

Preferred Breastfeeding Postures and Factors Associated with Musculoskeletal Problems in Peshawar: A Cross-Sectional Study

Kainat Mukhtiar¹, Dr Fatima¹, Muhammad Ishaq¹, Muhammad Osama¹

¹ Institute of Physical Medicine and Rehabilitation (IPM&R), Khyber Medical University, Peshawar, Pakistan

*Corresponding author: Fatima, fatimaaltaf472018@gmail.com

"Cite this Article" Received: 08 February 2026; Accepted: 10 March 2026; Published: 27 March 2026

Author Contributions: Concept: F, KM; Design: F, KM; Data Collection: F, KM; Analysis: F, KM; Drafting: F, KM. **Ethical Approval:** Khyber Medical University, Peshawar, Pakistan. **Informed Consent:** Written informed consent was obtained from all participants; **Conflict of Interest:** The authors declare no conflict of interest. **Funding:** No external funding; **Data Availability:** Available from the corresponding author on reasonable request; **Acknowledgments:** NA

ABSTRACT

Background: Breastfeeding is essential for infant health and maternal–infant bonding, but repeated feeding sessions may expose mothers to sustained static postures and musculoskeletal strain. Maternal postural discomfort during breastfeeding remains under-addressed in routine postnatal care, particularly in local Pakistani settings. **Objective:** To determine preferred breastfeeding postures and assess breastfeeding-related factors associated with musculoskeletal problems among lactating mothers in Peshawar. **Methods:** This cross-sectional observational study was conducted at the EPI Centre of Hayatabad Medical Complex, Peshawar. Breastfeeding mothers aged 18–45 years who had breastfed for more than two weeks were recruited using non-probability convenience sampling. Of 235 mothers initially assessed, 230 were included in the final analysis. Data were collected using demographic questions, breastfeeding posture images, breastfeeding-practice items, and the Nordic Musculoskeletal Questionnaire framework. Frequencies and percentages were calculated, and associations were assessed using chi-square testing. **Results:** Cradle hold was the most commonly preferred posture, reported by 153 mothers (66.5%), followed by cross-cradle hold in 46 (20.0%) and side-lying in 31 (13.5%). Lower back pain was reported by 51 mothers (22.2%), shoulder pain by 46 (20.0%), and upper back pain by 23 (10.0%). Upper back pain was significantly associated with maternal age ($p = 0.045$) and number of breastfeeding sessions per day ($p = 0.022$). **Conclusion:** Cradle hold was the dominant breastfeeding posture, while lower back and shoulder pain were the most frequent complaints. Maternal age and breastfeeding frequency were associated with upper back pain, supporting the need for ergonomic breastfeeding education in postnatal care. **Keywords:** Breastfeeding; Breastfeeding posture; Musculoskeletal pain; Lactating mothers; Lower back pain; Peshawar.

INTRODUCTION

Breastfeeding is a fundamental component of infant nutrition, immune protection, growth, and mother–infant bonding, and international recommendations support exclusive breastfeeding during the first six months of life because of its established benefits for infant survival and maternal–child health (1). Successful breastfeeding depends not only on milk transfer and infant latch but also on the mother's ability to maintain a comfortable and sustainable feeding position. During breastfeeding, mothers commonly adopt positions such as cradle hold, cross-cradle hold, football hold, and side-lying position, each of which places different biomechanical demands on the cervical spine, shoulders, upper back, lower back, wrists, and hands (2). Appropriate positioning can improve infant latch, feeding behavior, and maternal comfort, whereas unsupported or prolonged static postures may contribute to musculoskeletal strain and reduce maternal tolerance for continued breastfeeding (3).

Musculoskeletal discomfort among lactating mothers has increasingly been recognized as a clinically relevant but under-addressed postnatal health concern. Evidence from Saudi Arabia has shown that musculoskeletal pain during breastfeeding is frequently reported in the lower back and neck regions, particularly among mothers using cradle-type positions, while semi-reclined positions may be associated with less discomfort (4). Similarly, comparative evidence from Pakistan has suggested differences in neck pain according to breastfeeding position, with cross-cradle hold showing greater association with neck discomfort than cradle hold in some settings (5). Postural stress during lactation may also contribute to myofascial trigger points in the upper trapezius, indicating that repeated or sustained poor positioning can affect soft-tissue loading patterns in nursing mothers (6). These findings support the need to examine not only which breastfeeding positions are preferred, but also whether breastfeeding frequency and duration contribute to regional musculoskeletal symptoms.

