

Musculoskeletal Discomforts among Third Trimester Pregnant Women: Prevalence, Pain Types, and Correlations

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ABSTRACT

Background

Pregnancy- induced hormonal and biomechanical changes give rise to variety of musculoskeletal discomforts during pregnancy. These issues may affect daily activities and overall quality of life, especially in the later stages of pregnancy. Early identification is the crucial step for timely management in order to prevent discomfort from becoming chronic.

Objective

To identify the prevalence of musculoskeletal discomforts among third trimester pregnant women along with their aggravating and relieving factors. Moreover, it also explored the relationship between those discomforts and factors such as parity, body mass index, occupation and gestational week.

Method

An analytical cross sectional study was conducted during June 2024 to January 2025 among 150 pregnant women in their third trimester. Data was collected using structured questionnaire that included demographic and obstetric information and a body pain diagram to identify the pain sites. The data were analysed using descriptive and inferential statistics. The spearman rank correlation was used to assess the relationship between the musculoskeletal discomfort and selected variables.

Result

A total of 150 third trimester pregnant women (mean age 27.61 ± 4.48 years) participated in the study. Musculoskeletal discomforts were reported by 69.3% with low back pain being most common (59.6%). Night time, prolong walking and standing frequently aggravated symptoms while bedrest provided relief. A weak positive correlation was observed with body mass index ($r=0.237$, $p=0.004$) and gestational week ($r=0.234$, $p=0.004$) with no significant association with parity or occupation.

Conclusion

Musculoskeletal discomfort, especially low back pain, is common in late pregnancy. Early recognition will guide early management and management should focus on integrating educational programs and targeted exercises to reduce their occurrence as part of Antenatal care.

KEY WORDS

Antenatal care, Musculoskeletal pain, Pregnancy trimester, Prevalence

INTRODUCTION

Musculoskeletal (MSK) discomforts are the conditions characterized by impairments in the muscles, bones, joints and connective tissues leading to functional limitations.¹ Their risk heightens during pregnancy due to biomechanical and hormonal changes with prevalence ranging from 50 to 67%, low back pain and muscle cramps being the most prevalent conditions.^{2,3} Studies had shown that MSK discomfort markedly increases in incidence and severity during the third trimester due to intensified physiological and biomechanical changes, including elevated body weight, altered center of gravity, joint/ligament laxity, and fluid retention.⁴⁻⁶ A study in India reported the prevalence of MSK discomforts in the first trimester to be 49%, 64.6% in the second trimester and peaked with 70.2% in the third trimester.⁷

Other contributing factors include multigravidas, occupation, increased body mass index and strenuous work during pregnancy.^{2,8} These discomforts can impair daily activities, social participation, reducing quality of life (QOL) and if untreated, can persist as chronic issues beyond postpartum period.⁹⁻¹¹ In our context, where most of the women perform physically demanding agricultural works, household chores even during pregnancy, these conditions tend to exaggerate.^{12,13} Previous study have reported a 34% prevalence of low back pain and pelvic girdle pain during pregnancy, however, other discomforts remain unexplored.¹³

This study aims to address the gap by identifying the prevalence of musculoskeletal discomforts among third trimester pregnant women. Insights from this study can be integrated in Antenatal education and routine check-ups, facilitating prevention, early diagnosis and management, improving overall well-being and QOL of the pregnant women.

METHODS

This was a cross sectional study conducted among third trimester pregnant women from June 2024 to January 2025. The study was conducted in Antenatal Care Out-patient Department (ANC OPD) and ward of Department of Obstetrics and Gynecology, Dhulikhel Hospital. The sample size was calculated using the single population proportion formula: $n = Z^2 p (1-p) / d^2$ Where, n=sample size,

Z=standard normal coefficient=1.96,

P=The value of proportion as decimal percent (50.7%).⁷

d=desired precision level expressed as half of the maximum acceptable confidence interval width 0.05. Therefore, the sample size is 150.

Selection of the participants was done using non-probability purposive sampling. For data collection, a structured questionnaire was used which comprised of 3 sections.

Participants were screened based on criteria outlined in section "A" of the questionnaire. Socio-demographic data was collected via questionnaire that included Personal details (Age, Education level, Occupation, Ethnicity), Anthropometric data (Weight before pregnancy, Weight at present, Height, Body Mass Index/BMI) and Obstetric data (Gravida, Parity, Live birth and Abortion/GPLA and Gestational week). Those participants experiencing pregnancy related musculoskeletal discomforts/pain were asked to mark the pain site according to the type of pain, using appropriate symbols in the body pain diagram which was included in the questionnaire. In addition, they were asked about the aggravating and relieving factors of the discomfort.

Ethical approval was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences with approval number 197/24. The potential participants were briefed about the study procedure (Purpose of the study, benefits, harms, right to withdraw and confidentiality). Data collection was done after obtaining written as well as verbal consent from the selected participants. Third trimester pregnant women of age 18-45 years were included in the study. Those who had musculoskeletal conditions and/or deformities of the joints, limbs, or spine prior to pregnancy, history of traumatic injury to the musculoskeletal system and who refused to give informed consent were excluded from the study.

