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The Effect of Upper Limb Stretching and Strengthening Exercises on Cyclic Mastalgia in Adolescent School Girls

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Abstract:

- ***Background:***
  Cyclic mastalgia is a common breast pain disorder among adolescent girls. This study aimed to determine the effects of upper limb stretching and strengthening exercises on cyclic mastalgia among adolescent school girls.

- ***Materials and Method:***
  Fifty adolescent school girls aged 14–18 years with cyclic mastalgia participated in this experimental study. Participants underwent upper limb stretching and strengthening exercises for six weeks. Breast pain chart and Visual Analogue Scale (VAS) were used for assessment before and after intervention.

- ***Results:***
  Significant reduction in breast pain and improvement in outcome measures were observed after six weeks of intervention with p value <0.0001.

- ***Conclusion:***
  Upper limb stretching and strengthening exercises significantly improved cyclic mastalgia symptoms among adolescent school girls.

Keywords: *Cyclic Mastalgia, Adolescent Girls, Breast Pain, Stretching Exercises, Strengthening Exercises.*

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I. INTRODUCTION

Cyclic mastalgia is a common breast pain condition predominantly affecting adolescent females before the onset of menstruation. The pain may occur in one or both breasts and is often associated with tenderness [1]. It is commonly experienced during the luteal phase of the menstrual cycle and is frequently linked with ovulation. The nature of pain varies among individuals and is often described as sharp, shooting, stabbing, aching, throbbing, or a feeling of heaviness [2].

The exact cause of cyclic mastalgia remains unclear; however, studies suggest that hormonal fluctuations during the menstrual cycle play a significant role. Increased estrogen secretion from the ovaries, reduced progesterone levels, and elevated prolactin levels have been associated with the condition [4][5].

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Psychological factors may also influence the severity of symptoms, although limited studies have explored this relationship. Research indicates that menstrual irregularities, oral contraceptive use, hormone therapy, psychotropic medications, certain cardiovascular drugs such as spironolactone and digoxin, psychosocial issues, and emotional stress may contribute to breast pain [6][7]. In addition, caffeine and nicotine consumption have also been linked to mastalgia.

Several treatment approaches have been investigated for managing cyclic mastalgia, including yoga, primrose oil massage, laser therapy, and kinesiology techniques. Studies have reported that the prevalence of cyclic mastalgia ranges from 40% to 70% among adolescent and young females, significantly affecting quality of life and daily activities [8]. Despite this high prevalence, limited physiotherapy-based interventions have been studied for its management.

Samruddhi Shashikant Barve et al. (2019) concluded that a structured exercise programme was effective in reducing pain and tenderness while improving quality of life in adult females with cyclic mastalgia [9]. Similarly, Mojgan Mrghafourvand et al. (2020) reported that regular physical activity plays an important role in the management of cyclic mastalgia [10].

Although previous studies have demonstrated the effectiveness of various interventions for cyclic mastalgia, evidence regarding physiotherapy interventions in adolescents remains limited. Therefore, the present study aims to determine the effects of upper limb stretching and strengthening exercises among adolescent school girls with cyclic mastalgia.

II. METHODOLOGY

This is an experimental research design involved in a comparison of pre-test and post-test between the groups. A group of 50 samples were selected by using convenient sampling technique. The study was conducted with intervention of 6 weeks among adolescent school girls of government higher secondary school in Tiruvallur, Kancheepuram, Dharmapuri, Arani. Participants were selected between the age group of 14-18 years with cyclic mastalgia were eligible for this study. Participants with history of irregular menstrual cycle, on hormonal therapy, on medication for cyclic mastalgia, breast pain associated with the lump (noncyclical mastalgia), any other condition which is under investigation has been excluded. Breast pain chart and Visual analogue scale has been used to determine the pre-test and post-test values. Subjects has been explained about the chart and issued before the treatment and the pre-test scores has been calculated at the baseline. Upper limb stretches and strengthening exercises has been given to the subjects and the post-test values have been calculated after the 4 weeks of intervention.

A total of 50 adolescent school girls was selected using the convenient sampling technique based on the inclusion and exclusion criteria from the above-mentioned study setting and the informed consent were obtained from the participants and their Parents and they were explained about the safety and simplicity of the procedure. The pre-test and post-test scores has been obtained before and after the treatment procedure by using beast pain chart and visual analogue scale (VAS). The Ethical clearance was obtained from the Institutional Research Board.