Existing literature further suggests that breastfeeding-related pain may be influenced by the duration of each feeding session, the number of sessions per day, and the level of ergonomic support available to mothers. Online survey data have indicated that breastfeeding duration and adopted position can influence neck, upper back, and lower back pain, with lying or semi-lying positions and adequate head support recommended to reduce neck strain (7). Other studies have reported high frequencies of lower back, neck, and shoulder pain among mothers using incorrect or unsupported breastfeeding postures, highlighting the importance of ergonomic education as part of postnatal care (8). Reports from local and regional settings have also documented musculoskeletal discomfort involving the neck, shoulders, elbows, wrists, upper back, and lower back among nursing mothers, reinforcing the clinical relevance of breastfeeding-related physical strain (9). In addition, evidence from Cameroon has shown that spine-related musculoskeletal disorders, particularly lower back pain, occur among lactating mothers, although breastfeeding sessions lasting less than 30 minutes may reduce the risk of prolonged postural stress (10).

Despite these findings, maternal musculoskeletal health remains underemphasized in routine breastfeeding guidance, particularly in Pakistan, where postnatal counseling commonly prioritizes infant nutrition, feeding frequency, and breastfeeding continuation rather than maternal posture, pain prevention, and ergonomic support. The available Pakistani evidence remains limited regarding preferred breastfeeding postures, regional distribution of musculoskeletal pain, and the association of breastfeeding-related factors such as number of daily sessions and duration per session with maternal discomfort. This gap is important because unresolved musculoskeletal pain may affect maternal well-being, activities of daily living, and breastfeeding experience, especially in settings where mothers may feed frequently while lacking structured ergonomic counseling.

Using a PICO framework, the population of interest in the present study comprised breastfeeding mothers aged 18–45 years attending a postnatal immunization-related clinical setting in Peshawar; the exposure factors included preferred breastfeeding posture, number of breastfeeding sessions per day, duration of breastfeeding per session, maternal age, and child order; the comparison involved differences across posture categories and breastfeeding-related factor groups; and the outcomes were self-reported regional musculoskeletal problems during or after breastfeeding. Therefore, this study aimed to determine the preferred breastfeeding posture among mothers in Peshawar and to assess the association of breastfeeding-related factors with musculoskeletal problems. The study specifically examined whether preferred breastfeeding posture, breastfeeding frequency, breastfeeding duration, and maternal characteristics were associated with regional musculoskeletal pain among lactating mothers.

MATERIALS AND METHODS

This cross-sectional observational study was conducted at the EPI Centre of Hayatabad Medical Complex, Peshawar, over a six-month period that included participant recruitment, data collection, and

manuscript preparation. The cross-sectional design was selected because the objective was to estimate the distribution of preferred breastfeeding postures and assess their association with self-reported musculoskeletal problems at a single point in time among breastfeeding mothers attending a clinical service setting. The study population comprised lactating mothers aged 18–45 years who had breastfed for more than two weeks and were available during the data collection period. Mothers were excluded if their newborn was less than one week old or if they had a pre-existing chronic musculoskeletal problem, because these conditions could distort assessment of breastfeeding-related discomfort.

Participants were selected using a non-probability convenience sampling technique from eligible mothers attending the EPI Centre. A total of 235 mothers were initially approached or enrolled for data collection; however, five were excluded from analysis, including two mothers with newborns less than one week old and three mothers with chronic musculoskeletal problems. The final analyzed sample therefore comprised 230 breastfeeding mothers. Written informed consent was obtained from each participant after explaining the study purpose, procedures, voluntary nature of participation, and confidentiality of responses. Administrative permission was obtained from the Director of the Institute of Physical Medicine and Rehabilitation, Khyber Medical University, and the relevant hospital authority before data collection. Technical and ethical approval was granted by the ethical committee of Khyber Medical University.

