RESEARCH PAPER

Correlation of Musculoskeletal Disorders in Postpartum Females in Relationship with Breast Feeding Position

Miss. Nikita Ramchandra Naik[1], Dr. Rama Ramdurgkar[2*], Dr. Amrutkuvar Rayjade[3], Dr. Namrata Bavalekar[4], Dr. Umiya Pathan[5]

[1]B.P.Th Student, D. Y. Patil College of Physiotherapy, D. Y. Patil Education Society (Deemed to be University), Kolhapur - 416003, Maharashtra, India
Email: nikitanaik312002@gmail.com

[2*]Assistant Professor, Department of Orthopaedic Manual Therapy, D. Y. Patil College of Physiotherapy, D. Y. Patil Education Society (Deemed to be University), Kolhapur - 416006, Maharashtra, India
Email: rkarrama@gmail.com

[3]Professor and H.O.D., Department of Orthopaedic Manual Therapy, D. Y. Patil College of Physiotherapy, D. Y. Patil Education Society (Deemed to be University), Kolhapur - 416006, Maharashtra, India
Email: dramrutkuvarrayjade@gmail.com
Email: dramrutkuvarsrayjade@gmail.com

[4]Assistant Professor, Department of Musculoskeletal Physiotherapy, D. Y. Patil College of Physiotherapy, D. Y. Patil Education Society (Deemed to be University), Kolhapur - 416006, Maharashtra, India
Email: bavalekarnamrata@gmail.com

[5]Professor and H.O.D., Department of Musculoskeletal Science Physiotherapy, D. Y. Patil College of Physiotherapy, D. Y. Patil Education Society (Deemed to be University), Kolhapur - 416006, Maharashtra, India
Email: drumiyapathan@gmail.com

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ABSTRACT

Background:

Women in the postpartum period frequently experience musculoskeletal discomfort as a result of physical changes during pregnancy and the postures they adopt while breastfeeding. Certain breastfeeding positions can place additional stress on the neck, shoulders, and lower back, potentially leading to pain and functional limitations. Despite this, there is limited evidence exploring how breastfeeding positions, along with factors like breast engorgement and thoracic kyphosis, are related to musculoskeletal issues in new mothers.

Aimof the Study:

To examine the relationship between musculoskeletal disorders in postpartum women and factors such as breastfeeding position, breast engorgement, and thoracic kyphosis.

Procedure:

This observational study with a correlational design included 81 postpartum women between the ages of 20 and 35 years. Participants were recruited through random sampling. After obtaining informed consent, basic demographic information and relevant questionnaires were collected. A qualified physiotherapist evaluated breastfeeding positions, the presence of breast engorgement, and thoracic kyphosis. The craniovertebral angle was measured using the Physiomaster application to assess neck posture. Statistical methods were applied to analyse the relationships between the variables.

Outcome Measures:

Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)
Numeric Pain Rating Scale (NPRS)
Craniovertebral Angle (CVA) measured using the Physiomaster App

Conclusion:

The findings suggest that breastfeeding posture plays an important role in influencing musculoskeletal health among postpartum women. Mothers who breastfed in unsupported positions experienced significantly greater discomfort compared to those using proper support. Although differences in pain levels across various positions were not statistically significant, there was a noticeable trend of increased discomfort in side-lying and laid-back positions. These results highlight the importance of educating mothers about correct breastfeeding techniques and the use of ergonomic support to reduce the risk of musculoskeletal problems.

Keywords: Postpartum women, Breastfeeding posture, Musculoskeletal discomfort, Thoracic kyphosis, Breast engorgement, Craniovertebral angle, Ergonomics.

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INTRODUCTION

Breastfeeding Positions

Cradle Hold–

The cradle hold is the traditional breastfeeding position in which the mother supports the infant's head in the crook of her arm on the same side as the nursing breast. It is commonly used because of its simplicity and is suitable for older infants with established latching ability. (1)

Cross-Cradle Hold

In the cross-cradle hold, the infant is supported with the arm opposite to the nursing breast, while the mother's free hand guides the breast. This position provides better control of the infant's head and is often recommended for newborns or infants with latch difficulties. (1)

Side-Lying Position–

In this position, both mother and baby lie on their sides facing each other. It is especially useful during nighttime feeding and for mothers recovering from childbirth, as it allows rest during breastfeeding. (1)

Football Hold–

In the football or clutch hold, the infant is positioned under the mother's arm with the body aligned along her side. The baby is supported by the mother's hand while feeding. This position is particularly beneficial for post-caesarean mothers and mothers breastfeeding twins. (1)

Laid-Back Breast feeding Position (Biological Nurturing)–

The laid-back breastfeeding position is a semi-reclined posture in which the mother leans backward while the infant lies prone on her chest. This position utilizes gravity to support the baby and encourages natural feeding reflexes. (1)(11)

Musculoskeletal Effects of Breastfeeding Positions

Cradle and Cross-Cradle Positions–

Although commonly practiced, these positions frequently encourage mothers to lean forward and round their shoulders, especially without proper arm or back support. This posture increases tension in the cervical and upper trapezius muscles. A study published in *Clinical and Experimental Obstetrics & Gynaecology* reported that mothers using cradle holds frequently experienced neck and lower back pain, particularly when feeding without support pillows. (2)

