. Logistic regression was done to evaluate various risk factors for moderate to severe mastalgia.

All tests were two sided. $p < 0.05$ was considered statistically significant (S), $p \geq 0.05$ was considered statistically insignificant (NS).

Ethical approvals

Ethical approval was obtained from the Family Medicine department counsel and from the Ethical committee at National cancer institute and finally from the Research Committee of Cairo University. Informed consents were obtained from all participants after explaining the objectives of the study.

Results

The mean age of patients was 32.6 and their mean BMI was 24.8. The majority of the cases were

highly educated 48% and working 58.1% as showed in (Table 1).

Table 1: Demographic characteristics of the studied group (n = 148)

Variables	Study group (n = 148)	
Age (years)		
Mean ± SD	32.6 ± 8	
Range	18–51	
BMI (kg/m ²)		
Mean ± SD	24.8 ± 3.7	
Range	18–36	
Variables	No	%
Education		
Not educated	14	9.5
Middle education	63	42.6
High education	71	48
Occupation		
Working	86	58.1
Not working	62	41.9
Residency		
Urban	110	74.3
Rural	38	25.7
Marital status		
Single	31	20.9
Married	106	71.6
Widow	5	3.4
Divorced	6	4.1

BMI: Body mass index.

There was a positive family history of breast pain in 26.4% of the participants, most of the participants 66.9% breastfed their offspring. The mean age of menarche was 12 ± 3 and the duration of menstrual blood flow was more than 5 days in most of the cases 57.4%. Breast pain was 5 days or less in 64.9% of the cases. The PMS symptoms have been founded in 56.1% of the participants (Table 2).

Table 2: Menstrual and contraceptive history of the studied group (n = 148)

Variables	Study group (n = 148)	
Age of menarche (years)		
Mean ± SD	12 ± 3	
Range	9–15	
Variables	n	%
Family history		
Positive	39	26.4
Negative	109	73.6
Past history		
Positive	15	10.1
Negative	133	89.9
N of birth		
≤2	99	66.9
>2	49	33.1
Breast feeding		
Yes	99	66.9
No	49	33.1
Contraception		
Not used	69	46.6
Hormonal	37	25.0
Non hormonal	42	28.4
Hormonal medications		
Yes	6	4.1
No	142	95.9
Menstrual regularity		
Regular	102	68.9
Irregular	46	31.1
Menstrual duration		
3–5	63	42.6
>5	85	57.4
Associated pelvic pain		
Yes	30	20.3
No	118	79.7
Side of breast pain		
Unilateral	41	27.7
Bilateral	107	72.3
Duration of pain		
≤5	96	64.9
6–10	42	28.4
>10	10	6.8
Premenstrual tension symptoms		
Yes	83	56.1
No	65	43.9

The mean score of the new BPS of the studied participants was 4.67 ranging from (0 to 10) with

84 (56.75%) of them having mild mastalgia with VAS score ≤4, while 64 (43.25%) have moderate to severe mastalgia with VAS >4 (Table 3).

Table 3: Comparing demographic, menstrual and contraceptive characteristics between the studied groups (n = 148)

Variables	Mild pain (VAS≤4) (n = 84)		Moderate to severe pain (VAS>4) (n = 64)		p-value
Age (years): Mean ± SD	32.8 ± 7.9		32.4 ± 8.2		0.746
BMI (kg/m ²): Mean ± SD	22.7 ± 2.5		27.6 ± 3.1		<0.001**
Variables	n	%	n	%	p-value
Marital status					
Single	18	58.1	13	41.9	0.841
Married	60	56.6	46	43.4	
Widow	2	40	3	60	
Divorced	4	66.7	2	33.3	
Family history					
Positive	24	61.5	15	38.5	0.842
Negative	60	55	49	45	
Past history					
Positive	10	66.7	5	33.3	0.414
Negative	74	55.6	59	44.4	
Contraception					
Not used	43	62.3	26	37.7	<0.001**
Hormonal	4	10.8	33	89.2	
Non hormonal	37	88.1	5	11.9	
Hormonal medications					
Yes	5	83.3	1	16.7	0.180
No	79	55.6	63	44.4	
Menstrual regularity					
Regular	64	62.7	38	37.3	0.029*
Irregular	20	43.5	26	56.5	
Menstrual duration					
3–5	53	84.1	10	15.9	<0.001**
>5	31	36.5	54	63.5	
Associated pelvic pain					
Yes	15	50	15	50	0.403
No	69	58.5	49	41.5	
Side of breast pain					
Unilateral	26	63.4	15	36.6	0.312
Bilateral	58	54.2	49	45.8	
Duration of pain					
≤5	73	76	23	24	<0.001**
6–10	10	23.8	32	76.2	
>10	1	10	9	90	
Premenstrual tension symptoms					
Yes	27	32.5	56	67.5	<0.001**
No	57	87.7	8	12.3	

BMI: Body mass index, VAS: Visual analogue scale.

There was highly statistically significant difference between females with mild pain and those of moderate to severe pain regarding to BMI as the mean of BMI in patient with mild pain was 22.7 ± 2.5 while it was 27.6 ± 3.1 in females with moderate to severe pain (Table 3).

Furthermore, there was highly statistically significant difference between both groups as regards to the type of the contraception used that means females who used hormonal contraception had more pain (Table 3).

Sixty-two percent of females with mild pain have regular menstruation, while 56.5% of patients with moderate to severe pain have irregular menses. Females with longer menstrual blood flow were associated with moderate-to-severe pain than those with mild pain. Ninety percent of patients who have moderate-to-severe pain their breast pain duration more than 10 days. Most of the patients with PMS symptoms 67.5% were having moderate to severe pain (Table 3).