Descriptive data was expressed as means, standard deviations, frequencies and percentages. For inferential statistics, Kolmogorov-Smirnov test was used to assess the normality of the data and Spearman rank correlation coefficient was employed to determine relationship between the variables. Data were analyzed using Statistical Package for Social Science (SPSS) version 26.

RESULTS

The mean age of the 150 participants enrolled in the study was 27.61 ± 4.48 years. The participants had mean BMI of 28.01 ± 4.33 kg/m² and average gestational age of 33.47 ± 3.17 weeks. More detailed information regarding demographic characteristics of study participants is given in table 1. Musculoskeletal discomforts were reported by 69.3% of the pregnant women in their third trimester. Among the 104 participants with musculoskeletal discomforts, more than half (53.8%) reported single musculoskeletal discomfort while remaining (46.2%) have multiple (more than one) musculoskeletal discomforts. The most prevalent musculoskeletal discomfort was low back pain with the prevalence rate of 59.6%, followed by calf muscles cramps (19.2%) and pedal edema (9.6%) respectively. Likewise this, kat-kat (aching) was the most frequently reported type of pain (51.1%). The most typical aggravating factors of musculoskeletal discomforts among

Table 1. Demographic characteristics of study participants

Variables	Category	Frequency/n(%)
Age (In years)	mean $\pm$ S.D	27.61 $\pm$ 4.487
BMI (kg/m ²)	18.5-22.9	15(10)
	23-24.9	24 (16)
	≥ 25	111(74)
Parity	1	62 (41.3)
	2	79 (52.7)
	≥ 3	9 (6)
Occupation	Farmer	12 (8)
	Housewife	86 (57.3)
	Office workers	31 (20.7)
	Others	21 (14)
Education level	Uneducated	1 (0.7)
	Primary	9 (6)
	Secondary	41 (27.3)
	Higher secondary and above	99 (65.9)
Gestational week	28-32	62 (41.3)
	33-36	51 (34)
	37-40	37 (24.7)

BMI: Body mass index
SD: Standard deviation

Table 2. Prevalence of different musculoskeletal discomforts

MSK discomforts	Frequency(N)	Percent (%)
Low back pain	62	41.3
Calf muscles cramp	20	13.3
Pedal edema	10	6.7
Pelvic girdle pain	7	4.7
Hip pain	1	0.7
Ankle pain	1	0.7
Thigh muscle pain	1	0.7
Hand pain	1	0.7
Upper back pain	1	0.7

Table 3. Description of different types of pain, aggravating and relieving factors among pregnant women with MSK discomforts

Type of pain	N (%)	Aggravating factors	N (%)	Relieving factors	N (%)
Katkat	46 (51.1)	Heavy household chores	14 (15.2)	Bed rest	44 (44.9)
Jhamjham	2 (2.2)	Prolonged standing	15 (16.3)	Oil massage	25 (25.5)
Tanaktanak	7 (7.8)	Prolonged sitting	12 (13.0)	Walking	12 (12.2)
Chasakka	10 (11.1)	Prolonged walking	16 (17.4)	Sitting	7 (7.1)
Others	25 (27.8)	Bending activities	9 (9.8)	Stretching	4 (4.1)
		Night time	19 (20.7)	Exercise	1 (1)
		Others	7 (7.6)	Others	5 (5.1)

the participants were night time (20.7%), followed by prolonged walking (17.4%), prolonged standing (16.3%) and heavy household chores (15.2%). A majority of the participants (44.9%) reported bed rest as their relieving factor for musculoskeletal discomforts. Unfortunately, only 1% of the participants identified exercise as a factor that eased their musculoskeletal discomforts. There was a weak but significant correlation between MSK discomforts with BMI (r : 0.237, p : 0.004) and increasing gestational age (r :0.234, p : 0.004) however no significant correlation was found between MSK discomforts with occupation and parity in our study (Table 4).

Table 4. Correlation between MSK discomforts and independent variables

Independent variables	Presence of MSK discomforts	
Characteristics	r (Spearman correlation coefficient)	p-value
BMI	0.237*	0.004**
Occupation	0.086	0.297
Parity	-0.057	0.489
Gestational week	0.234*	0.004**

** Indicates significant at $p < 0.05$, *sign indicates correlation

DISCUSSIONS

The prevalence of musculoskeletal (MSK) discomforts among pregnant women in the third trimester was found to be 69.3% which is consistent with the findings of Yasobant et al.⁷ In our study, Low back pain (41.3%) was the most common musculoskeletal discomfort reported in this group. The result aligns with the findings from multiple studies in the literature, where prevalence rates range from 34.8% to 41.6%.^{2,9,10} During pregnancy, the growing fetus and expanding abdomen shift the center of gravity anteriorly, leading to postural adjustments, which become more pronounced in the third trimester. These changes along with the increase in lumbar lordosis place excessive strain on the lumbar spine. Additionally, ligamentous laxity induced by relaxin hormone contribute to lumbar instability, making the low back more prone to stress and discomfort.^{14,15} The progressive nature of these biomechanical and hormonal changes in the third trimester likely explains the high prevalence of low back pain observed in this study.⁴⁻⁶

