



International Journal of Medical and Exercise Science

(Multidisciplinary, Peer Reviewed and Indexed Journal)

ORIGINAL ARTICLE

EFFICACY OF PECTORAL MUSCLE TRAINING AND COSTAL MUSCLE TRAINING IN CYCLIC MASTALGIA TO IMPROVE THE QUALITY OF LIFE IN WOMEN

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Nithyanisha. R¹, G. Datchayani²

Authors:

¹Assistant Professor, Faculty of Physiotherapy, Dr. M.G.R Educational and Research Institute, Velappanchavadi, Chennai, Tamil Nadu, India

²Faculty of physiotherapy, Dr. M.G.R Educational and Research Institute, Velappanchavadi, Chennai, Tamil Nadu, India

Corresponding Author:

¹Faculty of physiotherapy, Dr. M.G.R Educational and Research Institute, Velappanchavadi, Chennai, Tamil Nadu, India, Mail id: nithyanisha.physio@drmgrdu.ac.in

ABSTRACT

Background of the study: Cyclic Mastalgia is defined as breast pain before the onset of menstruation. It may be experienced unilaterally or bilaterally and is often associated with tenderness. Pain usually subsides spontaneously but it re-occurs with subsequent menstrual cycles. The purpose of this study is to determine the efficacy of pectoral muscle training and costal muscle training in cyclic mastalgia to improve the quality of life in women. **Methodology:** This is the Comparative study of Pre and Post type with 30 subjects. The study was conducted and followed in Outpatient department of Physiotherapy, ACS Medical College and Hospital, Chennai. The subjects were selected based on the Inclusion and Exclusion criteria. Patients with Cyclic Mastalgia at the age group of 18-35 were included in the study after getting their consent for participations. The selected participants were divided into 2 Groups- Group A (15 subjects) exercises were given and Group B (15 subjects) exercises are not given. Post intervention outcome measures are recorded. Pre and post effects are recorded and compared. **Result:** On comparing the Pre-test and Post-test within Group A and Group B on VAS and DBPC, Group A showed that the intervention was effective in reducing the symptoms of pain in cyclic mastalgia. On comparing Pre test and Post test within Group A & Group B on VAS score & DPBC Score shows significant difference in the mean values at $P \leq 0.05$. **Conclusion:** This study concludes that the Efficacy of pectoral and costal muscle training on cyclic mastalgia has improved in reducing the pain and tenderness using various pectoral and costal muscle exercises among females.

Keywords: Breast pain, Cyclic mastalgia, Menstrual pain, Pectoral muscle strengthening, Costal muscle training.

Received on 24th July 2024; Revised on 20th August 2024; Accepted on 28th August 2024
DOI:10.36678/IJMAES.2024.V10I03.006

INTRODUCTION

Cyclic mastalgia is defined as breast pain before the onset of the menstruation and subsides with the onset of the menstrual cycle. It is classically related to the menstrual cycle and it is bilateral diffuse, poorly localised and generally described as a heaviness or soreness that often radiates to the axilla¹. Increased estrogen, increased prolactin, decreased progesterone levels, or alterations in the estrogen /progesterone ratio are theories regarding the pathophysiology of mastalgia.

Menstrual irregularity, oral contraceptives, hormone therapy, psychotropic drugs, some cardiovascular agents (i.e. Spironolactone, digoxin), psycho-social factors, and emotional stress are related with breast pain. Caffeine and nicotine consumption are also considered to be related with mastalgia². Three main theories have emerged regarding etiology of painful nodular breasts or cyclic mastalgia they are the increased estrogen secretion from the ovary, Deficient progesterone production, hyperprolactinemia.

The levels of anxiety, depression, and social dysfunction are shown to be significantly higher in women with severe mastalgia compared with those who had non-severe mastalgia. Some of the women who had improvement after drug treatment continued to experience some residual anxiety that suggests psychosocial factors may also contribute to the complaint of mastalgia³.