Football Hold (Clutch Position)–

The football hold allows the mother to maintain a more upright posture with adequate lumbar support. Since the infant's weight is distributed more effectively, shoulder and wrist fatigue are reduced. This position is commonly preferred after caesarean section because it avoids pressure on the abdomen. Biomechanical assessments indicate reduced forward trunk flexion compared to traditional holds. (3)

Side-Lying Position–

The side-lying position places minimal strain on the back and shoulders because both mother and infant remain supported while lying down. It is particularly useful during nighttime feeding and recovery following surgical delivery. According to an article in *Verywell Family*, this position promotes better spinal alignment and decreases muscular strain in mothers with chronic back pain. (3)

Laid-BackBreast feeding Position–

The semi-reclined laid-back posture allows the mother to lean backward while the infant rests on her chest. Gravity assists with infant positioning and latch, reducing the requirement for active muscular effort. Research indicates that this position is associated with fewer complaints of neck and shoulder tension and improves ergonomic comfort during feeding. (2)

Common Musculoskeletal Disorders in Postpartum Females

Low Back Pain (LBP)–

Low back pain is one of the most common postpartum complaints, with prevalence ranging from 50% to 74%. Contributing factors include pregnancy-related postural adaptations, abdominal muscle stretching, increased lumbar lordosis, and repetitive bending or lifting during infant care. (4)(11)

Pelvic Girdle Pain(PGP)–

Pelvic girdle pain involves pain around the sacroiliac joints and pubic symphysis and affects nearly one in four postpartum women. If untreated, symptoms may persist long after delivery and restrict mobility and daily function. (5)

Diastasis Recti Abdominis (DRA)–

DRA refers to separation of the rectus abdominis muscles along the linea alba and is commonly observed in the postpartum period. It affects nearly 59% of postpartum women and is associated with reduced core stability, low back pain, and pelvic dysfunction. (6)

Pelvic Floor Dysfunction (PFD)–

Pelvic floor dysfunction includes urinary incontinence, pelvic organ prolapse, and impaired sexual function. These complications are often related to stretching or weakening of pelvic floor muscles during vaginal delivery or prolonged labour. (7)

Carpal Tunnel Syndrome (CTS)–

CTS results from median nerve compression at the wrist and presents with numbness, tingling, and hand weakness. Hormonal changes and fluid retention during pregnancy may initiate symptoms that continue postpartum, particularly with repetitive infant-handling activities. (8)

De Quervain's Tenosynovitis–

This condition involves inflammation of the tendons along the thumb side of the wrist and is commonly associated with repetitive lifting and carrying of infants. Commonly termed "mommy thumb," it can significantly interfere with caregiving activities. (9)

Peripheral Joint Pain–

Pain involving the shoulders, hips, knees, and ankles is also frequently reported postpartum. Joint laxity caused by pregnancy hormones and the physical demands of childcare contribute to these symptoms. Persistence of pain may be influenced by poor ergonomics and inadequate musculoskeletal support during recovery. (10)

Correlation Between Breastfeeding Position and Musculoskeletal Disorders

Cradle Position and Musculoskeletal Pain

The cradle hold is one of the most commonly use d breastfeeding positions; however, it frequently requires forward flexion of the trunk when the infant is inadequately supported. This posture increases strain on the cervical and lumbar spine. Studies have demonstrated a significant association between cradle positioning and pain in the back and shoulders. (2)

Side-Lying Position and Neck Strain Reduction–

The side-lying position has been associated with reduced musculoskeletal stress, particularly in the neck and upper back. A study conducted in Poland found that mothers breastfeeding in the side-lying position experienced significantly lower neck pain compared to mothers feeding in sitting positions ($p < 0.05$). This position allows relaxation, adequate body support, and reduced static muscular loading. (11)

Laid-Back Position and Postural Advantages–

The laid-back or biological nurturing position minimizes forward trunk flexion by allowing the mother to recline while the infant lies against her chest. Gravity assists with alignment and latching, thereby reducing spinal strain. Research suggests that this position is associated with fewer reports of musculoskeletal discomfort among lactating women. (2)

Cross-Cradle and Football Hold: Benefits and Risks–

The cross-cradle and football holds are commonly recommended to improve infant positioning and latch control, particularly during early breastfeeding. While these positions provide better control and visibility, they may also involve prolonged shoulder elevation and wrist extension, potentially contributing to upper limb discomfort. Evidence regarding their long-term ergonomic effects remains limited, indicating the need for further research.

Role of Ergonomic Support–

Regardless of breastfeeding position, ergonomic aids such as nursing pillows, supportive chairs, and armrests play an important role in reducing musculoskeletal strain. Proper support promotes spinal neutrality, decreases muscular fatigue, and prevents postural dysfunction. Studies emphasize the importance of ergonomic education during postpartum

care to improve breastfeeding mechanics and maternal comfort. (11)

MATERIALS AND METHODOLOGY

An Observational Study conducted using Co-relation research design and Randomised Sam pling, Probability Sampling. The study conducted on Postpartum Women at D Y Patil Medical College Hospital and Research Institute, Kolhapur. The duration of the study was 6 months.

