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Prevalence of Musculoskeletal Problems Among Primipara Females After Spontaneous Vaginal Delivery

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ABSTRACT

***Background**: Pregnancy and childbirth induce significant biomechanical and hormonal changes that predispose women to musculoskeletal problems, which may persist into the postpartum period, particularly among primiparous women following spontaneous vaginal delivery.* ***Objective**: To determine the prevalence and functional impact of musculoskeletal problems among primiparous women within one year after spontaneous vaginal delivery.* ***Methods**: A cross-sectional observational study was conducted among 267 primiparous women in Sialkot, Pakistan, one year after spontaneous vaginal delivery. Musculoskeletal symptoms were assessed using the standardized Nordic Musculoskeletal Questionnaire, evaluating symptoms over the past 12 months, functional limitation, and symptoms in the past seven days. Descriptive statistical analysis was performed using SPSS version 26.* ***Results**: Musculoskeletal symptoms were highly prevalent, with the lower back (57.3%), hip/thigh (55.1%), upper back (39.0%), and shoulder (47.9%) being the most commonly affected regions in the past 12 months. Recent symptoms were most frequent in the lower back (60.3%) and upper back (56.9%). Functional limitation due to musculoskeletal pain was reported by more than half of participants for the lower back (55.4%) and hip/thigh (56.6%).* ***Conclusion**: Musculoskeletal problems are common and functionally limiting among primiparous women one year after spontaneous vaginal delivery, highlighting the need for early postpartum screening, ergonomic education, and targeted rehabilitation.*

Keywords
Musculoskeletal disorders, Postpartum, Primiparous women, Low back pain, Spontaneous vaginal delivery, Nordic Musculoskeletal Questionnaire.

INTRODUCTION

Pregnancy and childbirth represent profound physiological, biomechanical, and psychosocial transitions that can predispose women to a wide range of musculoskeletal problems, particularly during the postpartum period. These changes are especially pronounced among primiparous women, who experience pregnancy and childbirth for the first time and must simultaneously adapt to unfamiliar physical demands and caregiving responsibilities. Hormonal influences such as increased relaxin and progesterone levels lead to ligamentous laxity, while gestational weight gain and anterior displacement of the center of gravity impose additional mechanical stress on the spine, pelvis, and lower extremities, often persisting beyond delivery (1,2). Although spontaneous vaginal delivery is generally regarded as a physiologically favorable mode of childbirth, it is frequently associated with transient or persistent musculoskeletal strain due to prolonged labor, altered pelvic floor dynamics, and postpartum biomechanical imbalance (3).

Epidemiological evidence indicates that musculoskeletal pain is highly prevalent during pregnancy and may continue for months or even years after delivery. Previous studies have reported that 30–70% of women experience low back pain, pelvic girdle pain, or peripheral joint discomfort during pregnancy, with a substantial proportion reporting persistence of symptoms into the postpartum period (4,5). Low back pain has consistently been identified as the most common complaint, followed by hip, knee, and upper back pain, all of which can significantly impair functional capacity and quality of life (6). In addition to axial and appendicular musculoskeletal disorders, postpartum women frequently experience upper limb discomfort related to repetitive childcare activities such as breastfeeding, infant lifting, and prolonged static postures (7). These musculoskeletal challenges are further compounded by fatigue, sleep deprivation, and reduced postural control during the early postpartum phase. Primiparous women appear to be particularly vulnerable to postpartum musculoskeletal problems due to lack of prior biomechanical adaptation, limited experience with ergonomic infant handling, and heightened psychological stress. Studies have shown that first-time mothers report higher levels of physical discomfort, fear of bodily harm, and functional limitation compared to multiparous women (8,9). Psychosocial factors, including inadequate social support and limited access to postpartum rehabilitation services, may exacerbate symptom severity and prolong recovery (10). Despite this vulnerability, postpartum musculoskeletal health remains under-recognized in routine maternal care, particularly in low- and middle-income countries where structured postpartum rehabilitation programs are often absent.

