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Impact of Klapp Method Exercises on Pain, Posture Correction and Self-Efficacy in Breastfeeding Females with Kyphotic Posture

Husna Amjad[1], Hina Gul[2]*, Muqaddas Aslam[3], Areej[4], Maryam Javed[5]

[1]*Physiotherapist, Al-Siddique Hospital, Sialkot, Pakistan*
[2]*Assistant Professor, Riphah International University, Lahore, Pakistan*
[3]*Lecturer, Islam Medical and Dental College, Sialkot, Pakistan*
[4]*Demonstrator, Nazir Institute of Medical Sciences, Sambrial, Sialkot, Pakistan*
[5]*Clinician, Bhawalpur, Pakistan*
Correspondence: *hinagul@riphah.edu.pk*
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ABSTRACT

OBJECTIVE: This study explored how Klapp exercises could help reduce pain, improve posture, and boost confidence in breastfeeding women with rounded upper backs (kyphosis).

METHODOLOGY: This study was a randomized controlled trial involving 32 participants. The data were gathered from Allama Iqbal Memorial & Teaching Hospital and Al-Siddique Hospital in Sialkot, using a convenience sampling method. A sample of 32 participants was divided into two groups of 16. Group A received Klapp method exercises for a period of 1 month, twice a week, for 50-minute sessions. Group B was provided written information about an at-home fitness regimen, including posture correction, corrective exercises, and breathing exercises. They were asked to perform the exercises twice weekly during the trial and follow-up periods. All these sessions lasted 50 minutes, 2 per week. Pre- and post-assessment of pain was assessed using a visual analogue scale; posture was evaluated using a flexible ruler; self-efficacy in breastfeeding was assessed using the self-efficacy breastfeeding scale (BSES-SF). The data were analyzed using SPSS Software (version 26.0).

RESULTS: Results were assessed by parametric and nonparametric tests. Within-group analysis: p-value was 0.00 for VAS, BSES-SF, and Ruler. Between-group analysis p-value 0.491 for VAS, 0.273 for BSESSF and 0.410 for ruler.

CONCLUSION: Klapp method exercises are an effective method to reduce the kyphosis angle in breastfeeding females (who have rounded shoulders). They enhance the quality of self-efficacy in breastfeeding and also reduce neck and back pain.

KEYWORDS: Breastfeeding, female, posture, pain, self-efficacy, kyphosis

INTRODUCTION

Normal body posture is a state in which the musculoskeletal system is balanced and functions with minimal tension or stress. When this balance is disturbed, postural anomalies develop. [1] One of the most common abnormalities is Hyperkyphosis, a condition in which the thoracic spine curves excessively beyond the normal 20°–40° kyphotic range. When the curvature exceeds 40°, it is classified as Hyperkyphosis. Research has linked this condition to a wide range of upper-quarter problems, including vertebral discomfort, muscular imbalance, and shoulder pain[2] Hyperkyphosis is often accompanied by altered postural alignment, weakness in the cervical flexors and lower trapezius, tightness in the pectoralis and upper trapezius muscles, and noticeable changes in shoulder mechanics[3].

Previous studies indicate that prolonged poor posture, thoracolumbar muscle weakness, and increased mechanical stress on the spine play significant roles in the progression of this abnormal curvature[4]. In addition to structural changes, Hyperkyphosis has functional consequences. It may impair breathing patterns, reduce pulmonary efficiency, and restrict chest expansion due to tightness in the pectoral muscles and reduced flexibility in supporting musculature such as the serratus anterior[5].

These limitations are often accompanied by a reduced range of motion in the spine and shoulder joints, negatively influencing overall mobility and physical performance[6]. During pregnancy, a woman's body undergoes multiple biomechanical adjustments as weight is disproportionately distributed toward the front of the body[7]. After childbirth, many women experience breast engorgement, which further pulls the upper body forward. Combined with the tendency to lean toward the infant during breastfeeding, these factors can encourage the development or worsening of a kyphotic posture[1]. Modern sedentary lifestyles also contribute to changes in spinal curves, pelvic alignment, and muscle balance. Poor postural habits may lead to upper and lower crossed syndromes, where specific muscles become excessively tight while others weaken[8].