Materials Informed Consent Form – Explains study purpose and ensures voluntary participation.

	Minimum	Maximum	Mean	Std. Deviation
AGE	19	31	24.83	3.045
NO. OF MONTHS OF BREAST FEEDING	3	48	24.23	11.953

Demographic Sheet – Records participant age, gender, occupation, duration of standing, footwear habits, etc, Physical Examination Tools: 1) PHYSIOMASTER, Includes breast palpation, posture screening checklist, Scales – Cornell musculoskeletal discomfort questionnaire, NPRS

Inclusion criteria

Age: 20 to 35 years, Postpartum period within 3 months to 1 year, currently breastfeeding, Breast engorgement, thoracic kyphosis, craniovertebral angle and breastfeeding position, willing to provide informed consent and participate in the study, Able to comprehend and follow instructions in the local language or English.

Exclusion criteria

History of pre-existing musculoskeletal disorders (e.g., scoliosis, chronic back pain, or orthopedic surgeries), Neurological conditions affecting posture or mobility (e.g., stroke, multiple sclerosis), Diagnosed with psychiatric disorders or cognitive impairments that affect participation, Postpartum complications such as severe infections or surgical interventions that limit mobility. Congenital anomalies or deformities affecting the spine or thoracic region, Use of assistive devices for ambulation or posture (e.g., orthotic braces).

PROCEDURE

Ethical Approval:

Ethical clearance will be obtained from the institutional review board prior to data collection.

Participant Recruitment:

Workers who fit the inclusion criteria will be approached in their respective workplaces and briefed about the study.

Consent and pre-screening:

Informed consent will be obtained. Participants will undergo screening to rule out systemic or neurological conditions.

Questionnaire Administration:

Each participant will fill out the demographic form and all pain/disability scales under researcher supervision.

Physical Assessment:

A physiotherapist will conduct assessment for breast engorgement & breast-feeding position & thoracic kyphosis

Data Recording:

All data will be entered manually into datasheets and later cross-verified before statistical analysis.

Data Analysis:

Relationships between breast engorgement, thoracic kyphosis and breast-feeding position will be statistically analysed using correlation tests.

Confidentiality:

Participants' identities and responses will remain confidential and used solely for academic purposes.

RESULT

The descriptive statistics of the study participants show that postpartum females had an age range of 19 to 31 years, with an average age of 24.83 years (SD = 3.045). This indicates that most participants were within a narrow age bracket, suggesting a relatively homogeneous sample in terms of age.

The duration of breastfeeding varied considerably among participants, ranging from 3 to 48 months, with a mean of 24.23 months (SD = 11.953). The higher standard deviation reflects notable differences in breastfeeding duration, implying variability in individual practices or postpartum conditions.

These baseline characteristics were considered while examining the relationship between breastfeeding position and musculoskeletal disorders. The limited variation in age suggests that age is less likely to significantly influence the outcomes. In contrast, the wide range in breastfeeding duration may contribute to differences in physical strain experienced by participants.

The figure illustrates the distribution of different breastfeeding positions adopted by postpartum females in the study. Among the participants, the side-lying position and the cross-cradle hold were the most commonly practiced, each accounting for 29.6% of the total sample. This indicates that nearly one-third of the mothers preferred these two positions, possibly due to

comfort, ease of handling the infant, or reduced physical strain.

The cradle hold was also frequently used, representing 25.9% of the participants. This suggests that traditional breastfeeding techniques remain widely practiced among postpartum females.

In contrast, the laid-back position (8.6%) and the football hold (6.2%) were less commonly utilized. The lower preference for these positions may be due to lack of awareness, perceived difficulty in positioning, or limited guidance provided to mothers during the postpartum period.

variation in positioning may play a significant role in influencing the occurrence of musculoskeletal discomfort, as different postures place varying levels of stress on the neck, shoulders, and back.

TYPE OF BRESTFEEDING POSTION	Frequency	Percent
CRADLE HOLD	21	25.90 %
CROSS CRADLE HOLD	24	29.60 %
FOOTBALL HOLD	5	6.20 %
LAID BACK	7	8.60 %
SIDE LYINE POSITION	24	29.60 %
Total	**81**	**100 %**

The table presents the frequency and percentage distribution of breastfeeding positions among the study participants (n = 81). The findings show that the cross-cradle hold and the side-lying position were the most frequently used methods, each reported by 24 participants (29.6%). This indicates that these two positions were equally preferred and together accounted for more than half of the total sample.

The cradle hold was also commonly practiced, with 21 participants (25.9%) adopting this method. This suggests that traditional positioning remains a popular choice among postpartum females.

In contrast, fewer participants reported using the laid-back position (7 participants; 8.6%) and the football hold (5 participants; 6.2%). The relatively low usage of these positions may reflect limited familiarity, lack of instruction, or perceived difficulty in maintaining these postures.

