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The Association of Knowledge and Practice of Body Mechanics and Lumbopelvic Pain among Pregnant Women: A Cross-sectional Study

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ABSTRACT

Background & aim: Lumbopelvic pain (LPP) in pregnancy is prevalent. Although poor body mechanics (BM) and lack of posture awareness contribute to LPP, prenatal care services do not address these issues. The purpose of this study was to evaluate the association of BM awareness and practice with LPP among pregnant women.

Methods: In this cross-sectional research، 110 pregnant women with LPP were enrolled between October 2020 and October 2021 using a convenient sampling technique. The study setting was antenatal care units within Public Primary Health Center in Sulaymaniyah, Iraq. For data collection a structured questionnaire comprised of three parts of sociodemographic data, pain Numeric Rating Scale, and 44 images created by the researchers were used to assess both knowledge and practice related to BM via face-to-face interview. The collected data were analyzed in SPSS (version 27).

Results: Over half of the participants (53.6%) demonstrated an awareness of the BM to carry out their everyday tasks, appropriately. However, 55.5% reported that they were engaging in routine tasks improperly. The degree of BM knowledge (P=0.024), and the level of practice (P=0.038) were substantially correlated with lumbopelvic pain. Participants with significant discomfort and improper BM practices showed a higher odds ratio (OR=5.105). The odds ratio (OR=4.581) was greater in patients with extremely acute pain and inadequate BM knowledge.

Conclusion: It is less common for pregnant women to have low back discomfort when there is greater awareness of proper BM and posture during prenatal care sessions.

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Introduction

In the third trimester of pregnancy, up to 86% of pregnant women have pelvic girdle pain (PGP) and low back pain (LBP) associated with pregnancy (1). Low back pain is "pain or discomfort between the 12th rib and the gluteal fold", and PGP is "pain experienced between the posterior iliac crest and the gluteal fold." Both conditions are common during pregnancy (2). Lumbopelvic pain (LPP) is the term used to describe both symptoms when they coexist. Most studies show a prevalence of more than 50%, however, the prevalence of LPP during pregnancy varies between 20% to 90% (2-3). Women who are pregnant often have a lower quality of life in terms of their health and are considerably more prone to develop LPP. It hinders day-to-day activities and increases sick leave (4).

At this time, it is unclear what pathophysiological pathways LPP during

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pregnancy involves. Maternal weight gain, fetal growth, increased uterine volume, abdominal muscle stretching, increased lumbar lordosis, pelvic anteversion, and adjustments to posture and alignment are the key physiological and anatomical factors that contribute to the development of LPP. LBP develops as a result of variations in the load pattern on the tendons, ligaments, and joints in the lumbopelvic region, as well as hormonal changes that result in greater muscle-tendon and joint laxity (4-5). Numerous pregnant ladies reported experiencing the initial LBP (6).

Obesity, a sedentary lifestyle, a history of LBP or trauma, higher gestational age, and decreased maternal age are just a few of the LPP risk factors that have been studied (7). Pregnancy-related alterations to posture have also been identified as risk factors (8). Despite these unpleasant pregnancy-related experiences, women carry on with their normal daily duties, including housework, self-care, and helping others. These actions require standing, moving around while bending, lifting while using or without tools, and walking. These activities have the potential to cause lower back discomfort in pregnant women if done incorrectly. Lower back discomfort can result from poor body mechanics (BM) and posture during pregnancy (9).

The phrase "body mechanics" refers to the coordinated effort of the neurological and musculoskeletal systems to maintain balance, posture, and body alignment in daily living, which is directly connected to efficient physical functioning. The danger of bodily injury increases with poor working posture (10-11). Standing, sitting, or laying down, the tension on the joints, muscles, tendons, and ligaments is reduced thanks to body mechanics and position modifications, which also enable people to carry out everyday chores safely and retain the finest action (12-13). For every action, including relaxation, proper body mechanics should be employed (14). According to the American Occupational Therapy Association (2011), pregnant women need to know how to manage their discomfort, learn proper posture, protect their joints, and make adjustments to their home and working surroundings (15).