Appropriate breast support is particularly important for exercising females due to the limited anatomical support. This lack of intrinsic breast support can cause excessive breast motion during physical activity and is

hypothesised to increase tension and stretching of the supporting structures of the breast leading to exercise-induced mastalgia⁴.

The severity of the pain on daily basis for at least once during menstrual cycle using a visual analog scale is the best assessment. The pain scale is also helpful in assessing treatment response in mastalgia, which is characterized by the waxing and waning of symptoms and a high spontaneous remission rate⁵.

When exercises are performed, they help in regulation of the hormones, especially estrogen and progesterone, which is one of the main causes of cyclic mastalgia and hence exercises help in regulating the hormonal imbalance and in turn help in reducing the breast pain and also helps in improving the quality of life in women⁶.

Pectoral muscles: The Pectoralis minor is a small, triangular muscle that lies beneath the Pectoralis major .The pectoral muscles are situated under the breast, Costal muscles are found in between the ribs which are responsible for expansion and contraction during breathing⁷.

A recent classification, first described by the Cardiff Mastalgia Clinic⁹ is useful in making clinical decisions and consists of 3 components: cyclical, noncyclical, and chest-wall pain. Cyclical pain is most prominent towards the end of the menstrual cycle. Cyclical mastalgia affects up to 40% of women before menopause, most often in their thirties. In approximately 8% of these women pain will be severe and interfere with their normal activities. A minority of women with the most severe pain will also experience it during menstruation¹³. The pain can continue for

many years but will usually disappear after menopause. In 20% of women it subsides without intervention. Cyclical mastalgia is not to be confused with premenstrual syndrome (PMS) which, by definition, is associated with the menstrual cycle but differs in presentation, effective treatment, and likely etiology.

There is evidence that a well-fitting bra may provide relief for mastalgia. In two 2 prospective, CM accounts for approximately 2/3 of breast pain in specialty clinics, whereas non-CM accounts for the remaining 1/322. CM typically presents during the third or the fourth decade of life and the symptoms tend to persist with a relapsing course. It usually starts during the luteal phase of the menstrual cycle to influence usual daily activities. In spite of that, mastalgia generally is underreported. Remission often occurs with hormonal events such as pregnancy or menopause. Only 14% of women with CM experience spontaneous resolution; however, 42% experience resolution at menopause^{9,10}.

Procedure:

This study was an experimental study with pre and post type, which was conducted in the Outpatient department of Physiotherapy in ACS Medical College and hospital for 4 months. For this study, 30 females were recruited for the study based on the inclusion and exclusion criteria, group A 15 members were given Pectoral and costal muscle exercises and Group B 15 members were not given exercise but the progression of pain and tenderness is assessed in successive month, for Group A exercise programme is administered and the intervention scores are recorded, 3 times per week for 4 weeks. Post Intervention outcome measures are recorded. Pre and post effects

are recorded and compared using DBPC and VAS scale.

DBPC: Patients were explained about the hormonal changes with menstruation and its relation with mastalgia and requested to record their daily pain experience on a chart. The days with menses are marked with letter "P".

VAS: The severity of pain is noted on a visual analogue scale. VAS is usually a horizontal line, 10 cm in length, anchored by word descriptors at each end. The patient marks on the line below, the point that they feel represents their perception of pain. The VAS score is determined by measuring in Millimeter from the left hand end of the line to the point that the patient marks. On this VAS, the 0 indicates no pain and 10 indicate very severe excruciating pain in the breast. Most mastalgia experts consider any pain of ≥ 3 on a VAS of 0 to 10 to be significantly severe to require therapy.

Interventions:

- 1. Pectoral stretching:** The participant was made to sit on a chair; the therapist stands behind the participant. The participant was asked to bend both the elbows to 90° and shoulder to 90°. The therapist places her hands at the end of the elbow and passively pulls the hand behind. This position is maintained for 30 s and repeated.
- 2. Retractor strengthening (wall push-ups):** Participant were asked to be in the standing position facing toward the wall with feet apart, the shoulder is flexed to 90°, and the palms are placed on the wall. The participants were asked to go forward toward the wall bending their elbows and come back.