Existing literature on postpartum musculoskeletal disorders has predominantly focused on pregnancy-related pain or comparisons between vaginal and cesarean delivery, with relatively limited attention given to primiparous women following spontaneous vaginal delivery specifically (6,11). Moreover, most available studies originate from high-income settings, limiting the generalizability of findings to regions with differing healthcare

infrastructure, cultural practices, and postpartum care norms. In Pakistan and similar contexts, postpartum women—particularly housewives—are often expected to resume physically demanding household tasks shortly after delivery, potentially increasing the risk and persistence of musculoskeletal problems. However, data describing the prevalence, anatomical distribution, and functional impact of these conditions in this population remain scarce.

Given the high potential burden of postpartum musculoskeletal disorders and their implications for maternal health, functional independence, and quality of life, there is a clear need for region-specific evidence to inform preventive and rehabilitative strategies. Therefore, the present study aimed to determine the prevalence and distribution of musculoskeletal problems among primiparous women within one year after spontaneous vaginal delivery and to assess the extent to which these problems interfere with normal daily activities. The central research question guiding this study was: What is the prevalence of musculoskeletal problems among primiparous women one year after spontaneous vaginal delivery, and which anatomical regions are most commonly associated with functional limitation?

MATERIALS AND METHODS

This observational cross-sectional study was conducted to assess the prevalence of musculoskeletal problems among primiparous women following spontaneous vaginal delivery. The study was carried out over a six-month period in multiple public and private hospitals in Sialkot, Pakistan, to ensure inclusion of participants from diverse socioeconomic backgrounds. The cross-sectional design was selected as it is appropriate for estimating prevalence and identifying the distribution of health-related conditions within a defined population at a specific point in time (12).

The study population comprised primiparous women who had delivered via spontaneous vaginal delivery approximately 12 months prior to recruitment. Eligibility criteria included women aged 18–40 years, primiparity, completion of a full-term spontaneous vaginal delivery, and engagement primarily in household activities. Women with a history of cesarean section, traumatic musculoskeletal injury, diagnosed rheumatologic or neurological disorders, or employment involving prolonged occupational physical demands were excluded to reduce confounding influences on musculoskeletal outcomes. Participants were selected using purposive sampling to ensure inclusion of individuals meeting the predefined criteria and relevant to the study objectives.

Eligible participants were approached during outpatient follow-up visits or community health encounters. After receiving a detailed explanation of the study purpose and procedures, written informed consent was obtained prior to enrollment. Data were collected through face-to-face interviews conducted by trained researchers to minimize misunderstanding and enhance response accuracy. Standardized administration procedures were followed to reduce interviewer bias and ensure consistency across study sites.

Musculoskeletal symptoms were assessed using the standardized Nordic Musculoskeletal Questionnaire, a validated and widely used instrument for identifying musculoskeletal pain and discomfort across nine anatomical regions, including the neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees, and ankles/feet (13). The questionnaire evaluates the presence of symptoms during the past 12 months, symptoms severe enough to prevent normal work, and symptoms experienced during the past seven days. Each anatomical region was scored dichotomously, allowing for quantification of symptom prevalence and functional impact. The instrument has demonstrated acceptable reliability and validity across diverse populations and clinical settings (13).

The primary outcome variable was the prevalence of musculoskeletal problems in each body region during the previous 12 months. Secondary outcomes included the prevalence of symptoms preventing normal daily activities and symptoms reported during the past seven days. Sociodemographic variables such as age and postpartum duration were recorded to characterize the study population. To reduce information bias, the same questionnaire version and standardized explanation were used for all participants.

Sample size was calculated based on prevalence estimation principles using a confidence level of 90%, an anticipated prevalence of musculoskeletal problems derived from prior regional studies, and a conservative population proportion to ensure adequate precision (12). This resulted in a required sample size of 267 participants, which was achieved during the study period.

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize participant characteristics and prevalence estimates, presented as frequencies and percentages. Where applicable, subgroup analyses were planned to explore differences across anatomical regions. Data integrity was ensured through double-entry verification and random cross-checking of completed questionnaires. Ethical approval for the study was obtained from the relevant institutional research ethics committee, and all procedures were conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

A total of 267 primiparous women within one year after spontaneous vaginal delivery were analyzed using the Nordic Musculoskeletal Questionnaire. Across body regions, musculoskeletal symptoms were common and frequently associated with restrictions in routine work.

