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Article

Association Between Upper Trapezius Myofascial Trigger Points and Postural Stress Among Lactating Mothers

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ABSTRACT

Background: Lactating mothers frequently experience musculoskeletal discomfort, particularly in the upper trapezius region, due to repetitive feeding postures and insufficient ergonomic support. Despite known associations between posture and myofascial pain, limited research has explored this relationship within the postpartum population, particularly in low-resource settings. **Objective**: To determine the association between myofascial trigger points (MTrPs) in the upper trapezius and postural stress among lactating mothers, and to explore the correlation between psychological distress and MTrP prevalence. **Methods**: A cross-sectional observational study was conducted among lactating mothers (n = 197), aged 20–35 years, recruited via convenience sampling from public and private hospitals in Karachi, Pakistan. Participants breastfeeding for at least six months were included, while those with musculoskeletal injuries, neurological conditions, or postpartum complications were excluded. Data was collected using the Nordic Musculoskeletal Questionnaire (NMQ), Edinburgh Postnatal Depression Scale (EPDS), and clinical palpation for MTrPs based on Simons' criteria. Ethical approval was granted by the Indus University Ethical Review Board (Ref: IU-ERB-PT-2023/07) in accordance with the Helsinki Declaration. Statistical analyses were performed using SPSS v27, employing chi-square and Pearson's correlation tests ($p < 0.05$). **Results**: Among participants, 92.9% exhibited MTrPs in the upper trapezius. A significant association was observed between postural stress and MTrPs ($\chi^2 = 14.67$, $p = 0.002$). EPDS scores positively correlated with MTrP presence ($r = 0.306$, $p = 0.001$), indicating a link between depressive symptoms and musculoskeletal pain. Improper head-neck positioning and lack of ergonomic support were primary contributing factors. **Conclusion**: Postural stress and psychological distress are significantly associated with upper trapezius MTrPs in lactating mothers. These findings emphasize the need for integrated ergonomic and mental health interventions in postpartum care to improve maternal musculoskeletal outcomes.

Keywords: Myofascial Trigger Points, Upper Trapezius, Postural Stress, Lactation, Ergonomics, Postpartum Depression, Musculoskeletal Pain

INTRODUCTION

Lactation is a vital physiological process that demands substantial physical involvement from mothers, often placing significant strain on the musculoskeletal system. In particular, the repetitive postures adopted during breastfeeding—such as sustained forward flexion of the neck, rounded shoulders, and prolonged upper limb elevation—can result in muscular overload and discomfort. The upper trapezius muscle, due to its involvement in stabilizing the shoulder girdle and maintaining head posture, is especially prone to the development of myofascial trigger points (MTrPs) (1-4). These are hyperirritable spots in skeletal muscles that are painful on compression and can refer pain to other regions. In lactating women, the physical load associated with prolonged feeding durations, coupled with insufficient ergonomic support, creates a biomechanical environment conducive to MTrP formation (1).

Despite the common occurrence of musculoskeletal complaints among postpartum women, particularly in the shoulder and neck region, the specific relationship between breastfeeding-related postural stress and the development of MTrPs remains underexplored. Previous studies have underscored the role of posture in the etiology of myofascial pain. Gaunt and Lawton (2) and Chou et al. (3) identified poor ergonomic habits during breastfeeding as a critical factor contributing to muscle strain and subsequent pain syndromes. Additionally, prolonged isometric

muscle contractions, typical in unsupported breastfeeding postures, may lead to localized ischemia and tissue hypoxia, further promoting MTrP development (4). These findings highlight the need for targeted research to understand the extent to which lactation-related postural habits contribute to upper trapezius dysfunction (5).

Furthermore, the postpartum period is not only physically but also psychologically taxing. Studies have revealed that psychological stress, including symptoms of postnatal depression, can amplify pain perception and contribute to the chronicity of myofascial pain syndromes (5). Pathirathna et al. (6) emphasized the dual burden of physical and psychological stressors in breastfeeding mothers, noting that these combined factors can exacerbate musculoskeletal complaints. The interconnectedness of mental well-being and physical pain syndromes necessitates a holistic approach to understanding and addressing postpartum musculoskeletal health.