Overall, the distribution demonstrates a clear preference for certain breastfeeding positions, while others are less commonly practiced. This variation is important for the study, as different positions may impose different levels of physical strain and could be associated with the development of musculoskeletal discomfort in postpartum females.

The above graph illustrates the distribution of breastfeeding positions among postpartum females included in the study. It shows that 67.9% of participants adopted unsupported positions, while only 32.1% used supported positions during breastfeeding.

This distribution indicates that a substantial proportion of mothers are feeding in ergonomically unfavorable postures. Unsupported positions typically lack adequate back, arm, or lumbar support, which may increase mechanical strain on the musculoskeletal system. In contrast, supported positions generally promote better alignment and load distribution, potentially reducing physical stress.

When interpreted in relation to musculoskeletal disorders (MSDs), the higher prevalence of unsupported positioning suggests a possible positive correlation between unsupported breastfeeding posture and increased risk of musculoskeletal discomfort or disorders in postpartum females. The sustained awkward postures associated with unsupported feeding—such as forward trunk flexion, rounded shoulders, and inadequate arm support—can contribute to pain in areas like the neck, shoulders, and lower back.

Therefore, this finding supports the hypothesis that breastfeeding position plays a significant role in postpartum musculoskeletal health. The predominance of unsupported positions among participants may help explain a higher incidence of MSDs observed in the study population, indicating that poor breastfeeding ergonomics could be a contributing factor to musculoskeletal problems in postpartum women.

POSITION OF BODY DURING BRESTFEEDING	Frequency	Percent
SUPPORTED	26	32.10%
UNSUPPORTED	55	67.90%
Total	**81**	**10000%**

The table presents the distribution of breastfeeding positions among the 81 postpartum females included in the study. Out of the total participants, 26 women (32.10%) practiced breastfeeding in a supported

position, whereas 55 women (67.90%) adopted an unsupported position.

This indicates that nearly two-thirds of the study population relied on unsupported postures during breastfeeding. The predominance of unsupported positioning suggests that many mothers may not be using adequate physical support, such as pillows, backrests, or arm support, while feeding.

From a clinical perspective, this pattern is important because unsupported positions often require sustained muscular effort to maintain posture, which may increase physical strain. In contrast, supported positions typically help in maintaining better body alignment and reducing stress on the musculoskeletal system.

Overall, the findings highlight that unsupported breastfeeding posture is more commonly practiced among the participants, which may have implications for the development or aggravation of musculoskeletal discomfort in postpartum females.

The graph illustrates the mean craniovertebral angle (CVA) observed across different breastfeeding positions among the study participants. Among all positions, the football hold demonstrated the highest mean CVA (48.25°), followed closely by the cradle hold (47.90°) and cross-cradle hold (47.71°). In contrast, relatively lower mean CVA values were recorded in the laid-back position (45.00°) and side-lying position (44.88°).

The craniovertebral angle is commonly used as an indicator of head and neck posture, where a higher angle reflects a more neutral alignment and a lower angle indicates a forward head posture. Based on this interpretation, positions such as the football hold and cradle variations appear to promote better cervical posture during breastfeeding, as evidenced by their comparatively higher CVA values.

On the other hand, the side-lying and laid-back positions demonstrate reduced CVA values, suggesting a tendency toward forward head positioning or less optimal neck alignment. This may be due to the body mechanics involved in these positions, where maintaining visual contact with the infant or inadequate support may encourage neck flexion.

These findings suggest a potential relationship between breastfeeding position and cervical posture. Positions associated with lower craniovertebral angles may contribute to increased strain on the neck and upper back, thereby potentially increasing the risk of musculoskeletal discomfort in postpartum females. Conversely, positions with higher CVA values may be more ergonomically favorable and could help reduce such risks.

	CRANIOVERTEBRAL ANGLE	

TYPE OF BRESTFEEDING POSTION	**Mean**	**Std. Deviation**	**p-value**
CRADLE HOLD	47.90	2.53	<0.001*
CROSS CRADLE HOLD	47.71	2.76	
FOOTBALL HOLD	48.25	3.50	
LAID BACK	45.00	0.82	
SIDE LYINE POSITION	44.88	1.26	
Total	46.70	2.63	

The table presents the comparison of mean craniovertebral angle (CVA) across different breastfeeding positions among postpartum females. The overall mean CVA for the study population was 46.70° ± 2.63.

Among the various positions, the football hold demonstrated the highest mean CVA (48.25° ± 3.50), followed by the cradle hold (47.90° ± 2.53) and cross-cradle hold (47.71° ± 2.76). In contrast, lower mean CVA values were observed in the laid-back position (45.00° ± 0.82) and side-lying position (44.88° ± 1.26).

The differences in mean CVA across breastfeeding positions were found to be statistically significant ($p < 0.001$). This indicates that the variation in craniovertebral angle is unlikely to be due to chance and suggests a meaningful association between breastfeeding position and cervical posture.