➢ *The Subject Asked to Perform:*

- *Stretching and Exercises:*

Table 1 Exercise Intervention Protocol for Cyclic Mastalgia

Exercise	Procedure
Pectoral Stretching	Participants sat on a chair while the therapist stood behind. Shoulders and elbows were positioned at 90°. The therapist gently pulled the elbows backward to stretch the pectoral muscles. The stretch was held for 30 seconds and repeated.
Retractor Strengthening (Wall Push-Ups)	Participants stood facing a wall with feet apart and shoulders flexed to 90°. With palms on the wall, they bent the elbows to move toward the wall and returned to the starting position.
Trunk Mobility Exercises	Participants performed trunk flexion, extension, lateral flexion, and rotation in standing.
Diaphragmatic Breathing	Participants sat comfortably with hands over the abdomen. They inhaled deeply through the nose and exhaled through the mouth while observing abdominal movement.
Segmental Breathing	In sitting, participants placed their hands on the lower ribs and performed deep breathing. Gentle manual resistance was applied at the end of expiration.
Thoracic Expansion – Pectoral Stretch	Participants sat with hands clasped behind the head. During inspiration, shoulders were horizontally abducted; during expiration, elbows were brought together.
Thoracic Expansion – Shoulder Mobility	Participants performed bilateral shoulder flexion with slight abduction during inspiration and bent forward during expiration.

- *Exercise Dosage:*

Table 2 Exercise Dosage and Training Parameters

Exercise Type	Protocol
Stretching Exercises	30-second hold, 4 repetitions, mild-to-moderate intensity, 3 sessions/week

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Strength Exercises	4 sets × 8 repetitions, mild-to-moderate intensity, 3 sessions/week
Cardiorespiratory Exercises	10-minute continuous session, mild-to-moderate intensity, 3 sessions/week

Participants underwent a 6-week intervention programme with three sessions per week. Pre- and post-test values were statistically analyzed.

III. RESULTS

The collected data were tabulated and analyzed using descriptive and inferential statistics. Mean and standard deviation (SD) were calculated for all variables. A paired t-test was used to determine significant differences between pre- and post-test measurements within the experimental group. A p-value of <0.0001 was considered statistically significant.

The findings demonstrated a significant reduction in cyclic mastalgia symptoms following upper limb stretching and strengthening exercises.

Table 3 Pre and Post Test of Experimental Group

S.NO	PRE-TEST	POST-TEST
1	45	43
2	48	45
3	44	40
4	47	45
5	46	43
6	45	41
7	44	40
8	40	39
9	42	38
10	43	42
11	41	37
12	47	43
13	45	42
14	48	45
15	49	46
16	47	42
17	45	43
18	46	42
19	40	38
20	44	41
21	48	46
22	43	40
23	44	41
24	42	36
25	44	39
26	46	43
27	47	45
28	43	38
29	42	41
30	41	38
31	40	40
32	43	42
33	45	41
34	44	40
35	46	42
36	47	45
29	42	41
30	41	38
31	40	40
32	43	42
33	45	41
34	44	40
35	46	42
36	47	45

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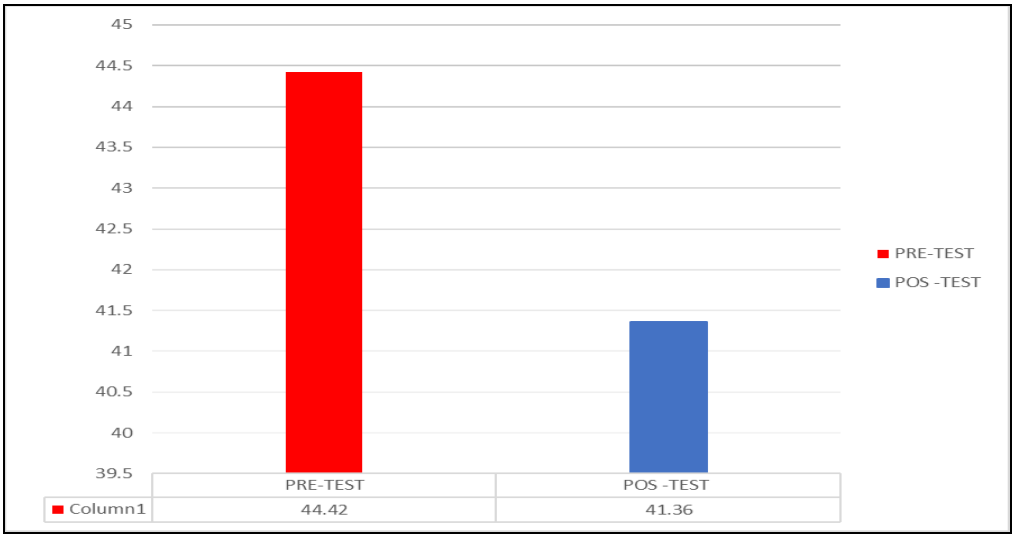
37	39	37
38	40	39
39	41	38
40	43	40
41	46	43
42	44	40
43	45	43
44	47	43
45	48	42
46	49	46
47	38	36
48	45	43
49	47	42
50	48	44

