RESEARCH ARTICLE

# Prevalence and association of musculoskeletal disorders among breastfeeding women in Saudi Arabia

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## Abstract

**Objective:** To investigate the prevalence of musculoskeletal disorders, and to explore the association between maternal positioning and musculoskeletal pain among lactating women.

**Methods:** The cross-sectional survey-based study was conducted from January to May 2022 at buraidah, Saudi Arabia, and comprised Arabic-speaking women aged 18-49 years who were breastfeeding. Sociodemographic and clinical data related to musculoskeletal disorders was collected using a redesigned questionnaire through Twitter and WhatsApp platforms. Data was analysed using SPSS 28.

**Results:** Of the 474 women who responded, 192(40.7%) were excluded because they did not meet the eligibility criteria. The sample comprised 281(59.3%) women. The median age was 33 years with an interquartile range of 10 years 71(25.3%). Overall, 163(58%) subjects reported musculoskeletal pain caused by breastfeeding, 78(27.8%) experienced musculoskeletal pain with breastfeeding, 43(15.3%) considered discontinuing breastfeeding, and 59(21%) reported that musculoskeletal pain prevented them from performing their activities of daily living. The most painful segments reported were the back 6.24±3.21, nipple 5.51±3.43, shoulders 4.88±3.40, and neck 4.10±3.13. Sitting on a mat was the commonly adopted maternal positioning 2.38±1.41. Cradle hold was the most convenient baby-holding positioning during breastfeeding reported by 170(60.5%).

**Conclusion:** The prevalence of musculoskeletal disorders was found to be high among breastfeeding women in Saudi Arabia, and an association was found between musculoskeletal disorders and maternal breastfeeding positioning.

**Keywords:** Breastfeeding, Musculoskeletal pain, Physical therapy, Lactation, Women's health. (JPMA 73: 72; 2023)

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## Introduction

Musculoskeletal (MSK) pain is a global medical and socioeconomic dilemma that can develop into chronic pain syndromes that are difficult to manage.[1] MSK pain is defined as acute or chronic pain that affects bones, muscles, tendons, ligaments and nerves.[2] MSK disorders are an important topic in women's health. During pregnancy, delivery and postpartum, women go through different conditions, and body mechanics and alignments are altered in a short period of time (<2 years). Women usually breastfeed their babies for up to two years postpartum[3] and adopt different body alignments and postures during breastfeeding, including cradle, cross-cradle (opposite arm), side-lying, sitting on a mat, and sitting on a chair.[4]

Improper positioning during breastfeeding can lead to MSK disorders in mothers[4-6] and commonly produces considerable physical stress on the woman's body, causing muscle strain.[7] In a previous study, 29.3% of women stopped breastfeeding during the first month because of MSK pain.[8] In contrast, proper positioning during breastfeeding is a significant factor in continued breastfeeding.[9] Women tend to lean forward to latch their babies during breastfeeding.[5] Sitting in a flexed position causes the spine to flex and the muscles to strain, and consequently it increases the pressure on the disc, producing muscle fatigue and causing discomfort.[10]

The prevalence of MSK disorders ranges from 39.4% to 74% among breastfeeding women.[4,11,12] Moreover, 70% of breastfeeding women reported a decrease in activities of daily living (ADLs).[11] Most women experience nipple discomfort and trauma during breastfeeding, which results in early weaning.[13] Approximately 77-95% of breastfeeding women experience nipple pain.[14] In addition to the nipples, pain in cervical and neck region have been reported in 24%[6] to 37.3%[4] of breastfeeding women, while pain in lower back and lumbar region has been reported in 21.8%[11] to 44%.[6] Furthermore, back pain is associated with decreased breastfeeding frequency, and when lumbar support is used, pain is diminished.[15] Moreover, breastfeeding women experienced pain in various parts of their body, including the face and jaw (7%), arms (2.5%), upper trunk (5.8%), and legs (2.5%).[4,6] Undoubtedly,

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improving the health status of breastfeeding women is crucial for infant health.[16]

The impact of maternal positioning on the MSK system across various body segments has been identified in several cultures.[6,11,12,15] However, to date, MSK disorders related to breastfeeding have not been explored in Saudi Arabia. Behavioural culture, such as posture during breastfeeding, is an important variable as it influences MSK disorders. For instance, sitting on a mat, ground or floor in the tailor position (sitting on one's bottom with both legs bent in front and one leg crossed over the other) is common practice in Saudi Arabian culture.