3. Trunk mobility exercises (trunk flexion, extension, rotation and lateral flexion) – Participants were asked to be in the standing position, they were asked to stand with their feet slightly apart, and then ask the participant to perform trunk flexion, extension, lateral flexion to the right and left sides, and rotation to both the sides.

4. Breathing exercises

a) Diaphragmatic breathing- Participant was in the sitting position. Asking them to place the palms on Rectus Abdominis, and instruct them to breathe slowly and deeply through the nose, and then participants were instructed to relax and exhale through the mouth and draw the attention at the hand slightly rising during inspiration and going inward during expiration.

b) Segmental breathing (bilateral costal expansion): The participants were in a sitting position with their hands being placed on the lateral aspect of the lower ribs bilaterally. They were asked to breathe in through the nose and breathe out through the mouth. At the end of the expiration, ask the patient to apply the manual resistance to the lower ribs.

Exercise dosage According to the new guidelines by American College of Sports Medicine Stretching/flexibility exercise protocol

Strength/resistance exercises protocol:
Frequency: 4 sets with eight repetitions;
Intensity: mild to moderate; and Duration: 3 sessions/ week.

Cardio/respiratory exercises:

Frequency: continuous session of 10 min;
Intensity: mild to moderate; and
Duration: 3 sessions/ week, the exercise program is delivered to the Participants three times per week for 2 consecutive weeks.

Data Analysis: The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24, with a significance level of p value less than 0.05 and a 95% confidence interval set for all analysis. The Shapiro Wilk test was used to determine the normality of the data. In this study, Shapiro Wilk test showed that the data was normally distributed on the dependent values at $P > 0.05$. Hence parametric test was adopted. Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups.

TEST	GROUP – A		GROUP - B		t - TEST	df	Significance
	MEAN	S.D	MEAN	S.D			
PRE TEST	4.06	1.09	4.20	1.14	-.325	28	.748*
POST TEST	1.33	.975	3.86	.915	-7.33	28	.000**

Table-1. Comparison of vas score between group – A and group - B in pre and Post Test (*- $P > 0.05$ - Not Significant) & (**- $P \leq 0.05$ - Significant)

The above table reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value between Group A & Group B in pre test and post test.

& Group B at $P > 0.05$. The above table shows that statistically significant difference in post-test values between Group A & Group B at $P \leq 0.05$.

This table shows that there is no significant difference in pre test values between Group A

Comparison of Vas Score between Group – A and Group - B in Pre and Post Test

TEST	Group - A		Group - B		t - TEST	df	Significance
	MEAN	S.D	MEAN	S.D			
PRE TEST	14.13	1.24	13.93	.961	.492	28	.626*
POST TEST	4.13	1.06	13.13	.833	-25.84	28	.000**

Table-2. Comparison of DPBC Score between Group- A and Group - B in Pre and Post Test (*- $P > 0.05$ - Not Significant) & (**- $P \leq 0.05$ - Significant).

The above table reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value between Group A & Group B in pre test and post test.

& Group B at $P > 0.05$.The above table shows that statistically significant difference in post test values between Group A& Group B at $P \leq 0.05$.

This table shows that there is no significant difference in pre test values between Group A

GROUPS	PRE TEST		POST TEST		t - TEST	Significance
	MEAN	S.D	MEAN	S.D		
GROUP- A	4.06	1.09	1.33	.975	15.04	.000**
GROUP-B	4.20	1.14	3.86	.915	1.58	.000**

Table- 3. Comparison of Vas Score within Group – A and Group – B between Pre Test and Post Test (**- $P \leq 0.05$ - Significant)

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – A & Group – B. There is a statistically significant

difference between the pre test and post test values within Group A and Group B at $P \leq 0.05$.