From a clinical perspective, higher CVA values indicate a more neutral head and neck alignment, whereas lower values reflect a forward head posture. Based on these findings, positions such as the football hold and cradle variations appear to support better cervical alignment, while laid-back and side-lying positions may predispose individuals to less optimal posture.

Overall, the results demonstrate a significant relationship between breastfeeding position and craniovertebral angle, implying that the choice of breastfeeding posture may influence neck alignment and potentially contribute to the development of musculoskeletal discomfort in postpartum females.

The graph depicts the mean pain scores reported by postpartum females across different breastfeeding positions. Among all positions, the side-lying position was associated with the highest mean pain score (7.42), followed by the laid-back position (6.71). Moderate pain levels were observed in the football hold (5.40) and cradle hold (5.17), while the cross-cradle hold demonstrated the lowest mean pain score (4.29).

This pattern indicates that positions such as side-lying and laid-back are associated with greater perceived discomfort. These positions may involve less controlled posture or inadequate support, potentially leading to increased strain on the neck, shoulders, or back. In contrast, positions like cross-cradle and cradle hold appear to be relatively more comfortable, possibly due to better postural alignment and support during feeding.

Overall, the findings suggest a variation in pain intensity depending on breastfeeding position, with certain postures being more likely to contribute to musculoskeletal discomfort. This supports the notion that breastfeeding ergonomics plays an important role in influencing pain levels among postpartum females.

TYPE OF BRESTFEEDING POSTION	Pain Amount		p-value
	Mean	Std. Deviation	
CRADLE HOLD	4.29	3.12	0.388
CROSS CRADLE HOLD	5.17	2.84	
FOOTBALL HOLD	5.40	3.65	
LAID BACK	6.71	1.49	
SIDE LYINE POSITION	7.42	1.25	
Total	5.75	2.79	

The table presents the comparison of mean pain scores across different breastfeeding positions among postpartum females. The overall mean pain score for the study population was 5.75 ± 2.79.

Among the various positions, the side-lying position showed the highest mean pain score (7.42 ± 1.25), followed by the laid-back position (6.71 ± 1.49). Moderate pain levels were observed in the football hold (5.40 ± 3.65) and cross-cradle hold (5.17 ± 2.84), while the cradle hold demonstrated the lowest mean pain score (4.29 ± 3.12).

Although there is a visible variation in pain levels across different breastfeeding positions, the difference was found to be statistically not significant ($p = 0.388$). This indicates that the observed differences in mean pain scores may be due to random variation rather than a true effect of breastfeeding position.

From a clinical perspective, the higher pain scores in side-lying and laid-back positions may still suggest a tendency toward increased discomfort in these postures. However, based on the present data, no definitive association can be established between breastfeeding position and pain intensity.

The graph illustrates the mean Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) scores across different breastfeeding positions among postpartum females. Among all positions, the side-lying position demonstrated the highest mean discomfort score (28.62), indicating greater musculoskeletal discomfort. This was followed by the football hold (20.00) and the laid-back position (18.64). Lower discomfort scores were observed in the cross-cradle hold (17.42), while the cradle hold showed the lowest mean score (11.96).

This distribution suggests that breastfeeding positions vary considerably in terms of the level of musculoskeletal discomfort experienced by mothers. The notably higher CMDQ score in the side-lying position may reflect increased strain or suboptimal alignment of the spine and supporting musculature. Similarly, the laid-back position also shows relatively elevated discomfort, possibly due to inadequate support or prolonged static posture.

In contrast, positions such as cradle and cross-cradle hold are associated with lower discomfort scores, which may indicate better ergonomic support and improved body alignment during breastfeeding.

Overall, the findings highlight a clear variation in musculoskeletal discomfort across breastfeeding positions, suggesting that certain postures may place greater physical demands on postpartum females and could contribute to the development or aggravation of musculoskeletal issues.

TYPE OF BRESTFEEDING POSTION	CORNELL MUSCULOSKELETAL DISCOMFORT QUESTION SCORE		p-value
	Mean	Std. Deviation	

CRADLE HOLD	11.96	21.56	0.302
CROSS CRADLE HOLD	17.42	28.11	
FOOTBALL HOLD	20.00	32.02	
LAID BACK	18.64	32.10	
SIDE LYINE POSITION	28.62	31.40	
Total	19.88	28.46	

The table presents the comparison of Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) scores across different breastfeeding positions among postpartum females. The overall mean CMDQ score was 19.88 ± 28.46, reflecting variability in the level of musculoskeletal discomfort experienced by participants.

Higher mean CMDQ scores were observed in the side-lying position (28.62 ± 31.40), followed by the football hold (20.00 ± 32.02) and laid-back position (18.64 ± 32.10). In contrast, relatively lower discomfort scores were noted in the cross-cradle hold (17.42 ± 28.11) and cradle hold (11.96 ± 21.56).

The analysis indicates a positive trend, where positions associated with less postural support tend to demonstrate higher musculoskeletal discomfort scores. This suggests that suboptimal breastfeeding posture may contribute to increased physical strain among postpartum females.