Data were collected using a structured questionnaire package that included demographic information, breastfeeding-related factors, preferred breastfeeding posture, and musculoskeletal symptoms. Demographic variables included maternal age, education level, marital status, employment status, family structure, religion, language, and order number of children. Breastfeeding-related variables included preferred posture adopted during breastfeeding, number of breastfeeding sessions per day, and duration of breastfeeding per session in minutes. Preferred breastfeeding posture was assessed using breastfeeding position pictures shown to each participant, allowing classification into posture categories including cradle hold, cross-cradle hold, football hold, and side-lying position; however, only the postures reported by participants were included in the final descriptive analysis. Musculoskeletal symptoms were assessed using the Nordic Musculoskeletal Questionnaire framework, with participants reporting pain or discomfort in specific body regions during breastfeeding, after breastfeeding, or both.

The primary outcome was the presence of breastfeeding-related musculoskeletal pain in any reported body region. Regional outcomes included neck pain, shoulder pain, upper back pain, wrist or hand pain, and lower back pain. Pain timing was categorized as pain during breastfeeding, pain after breastfeeding, pain both during and after breastfeeding, or no pain. Functional impact was assessed by asking whether pain limited the mother's activities of daily living. The main exposure variable was preferred breastfeeding posture, categorized according to the breastfeeding position selected by the mother. Additional exposure variables included maternal age group, number of breastfeeding sessions per day, breastfeeding duration per session, and order number of children. Maternal age was categorized into 18–23, 24–30, 31–38, and 39–45 years. Breastfeeding sessions per day were categorized as 1–5, 5–10, 10–15, and more than 15 sessions. Breastfeeding duration per session was categorized as less than 10 minutes, 10–20 minutes, 20–30 minutes, and more than 30 minutes.

Several steps were used to reduce bias and improve data quality. Eligibility criteria were applied before analysis to reduce misclassification from mothers with very early postpartum feeding or chronic musculoskeletal conditions unrelated to breastfeeding. The same structured data collection approach was used for all participants, and posture categories were supported by visual breastfeeding position images to improve consistency of classification. The use of a standardized musculoskeletal questionnaire framework helped ensure systematic reporting of regional pain. Because the study used convenience sampling and self-reported symptoms, the possibility of selection bias, recall bias, and reporting bias was recognized. Potential confounding by maternal age, number of children, breastfeeding frequency,

breastfeeding duration, employment status, and family structure was considered during interpretation, particularly when evaluating associations between posture and regional musculoskeletal symptoms.

The sample size was based on the number of eligible breastfeeding mothers available during the defined data collection period at the study site, after applying inclusion and exclusion criteria. Data were checked for completeness and consistency before analysis, and mothers meeting exclusion criteria were removed from the final analytic dataset. Categorical variables were summarized using frequencies and percentages. Associations between breastfeeding-related factors and musculoskeletal pain outcomes were assessed using the chi-square test. The association analysis focused on regional musculoskeletal pain outcomes, including upper back pain, lower back pain, shoulder pain, neck pain, and wrist or hand pain, in relation to maternal age, preferred breastfeeding posture, number of breastfeeding sessions per day, breastfeeding duration per session, and order number of children. Statistical significance was interpreted using a p-value threshold of 0.05. Findings were reported as descriptive frequencies, percentages, and p-values for association testing. Because the study design was cross-sectional, all associations were interpreted as non-causal.

To support reproducibility and data integrity, participant eligibility, exposure categories, outcome regions, and breastfeeding-related variables were defined before analysis. The final denominator was maintained as 230 for all descriptive tables and inferential analyses unless otherwise specified. Frequencies and percentages were checked against the analyzed sample, and inconsistent or ineligible entries were excluded before final reporting. Ethical conduct was maintained through informed consent, institutional approval, voluntary participation, and confidentiality of participant information.

RESULTS

A total of 235 breastfeeding mothers were initially assessed for participation. Five mothers were excluded from the final analysis, including two mothers with newborns younger than one week and three mothers with chronic musculoskeletal problems. The final analyzed sample comprised 230 breastfeeding mothers.