This imbalance disrupts core stability, limits thoracic mobility, and reduces the capacity for deep breathing[9]. In young adults, such imbalances increase the likelihood of musculoskeletal pain and may even compromise cardiorespiratory endurance. Structural changes in the thoracic spine further influence shoulder alignment, often resulting in forward shoulder posture, scapular protraction, and anterior tilting[6]. These alterations narrow the subacromial space and may increase the risk of shoulder impingement, thoracic outlet syndrome, and overall shoulder dysfunction.

Given these concerns, there is growing interest in corrective exercises that can help restore normal posture and reduce discomfortx[10]. Klapp exercises, originally designed to improve spinal alignment through crawling-based positions, aim to stretch tight muscles, strengthen weak spinal stabilizers, and promote functional realignment of the thoracic region[11].

The objective of this study is to explore how Klapp exercises may help breastfeeding women with rounded upper backs resulting from poor feeding posture. Many lactating mothers experience neck pain, postural instability, and discomfort that interferes with their ability to breastfeed comfortably. By examining the effects of Klapp exercises on posture, pain levels, and overall confidence, this study seeks to determine whether these exercises can support better musculoskeletal health and enhance the breastfeeding experience. Ultimately, improving posture may allow mothers to feed their infants more comfortably and reduce the progression of kyphotic changes during the postpartum period.

METHODOLOGY

This randomized controlled trial enrolled 32 participants, with the sample size calculated using the OpenEpi calculator and adjusted for a 10% attrition rate. Data were collected from Allama Iqbal Memorial and Teaching Hospital and Al-Siddique Hospital in Sialkot using a non-probability sampling technique. A total of 36 participants were initially included in the lottery-based randomization; however, four were excluded: two did not meet the inclusion criteria, and two refused to participate, leaving 32 participants randomly assigned to two groups via the lottery (Chit) method, which helped minimize selection bias. The study used a single-blind design in which the outcome assessor remained unaware of group allocation, and no dropouts occurred. Group A (experimental group) received Klapp method exercises twice weekly for 50 minutes over four weeks.

In contrast, group B (control group) received written instructions for a home-based regimen including corrective movements, stretching exercises, strengthening of deep cervical flexors and shoulder retractors, and breathing exercises, performed twice weekly during the intervention and follow-up period. Pain levels were measured using the visual analogue scale, kyphotic posture was assessed with a flexible ruler, and breastfeeding self-efficacy was evaluated using the BSES-SF questionnaire. Inclusion criteria consisted of primiparous females aged 18–35 years with vaginal delivery, breastfeeding for 3–6 months, moderate to severe neck or back pain (vas 4–6), and kyphotic angles greater than 45°, while exclusion criteria included individuals with previous orthopedic surgeries such as spinal fusion, orthopedic conditions like disc degeneration or osteoporosis, vertebral fractures, C-Section delivery, breastfeeding issues such as lactation or nipple failure, and severe kyphosis exceeding 75° requiring surgery. Both parametric and nonparametric statistical tests were applied depending on the data distribution, with a significance level of $p \leq 0.05$ considered statistically significant. The study adhered to CONSORT guidelines, ensuring transparent documentation of participant flow, allocation, follow-up, and analysis to maintain methodological rigor**.**

Klapp Exercises

Four-point walk followed by two-point walk & back walk: This exercise is basic; it is a mobility exercise and is always applied at the beginning of the program.

Breathing exercise from a kneeling position: (raising hands with inhalation - lowering hands with exhalation).

Breathing exercise from quadrapedal position: (inhalation with head elevation and lordosis of the anterior tilt of the pelvis, and exhalation with head descent and kyphosis of the anterior tilt of the pelvis)

Simple bounce glide with simultaneous breathing: (a stretching, strengthening and corrective exercise)

Bunny hop: (for stretching and strengthening).