The current study was planned to investigate the prevalence of MSK disorders in breastfeeding mothers, and to explore the association of maternal and baby positioning with MSK pain among lactating women in Saudi Arabia.

## Subjects and Methods

Using a convenience sampling, the cross-sectional survey-based study was conducted from January to May 2022 at Buraidah, Saudi Arabia, after approval from the institutional ethics review board of Ministry of Health. Those included were Arabic-speaking women aged 18-49 years who were breastfeeding. Women were excluded if they reported a history of neurological and/or orthopaedic diseases causing any pain other than that due to breastfeeding, caesarean delivery since it might produce pain due to the surgery, and known pregnancy. The survey form, along with informed consent form were distributed using social media platform Twitter and mobile application WhatsApp.

The survey questionnaire was self-designed, which was later reviewed by experts in the field. The self-administered online questionnaire contained information on sociodemographic data and questions related to the prevalence and nature of MSK disorders among breastfeeding women in several maternal positioning. The questionnaire explored the prevalence of MSK pain, adopted maternal positioning, and MSK pain across various body segments using numeric pain rating scale (NPRS), which is a Likert scale scored from 0= no pain to 10=severe pain). It is a reliable and valid tool for assessing MSK pain intensity.[17] Maternal positioning was also rated on a 5-point Likert scale, with 0 indicating never assuming the position, and 4 indicating always assuming the maternal positioning.

The questionnaire was piloted in a sample of 15 eligible breastfeeding women to test its design, gain feedback on its usability and language, and to make any required changes. Minor modifications were made to the questions after feedback to ensure that they were clear, and that the necessary information was obtained.

Data was analyzed using SPSS 28. Demographic characteristics and responses were reported as mean (m), standard deviation (SD), frequencies (n) and percentages (%), as appropriate. Spearman's rank correlation coefficient was used to assess the relationship between body segment pain and maternal positioning. Chi-square test was used to analyse the relationship between nominal elements. Odds ratio (OR) was calculated using chi-square test to measure the effect of this relationship. The effect size (r) was categorised as small effect ±0.1, medium effect ±0.3) and large effect ±0.5. NPRS was divided into four categories: 0=no pain, 1-3=mild pain, 4-7=moderate pain, and 8-10=severe pain. A few questions on income range, height and residential region were answered as 'not applicable' (N/A) because respondents preferred not to declare or because inaccurate data was given. The level of significance was set at $p<0.05$.

## Results

Of the 474 women who responded, 192(40.7%) were excluded because they did not meet the eligibility criteria. The sample comprised 281(59.3%) women. The median age was 33 years with an interquartile range of 10 years 71(25.3%). The mean height and weight were 157.62±7.5cm and 68.66±14.54kg, respectively. Besides, 122(43.4%) participants were housewives.

Overall, 163(58%) subjects reported MSK pain caused by breastfeeding. Pain was felt immediately after breastfeeding 136(48.4%) and was described as intermittent pain 185(65.8%). Among the participants, 140(49.8%) tended to change their position while breastfeeding to relieve the pain. During the survey, 78(27.8%) participants reported experiencing MSK pain due to breastfeeding, and 43(15.3%) were considering cessation of breastfeeding because of pain when breastfeeding. In addition, 59(21%) participants stated that MSK pain prevented them from performing ADLs (Table 1).

The most painful segments reported were the back 123(43.8%) 6.24±3.21, nipple 102(36.3%) 5.51±3.43, shoulders 106(37.7%) 4.88±3.40), and neck 122(43.4%) 4.10±3.13 (Table 2).

Sitting on the edge of the bed had a significant effect on MSK pain ($p$=0.003) with a small effect size of 0.24, while none of the other breastfeeding positions showed a significant effect on MSK pain (p>0.05). The head, jaw, neck, elbow, back, hip, knee, ankle, and foot pain were associated with standing and long sitting position with small size effect ranging from 0.12 to 0.22. However, the method of positioning the baby and the frequency of breastfeeding

had no significant effect on MSK pain ($p$=0.38 and p=0.40).