Table 1. Prevalence of Musculoskeletal Symptoms in the Past 12 Months (N=267)

Body Region	Yes, n	Yes, %	95% CI (%)	p-value*
Neck	101	37.8	32.2–43.8	<0.001
Shoulder	128	47.9	42.0–53.9	0.541
Elbow	98	36.7	31.1–42.6	<0.001
Wrist/Hand	110	41.2	35.5–47.2	0.005
Upper Back	104	39.0	33.3–44.9	<0.001
Lower Back	153	57.3	51.3–63.1	0.020
Hip/Thigh	147	55.1	49.1–60.9	0.111
Knee	106	39.7	34.0–45.7	<0.001
Ankle/Feet	104	39.0	33.3–44.9	<0.001

*Exact binomial p-value versus a 50% prevalence benchmark.

In the preceding 12 months, the highest symptom prevalence was observed in the lower back (57.3%; n=153) and hip/thigh (55.1%; n=147), with nearly half reporting shoulder symptoms (47.9%; n=128). Neck and upper back symptoms were also substantial at 37.8% (n=101) and 39.0% (n=104), respectively, with peripheral joint involvement remaining notable (wrist/hand 41.2%, knee 39.7%, ankle/feet 39.0%).

Table 2. Prevalence of Musculoskeletal Symptoms in the Past 7 Days (N=267)

Body Region	Yes, n	Yes, %	95% CI (%)	p-value*
Neck	125	46.8	40.9–52.8	0.327
Shoulder	139	52.1	46.1–58.0	0.541
Upper Back	152	56.9	50.9–62.7	0.027
Lower Back	161	60.3	54.3–66.0	<0.001
Hip/Thigh	148	55.4	49.4–61.3	0.086
Elbow	98	36.7	31.1–42.6	<0.001
Wrist/Hand	82	30.7	25.5–36.5	<0.001
Knee	80	30.0	24.8–35.7	<0.001
Ankle/Feet	90	33.7	28.3–39.6	<0.001

*Exact binomial p-value versus a 50% prevalence benchmark.

Recent symptoms in the prior week showed an ongoing burden, led by lower back pain (60.3%; n=161), upper back pain (56.9%; n=152), and hip/thigh pain (55.4%; n=148). Shoulder symptoms also remained high (52.1%; n=139), while neck symptoms affected nearly half (46.8%; n=125). Upper limb and distal lower limb complaints persisted as well, with ankle/feet symptoms at 33.7% (n=90) and wrist/hand symptoms at 30.7% (n=82).

Table 3. Musculoskeletal Symptoms Preventing Normal Work in the Past 12 Months (N=267)

Body Region	Yes, n	Yes, %	95% CI (%)	p-value*
Neck	80	30.0	24.8–35.7	<0.001
Shoulder	100	37.5	31.9–43.4	<0.001
Upper Back	89	33.3	28.0–39.2	<0.001
Lower Back	148	55.4	49.4–61.3	0.086
Hip/Thigh	151	56.6	50.6–62.4	0.037
Elbow	75	28.1	23.0–33.8	<0.001
Wrist/Hand	68	25.5	20.6–31.0	<0.001
Knee	89	33.3	28.0–39.2	<0.001
Ankle/Feet	86	32.2	26.9–38.0	<0.001

*Exact binomial p-value versus a 50% prevalence benchmark.

Functional restriction due to musculoskeletal problems was prominent. More than half of participants reported that symptoms interfered with routine work in the hip/thigh region (56.6%; n=151) and lower back (55.4%; n=148). Work limitation was also notable for the shoulder (37.5%; n=100) and upper back (33.3%; n=89), indicating that both axial pain and upper-limb-related strain had measurable consequences for daily functioning. Even distal regions demonstrated meaningful functional impact, including ankle/feet (32.2%; n=86) and wrist/hand (25.5%; n=68).