GROUPS	PRE TEST		POST TEST		t - TEST	Significance
	MEAN	S.D	MEAN	S.D		
GROUP- A	14.13	1.24	4.13	1.06	102.47	.000 **
GROUP-B	13.93	.961	13.13	.833	3.29	.000 **

Table- 4. Comparison of DBPC scores within Group-A and Group-B between Pre Test and Post test. (**- $P \leq 0.05$ - Significant)

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group -A & Group-B. There is a statistically significant difference between the pre test and post test values within Group A and Group B at $P \leq 0.05$.

RESULT

On comparing the Mean Values of Group A & Group B on VAS Score, it shows a significant decrease in the post test mean values in both groups, but (Group A - Pectoral and costal muscle training) shows $1.33 \pm .975$ which has the lower mean value is more effective than (Group B -Control) $3.86 \pm .915$ at $P \leq 0.05$. Hence the null hypothesis is rejected.

On comparing the Mean Values of Group A & Group B on DPBC Score, it shows a significant decrease in the post test mean values in both groups, but (Group A - Pectoral and costal muscle training) shows 4.13 ± 1.06 which has the lower mean value is more effective than (Group B -Control) $13.13 \pm .833$ at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing Pre test and Post test within Group A & Group B on VAS score & DBPC Score shows significant difference in the mean values at $P \leq 0.05$.

DISCUSSION

The study was to assess the pain intensity and also to diagnose the cyclic mastalgia and record the normative data with the help of DBPC and VAS scale.

Cyclic mastalgia is defined as breast pain before the onset of the menstruation and subsides with the onset of the menstrual cycle. It is classically related to the menstrual cycle and it is bilateral diffuse, poorly localized and generally described as a heaviness or soreness that often radiates to the axilla. When exercises are performed, they help in regulation of the hormones, especially estrogen and progesterone, which is one of the main causes of cyclic mastalgia and hence exercises help in regulating the hormonal imbalance and in turn helps in reducing the breast pain and also helps in improving the quality of life in women¹¹⁻¹³.

Dr.Neha Chauhan et al in the year 2019 concluded that utility of structured exercise programme was effective in reducing the symptoms of cyclic mastalgia. R Gumm in the year 2004 conducted an evidence based study and concluded that pain In cyclic mastalgia often settles spontaneously by altering simple lifestyle changes that is suggested initially, such as wearing a well-fitted sports bra, weight reduction, regular exercise^{14- 16}.

The mean value of VAS Score in Group A pre test 4.06 , post test 1.33 and Group B pre test 4.20, Post test 3.86 from the data analysis shows that there was a significant reduction in pain and tenderness in both groups but Group A is more effective than Group B in reducing the pain and tenderness.

The mean value of DBPC Score in Group A pre test 14.13 , post test 13.93 and Group B pre test 4.13, Post test 13.13 from the data analysis shows that there was a significant reduction in pain and tenderness in both groups but Group A is more effective than Group B in reducing the pain and tenderness.

Ethical Clearance: Ethical clearance has obtained from Faculty of Physiotherapy, Dr. MGR. Educational and Research Institute, Chennai, Tamil Nadu, Reference number: No: B-13 / PHYSIO/ IRB/ 2019-2023, Dated: 15/02/2023.

Conflict of interest: There was no conflict of interest to conduct this study.

Fund for the study: It was a self-financed study.

CONCLUSION

In this present study, the exercise intervention is proved to be effective in decreasing the pain as when physical activity or exercises are performed; it enhances the return of blood to the heart and improves the blood circulation. When exercises are performed it helps in release of prostaglandins into the body which in turn reduces or prevents pain especially in pectoral muscles, retractors, trunk flexors, extensors, rotators, side flexors etc and also it helps in regulation of estrogen and progesterone which is the main cause of cyclic mastalgia.