MSK pain due to breastfeeding had a significant effect on ADLs among breastfeeding women ($p$<0.001). The OR of breastfeeding women who had difficulty with performing ADLs due to breastfeeding was 4.2 times (95% CI: 2,01-8.23) higher if they had MSK pain than if they did not. Additionally, MSK pain due to breastfeeding had a significant effect on continuation of breastfeeding ($p$<0.01). The OR of breastfeeding women who reportedly considered stopping breastfeeding was 2.6 times (95% CI: 1.44-6.82) higher if they had MSK pain than if they did not.

Sitting on a mat was the commonly adopted maternal positioning 2.38±1.41 and the least common was standing 0.46±0.83. Cradle hold was the most convenient baby-holding positioning during breastfeeding reported by 170(60.5%) and the football hold position was the least convenient 1(0.4%). The number of breastfeeding sessions varied between 4 and 12 per day, with the most frequent being 4 times a day reported by 78(27.8%) subjects (Table 3).

**Table-1:** The prevalence and nature of musculoskeletal (MSK) pain among breastfeeding women.

| Items | (n) (%) |
|---|---|
| Lifetime prevalence | |
| Yes | 163 (58) |
| No | 118 (42) |
| Point prevalence | |
| Yes | 78 (27.8) |
| No | 202 (71.9) |
| N/A | 1 (0.4) |
| Pain onset | |
| Immediately after breastfeeding | 136 (48.4) |
| Between 1 to 3 months | 93 (33.1) |
| Between 4 to 6 months | 19 (6.8) |
| After 6 months | 20 (7.1) |
| No pain | 7 (2.5) |
| N/A | 6 (2.1) |
| Pain nature | |
| Intermittent pain | 185 (65.8) |
| Continuous pain | 23 (8.2) |
| Not sure | 73 (26) |
| Attitude toward the pain | |
| Change the maternal positioning | 140 (49.8) |
| Did nothing | 76 (27) |
| Discontinuation of breastfeeding | 16 (5.7) |
| Visited a doctor | 22 (7.8) |
| Reduced the time and frequency of breastfeeding | 27 (9.6) |
| Thinking of cessation of breastfeeding | |
| Yes | 43 (15.3) |
| No | 236 (84) |
| N/A | 2 (0.7) |
| Difficulties on activities of daily living (ADLs) | |
| Yes | 59 (21) |
| No | 222 (79) |

**Table-2:** Musculoskeletal pain and the affected body segments.

| Body segments | No pain n (%) | Mild pain n (%) | Moderate pain n (%) | Sever pain n (%) | Mean±SD |
|---|---|---|---|---|---|
| Head | 139 (49.5) | 26 (22.1) | 71 (25.2) | 9 (3.2) | 1.99±2.50 |
| Jaw | 193 (68.7) | 50 (17.7) | 33 (11.8) | 5 (1.8) | 1.05±2.00 |
| Face | 209 (74.4) | 48 (17.1) | 22 (7.8) | 2 (0.8) | 0.71±1.60 |
| Neck | 68 (24.2) | 47 (16.8) | 122 (43.4) | 44 (15.6) | 4.10±3.13 |
| Shoulder | 55 (19.6) | 45 (16) | 106 (37.7) | 75 (26.7) | 4.88±3.40 |
| Elbow | 92 (32.7) | 64 (22.8) | 89 (31.7) | 36 (12.9) | 3.31±3.20 |
| Wrist | 109 (38.8) | 55 (19.5) | 88 (31.3) | 29 (10.3) | 2.98±3.10 |
| Back | 28 (10) | 25 (8.8) | 105 (37.3) | 123 (43.8) | 6.24 ±3.21 |
| Hip | 99 (35.2) | 55 (19.6) | 75 (26.7) | 52 (18.4) | 3.49±3.50 |
| Knee | 144 (51.2) | 52 (18.4) | 5 (19.9) | 29 (10.3) | 2.37±3.12 |
| Ankle | 170 (60.5) | 67 (23.8) | 33 (11.7) | 11 (3.9) | 1.41±2.40 |
| Foot | 176 (62.6) | 57 (20.3) | 29 (10.2) | 19 (6.8) | 1.52±2.70 |
| Nipple | 41 (14.6) | 41 (14.6) | 102 (36.3) | 97 (34.5) | 5.51±3.43 |
| Whole body | 77 (27.4) | 71 (25.2) | 103 (36.7) | 30 (10.6) | 3.38±3.00 |

SD: Standard deviation, n: Number, %: Percentage.