In our study, calf muscle cramps was the second most prevalent form of discomfort which was reported by 13% of the participants. This is similar to the prevalence of 16.3% reported in the study by Khattak et al.¹⁰ Muscles cramps, which often become more pronounced as the pregnancy progresses, especially in the third trimester, may arise as a result of several factors, including the accumulation of body fluids, electrolyte imbalances that occurs during pregnancy. Other contributing factors include physical inactivity, which leads to poor circulation and muscle fatigue, as well as excessive physical exertion.¹⁶⁻¹⁸ Studies conducted

in Nigeria and Jordan found a significant association between higher number of previous pregnancies and increased prevalence of leg cramps.^{8,16} However, the results are notably inconsistent when compared to studies conducted in India, the USA, and Jordan, with the prevalence of leg cramps among pregnant women in the third trimester ranging between 47.8% to 64.6%. The majority of participants were physically active due to their involvement in household chores, while those with higher parity were fewer in number. These two factors may help explain the low prevalence of calf muscle cramps observed in our study.

The hormone-induced retention of sodium and water, which increases fluid buildup, changes in the permeability of blood vessels, allowing more fluid to leak into surrounding tissues lead to the formation of edema.¹⁹ The prevalence of Pedal edema among the pregnant women in this study, 6.7% is far lower compared to the findings from previous studies.^{9,10} A possible explanation for this discrepancy is that participants might have been more inclined to report pain or general discomfort rather than swelling, potentially leading to underreporting of pedal edema. Previous research studies have documented pelvic girdle pain as another significant discomfort, though this condition appeared less common (4.7%) in our sample.^{2,9,20}

The prevalence of MSK discomforts at night (20.7%) in this study may be attributed to the body's relaxation and the cumulative fatigue from daily activities. The intensity of pain often worsens at night due to the lack of distractions and the body's transition into a resting state, which may amplify awareness of discomforts. Prolonged walking was another frequently reported aggravating factor, likely due to the excessive load it places in the joints, leading to pain over time.²¹ Similarly, prolonged standing was the third most common aggravating factor as it reduces blood supply to the muscles, accelerating fatigue and pain in the legs, back and neck.²² In terms of relieving factors, bed rest was the most commonly reported, indicating that the participants experienced pain relief primarily when muscle engagement was minimized. Notably, exercise despite being an evidence-based intervention for MSK discomfort, was the least reported relieving factor. This finding highlights a lack of awareness and limited practice of antenatal exercises emphasizing the need to promote and encourage their adoption as an effective strategy for managing pregnancy-related discomfort.

Our study showed weak positive correlations between the presence of MSK discomforts and both body mass index (BMI) ($r = 0.237$) and gestational age ($r = 0.234$). These findings align with previous studies. A systematic review and meta-analysis concluded that obesity negatively impacts musculoskeletal health by increasing mechanical loading in the joints and inducing postural changes, leading to greater MSK pain.²³ Similarly, the pregnancy induced

hormonal and biomechanical changes intensify with an increase in gestational age, resulting in higher risk of MSK discomfort during later stage of pregnancy.^{2,6,8} However, our study found no significant relationship between MSK discomforts and occupation. This contrasts with the result of Onyemaechi et al. which reported greater prevalence of MSK pain among individuals with physically demanding occupation such as farmers.² This could be attributed to the fact that only a small proportion of participants in our study had physically demanding (strenuous) jobs. Additionally, while a study in Nigeria revealed that higher parity causes MSK discomfort, our study revealed no such correlation.⁸ This may be due to the fact that only 6% of our participants had a parity of three or more, which limited our ability to detect such a relationship.

This study reveals high prevalence of MSK discomforts during third trimester, emphasizing the need for screening of MSK discomforts during routine ANC checkups. This will help the health professionals in early identification of the discomforts. Similarly, ANC education and programs should focus on role of physiotherapy and ANC exercises in managing those discomforts, thereby minimizing their impact on daily lives of pregnant women.

This was a single- center study, conducted at Dhulikhel hospital with a limited sample size may limit the generalizability of the findings. Furthermore additionally, the predominance of housewife as an occupation among the participants may further limit the applicability of the finding to broader population. In addition, women who did not attend the antenatal care visits were not included, introducing a potential selection bias. Lastly the study did not assess the severity of MSK discomfort or their impact on the daily activities of pregnant women which restrict the depth of understanding regarding the condition's functional implications.

CONCLUSION

Musculoskeletal discomforts are common concern among pregnant women during third trimester, with LBP being the leading one. Despite the weak correlation, factors such as BMI, occupation, gestational week appear to contribute these discomforts. The study highlights the need to emphasize on early identification and management of the discomforts to enhance overall well-being of the pregnant women. Integration of education on MSK discomforts and specific antenatal exercises into ANC programs could be beneficial in managing these issues alongside medical management.

Future studies should explore the severity of MSK discomforts and their impact on QOL. Similarly, prospective studies should be conducted to investigate the effectiveness of Antenatal exercises to reduce the risk and impact of MSK discomforts during pregnancy.

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