Table 1. Sociodemographic Characteristics of Breastfeeding Mothers (n = 230)

Variable	Category	n (%)
Age of mother, years	18–23	49 (21.3)
	24–30	112 (48.7)
	31–38	61 (26.5)
	39–45	8 (3.5)
Education level	Less than high school	42 (18.3)
	High school	24 (10.4)
	No degree	99 (43.0)
	Bachelor's degree	42 (18.3)
	Master's degree	23 (10.0)
Marital status	Married	230 (100.0)
Employment status	Employed	22 (9.6)
	Unemployed	208 (90.4)
Family status	Extended family	198 (86.1)
	Nuclear family	32 (13.9)
Order number of children	1	56 (24.3)
	2	47 (20.4)
	3	49 (21.3)
	4	32 (13.9)
	5	21 (9.1)
	6	10 (4.3)
	7	9 (3.9)
	8	3 (1.3)
	9	1 (0.4)
	12	2 (0.9)
Religion	Islam	230 (100.0)

Variable	Category	n (%)
Language	Urdu	4 (1.7)
	Pashto	226 (98.3)

The largest age group was 24–30 years, comprising 112 mothers (48.7%), followed by 31–38 years in 61 mothers (26.5%) and 18–23 years in 49 mothers (21.3%). Most mothers were unemployed, with 208 participants (90.4%) reporting no employment outside the home. Extended family structure was reported by 198 mothers (86.1%), while 32 mothers (13.9%) lived in nuclear families. All participants were married and Muslim, and Pashto was the predominant language, reported by 226 mothers (98.3%).

Table 2. Breastfeeding Practices Among Study Participants (n = 230)

Variable	Category	n (%)
Preferred breastfeeding posture	Cradle hold	153 (66.5)
	Cross-cradle hold	46 (20.0)
	Side-lying	31 (13.5)
Breastfeeding sessions per day	1–5	30 (13.0)
	5–10	113 (49.1)
	10–15	78 (33.9)
	>15	9 (3.9)
Duration per breastfeeding session, minutes	<10	98 (42.6)
	10–20	105 (45.7)
	20–30	24 (10.4)
	>30	3 (1.3)

Cradle hold was the most frequently preferred breastfeeding posture, reported by 153 mothers (66.5%). Cross-cradle hold was used by 46 mothers (20.0%), while 31 mothers (13.5%) preferred side-lying position. Nearly half of the mothers, 113 (49.1%), reported breastfeeding 5–10 times per day, and 78 mothers (33.9%) reported 10–15 breastfeeding sessions per day. The most common breastfeeding duration per session was 10–20 minutes, reported by 105 mothers (45.7%), followed by less than 10 minutes in 98 mothers (42.6%).

Table 3. Regional Musculoskeletal Pain During Breastfeeding (n = 230)

Body Region	Yes, n (%)	No, n (%)
Neck	13 (5.7)	217 (94.3)
Shoulders	46 (20.0)	184 (80.0)
Upper back	23 (10.0)	207 (90.0)
Wrists/hands	5 (2.2)	225 (97.8)
Lower back	51 (22.2)	179 (77.8)
No pain	92 (40.0)	138 (60.0)

Lower back pain was the most frequently reported regional musculoskeletal complaint, affecting 51 mothers (22.2%), followed by shoulder pain in 46 mothers (20.0%) and upper back pain in 23 mothers (10.0%). Neck pain was reported by 13 mothers (5.7%), while wrist or hand pain was the least frequent symptom, reported by 5 mothers (2.2%). Overall, 92 mothers (40.0%) reported no musculoskeletal pain during breastfeeding-related assessment.

Table 4. Timing of Musculoskeletal Pain and Functional Limitation (n = 230)

Variable	Category	n (%)
Timing of pain	During breastfeeding	84 (36.5)
	After breastfeeding	1 (0.4)
	During and after breastfeeding	53 (23.0)
	No pain during or after breastfeeding	92 (40.0)
Activities of daily living	Limited	41 (17.8)
	Not limited	189 (82.2)

Pain during breastfeeding alone was reported by 84 mothers (36.5%), while 53 mothers (23.0%) experienced pain both during and after breastfeeding. Only 1 mother (0.4%) reported pain exclusively after breastfeeding. Functional limitation was less frequent than pain itself, with 41 mothers (17.8%) reporting limitation in activities of daily living and 189 mothers (82.2%) reporting no activity limitation.