When exercises are performed, they help in regulation of the hormones, especially estrogen and progesterone, which is one of the main causes of cyclic mastalgia and hence exercises help in regulating the hormonal imbalance and in turn helps in reducing the breast pain and also helps in improving the quality of life in women

The stretching of the Pectorals stretches the muscle fibers which reduces the tender points generated due to pain .Thus it concludes that Pectoral and costal muscle exercises was effective in reducing the symptoms of Cyclic mastalgia.

REFERENCES

1. Goyal A, Mansel RE. Mastalgia. In Management of Breast Diseases. Springer, Cham, 2016, 73-79.
2. Rosolowich V, Saettler E, Szuck B. Breast Disease Committee. Mastalgia. J ObstetGynaecol Can 2006; 28:49-57.
3. Sitruk-Ware R, Sterkers N, Mauvais-Jarvis P. Benign breast disease I: Hormonal investigation. ObstetGynecol 1979; 53:457-60.
4. Padang WS. The effect of anaerobic and aerobic exercise on endurance and non endurance athletes on premenstrual syndrome (PMS). IOP Conf. Series: Materials Science and Engineering. 2017; 180:012183.
5. Ader DN, Shriver CD, Browne MW. Cyclical mastalgia: premenstrual Syndrome or recurrent pain disorder? J PsychosomObstet Gynaecol1999;20(4):198–202.
6. Preece PE, Mansel RE, Bolton PM, Hughes LE, Baum M, Gravelle IH. Clinical syndromes of mastalgia. Lancet 1976; 02(7987):670–3.
7. RE, Webster DJT, eds. Benign disorders and diseases of the breast concepts and clinical

- management. 2nd ed. London: WB Saunders; 2000:95–121.
8. Fox H, Walker LG, Heys SD, Ah-See AK, Eremin O. Are patients with Mastalgia anxious, or does relaxation therapy help? *The Breast* 1997; 6:138–42.
 9. McFadden IJ, Forrest AP, Chetty U, Raab G. Cyclical breast pain – some Observations and the difficulties in treatment. *Br J Clin Pract* 1992; 46(3):161–4.
 10. Messinis IE, Lolis D. Treatment of premenstrual mastalgia with tamoxifen. *Acta Obstet Gynecol Scand* 1988; 67(4):307–9.
 11. Mansel RE, Wisbey JR, Hughes LE. Controlled trial of the antigonadotropin danazol in painful nodular breast disease. *Lancet* 1982; 1(8278):928–30.
 12. O'Brien PMS, Abukhalil IEH: Randomized controlled trial of the management of premenstrual syndrome and premenstrual mastalgia using luteal phase-only danazol. *Am J Obstet Gynecol* 1999; 180:18–23.
 13. Published online 2024 Mar 14. Prepublished online 2024 Jan doi: 10.12659/MSM.943448 Comparison of Presentation Types and Clinical Findings of Rural and Urban Patients with Mastalgia: A Retrospective Analysis
 14. PMID: PMC8140869 PMID: 34046576 Is it mastalgia or myofascial pain? A clinical confusionsibel mandiroğlu,¹ ulvi murat yüksel,² sibel ünsal delialioğlu,¹ and lütfi doğan² 2021 Mar; 36(1): 114–119 Published online 2021 Jan 14. doi: 10.46497/Arch Rheumatol. 2021.8255
 15. Evening Primrose (*Oenothera biennis*) Oil in Management of Female Ailments Mohaddese Mahboubi 2019 Aug; 25(2): 74–82. Published online 2019 Aug 5. doi: 10.6118/jmm.18190.
 16. A Randomized Pilot Study of Inositol in Association with Betaine and Boswellia in the Management of Mastalgia and Benign Breast Lump in Premenopausal Women 2016; 10: 37–43. doi: 10.4137/BCBCR.S38408

Nithyanisha. R, G. Datchayani (2024). Efficacy of Pectoral Muscle Training and Costal Muscle Training in Cyclic Mastalgia to Improve the Quality of Life in Women, *ijmaes*; 10(3); 1918-1925.