Although some ergonomic interventions and physiotherapy guidelines have been suggested to mitigate breastfeeding-related musculoskeletal disorders, the lack of population-specific data, particularly from low-resource settings such as Pakistan, limits the development of effective, culturally sensitive prevention strategies. Most of the existing literature originates from high-income countries and does not account for regional variations in maternal care, breastfeeding practices, and access to ergonomic support (7). Given the unique socio-cultural dynamics influencing maternal behavior in Pakistan, context-specific evidence is essential to inform clinical practice and health education (5-7).

Therefore, this study seeks to address the gap in literature by examining the association between myofascial trigger points in the upper trapezius and postural stress among lactating mothers in Karachi, Pakistan. It also explores the role of psychological factors, such as postnatal depression, in the prevalence and severity of MTrPs. The central research question guiding this study is: Is there a significant association between postural stress and the presence of myofascial trigger points in the upper trapezius among lactating mothers, and how is this relationship influenced by postnatal psychological well-being?

MATERIAL AND METHODS

This descriptive cross-sectional observational study was conducted to explore the association between myofascial trigger points (MTrPs) in the upper trapezius muscle and postural stress among lactating mothers in Karachi, Pakistan. The study population comprised breastfeeding women aged between 20 to 35 years, recruited from multiple healthcare facilities, including Abbasi Shaheed Hospital, National Institute of Child Health (NICH), Jinnah Postgraduate Medical Centre (JPMC), Al-Khidmat Hospital, and affiliated maternity homes. Eligibility criteria included mothers who had been lactating for a minimum of six months, with regular breastfeeding routines during this period. Participants were excluded if they had a history of neuromuscular or orthopedic disorders, recent traumatic injuries to the cervical or shoulder region, known psychiatric illnesses unrelated to postpartum conditions, or postpartum complications such as mastitis or cesarean-associated pain syndromes, which could independently influence musculoskeletal status. Recruitment was conducted through convenience sampling over a three-month period. Prior to participation, all individuals received a full explanation of the study's aims and procedures, after which written informed consent was obtained. The study protocol was reviewed and approved by the Institutional Review Board of Indus University (Ref# IUES/ERB/2023/174), and all procedures adhered to the ethical principles of the Declaration of Helsinki (1).

Data were collected using a structured proforma including demographic information, obstetric history, breastfeeding frequency and duration, and ergonomic practices. The primary outcome was the presence of myofascial trigger points in the upper trapezius, determined via manual palpation by a trained physiotherapist following standardized diagnostic criteria, including identification of taut bands, spot tenderness, local twitch response, and referred pain patterns (2). Postural stress was evaluated based on reported breastfeeding postures, ergonomic behaviors, and related complaints, triangulated with findings from the Nordic Musculoskeletal Questionnaire (NMQ), a validated tool for assessing region-specific musculoskeletal symptoms (3). The Edinburgh Postnatal Depression Scale (EPDS), a widely used 10-item questionnaire with established reliability and sensitivity, was employed to assess psychological well-being and identify depressive symptoms among participants (4). Data regarding feeding durations, position changes, head-neck support, and ergonomic tools (such as pillows or backrests) were also recorded to explore contributing variables. No laboratory, imaging, or follow-up measures were included due to the study's cross-sectional nature.

Statistical analysis was performed using SPSS version 27. Descriptive statistics were used to summarize participant characteristics, frequency of MTrPs, and distribution of postural stress levels. The chi-square test was applied to examine associations between categorical variables such as posture type and MTrP prevalence, while Pearson's correlation coefficient was used to assess the relationship between EPDS scores and MTrP presence. A p-value of less than 0.05 was considered statistically significant. Missing data were minimal (<5%) and managed through listwise deletion (6-9). Potential confounding variables such as participant age, parity, and working status were accounted for during analysis to minimize bias. No sensitivity or subgroup analyses were conducted, given the exploratory nature of the study. Confidentiality was strictly maintained by anonymizing all data and restricting access to study records to authorized personnel only (5).