Greeting: (Stretching and mobilization of the thalamus)

RESULTS

The statistical analysis was conducted using SPSS version 26. For categorical variables, frequency and bar charts were used; for continuous variables, the mean and standard deviation were determined. The data were gathered from 32 people who met the inclusion and exclusion criteria. Participants were randomly assigned to two groups (Group A, the experimental group, and Group B, the control group) using the lottery and chit method. Each group had 16 participants. Klapp exercises were administered to group A participants, and traditional physiotherapy exercises were administered to group B participants for a period of 1 month. **Table I** explained the basic demographics of age, weight, height and BMI of the participants.

The mean age was 24.56±3.926, with a maximum of 31 and a minimum of 18. Mean weight was 67.21±5.900 with a maximum weight of 80 and a minimum weight of 58. Mean height was 5.218±0.599 with a maximum height of 5.70 and a minimum height of 2.40. Mean BMI was 25.981±2.652, with a maximum of 30.50 and a minimum of 21.00. The normality of the data was assessed using the Shapiro-Wilk test. The p-values for Ruler and BSESSF were 0.059 and 0.51, respectively, which are greater than 0.05, indicating that the data were normally distributed and parametric tests were utilized for analysis. The VAS p-value was less than 0.05, indicating that the data were not normally distributed. Nonparametric tests were performed for analysis. This variable difference was measured using tests such as the Wilcoxon signed-rank test for within-group analysis and the Mann-Whitney test for between-group analysis.

Table II explained the comparison of both group A and group B for VAS. For pre-assessment, the p-value was 0.795, and for post-assessment, the p-value was 0.491. This showed that there was a significant difference between the pre- and post-assessment scores of the group. **Table III** presents the within-group comparisons for groups A and B on the VAS. For the pre-assessment, the p-value was 0.000; for the post-assessment, the p-value was 0.001, indicating no significant difference between the groups. **Table IV** explains the between-group comparison for both groups A and B for the ruler. For pre-assessment, the p-value was 0.728, and for post-assessment, the p-value was 0.410, which showed that there was a significant difference between pre- and post-assessment of the group.

Table IV also explained the between-group comparison for both group A and group B for BSESSF. For pre-assessment, the p-value was 0.497, and for post-assessment, the p-value was 0.273, which showed that there was a significant difference between pre- and post-assessment of the group. **Table V** demonstrated the within-group comparisons for both groups A and B for the ruler and BSESSF. For pre-assessment, the p-value was 0.000; for post-assessment, the p-value was 0.00, indicating no significant difference within-group. Both interventions showed improvement in their respective groups. But the Klapp method exercises showed more substantial improvements in the kyphosis angle and the BSESSF scale than traditional physiotherapy.

In conclusion, the Klapp method of exercises is an effective way to reduce the kyphosis angle in breastfeeding females. It enhances the quality of self-efficacy in breastfeeding and also reduces neck and back pain. However, further long-term follow-up studies are needed to confirm the extent of these findings.

Mean weight was 67.21±5.900 with a maximum weight of 80 and a minimum weight of 58. Mean height was 5.218±0.599 with a maximum height of 5.70 and a minimum height of 2.40. Mean BMI was 25.981±2.652, with a maximum BMI of 30.50 and a minimum of 21.00

Table I: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Age	18.00	31.00	24.56	3.92
Weight	58.00	80.00	67.21	5.90
Height	5.0	5.70	5.34	0.20
BMI	21.00	30.50	25.98	2.65

Table II demonstrates the group comparison of groups A and B for VAS. Mann-Whitney was applied to detect the difference of pre- and post-assessment. For pre-assessment, the p-value was 0.795, and for post-assessment, the p-value was 0.491, which showed that there was a significant difference between pre- and post-assessment of the group.