Furthermore, when interpreted alongside other study findings (such as craniovertebral angle and pain scores), these results support a positive relationship between breastfeeding position and musculoskeletal discomfort, indicating that less ergonomic positions are associated with greater discomfort levels.

The graph illustrates the mean Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) score for participants practicing an unsupported breastfeeding position. The mean CMDQ score observed for this group was 28.56, indicating a relatively high level of musculoskeletal discomfort among mothers who breastfeed without adequate postural support.

This finding suggests that unsupported breastfeeding positions may place increased physical strain on the body, particularly on the neck, shoulders, and back. The absence of proper support—such as backrests, arm support, or pillows—can lead to sustained awkward postures, which may contribute to higher discomfort levels.

In the context of the study, the elevated CMDQ score in the unsupported group supports the notion that inadequate breastfeeding posture is associated with greater musculoskeletal discomfort in postpartum females. This highlights the importance of adopting ergonomically supported positions during breastfeeding to potentially reduce physical strain and improve maternal comfort.

	POSITION OF BODY DURING BRESTFEEDING	**Mean**	**Std. Deviation**	**p-value**
CORNELL MUSCULOSKELETAL DISCOMFORT QUESTION SCORE	SUPPORTED	1.37	1.09	<0.001*
	UNSUPPORTED	28.56	30.91	

The table compares the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) scores between supported and unsupported breastfeeding positions among postpartum females. The mean CMDQ score for mothers using a supported position was 1.37 ± 1.09, whereas those using an unsupported position reported a substantially higher mean score of 28.56 ± 30.91.

This marked difference indicates that participants who breastfed without adequate support experienced considerably greater musculoskeletal discomfort compared to those who used supported positions. The large standard deviation in the unsupported group also suggests variability in discomfort levels, although the overall trend remains notably higher.

The difference between the two groups was found to be statistically highly significant ($p < 0.001$). This confirms that the observed variation in CMDQ scores is unlikely to be due to chance and reflects a true association between breastfeeding position and musculoskeletal discomfort.

These findings demonstrate a strong positive relationship between unsupported breastfeeding

posture and increased musculoskeletal discomfort. In contrast, supported positions appear to have a protective effect, likely due to improved posture, better weight distribution, and reduced strain on the musculoskeletal system. Overall, this result strongly supports the study hypothesis that breastfeeding position plays a significant role in the development of musculoskeletal discomfort among postpartum females.

TYPE OF BRESTFEEDING POSTION	Area of Pain									Total	p-value
	BUTTOCKS	FOREARM	KNEE	LOW BACK	NECK	SHOULDER	THIGH	UPPER BACK	WRIST		
CRADLE HOLD	1	2	0	8	6	3	1	2	1	**24**	0.128
	100.00%	20.00%	0.00%	25.00 %	31.60 %	25.00%	50.00 %	12.50 %	100.00 %	**25.50 %**	
CROSS CRADLE HOLD	0	3	1	12	4	0	1	5	0	**26**	
	0.00%	30.00%	100.00 %	37.50 %	21.10 %	0.00%	50.00 %	31.30 %	0.00%	**27.70 %**	
FOOTBALL HOLD	0	3	0	3	1	0	0	0	0	**7**	
	0.00%	30.00%	0.00%	9.40%	5.30%	0.00%	0.00%	0.00%	0.00%	**7.40%**	
LAID BACK	0	0	0	2	0	1	0	4	0	**7**	
	0.00%	0.00%	0.00%	6.30%	0.00%	8.30%	0.00%	25.00 %	0.00%	**7.40%**	
SIDE LYINE POSITION	0	2	0	7	8	8	0	5	0	**30**	
	0.00%	20.00%	0.00%	21.90 %	42.10 %	66.70%	0.00%	31.30 %	0.00%	**31.90 %**	
Total	**1**	**10**	**1**	**32**	**19**	**12**	**2**	**16**	**1**	**94**	
	100.00%	**100.00%**	**100.00 %**	**100.00 %**	**100.00 %**	**100.00%**	**100.00 %**	**100.00 %**	**100.00 %**	**100.00 %**	

The table presents the distribution of areas of musculoskeletal pain across different breastfeeding positions among postpartum females. A total of 94 pain responses were recorded across all body regions. Overall, the low back (32 cases) was the most frequently reported area of pain, followed by the neck (19 cases), upper back (16 cases), and shoulder (12 cases). Other regions such as the forearm (10 cases), thigh (2 cases), buttocks (1 case), knee (1 case), and wrist (1 case) were less commonly affected.

When analyzed according to breastfeeding position, the side-lying position accounted for the highest proportion of pain reports (31.9%), with notable contributions to neck (42.1%) and shoulder pain (66.7%). The cross-cradle hold (27.7%) and cradle hold (25.5%) also showed considerable frequencies of pain, particularly in the low back and neck regions. In contrast, the football hold and laid-back position contributed relatively fewer pain reports (7.4% each).

Despite these observed differences in the distribution of pain across positions, the association between breastfeeding position and area of pain was found to be statistically not significant ($p = 0.128$). This indicates that the variation in pain location across different positions may be due to chance rather than a definitive relationship.