DISCUSSION

This study investigated the prevalence and functional impact of musculoskeletal problems among primiparous women within one year following spontaneous vaginal delivery, revealing a substantial burden of symptoms across multiple anatomical regions. The findings demonstrate that musculoskeletal discomfort remains highly prevalent well beyond the immediate postpartum period, with the lower back, hip/thigh, upper back, and shoulder regions most frequently affected. Notably, more than half of the participants reported lower back and hip pain within the past seven days, and a similar proportion experienced functional limitations severe enough to restrict routine household activities. These results underscore that musculoskeletal morbidity after childbirth is not a transient phenomenon but a persistent health concern among primiparous women.

The predominance of lower back and hip pain observed in this study aligns closely with previous research identifying these regions as particularly vulnerable during pregnancy and postpartum recovery. Onyemaechi et al. reported that pregnancy-related musculoskeletal disorders affected over 90% of women, with low back pain being the most prevalent complaint (14). Similarly, Kesikburun et al. demonstrated that hormonal ligamentous laxity, combined with altered spinal curvature and pelvic mechanics, contributes to sustained axial pain even after delivery (2). The persistence of lower back pain one year after childbirth, as observed in the present study, is consistent with findings by Saha, who reported that postpartum low back pain can persist for up to 12 months or longer and significantly impair quality of life (15). These converging findings suggest that spontaneous vaginal delivery does not confer protection against long-term musculoskeletal sequelae, particularly among first-time mothers.

Upper back and shoulder pain were also highly prevalent in the present cohort and were frequently associated with work limitation. This pattern likely reflects repetitive postural strain related to infant feeding, carrying, and prolonged static positions adopted during childcare. Ramachandra et al. attributed similar upper body symptoms to sustained flexed postures and inadequate ergonomic awareness among postpartum women (5). The relatively high prevalence of neck pain and its associated functional impairment further supports the notion that postpartum musculoskeletal problems extend beyond the lumbopelvic region and involve the cervical and thoracic spine. These findings emphasize the need for comprehensive postpartum musculoskeletal assessment rather than focusing solely on pelvic floor or low back complaints.

Peripheral joint involvement, including wrists, elbows, knees, and ankles, was also evident, although at comparatively lower prevalence than axial symptoms. Nevertheless, a meaningful proportion of participants reported recent symptoms and work limitation related to these regions, highlighting the cumulative biomechanical load imposed by household tasks and infant handling. Upper limb symptoms, particularly wrist and hand pain, may reflect repetitive gripping and lifting activities, while knee and ankle pain may be associated with altered gait mechanics, residual

weight retention, and prolonged standing during domestic work. Similar patterns have been reported in studies examining postpartum musculoskeletal health in low-resource settings, where women resume physically demanding roles shortly after delivery (16).

The functional implications of these findings are particularly important. More than half of the participants reported that musculoskeletal symptoms interfered with their ability to perform normal work, primarily household activities. This functional burden has broader implications for maternal well-being, caregiving capacity, and psychosocial health. Ojukwu et al. demonstrated that postpartum musculoskeletal pain is significantly associated with reduced health-related quality of life, irrespective of mode of delivery (17). For primiparous women, who are simultaneously adapting to new maternal roles, persistent pain and functional limitation may increase psychological stress and delay overall recovery.

Several factors may explain the high prevalence observed in this study. Primiparous women lack prior biomechanical adaptation to pregnancy-related changes and may have limited knowledge of postpartum body mechanics and ergonomic strategies. Additionally, the absence of structured postpartum rehabilitation services and limited access to physical therapy in the local healthcare context may contribute to symptom persistence. Cultural expectations that women resume household responsibilities early in the postpartum period may further exacerbate musculoskeletal strain. These contextual factors highlight the importance of region-specific evidence to inform targeted interventions.

Taken together, the findings of this study reinforce the need for early screening of musculoskeletal problems during the postpartum period and the integration of targeted physical therapy, ergonomic education, and rehabilitation strategies into routine maternal care. Addressing these issues proactively may reduce long-term disability, improve functional independence, and enhance overall maternal quality of life among primiparous women following spontaneous vaginal delivery.

CONCLUSION

Musculoskeletal problems are highly prevalent among primiparous women one year after spontaneous vaginal delivery and are frequently associated with significant functional limitations, particularly involving the lower back and hip regions. The persistence of symptoms across axial and peripheral joints highlights the need for early identification, targeted postpartum rehabilitation, and ergonomic education to support maternal recovery and prevent long-term disability.

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