**Table-3:** Mother's position during breastfeeding and convenient baby-holding positioning

| Items | (Mean±SD) | $p$-value |
|---|---|---|
| Women maternal positioning | | |
| Side lying | 2.04±1.40 | 0.70 |
| Sitting on a mat | 2.40±1.42 | 0.57 |
| Sitting on the edge of the bed | 1.84±1.41 | 0.003* |
| Sitting on a chair | 2.21±1.33 | 0.92 |
| Standing | 0.48±0.83 | 0.51 |
| Long sitting | 1.50±1.31 | 0.16 |
| Convenient baby holding positioning | | 0.38 |
| Side lying (n) % | 85 (30.2) | |
| Cross-cradle hold (n) % | 25 (8.9) | |
| Cradle hold (n) % | 170 (60.5) | |
| Football hold (n) % | 1 (0.4) | |
| Numbers of breastfeeding sessions per day | | 0.41 |
| 4 n (%) | 78 (27.8) | |
| 6 n (%) | 58 (20.6) | |
| 8 n (%) | 75 (26.7) | |
| 12 n (%) | 62 (22.1) | |
| N/A n (%) | 8 (2.8) | |

SD: Standard deviation, n: Number, %: Percentage; * significant level at p<0.05.

## Discussion

To the best of our knowledge, the current study is the first to evaluate common MSK disorders associated with breastfeeding in Saudi Arabia. The prevalence of MSK pain associated with breastfeeding was 58%, and at the time of the survey, 27.8% of the participants had experienced MSK pain with breastfeeding. Similar findings have been reported in the literature on breastfeeding women.[4,11,12] In these studies, the prevalence of MSK pain among breastfeeding women ranged from 39.4% to 74%. However, MSK pain varied between body segments.

The most reported areas where participants

experienced pain were the back, nipples, shoulders and neck. Interestingly, back pain was more common than nipple pain among breastfeeding women although nipple pain was common and significant. The incidence of nipple pain reportedly affected 95% of Canadian women and 77-79% of Australian women[14] and was mainly reported in the first few weeks postpartum. However, in the current study, almost two-thirds of the babies were older than 6 months (7-24 months), suggesting other pain aetiology than the usual associations with latching behaviours[18] or baby positioning.[19] Besides, the results showed no correlation between the pain and the baby positioning, so it may be assumed that it allowed a correct latch. Healthcare providers often recommend the use of lanolin or low-level laser therapy for the treatment of painful and/or damaged nipples.[13,20] Furthermore, nipple or breast pain can be referred to as pain due to impairment of thoracic biomechanics that affect the thoracic muscles, fascia, joints, and nerves.[21] In this regard, physiotherapy improves MSK pain as women are educated about appropriate positions and alignments that will help to avoid shear posture.[21]

In this study, the participants reported mostly sitting on a mat while breastfeeding. This postural habit may increase bending forward and rotation of the spine during breastfeeding, which may explain at least in part, the higher incidence of back pain reported in the study. MSK pain in breastfeeding women has been repeatedly linked to faulty positioning during breastfeeding.[4-6] Similar to the current study, the neck, shoulders and back were the most painful areas for breastfeeding women in a previous study.[12] Moreover, 37.3% of breastfeeding women experienced neck pain, and 21.8% experienced low back pain.[4] Ergonomic interventions for women during breastfeeding are highly recommended to support the back and shoulders, and correct positioning to avoid MSK pain.[15]

In the present study, the difficulty in performing ADLs in participants with MSK pain was 4.2 times higher than that in those without MSK pain. In addition, the number of participants with MSK pain who reported considering cessation of breastfeeding was 2.6 times higher than that of participants without MSK pain. Similarly, 92.9% of postpartum women (among whom 97.7% were breastfeeding women) suffered from neck and shoulder pain due to breastfeeding and reported worsening of ADLs, such as housework, reading, sleeping, mailing and using computers.[11]