Table II: Group comparison of Group A (experimental) and Group B (control) for VAS (Mann-Whitney test)

Treatment	Groups	Median	Mean Rank	p-value
Pre treatment	Group A	5.00	16.09	0.79
	Group B	5.00	16.91	
Post treatment	Group A	3.00	15.41	0.49
	Group B	3.00	17.59	

Table III demonstrates the within-group comparison for groups A and B on VAS. The Wilcoxon test was applied to detect differences between the pre- and post-assessments. For pre-assessment, the p-value was 0.000, and for post-assessment, the p-value was 0.001, indicating no significant difference between the groups.

Table III: Group comparison of Group A and Group B for VAS (WILCOXON TEST)

Group A				P-Value	Group B				P-Value
Pre VAS		Post VAS			Pre VAS		Post VAS		
Median	Mean Rank	Median	Mean Rank	.000	Median	Mean. Rank	Median	Mean Rank	0.001
5.00	8.50	3.00	8.50	.000	5.00	7.50	3.00	7.50	0.001

Table IV compares Groups A (Ruler, BSESSF) and B (Ruler, BSES-SF). An independent-samples t-test was applied to detect differences between the pre- and post-assessment scores. For pre-assessment, the p-value was 0.728, and for post-assessment, the p-value was 0.410. For pre-assessment, the p-value was 0.497, and for post-assessment, the p-value was 0.273, which showed that there was a significant difference between pre- and post-assessment of the group.

Table IV: Comparison between Groups (A and B) of Ruler and BSESSF (independent sample-t test)

Tools	Treatment	Group A (Mean±SD)	Group B (Mean±SD)	Mean difference	t-value	P value
Ruler values	Pre-treatment	68.43±8.64	67.25±10.40	1.18	0.35	0.72
Ruler values	Post- treatment	62.20±7.81	65.00±10.56	-2.75	-8.37	0.41
BSES-SF values	Pre- treatment	42.50±9.30	44.62±8.13	-2.12	-6.88	0.49
BSES-SF values	Post- treatment	53.35±7.77	49.37±7.41	3.00	1.18	0.27

Table V shows the within-group comparisons for groups A and B for the ruler and BSESSF. Paired sample t-test applied to detect the difference of pre- and post-assessment. For pre-assessment, the p-value was 0.000, and for post-assessment, the p-value was 0.00. Which showed that there was no significant difference within group analysis

Table V: Comparison of group A and Group B for VAS and BSESSF paired t-test

Tools	Group A		t-value	p-value	Group B		t-value	p-value
	Pre-Treatment	Post-Treatment			Pre-Treatment	Post-Treatment		
	Mean±S.D	Mean±S.D			Mean±S.D	Mean±S.D		
Ruler values	68.43±8.64	62.25±7.81	8.59	0.00	67.25±10.4	65.00±10.40	6.60	0.00
BSESSF-values	42.50±9.30	52.37±7.77	-12.7	0.00	44.62±8.13	49.37± 7.41	-6.92	0.00

DISCUSSION

In a previous study, Klapp exercises were given to two 14-year-old adolescents, a boy and a girl, both with kyphotic posture. Their progress was evaluated before and after the intervention using posture-related questionnaires, visual posture assessments, posture and flexion tests, and measurements of thoracic spine mobility. Results of this study showed that Klapp exercises worked well for enhancing thoracic mobility and posture. The teenagers confirmed the method's beneficial effects by reporting a notable reduction in neck and lumbar spine pain, as well as an improvement in posture[10]. In the current study, 32 breastfeeding females with kyphotic posture were divided into two groups: an experimental group and a control group. Each group contain 16 participants. The experimental group received Klapp exercises, while the control group received traditional physiotherapy. Pre- and post-assessment were done using a visual analogue scale, a flexible ruler, and the BSES-SF questionnaire. The results demonstrated a substantial difference between the pre- and post-assessments. Klapp exercises were effective in decreasing the kyphotic angle and intensity of pain in breastfeeding females with kyphotic posture. Both previous and current studies showed that Klapp exercises are an effective method for the treatment of kyphosis.