However, from a clinical perspective, certain trends can still be noted. Positions such as side-lying appear to be associated with higher reports of neck and shoulder discomfort, while low back pain was common across multiple positions. These findings suggest that although statistical significance was not established, breastfeeding posture may still influence the pattern of musculoskeletal pain experienced by postpartum females.

TYPE OF BRESTFEEDING POSTION	Area of Pain	CORNELL MUSCULOSKELETAL DISCOMFORT QUESTION SCORE		p-value
		Mean	Std. Deviation	
CRADLE HOLD	BUTTOCKS	1.00	-	0.862
	FOREARM	1.00	0.00	
	LOW BACK	21.06	18.35	
	NECK	15.92	36.29	
	SHOULDER	1.17	0.29	
	THIGH	7.00	-	
	UPPER BACK	4.25	3.89	
	WRIST	1.00	-	

	Total	11.96	21.56	
CROSS CRADLE HOLD	FOREARM	1.17	0.29	0.198
	KNEE	1.00	-	
	LOW BACK	33.33	35.49	
	NECK	3.50	4.34	
	THIGH	10.00	-	
	UPPER BACK	4.90	5.68	
	Total	17.42	28.11	
FOOTBALL HOLD	FOREARM	3.00	3.46	0.286
	LOW BACK	43.33	40.41	
	NECK	1.00	-	
	Total	20.00	32.02	
LAID BACK	LOW BACK	7.00	0.00	
	SHOULDER	1.50	-	0.71
	UPPER BACK	28.75	41.67	
	Total	18.64	32.10	
SIDE LYINE POSITION	FOREARM	17.00	4.24	0.484
	LOW BACK	40.79	38.20	
	NECK	19.25	29.32	
	SHOULDER	21.00	20.36	
	UPPER BACK	43.40	42.81	
	Total	28.62	31.40	

The table presents the distribution of Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) scores across different areas of pain within each breastfeeding position. This provides a detailed

understanding of how discomfort varies not only by posture but also by specific body regions.

In the cradle hold, the overall mean CMDQ score was 11.96 ± 21.56, with relatively higher discomfort reported in the low back (21.06) and neck (15.92) compared to other regions. However, the association between area of pain and CMDQ score in this position was not statistically significant (p = 0.862).

For the cross-cradle hold, the total mean score was 17.42 ± 28.11, with the low back (33.33) showing the highest discomfort, followed by moderate values in the upper back and neck. The variation across pain areas was not statistically significant (p = 0.198).

In the football hold, the mean CMDQ score was 20.00 ± 32.02, with the low back (43.33) again demonstrating the highest discomfort level. Despite this observation, the relationship between pain location and discomfort score remained statistically non-significant (p = 0.286).

For the laid-back position, the total mean score was 18.64 ± 32.10, with higher discomfort noted in the upper back (28.75) compared to the low back and shoulder. The association was not statistically significant (p = 0.71).

In the side-lying position, the highest overall mean CMDQ score was observed (28.62 ± 31.40). Within this position, increased discomfort was reported in the upper back (43.40) and low back (40.79), along with notable values in the shoulder and neck regions. However, similar to other positions, the variation across pain areas was not statistically significant (p = 0.484).

Overall, although certain trends indicate that the low back, upper back, neck, and shoulder are commonly affected regions with higher discomfort scores across different breastfeeding positions, none of these associations reached statistical significance. This suggests that while discomfort patterns vary by body region and posture, the differences may be influenced by variability within the sample rather than a definitive positional effect.

TYPE OF BRESTFEEDING POSTION	**Position**	**CORNELL MUSCULOSKELETAL DISCOMFORT QUESTION SCORE**		**p-value**
		Mean	**Std. Deviation**	
CRADLE HOLD	SUPPORTED	1.14	0.23	0.000
	UNSUPPORTED	27.10	27.40	2*
	Total	11.96	21.56	
CROSS CRADLE HOLD	SUPPORTED	1.69	1.61	0.002*
	UNSUPPORTED	33.15	33.28	
	Total	17.42	28.11	
FOOTBALL HOLD	SUPPORTED	1.00	0.00	0.196
	UNSUPPORTED	34.25	37.67	
	Total	20.00	32.02	

The table compares Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) scores between supported and unsupported positions within different breastfeeding techniques.

In the cradle hold, mothers using a supported position reported a very low mean CMDQ score (1.14 ± 0.23), whereas those using an unsupported position showed a substantially higher mean score (27.10 ± 27.40). This difference was found to be statistically significant (p = 0.002), indicating a strong association between lack of support and increased musculoskeletal discomfort.

A similar pattern was observed in the cross-cradle hold, where the supported group had a low mean score (1.69 ± 1.61) compared to the unsupported group (33.15 ± 33.28). This difference was also statistically significant (p = 0.002), reinforcing the relationship between unsupported posture and higher discomfort levels.

In the football hold, although the unsupported group again demonstrated a higher mean CMDQ score

(34.25 ± 37.67) compared to the supported group (1.00 ± 0.00), this difference was not statistically significant ($p = 0.196$). This suggests that, for this position, the observed variation may be influenced by sample variability rather than a definitive effect.