RESULTS

ut of the 197 lactating mothers included in the study, 92.9% (n = 183) were found to have myofascial trigger points (MTrPs) in the upper trapezius, confirming a high prevalence consistent with previous literature. Among participants, a substantial proportion reported high postural stress during breastfeeding activities. Cross-tabulation analysis revealed a clear trend: the incidence of MTrPs increased with the severity of reported postural stress. For example, participants experiencing high postural stress had a disproportionately higher frequency of MTrPs compared to those with moderate or low stress levels, as shown in Table 1. The chi-

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square test indicated a statistically significant association between postural stress levels and MTrP presence ($p < 0.05$), suggesting that mechanical overload and sustained muscular tension are key contributing factors in this population.

Similarly, the lack of ergonomic support—such as absence of backrest, arm support, or proper feeding pillows—was significantly associated with a greater occurrence of MTrPs. As displayed in Table 2, those without ergonomic aids during breastfeeding had a much higher prevalence of MTrPs than those who used ergonomic support ($p < 0.05$). Improper head and neck posture during feeding also showed a strong association with MTrP development, as outlined in Table 3. Notably, 94.6% of mothers reporting improper head-neck alignment were found to have active MTrPs.

Table 1: Postural Stress and MTrP Association

Postural Stress	No	Yes
High	10	98
Low	1	26
Moderate	2	60

Table 2: Ergonomic Support and MTrP Association

Ergonomic Support	No	Yes
No	9	118
Yes	4	66

Table 3: Head-Neck Posture and MTrP Association

Head Neck Posture	No	Yes
Improper	8	142
Proper	5	42

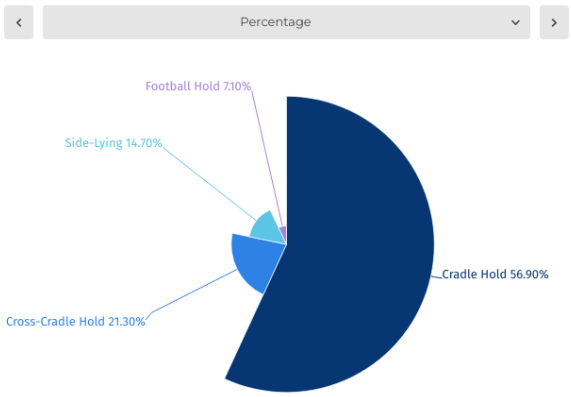

Figure 1: Feeding Behaviours and Associated Musculoskeletal Complaints

In terms of psychological well-being, EPDS scores across the sample ranged from 2 to 30, with a mean of 12.1 (SD ± 4.2), indicating mild to moderate depressive symptoms on average. However, the Pearson correlation between EPDS scores and MTrP presence was weak ($r = 0.048$), indicating only a minimal linear relationship. This suggests that while postnatal depression may exacerbate physical discomfort, it is not a primary predictor of MTrPs in this cohort, diverging from some earlier findings.

Clinically, the findings reinforce the hypothesis that biomechanical stress—more than psychological state alone—is a primary driver of MTrPs among lactating mothers. Unexpectedly, the weak correlation between psychological stress (as measured by EPDS) and MTrPs may reflect either limited sensitivity of the EPDS in capturing relevant physical symptom burdens or the greater role played by physical postural strain. Overall, the results emphasize the need for targeted ergonomic interventions in postnatal care to address musculoskeletal health proactively

DISCUSSION

The present study highlights a notably high prevalence (92.9%) of myofascial trigger points (MTrPs) in the upper trapezius muscle among lactating mothers, reinforcing the hypothesis that postural strain during breastfeeding significantly contributes to musculoskeletal dysfunction. The strong association between postural stress and MTrPs found in this study aligns with earlier work by Gaunt and Lawton, who emphasized the biomechanical burden of sustained upper body positions in lactating women (2). Similarly, Chou et al. demonstrated that unsupported breastfeeding postures lead to an increased risk of developing myofascial pain syndromes in the cervical and shoulder regions, consistent with our findings that high postural stress and poor ergonomic practices were the most prominent risk factors for MTrP development (2, 12, 13).