Women in developing countries have special behavior habits regarding posture when standing, sitting, using traditional squat toilets, daily activities, and taking improper care during pregnancy (16). In addition, women who work as housewives must bend, lift, carry, push, and drag without respect for the BMs' guiding principles. Research on workplace requirements, such as ergonomics and body posture during pregnancy, are numerous; however, there are few research on the home environment.

A cross-sectional research was conducted with pregnant women in their third trimester in the working area of the Kambangan health center, with 24 pregnant respondents serving as the sample. Good BMs were reported by 58.3% of respondents, while back pain was reported by 45.8%. An association between BM and back discomfort in third-trimester pregnant women was shown using bivariate analysis (P=0.011) (9).

An interview method was used to study 100 primigravida mothers (third trimester) in selected antenatal clinics. The majority of women (84%) were unaware of their body posture, and 78% had exhibited poor posture. It was shown that back discomfort and poor posture were positively correlated (r=78.92) (17).

Few studies have been conducted during pregnancy regarding knowledge and practice of BM, particularly at home. Therefore, the researchers were interested to assess the association of BM knowledge and practice with LPP among pregnant women.

Materials and Methods

Five antenatal care units (ANC) out of all the neighborhood primary healthcare facilities (PHFs) in the Sulaymaniyah governorate were the subject of this cross-sectional research. The Director of Health (DOH) provided a list of PHCs, and the selection was based on how congested each facility was. The ANC unit is the first public healthcare facility that women go to while pregnant and after giving birth.

Recruitment took place between the first and final weeks of October 2020 and 2021. The sample size was calculated using an online Sample Size Calculator (18), which was filled out with the following information: confidence interval (CI) of 95%, margin error of 5%, and population proportion of 10%. As a result, 139 sample were estimated to be included in the

study. The method of non-probability sampling was employed. In this study 311 pregnant women screened for eligibility criteria. Of all of the participants, 73 declined to continue, 50 did not meet eligibility and 46 of them were not interesting. One hundred forty-two pregnant women were included in this study but 32 of them could not complete the questionnaire. In total 110 pregnant women remained in this research study. Our study sample size was nearly identical to the study conducted by Souza & Sandhya (2019) with 100 primigravidas and the cross-sectional research performed with 24 pregnant women by Dewi et al. (2017).

Age under 18, singleton pregnancy, gestational age between 14 and 30, and lumbopelvic discomfort in the lower back or pelvis were inclusion criteria for participation. Women having comorbidities related to pregnancy, disc prolapses in the past, trauma, or lumbar spine or pelvic surgery were excluded.

The study protocol was ethically approved by the scientific boards of the Nursing College, University of Raparin (approval number 7/29/3634 on November 8th, 2020). The Director of each PHC and the Slemani DOH both gave their consent for access to ANC units. The study objectives were explained orally and a hand sheet was distributed before the participants gave their written informed permission (in the local language-Kurdish). To guarantee anonymity and privacy, participant names were not included in the questionnaire; instead, coding was employed. The ability to leave the research without any issues was made clear to the participants.

The first tool included sociodemographic data (age, education, occupation, gestational body mass index (BMI), delivery moods, gestational age, obstetric data related to LPP, and history of LBP).

The second was the pain numerical rating score (NRS) adopted by Jensen & McFarland (1993) (19). It is used as a single-item self-report measure of pain intensity. Due to its benefits and practicality, it is more commonly utilized than the visual analog scale as an assessment tool in clinical settings and research fields (20). Similarly, the scale consists of a linear arrangement of symbols that are uniformly spaced at intervals of 1 cm. It ranges from 0 to 10 and the participants express their pain intensity by selecting and circling a single number. The scale is comprised of 11 points that correspond to different levels of pain intensity. The range starts from 0, which represents no pain, and goes up to 10, which signifies the most intense pain. The points from 1 to 3 indicate mild pain, 4 to 6 suggest moderate pain, 7 to 9 signify severe pain, and 10 stands for very severe pain. Lumbopelvic pain was confirmed according to the definition reported by Vleeming et al. (2008) and Morino et al. (2017) (2-3). In which the pain was between the 12 ribs and gluteal fold. Participants were asked to identify the location of their pain. Due to limited diagnostic scales and tests now available, LBP is often diagnosed mainly with symptoms (21). The last query about pregnancy-related LPP was about the beginning of pain.