Table 4 Pre-Test and Post-Test Values of Breast Pain Chart

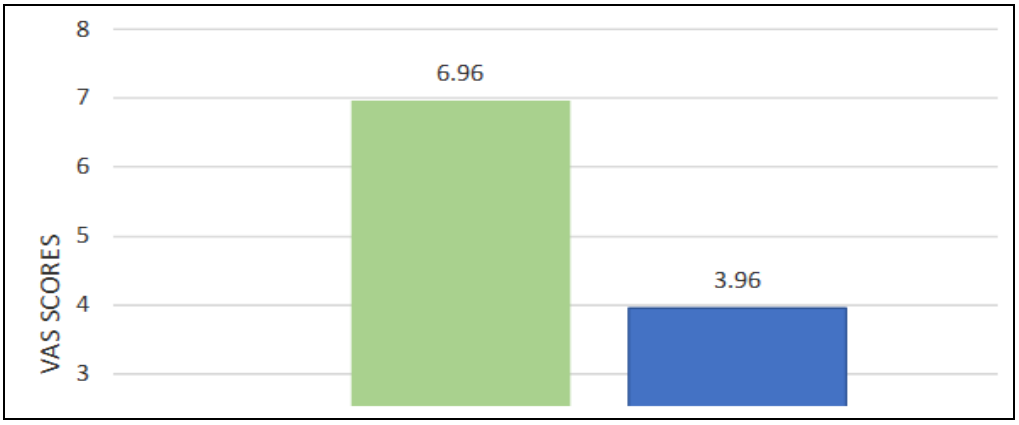
S.N0	VARIABLES	PRE-TEST	POST-TEST	T-VALUE	LEVEL OF SIGNIFICANCE
		MEAN 1ST WEEK	MEAN 6TH WEEK		
1.	BREAST PAIN CHART	44.42	41.36	16.2553	<0.0001

Table 5 Pre-Test and Post Test Values for (Vas) Pain Score

S.NO	VARIABLES	PRE-TEST	POST-TEST	T-VALUE	LEVEL OF SIGNIFICANCE
		MEAN 1ST WEEK	MEAN 6TH WEEK		
1.	VISUAL ANALOGUE SCALE (VAS)	6.96	3.96	21.8940	



Graph 1 Pre- and Post-Intervention Breast Pain Chart Values



Graph 2 Comparison of Pre- and Post-Test VAS Pain Scores

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Statistical analysis of the quantitative data demonstrated significant differences between the pre-test and post-test values in the experimental group.

Table 1 presents the comparison of pre- and post-test values, showing higher scores during the pre-test assessment compared to the post-test assessment. The findings were statistically significant with a p-value of <0.0001.

Table 2 shows the comparison of Breast Pain Chart scores in the experimental group. The mean value decreased from 44.42 during the first week to 41.36 at the end of the sixth week following the intervention. The results were found to be statistically significant with a p-value of <0.0001.

IV. DISCUSSION

Cyclic mastalgia is a frequently reported breast condition in adolescent and young females, characterized by pain and tenderness that commonly fluctuate with the menstrual cycle. Symptoms often intensify before menstruation and may include breast heaviness, swelling, and discomfort. Although several treatment approaches have been explored, evidence regarding structured physiotherapy interventions for cyclic mastalgia remains limited.

The present study demonstrated that upper limb stretching and strengthening exercises were beneficial in reducing breast pain and improving the quality of life among adolescent school girls with cyclic mastalgia. Participants showed noticeable improvement in pain reduction, physical functioning, emotional well-being, social interaction, and daily activities following the exercise programme.

Previous literature also supports the role of exercise in managing cyclic mastalgia. Samruddhi Shashikant Barve (2019) reported that structured exercise programmes effectively reduced pain and tenderness in women with cyclic mastalgia. The study further suggested that exercise may contribute to hormonal regulation, particularly estrogen and progesterone balance, thereby helping to reduce breast discomfort [9].

Likewise, Neha Chauhan (2019) highlighted that regular physical activity improves circulation and promotes physiological mechanisms that help reduce pain and associated symptoms [11].

The findings of the current study indicate that upper limb stretching and strengthening exercises can serve as a safe and effective physiotherapy intervention for managing cyclic mastalgia in adolescent females.

V. CONCLUSION

This study provides evidence that upper limb stretching and strengthening exercises are effective in reducing cyclic mastalgia symptoms and improving quality of life among adolescent school girls.

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- *Conflict of Interest*

The author declares that there is no conflict of interest related to this study.

- *Disclosure Statement*

The authors declare that no financial support or personal financial benefit was received for this research.

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