Table 5. Statistically Significant Associations Between Breastfeeding-Related Factors and Upper Back Pain

Outcome	Associated Factor	Statistical Test	p-value
Upper back pain	Age of mother	Chi-square test	0.045
Upper back pain	Breastfeeding sessions per day	Chi-square test	0.022

Upper back pain showed statistically significant associations with maternal age and number of breastfeeding sessions per day. The association between upper back pain and maternal age had a p-value of 0.045, while the association between upper back pain and breastfeeding sessions per day had a p-value of 0.022. No other reported musculoskeletal pain region or breastfeeding-related factor was described as having a statistically significant association in the available manuscript data.

Breastfeeding Practices, Regional Pain Burden, and Functional Impact Among Lactating Mothers

Aggregated cross-sectional findings from analyzed participants (n = 230)

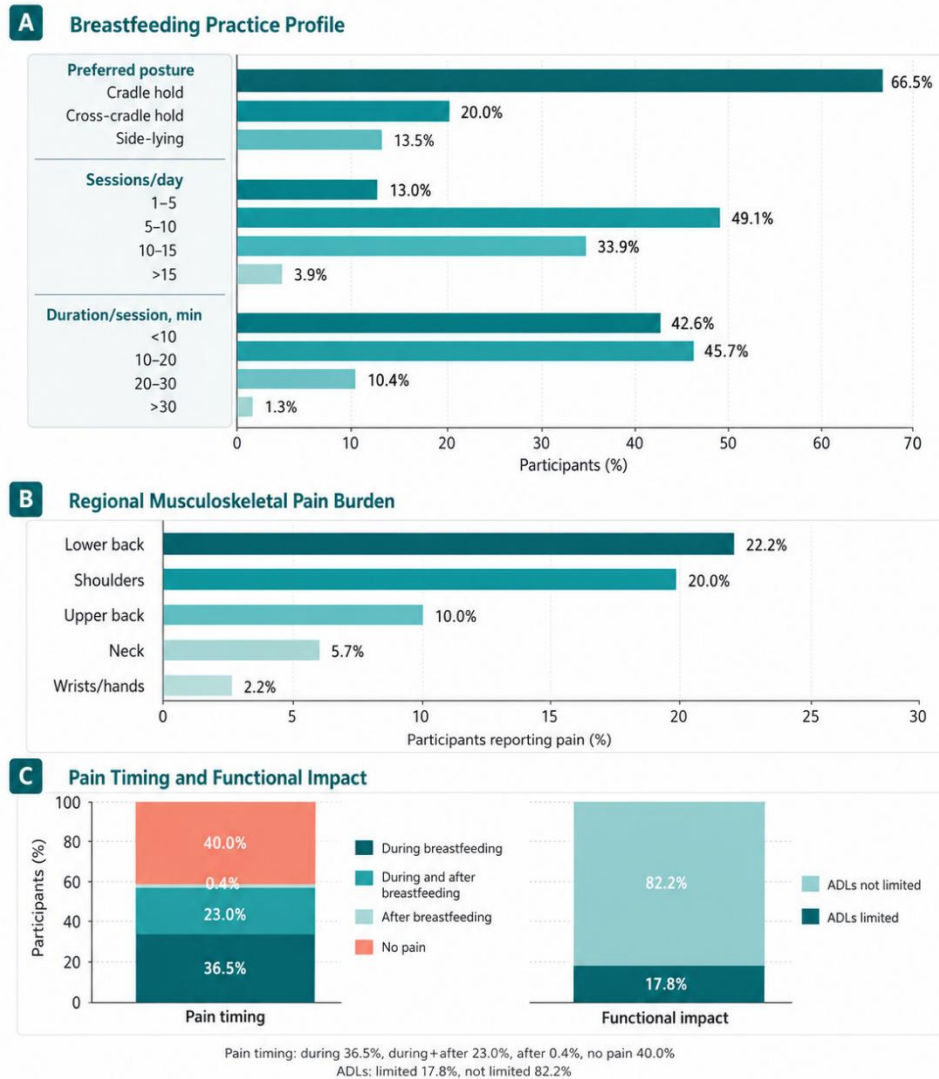


Figure 1 The panelled figure shows that cradle hold was the dominant breastfeeding posture, reported by 153 mothers (66.5%), while most participants breastfed either 5–10 times per day (49.1%) or 10–15 times per day (33.9%). Breastfeeding duration clustered mainly within shorter feeding periods, with 105 mothers (45.7%) reporting 10–20 minutes per session and 98 mothers (42.6%) reporting less than 10 minutes per session. Regional pain burden was greatest in the lower back, affecting 51 mothers (22.2%), followed by shoulder pain in 46 mothers (20.0%) and upper back pain in 23 mothers (10.0%). Pain occurred during breastfeeding in 84 mothers (36.5%) and both during and after breastfeeding in 53 mothers (23.0%), while 41 mothers (17.8%) reported limitation in activities of daily living. These patterns suggest that breastfeeding-related musculoskeletal discomfort was concentrated in axial and shoulder regions and was more commonly experienced during feeding than after feeding.