The researchers devised a self-administered questionnaire, which constitutes the third tool used in the study. The questionnaire was developed following an extensive review of the relevant literature (12, 22, 7, 4). A total of 44 graphics make up the tool, which are divided into six categories: standing (four photos), sitting on the ground (six photographs), sitting in a chair (10 images), carrying and lifting (eight images), housekeeping (eight images), and sleeping posture out of bed (eight images). Seven specialists with various academic backgrounds, including two physiotherapists, two registered nurses, an obstetrician, two rheumatologists, and a rehabilitation physician, examined the questionnaire for validity. Additionally, 10 pregnant women participated in pilot research to evaluate the questionnaire's clarity and simplicity. After then, the number dropped from 68 to 44, and 10 to 15 minutes were needed.

These instances show that local basic activities of daily living (BADL) are performed by pregnant women. The World Confederation for Physical Therapy defines BADLs as activities that address areas including clothing, eating, mobility, using the restroom, and maintaining personal hygiene (23). These six dimensions were regarded as BADL in this investigation. The photos were utilized to evaluate the two primary objectives and showed a mixture of 50% appropriate and 50% improper BMs.

The first step was to rate each participant's understanding of BM using a single scale (0 = I don't know; 1 = Incorrect; and 2 = Correct). Second, a scale was employed to rank the practical applications of BM, with (0 representing never, 1 occasionally, and 2 consistently).

The participants responded to a questionnaire that had been written in English and translated into Kurdish. Cronbach's alpha, a measure of the questionnaire's internal consistency and reliability, was 0.881 for the knowledge section and 0.810 for the practice section. Additionally, 10 pregnant women participated in pilot research to evaluate the questionnaire's clarity and simplicity. After then, the number of photos dropped from 68 to 44, and 10 to 15 minutes were needed. The instrument was revised by specialists (including an orthopedic surgeon, an obstetrician, a physical therapist, and a nurse) based on the results of the pilot research, and the required adjustments were made. Everyone who took part in the pilot study was not included in this one.

The structured questionnaires were prepared and administered by the primary investigator. During the study period, the researchers visited ANC units three times per week, from 9 a.m. to 1 p.m. A minimum of three and a maximum of eight pregnant women met each day in the same ANC unit room, but in a separate area to ensure privacy. The meeting was face to face, and the first question asked of each pregnant woman was, “Do you have lower back pain?” yes/no. If the participant said yes, the researchers explained the study and obtained her approval. When she agreed, data collection was performed based on inclusion criteria, with sociodemographic information, obstetric history, and LBP if present, followed by a pain assessment and clinical examination. The administration of all information and examination took between 20 and 40 min.

Utilizing the SPSS program (version 27), statistical analyses were performed after data collection. For categorical variables, descriptive statistics were employed to understand the data, such as frequencies and percentages. The chi-squared test was employed to identify significant associations between the categorical variables, and a significance level of 5% was set. A multinomial regression model was used to determine odds ratios, and 95% confidence intervals (CIs) were computed.

Results

The researchers interviewed 311 pregnant women, and 110 completed the questionnaires. Most participants (71%) were young (≤30 years). A significant proportion of the participants (44.50%) had a BMI falling within the range of 25-30, while approximately one-third (30%) had a BMI between 30-35. Furthermore, there was a considerable variation in gestational age, ranging from 14 to 30 weeks. The majority of the women (70.9%) were identified as housewives, and a significant number (64.5%) had attained a university degree.

Before this pregnancy, (73.6%) of the participants did not exercise, and during this study (96.4%) of the participants did not take part in any exercise. Almost half of the participants (49%) were experiencing their first pregnancy (primipara), while 61.8% had given birth to multiple children (multi- or grand-multi). Furthermore, 41.8% of the participants reported a history of non-specific low back pain in the past. In addition, (70.9%) had a family history related to LBP (e.g., mother, father, and sister).

In terms of pain severity, half of the participants (50%) reported severe pain (7-9/10 NRS), followed by very severe pain (10/10 NRS), and the remaining (13.6%) reported moderate pain (3-5/10 NRS).