The current results showed that sitting on a mat was the most frequent maternal positioning among lactating Saudi women. In contrast, a study reported sitting on a chair as the most common breastfeeding practice.[12] Sitting on a mat usually lacks back support, which could be the reason for back pain among the participants. It has been suggested that poor sitting posture for prolonged periods is linked to low back pain.[10,22] In contrast, sitting on a chair reportedly increases back support and decreases back muscle strain, providing a comfortable breastfeeding practice.[15,23] Strengthening and stretching exercises particularly for the neck, shoulder, and scapular muscles are also recommended during breastfeeding.[24] Additionally, educational classes on proper latching and positioning during breastfeeding have been shown to help reduce MSK pain and promote the continuation of breastfeeding.[4,24]

Nevertheless, sitting on a chair, side-lying, and sitting on the edge of the bed are also common breastfeeding practices among lactating women in Saudi Arabia. The participants in the current study indicated that sitting on the edge of the bed was associated with MSK pain. Sitting on the edge of the bed also lacks back support, which might be linked to the back pain experienced by the participants. Women might adopt different positions during breastfeeding, which might produce pain in specific body segments. Analysing each segment separately revealed that standing and long sitting were the most likely maternal positionings that aggravated the pain in many body segments, including the head, jaw, neck, elbow, back, hip, knee, ankle and foot. However, the size effect of these associations was small, ranging between 0.12 and 0.22.

In this study, the most common convenient position for holding the baby used by breastfeeding women (60.5%) was the cradle hold position. Only one participant used the football hold position. In contrast, the cross-cradle hold position was the most common baby holding positioning during breastfeeding in another study.[4] However, football hold was the least common baby holding positioning in both studies. A cradle hold is the classic and most common positioning of the baby during breastfeeding in which the baby is cradled in the mother's arm crook and the mother's arm supports the baby along the back and neck. However, in the cross-cradle hold position, the mother uses the opposite arm to support the baby and guide it towards the breast. In the football hold position, the baby is placed on the side of the mother's arm, with its head held in the mother's hand.[18] The cross-cradle position is usually suitable for small babies or babies who have trouble latching on to the nipple.[4] Compared with the cradle hold position, the cross-cradle hold position results in significantly higher anterior trunk bending and erector spinae and external oblique muscle activation. However, lateral trunk leaning is higher in the football hold position.[5] These findings highlight the important role of health

professionals in the prevention and treatment of MSK disorders in breastfeeding women.[13,24] Educating breastfeeding women on preventive strategies and employing non-pharmacological pain control techniques are preferable for reducing the substantial burden of MSK pain in women and on society and healthcare system.[2] It is well-documented that physiotherapists play a vital role in the assessment and treatment of MSK pain experienced by breastfeeding women.[13,21] Physiotherapeutic interventions, such as educating lactating women on proper postural breastfeeding habits to avoid shear posture (lateral displacement of the trunk), are endorsed. Shear posture is a result of sitting while leaning to one side; it is aggravated by the thoracic coupling movement of rotation and flexion that occurs when turning the trunk and bending over the baby while offering the breast.[4,13,21] The continuation of breastfeeding was reportedly 4 times higher in breastfeeding women who received proper education regarding positioning than in those who did not.[25] In addition, physiotherapists may implement manual therapy to reduce tension in hypertonic muscles, enhance control of weakened muscles, mobilise joints to increase joint range of motion (ROM), and mobilise the myofascial system.[13,21]

The current study has limitations, including its cross-sectional design. The data might have recall bias because it relied on the memory of the subjects. Second, women who delivered via caesarean section were excluded, which may have led to the exclusion of important data regarding the association of maternal positioning with MSK pain among lactating women. Lastly, the calculation of sample size was not performed in this study. Consequently, the generalizability and precision of our findings may be impacted by the small sample size.

Despite the limitations, the findings provided valuable insights that should be considered and discussed. Future studies with more objective data-collection processes and larger sample size are recommended.

## Conclusion

The prevalence of MSK disorders among breastfeeding women was found to be high. Back pain was the most common symptom associated with breastfeeding. MSK disorders in breastfeeding women mostly affected the nipples, shoulders and the neck. MSK disorders had a significant effect on ADLs and on the continuation of breastfeeding.

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**Author Contribution:**

SA, YA, RAJ, RAS, MA: Manuscript proposal and drafting, designed the study, acquired and analysed the data.
RAJ, RAS: Participated in the survey distribution, sorting and data analysis.
All authors have read and approved the final manuscript.