DISCUSSION

This cross-sectional study assessed preferred breastfeeding postures and breastfeeding-related factors associated with musculoskeletal problems among lactating mothers in Peshawar. The findings showed that cradle hold was the most frequently preferred breastfeeding posture, used by 153 mothers (66.5%), followed by cross-cradle hold in 46 mothers (20.0%) and side-lying position in 31 mothers (13.5%). Most participants breastfed frequently, with 113 mothers (49.1%) reporting 5–10 sessions per day and 78 mothers (33.9%) reporting 10–15 sessions per day. Breastfeeding duration was generally short to moderate, as 105 mothers (45.7%) reported 10–20 minutes per session and 98 mothers (42.6%) reported less than 10 minutes per session. These findings indicate that breastfeeding among the study participants commonly involved repeated daily exposure to static maternal postures, which may be clinically relevant even when the duration of individual sessions is not prolonged.

The predominance of cradle hold in the present study is consistent with previous evidence indicating that cradle-type positioning is commonly practiced among breastfeeding mothers in different community and clinical settings. The frequent use of cradle hold may reflect cultural familiarity, ease of positioning, maternal habit, and the perceived convenience of holding the infant close to the body without requiring additional positioning support. Similar preference for cradle hold has been reported among Nigerian and Malaysian breastfeeding mothers, suggesting that this position is widely adopted across diverse populations (11,13). However, findings from Islamabad reported that cross-cradle hold was more commonly preferred among some postpartum mothers, indicating that breastfeeding posture preference may vary according to maternal education, counseling exposure, parity, infant age, health-facility guidance, and cultural feeding practices (2). These differences highlight the need to assess breastfeeding posture within the local maternal-care context rather than assuming uniform practice across populations.

Musculoskeletal pain was common in the present study, although 92 mothers (40.0%) reported no pain. Pain was most frequently reported in the lower back, affecting 51 mothers (22.2%), followed by shoulder pain in 46 mothers (20.0%), upper back pain in 23 mothers (10.0%), neck pain in 13 mothers (5.7%), and wrist or hand pain in 5 mothers (2.2%). The predominance of lower back and shoulder pain is biomechanically plausible because breastfeeding often requires mothers to maintain sustained sitting, trunk flexion, unsupported lumbar posture, rounded shoulders, and prolonged upper-limb loading while holding the infant. Static positioning during repeated feeding sessions may increase paraspinal, scapular, and shoulder-girdle muscle demand, particularly when mothers lack back support, arm support, pillows, or guidance on bringing the infant toward the breast rather than bending the trunk toward the infant.

The regional pattern of pain in this study partially aligns with previous literature, although reported prevalence differs across settings. Studies from Saudi Arabia and Malaysia have identified lower back, neck, and shoulder regions as common sites of breastfeeding-related musculoskeletal discomfort, with some studies reporting higher neck and lower back pain than observed in the present sample (4,13). In contrast, the current study found lower back pain as the most frequent complaint and neck pain as relatively less frequent. These differences may be explained by variation in participant characteristics, postpartum timing, pain recall period, posture classification, breastfeeding duration, ergonomic support, and whether pain was assessed through self-report alone or with additional clinical evaluation. They may also reflect the dominance of cradle hold in the present sample and the absence of detailed information regarding head position, lumbar support, pillow use, infant weight, and maternal seating arrangements.

The timing of pain further supports the relevance of breastfeeding posture and repeated static loading. Pain during breastfeeding alone was reported by 84 mothers (36.5%), while 53 mothers (23.0%) reported pain both during and after breastfeeding. Only 1 mother (0.4%) reported pain exclusively after breastfeeding. This pattern suggests that discomfort was most strongly linked to the act of breastfeeding itself rather than delayed post-feeding pain alone. Although the cross-sectional design does not allow

causal inference, pain occurring during feeding may reflect immediate mechanical strain from unsupported positioning, sustained flexion, or prolonged muscle activation. Functional impact was less frequent than pain, as 41 mothers (17.8%) reported limitation in activities of daily living, but this remains clinically meaningful because even non-severe musculoskeletal discomfort can affect maternal comfort, breastfeeding experience, rest, childcare, and willingness to continue optimal breastfeeding practices.