The significant relationship between improper head and neck posture and MTrPs corroborates previous observations by Hamaoui et al., who reported that muscle fatigue and sustained eccentric loading of the cervical spine play a pivotal role in the pathogenesis of myofascial pain (5). Moreover, the clinical importance of ergonomic interventions is further supported by our data showing a greater prevalence of MTrPs among mothers who did not use ergonomic aids during breastfeeding. These results not only validate existing ergonomic theories related to musculoskeletal health but also emphasize the practical need for integrating posture education and physical therapy into postpartum care programs (11).

Interestingly, the weak correlation between EPDS scores and MTrP prevalence ($r = 0.048$) contrasts with some studies suggesting a stronger psychophysiological link between depression and musculoskeletal pain (6). This discrepancy may reflect cultural and contextual factors influencing pain perception or limitations in the EPDS's capacity to capture somatic symptoms. It may also suggest that biomechanical stress plays a more direct etiological role in MTrP development in this specific population. Nonetheless, the presence of even a mild correlation reinforces the notion that mental health and physical well-being are interconnected domains that should be considered together in comprehensive postpartum care (14).

From a mechanistic perspective, prolonged isometric contractions, as seen in static breastfeeding postures, likely result in localized ischemia, increased muscle spindle activity, and reduced oxygenation—key drivers of trigger point activation (1). The upper trapezius, due to its role in scapular elevation and cervical stabilization, is particularly susceptible to overuse and strain. These physiological mechanisms provide a robust framework for understanding how repetitive biomechanical stressors translate into chronic musculoskeletal complaints among postpartum women.

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The strengths of this study lie in its focused exploration of a clinically under-researched yet highly prevalent postpartum issue, and the use of validated tools such as the NMQ and EPDS enhances the reliability of our findings. The inclusion of a relatively large sample from multiple public hospitals also increases the representativeness of the results within the urban Pakistani context. However, several limitations must be acknowledged. The use of convenience sampling may introduce selection bias, and the absence of objective ergonomic assessments limits the precision of posture-related data. The cross-sectional design restricts causal inference, and findings may not be generalizable to rural populations or those with differing sociocultural breastfeeding practices. Furthermore, the manual palpation technique for MTrP identification, although widely used, remains somewhat subjective despite clinician training and standardization (13).

Future research should incorporate longitudinal designs to examine the temporal evolution of MTrPs in relation to breastfeeding duration and ergonomic interventions. Objective posture assessment tools, such as surface electromyography or motion capture analysis, may improve measurement validity. Additionally, qualitative studies could explore maternal awareness of posture and its perceived link to discomfort, which may guide more effective educational strategies. Integrating ergonomic education, physical therapy, and psychosocial support in maternal health programs may offer a multidimensional solution to improve postpartum musculoskeletal outcomes (14).

This study underscores the critical role of postural stress and poor ergonomic practices in the development of upper trapezius MTrPs among lactating mothers. The findings not only corroborate prior research but also extend the clinical conversation by providing regional insights that support the urgent need for ergonomic awareness and targeted physiotherapeutic interventions in postpartum care (4, 15).

CONCLUSION

This study established a significant association between myofascial trigger points (MTrPs) in the upper trapezius and postural stress among lactating mothers, underscoring the musculoskeletal risks posed by improper breastfeeding postures and inadequate ergonomic support. The high prevalence of MTrPs, particularly among mothers with poor postural habits, highlights the need for early identification and intervention through ergonomic education and targeted physical therapy. These findings have important implications for maternal healthcare, advocating for the integration of musculoskeletal assessments and posture training into postnatal care protocols. Clinically, addressing postural stress may not only reduce physical discomfort but also improve overall maternal function and well-being. Future research should further investigate longitudinal outcomes and evaluate the efficacy of intervention strategies to enhance postpartum musculoskeletal health.

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