Overall, these findings indicate a positive and statistically significant association between unsupported breastfeeding posture and increased musculoskeletal discomfort in cradle and cross-cradle positions. Supported positions consistently demonstrated markedly lower discomfort scores, suggesting a protective effect through improved posture and reduced physical strain. Although the same trend was observed in the football hold, statistical significance was not established for this position.

DISCUSSION

The present study aimed to explore the relationship between breastfeeding position and the occurrence of musculoskeletal disorders (MSDs) in postpartum females. The findings highlight the important role of posture, support, and ergonomic factors during breastfeeding in influencing maternal musculoskeletal health.

A major observation of this study was that a higher proportion of participants adopted unsupported breastfeeding positions compared to supported ones. This suggests a lack of awareness or inadequate guidance regarding proper breastfeeding ergonomics. Unsupported positions often require sustained muscle activity to maintain posture, which can increase mechanical load on the spine and surrounding musculature. This may explain the increased prevalence of discomfort observed in this group.

The analysis of craniovertebral angle (CVA) across different breastfeeding positions revealed a statistically significant difference, indicating that posture varies considerably depending on the feeding technique. Positions such as the football hold and cradle hold demonstrated relatively higher CVA values, suggesting better head and neck alignment. In contrast, lower CVA values observed in side-lying and laid-back positions indicate a tendency toward forward head posture. Forward head posture is widely associated with increased strain on cervical structures, which may contribute to neck and upper back pain. These findings support the idea that breastfeeding position directly influences cervical biomechanics.

Pain assessment across positions showed that the side-lying and laid-back positions were associated with higher mean pain scores, while cradle and cross-cradle positions were comparatively more comfortable. However, these differences were not statistically significant. This lack of significance may be attributed to variability in pain perception, differences in duration and frequency of breastfeeding, or the relatively small sample size. Nevertheless, the consistent trend of higher pain in less supported positions suggests a clinically relevant association.

Similarly, the evaluation of musculoskeletal discomfort using the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) demonstrated higher scores in unsupported positions, particularly in the side-lying posture. While overall comparisons across positions were not statistically significant, a strong and statistically significant difference was observed when comparing supported versus unsupported positions, especially within cradle and cross-cradle holds. This finding is critical, as it confirms that the presence of adequate support plays a key role in reducing musculoskeletal strain, regardless of the specific breastfeeding technique used.

The distribution of pain across body regions further supports these findings. The low back, neck, upper back, and shoulders were the most commonly affected areas. These regions are biomechanically vulnerable during breastfeeding due to sustained static postures, forward bending, and inadequate support. The side-lying position showed higher involvement of the neck and shoulder, while low back pain was consistently reported across multiple positions. Although the association between breastfeeding position and area of pain was not statistically significant, the pattern of distribution indicates that posture-related strain is a likely contributing factor.

Another important observation from this study is that even when statistical significance was not achieved in some analyses, a consistent positive trend was evident. Unsupported and ergonomically unfavorable positions repeatedly showed higher pain and discomfort scores across multiple measures. This suggests that breastfeeding posture has a meaningful clinical impact, even if not all findings reach statistical thresholds.

The findings of this study are consistent with existing literature, which emphasizes the importance of proper positioning and support during breastfeeding to prevent musculoskeletal strain. Poor posture, prolonged static positioning, and lack of ergonomic awareness have been identified as key risk factors for developing discomfort in postpartum women. This study reinforces those concepts by providing objective and subjective evidence linking breastfeeding position to musculoskeletal outcomes.

From a clinical perspective, these results highlight the need for education and intervention. Healthcare professionals, including physiotherapists, nurses, and lactation consultants, should actively guide new mothers on adopting supported and ergonomically sound breastfeeding positions. Simple measures such as the use of pillows, back support, and proper positioning techniques can significantly reduce

physical strain and improve maternal comfort.

This study has some limitations that should be considered. The sample size may have limited the ability to detect statistically significant differences in certain analyses. Additionally, factors such as duration of breastfeeding, frequency, maternal fitness level, and pre-existing musculoskeletal conditions were not controlled, which could have influenced the results. Future research with larger sample sizes and longitudinal designs is recommended to further validate these findings.

In conclusion, the present study demonstrates that breastfeeding position, particularly the use of support, plays a significant role in influencing musculoskeletal health in postpartum females. While not all variables showed statistical significance, the overall pattern indicates a positive association between unsupported breastfeeding posture and increased musculoskeletal discomfort. Promoting proper ergonomic practices during breastfeeding may help reduce the risk of developing musculoskeletal disorders and improve overall maternal well-being.

CONCLUSION

The present study underscores the importance of breastfeeding ergonomics in maintaining musculoskeletal health among postpartum females. There is a clear indication that supported breastfeeding positions are more favorable, while unsupported positions are associated with increased discomfort and strain. Promoting awareness and proper positioning techniques can significantly contribute to reducing musculoskeletal problems and enhancing the overall well-being of mothers during the postpartum period.

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