A key finding was that preferred breastfeeding posture was not significantly associated with musculoskeletal pain in the available analysis. This result should be interpreted cautiously. The absence of a statistically significant association does not necessarily mean that posture is clinically irrelevant. Several methodological factors may have reduced the ability to detect posture-related differences, including the predominance of cradle hold, limited representation of other posture categories, lack of direct observation of posture quality, and absence of information on ergonomic modifiers such as back support, pillow use, maternal chair type, infant positioning, and whether the mother leaned forward during feeding. In addition, posture categories alone may not capture the biomechanical quality of breastfeeding. Two mothers may both report cradle hold, but one may feed with lumbar support and relaxed shoulders while another may breastfeed with unsupported trunk flexion and elevated shoulders. Therefore, future research should distinguish between posture type and posture quality.

Upper back pain showed statistically significant associations with maternal age and number of breastfeeding sessions per day, with p-values of 0.045 and 0.022, respectively. These findings suggest that maternal age and feeding frequency may be relevant factors for upper back discomfort among breastfeeding mothers. The association with breastfeeding sessions is clinically plausible because repeated daily feeding episodes may increase cumulative exposure to sustained thoracic flexion, scapular protraction, and shoulder-girdle loading. Similarly, maternal age may influence muscle endurance, postural tolerance, recovery, parity-related physical demands, or caregiving responsibilities. However, because the manuscript does not provide cross-tabulated cell counts, chi-square values, degrees of freedom, confidence intervals, or adjusted estimates, the strength and independence of these associations cannot be fully evaluated. Multivariable analysis would be useful to determine whether these associations persist after accounting for potential confounders such as child order, employment status, breastfeeding duration, preferred posture, and family structure.

The present findings are supported by previous studies showing that breastfeeding-related musculoskeletal symptoms may be associated with feeding frequency, duration, and maternal positioning. Ratajczak and Górniewicz reported that breastfeeding duration and adopted position influenced neck, upper back, and lower back pain, and recommended lying or semi-lying positions with adequate head support to reduce postural strain (7). Similarly, research examining breastfeeding-related neck pain among Nigerian lactating mothers has suggested that pain may vary across breastfeeding positions and that changing position during nursing may improve maternal comfort (14). Electromyographic evidence also indicates that different breastfeeding positions impose different trunk muscle activity demands, suggesting a physiological basis for posture-related discomfort even when epidemiological associations are not consistently observed (12). Together with the current findings, this literature supports integrating ergonomic counseling into postnatal breastfeeding support.

The clinical implication of this study is that breastfeeding education should include maternal musculoskeletal health in addition to infant latch, milk transfer, and feeding frequency. Healthcare providers, especially physiotherapists, nurses, midwives, and lactation counselors, should guide mothers on supported sitting, neutral spinal alignment, use of pillows or arm support, alternating breastfeeding positions, avoiding prolonged trunk flexion, and bringing the infant toward the breast rather than bending toward the infant. Mothers with frequent daily breastfeeding sessions may particularly benefit from posture variation and scheduled ergonomic advice. Screening for lower back, shoulder, and upper back pain during routine postnatal visits could help identify mothers at risk of persistent discomfort and functional limitation.

This study has several limitations. The cross-sectional design prevents causal interpretation of associations between breastfeeding factors and musculoskeletal pain. Convenience sampling from a single clinical setting limits generalizability to all breastfeeding mothers in Peshawar or Pakistan. Musculoskeletal symptoms and breastfeeding posture were self-reported, which may introduce recall bias and reporting bias. Breastfeeding posture was classified by preferred position rather than direct observation, so incorrect or unsupported posture within each position could not be assessed. The study also did not collect detailed ergonomic variables such as seating type, pillow use, back support, infant weight, maternal body mass index, postpartum duration, mode of delivery, or prior pregnancy-related pain. Finally, inferential reporting was limited because complete cross-tabulations and effect estimates were not available. Future studies should use larger probability-based samples, observational posture assessment, validated pain recall periods, and multivariable regression models to identify independent predictors of breastfeeding-related musculoskeletal pain.