In general, the proportion of incorrectly performed daily activities began with standing (74.6%), in-out bedding and sitting on a chair (70%), sleeping in poor alignment (69.8%), lifting (64.5%), sitting on the ground (62.7%), and housework activities (62.5%). Resting on the side without a cushion between the legs for support and alignment was identified as the most common activity by a significant majority of participants (90.9%). A significant proportion of participants (82.2%) reported adopting a symmetrical stance while standing upright and in close proximity to the kitchen surface, with a wide base providing support. Similarly, a high percentage (81.8%) lifted objects from the

ground with a straight back and by squatting halfway down. Another commonly reported motion was the in-out bedding (80.9%), where participants lifted both bent legs simultaneously while lying on their sides and supporting themselves with their arms. Most pregnant women (79.1%) preferred to stand in a hyper-lordotic posture, with their body weight shifting asymmetrically to one side. With a rounded back and shoulder, slouching posture, and protruded neck, cross-leg sitting on the ground is one of the most habituated mobilities (76.4%). However, when sitting in a chair for rest, a large proportion (74.6%) preferred to recline backward on a pillow to support the lower back.

The level of knowledge and experience needed to carry out daily tasks in accordance with BM principles is shown in Figure 1.

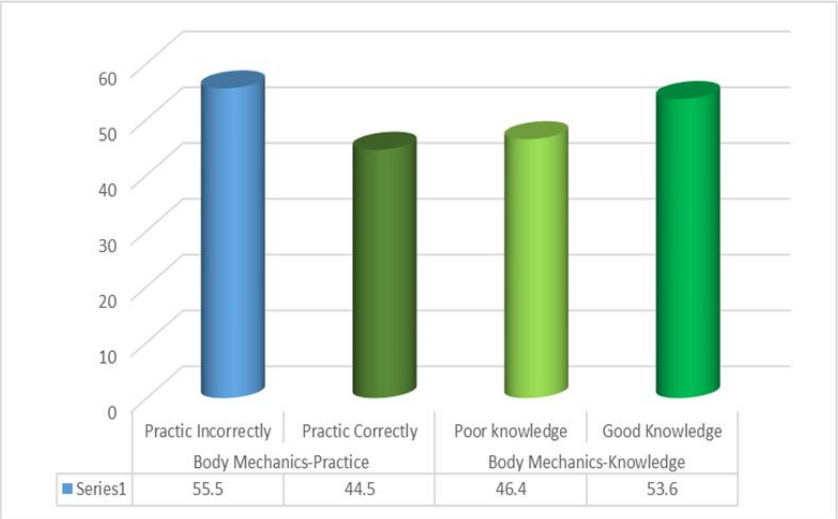

Figure 1. Level of Knowledge and practice of Body Mechanics

While the majority of participants (55.5%) reported they were engaging in routine tasks improperly, but a significant proportion (53.6%) of them demonstrated an awareness of the correct body mechanics. Table 1 exhibits an association between the social characteristics and participants' pain intensity. Age (P=0.557), occupation history (P=0.506 and P=0.54, respectively), and exercise history (P=0.506 and P=0.54) did not exhibit any significant correlation with pain intensity. In contrast, both body mass index (BMI) and educational attainment demonstrated a significant correlation with the degree of discomfort (P<0.05).

Table 2. Shows a significant association between each obstetric variable, including gestational age, gravidity, parity, abortion, cesarean section (CS), and pain intensity (P<0.05). There was no significant association found between normal vaginal delivery (NVD), anesthetic type, and pain intensity (P>0.05).

Table 3 indicates a significant correlation between the intensity of pain and a history of Low Back Pain (LBP) before and after pregnancy (P<0.05).