There was a strong positive association between BMI and average pain score with increasing the average of pain score with the high BMI (Table 4). After logistic regression, the only remaining significant factor was BMI 0.001 (Table 5).

Table 4: Correlation between average pain score, age, and BMI

Items	Average pain score	
	R	p
BMI	0.693	<0.001**
Age	-0.037	0.657

BMI: Body mass index.

Discussion

In the current cross-sectional study, we study the factors affecting mastalgia in 148 patients. This study was conducted in family medicine clinics at kasralainy hospital and early detection and screening unit at national cancer institute.

Regarding the age in our study the mean age was (32.6 ± 8), the age was ranged from 18 to 51, this was agreed with Johnson *et al.*, 2006 [4] who stated that the age of women complaining of mastalgia was between 35 and 55 years, however the age in the study conducted in turkey by Mynit *et al.*, 2016 [8] on 700 patients, the mean age of the participants was (45.20 ± 10.78) years (range 18–67). Commonly mastalgia affects about 60% of women aged 18–44 where most of it was cyclic.

Regarding BMI in our study, the mean BMI was (24.8 ± 3.7) ranged from (18 to 36), while Olfati *et al.*, 2009 [9] who study the relationship between BMI and mastalgia on 102 patients in Iran, stated that the mean BMI was (28.81 + 3.22) and it concluded that patient with abnormal BMI had mastalgia than those with normal BMI.

Most of the patients in our study were married 71.6% and breastfed their children 66.9%. This is in accordance with El Adwi *et al.*, 2014 [7], that reported mastalgia was more frequent among married than single participants (50.0% vs. 25.9%; respectively). This might be due to pregnancy and breastfeeding. Breastfeeding may also be common cause of mastalgia in women, especially after labor. Furthermore, mastitis occurs more during breastfeeding and leads to mastalgia [10].

In this study, the highly educated patients 48% were more than the non-educated patients 9.5%. also, Koçoğlu *et al.*, 2017 [11] found the fact that women who graduated from university suffered from mastalgia more frequently.

Patients who lived in urban areas in this study were the majority 74.3%, more than half of the patients were working 58%. This can be explained by

a psychogenic origin of breast pain. Women highly educated were working, and lived in urban areas might have more stressors. Stressors can be the cause of psychogenic health problems in women [12].

The majority of participants in this study were complaining of mild pain (VAS ≤ 4) 56.7% while those with moderate-to-severe pain (VAS > 4) were 43.2% with the mean pain score was 4.67.

This was not agreed with Myint *et al.*, 2016 [8] who reported that 41% of the participants who had mild mastalgia. However, the mean pain score was similar to Ader and Brown's study [13] (Mean=4.63 ± 2.3).

In our study, in most participants (64.9%) duration of mastalgia was 5 days or less, this was consistent with Varizi *et al.*, 2016 [5] who stated that the duration of pain in 65% of participants was 5 days or less. However, in Carmichael and colleagues' study [14] 93% of the participants reported more than 5 days of mastalgia.

In the current study, most patients had reported bilateral mastalgia 72.3%, this was in line with Varizi *et al.*, 2016 [5] as most mastalgic participants had bilateral breast pain 64%.

The major findings of the current study were that mastalgia is statistically significant related to BMI, type of contraception, menstrual regularity, menstrual duration, breast pain duration, and PMS.

There was highly statistically significant difference between patient with mild pain and those of moderate to severe pain regarding to BMI as patient with moderate to severe pain have higher BMI. This was consistent to the study in India by Raghunath *et al.*, 2015 [15] showed that Women who had low BMI had higher risk for mastalgia as compared to those with normal BMI. Johnson *et al.*, 2006 [4] identified the obesity as a risk factor in their study.

As regards the type of the contraception used this study demonstrated that the use of hormonal contraception associated with more pain (p < 0.001), this is not agreed with Shobeiri *et al.*, 2016 [16] who resulted that Hormonal contraceptive usage was associated with significantly less mastalgia.

In this study mastalgia significantly related to menstrual regularity and duration with p = 0.029, 0.001 respectively, this is not in line with Varizi *et al.*, 2016 [5] who demonstrated that mastalgia not related to them as the p value was 0.698, 0.607 respectively.

Table 5: Logistic regression of the associated risk factors of increased pain

Items	B	S.E.	Wald	df	Sig.	EXP (B) OR	95% CI for EXP (B)	
							Lower	Upper
Type of contraception	-0.428	0.288	2.202	1	0.138	0.652	0.371	1.147
Regular menses	-0.284	0.528	0.289	1	0.591	0.753	0.267	2.121
Menstrual duration 3–5.1, >5.2	0.268	0.563	0.227	1	0.634	1.307	0.434	3.940
Duration of pain in menstrual cycle	-0.034	0.555	0.004	1	0.951	0.967	0.326	2.869
PMS	-0.662	0.607	1.192	1	0.275	0.516	0.157	1.693
BMI	0.524	0.158	10.951	1	0.001*	1.689	1.238	2.303

BMI: Body mass index, PMS: Premenstrual symptoms.

Our study showed there was mastalgia related to PMS as patient with PMS had more pain ($p < 0.001$), this was inconsistent with Shobeiri *et al.*, 2016 [16] Also, they also reported in another observation that mastalgia was not significantly associated with PMS.

Conclusion

We concluded that there are many factors affecting mastalgia as BMI, type of contraception, menstrual regularity, menstrual duration, breast pain duration, and PMS. However, BMI is the most important factor affecting mastalgia, so in the prevention of mastalgia, it can be concluded that BMI within the normal range can be significant. In addition, weight loss may have a therapeutic effect if women suffering from breast pain are also having weight issues.

Our study had some limitations. We did not select the participants via a randomized method. Furthermore, we did not identify the dietary regimens of the participants. Hence, the relationship between mastalgia and dietary habits remained unclear.

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