CONCLUSION

This study found that cradle hold was the most commonly preferred breastfeeding posture among lactating mothers in Peshawar, while lower back and shoulder pain were the most frequently reported musculoskeletal complaints. Most mothers breastfed multiple times per day, and pain was more commonly experienced during breastfeeding than after breastfeeding. Preferred breastfeeding posture was not significantly associated with musculoskeletal pain in the available analysis; however, upper back pain was significantly associated with maternal age and the number of breastfeeding sessions per day. These findings suggest that maternal musculoskeletal health should be integrated into breastfeeding counseling, with emphasis on ergonomic positioning, posture variation, adequate support, and early screening for pain during postnatal care.

REFERENCES

1. Mekebo GG, Argawu AS, Likassa HT, Ayele W, Wake SK, Bedada D, et al. Factors influencing exclusive breastfeeding practice among under-six months infants in Ethiopia. *BMC Pregnancy Childbirth*. 2022;22(1):1-10.
2. Rani S, Habiba UE, Qazi WA, Tassadaq N. Association of breastfeeding positioning with musculoskeletal pain in postpartum mothers of Rawalpindi and Islamabad. *J Pak Med Assoc*. 2019;69(4):564-6.
3. D'Souza S, Thomas T, Paul S. Comparison of two breastfeeding positions on maternal comfort and infant feeding behaviors through video teaching among postnatal mothers. *J Health Allied Sci NU*. 2019;9(3):104-15.
4. Alazmi AA, Algabbani MF. Musculoskeletal pain prevalence and association with breastfeeding position in lactating mothers in Riyadh, Saudi Arabia: a cross-sectional study. *Clin Exp Obstet Gynecol*. 2023;50(11):250.
5. Rana UI, Irfan A, Saleem S, Hussain IT, Zahid N, Waheed Z. Comparison of breast-feeding positions related to neck pain among lactating mothers. *J Riphah Coll Rehabil Sci*. 2024;12(3).
6. Younus A, Muneer M, Anjum O. Association of myofascial trigger points in upper trapezius with postural stress among lactating mothers. 2025.
7. Ratajczak M, Górniewicz R. The influence of breastfeeding factors on the prevalence of back and neck pain: data from an online survey. *BMC Musculoskelet Disord*. 2024;25(1):675.
8. Sharma AM, Roopa R. Exploring modern breastfeeding practices: an insight into optimal positioning for today's mothers.

9. Irfan A, Rana UI, Hussain IT, Saeed U, Tahir H, Ahmad MT. Frequency of musculoskeletal discomforts and its association with various breastfeeding positions among nursing mothers. *MedERA J CMH LMC IOD*. 2023;5(2).
10. Womsi RT, Ghassi HT, Kenmogne AFT, Kendjoua JAN, Buh FC, Douryang M, et al. Postpartum stress and the occurrence of breastfeeding-related spine musculoskeletal disorders among lactating mothers in the Dschang Health District, Cameroon. *Cureus*. 2025;17(3).
11. Mbada CE, Olowookere AE, Faronbi JO, Oyinlola-Aromolaran FC, Faremi FA, Ogundele AO, et al. Knowledge, attitude and techniques of breastfeeding among Nigerian mothers from a semi-urban community. *BMC Res Notes*. 2013;6:1-8.
12. Ojukwu CP, Ezeukwu OA, Anih CF, Okemuo AJ, Ezugwu UA, Ikele CN, et al. Evaluation of trunk muscle activities in response to three breastfeeding positions utilised by women. *J Back Musculoskeletal Rehabil*. 2021;34(6):1015-21.
13. Yuan TP, Purushothaman VK, Muniandy Y, Pillai SGK. Prevalence and factors associated with neck and low back pain among breastfeeding mothers in the Klang Valley. *J Health Transl Med*. 2022;25(2):129-34.
14. Ojukwu CP, Okpoko CG, Okemuo AJ, Ede SS, Ilo IJ. Breastfeeding-related neck pain: prevalence and correlates among Nigerian lactating mothers. *Int Health*. 2023;15(4):383-8.