A previous study by Naufal et al. in 2023 examined how Klapp's exercises delivered via telerehabilitation affected the health-related quality of life of patients with scoliosis. Klapp exercises were done in 20 sessions, five times a week. Klapp's exercises, provided via tele-rehabilitation, reduce spine curvature and enhance scoliosis patients' quality of life, but there is no significant improvement in pain severity[11]. This study found that the Klapp method of exercises is an effective way to reduce the kyphosis angle in breastfeeding females. It enhances the quality of self-efficacy in breastfeeding and significantly reduces neck and back pain. The present study showed greater improvement on the pain scale than previous research.

In a previous study, Papadoupoulou AH et al.[13] performed Klapp exercises on two 14-year-old adolescents, a boy and a girl, with kyphotic posture. Their progress was evaluated before and after the intervention using posture-related questionnaires, visual posture assessments, posture and flexion tests, and measurements of thoracic spine mobility. Results of this study showed a significant reduction in kyphotic angle[10]. In our research, Klapp exercises were given to breastfeeding women with kyphotic posture. Results showed that it enhances the quality of life and reduces neck and back pain more effectively than reducing the kyphotic angle. In the current study, the kyphotic angle was reduced, but not significantly. The kyphotic angle was reduced more substantially in the previous research than in the present study.

A study by Elpeze G (2022)[12] examined how a comprehensive corrective exercise program could affect the kyphotic angle and balance in teenagers with kyphotic posture. The research involved 62 male adolescents with a thoracic kyphosis angle greater than 50°, divided into three groups: one followed a Comprehensive Corrective Exercise Program (CCEP), another performed a Thoracic Exercise Program (TEP), and the third served as a control group. Thoracic curvature was measured using a flexible ruler, while balance was assessed through the Romberg index. Both the CCEP and TEP groups showed a significant reduction in kyphosis angles ($p < 0.001$), with the CCEP group demonstrating the most important improvement. Additionally, the CCEP group showed greater postural awareness than the other groups ($p < 0.001$). In the current study, 32 breastfeeding participants with kyphotic posture were distributed into two groups. The experimental group received Klapp exercises, and the control group received postural correction, corrective and breathing exercises. Statistical analysis showed a difference in the pre- and post-

assessment of the kyphotic angles in the control group. Still, Klapp exercises significantly reduced the kyphotic angle compared to corrective exercises. As the previous study had a long duration of follow-up period, this may explain the significant reduction in kyphosis angle with comprehensive corrective exercises.

CONCLUSION

Klapp exercises are practical for treating kyphotic posture in breastfeeding females. It enhances the quality of life by relieving neck and back pain. Klapp exercises can help alleviate these issues, promoting better overall health and well-being for breastfeeding women. Traditional physiotherapy, including breathing, posture correction, and corrective exercises, is also an effective regimen for treating kyphotic posture. Still, Klapp exercises showed better results, significantly decreasing the kyphotic angle in breastfeeding females.

RECOMMENDATIONS

It is recommended that Klapp method exercises be incorporated into the routine postnatal care of females, as these exercises may help improve posture and reduce discomfort. Women should also be educated about maintaining proper posture during breastfeeding to prevent musculoskeletal issues. For future research, it is suggested that the duration of Klapp exercise interventions be extended to assess their long-term effects better better. Additionally, postpartum females should be encouraged to undergo early screening for thoracic kyphosis to ensure timely identification and management of postural deviations. It is recommended to include the Klapp method exercises in the postnatal care routine.

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AUTHOR CONTRIBUTION

Amjad H: Developed study idea and design, carried out the literature search, guided the questionnaire preparation, and wrote the first draft of the manuscript
Gul H: Oversaw the overall progress of the study, guided study design and interpretation of results, and carefully revised the manuscript
Aslam M: Refining the study design, supported the literature review, and collected data
Areej: Questionnaire writing, organizing data collection, and working on data analysis and interpretation
Javed M: Assisted with statistical analysis and reviewed the manuscript with helpful suggestions

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