Table 1. Association of sociodemographic data with pain intensity

Variables	Pain intensity			Total	P-Value*
	Moderate (3-5)	Severe (6-9)	Very severe (10)		
Age (Binned) (%)					
<= 24.00	6 18.80%	16 50.00%	10 31.20%	32 100%	0.557
25.00 - 30.00	7 14.90%	25 53.20%	15 31.90%	47 100%	
31.00 - 36.00	1 4.20%	12 50.00%	11 45.80%	24 100%	
37.00+	1 14.30%	2 28.60%	4 57.10%	7 100%	
Body mass index (Binned) (%)					
<= 25.00	7 25.00%	12 42.90%	9 32.10%	28 100%	0.026
25.01 - 30.00	8 16.30%	27 55.10%	14 28.60%	49 100%	
30.01 - 35.00	0 0.00%	16 48.50%	17 51.50%	33 100%	
Education level (%)					
Primary and secondary	1 2.60%	21 53.80%	17 43.60%	39 100%	0.039
University	14 19.70%	34 47.90%	23 32.40%	71 100%	
Occupation (%)					
Housewife	14 17.90%	37 47.40%	27 34.60%	78 100%	0.12
Working	1 3.10%	18 56.20%	13 40.60%	32 100%	
Exercised (before pregnancy) (%)					
Yes	4 13.80%	12 41.40%	13 44.80%	29 100%	0.506
No	11 13.60%	43 53.10%	27 33.30%	81 100%	
Exercise (currently)(%)					
Yes	0 0.00%	3 75.00%	1 25.00%	4 100%	0.54
No	15 14.20%	52 49.10%	39 36.80%	106 100%	

*Chi-square test

Table 2. Association of obstetric characteristics and pain intencity

Variables	Pain intensity			Total	P-Value*
	Moderate (3-5)	Severe (6-9)	Very severe (10)		
Gestational age (%)					
<= 18	5 23.80%	6 28.60%	10 47.60%	21 100%	0.004
19 – 24	9 21.40%	17 40.50%	16 38.10%	42 100%	
25 – 30	1 2.10%	32 68.10%	14 29.80%	47 100%	

Variables	Pain intensity			Total	P-Value*
	Moderate (3-5)	Severe (6-9)	Very severe (10)		
Gravida (%)					
Primigravida	14 33.30%	16 38.10%	12 28.60%	42 100%	< 0.001
Multi and Grand multi	1 1.50%	39 57.40%	28 41.20%	68 100%	
Para (%)					
Primipara	14 25.90%	24 44.40%	16 29.60%	54 100%	0.001
Multipara	1 1.80%	31 55.40%	24 42.90%	56 100%	
Abortion (%)					
No	15 18.30%	35 42.70%	32 39.00%	82 100%	0.01
Yes	0 0.00%	20 71.40%	8 28.60%	28 100%	
Normal vaginal delivery (NVD) (%)					
Non	14 16.70%	40 47.60%	30 35.70%	84 100%	0.242
NVD	1 3.80%	15 57.70%	10 38.50%	26 100%	
Cesarean section (%)					
Non	15 20.00%	37 49.30%	23 30.70%	75 100%	0.01
≥ 1	0 0.00%	18 51.40%	17 48.60%	35 100%	
Type of anesthesia in cesarean section cases					
Non	15 20.30%	36 48.60%	23 31.10%	74 100%	0.21
Spinal	0 0.00%	17 58.60%	12 41.40%	29 100%	
General anesthesia	0 0.00%	2 28.60%	5 71.40%	7 100%	

*Chi-square test

However, seeking medical advice from a healthcare professional or having a family history of LBP did not exhibit any significant correlation with the severity of pain (P>0.05).

Table 4 presents the association between body mechanics (knowledge and practice) and pain severity.

There was a significant correlation observed between the degree of pain and the practice of proper body mechanics (P<0.05). This was further supported by lower scores (0-21=Not done), indicating a notable correlation between incorrect body mechanics and the intensity of pain experienced, as reported by 61% of the participants. Specifically, 42.6% reported experiencing extremely severe pain, 50.8% reported severe pain, and 6.6% reported moderate pain due to incorrect body mechanics. Contrarily, the higher scores (21-44=done) indicated the percentage of pregnant women (49%) who adhered to the proper BM in relation to the severity of their pain (28.6% extremely severe, 49% severe, and 22.4% moderate pain). Knowledge of body mechanics was significantly correlated (P 0.05) with pain level. The results show that participants with higher scores (21–44=good knowledge) had a greater understanding of BM and reported less severe pain (25.4% very severe, 55.9% severe, and 18.8% moderate discomfort).

Table 3. Association of low back pain characteristics and pain intensity

Class	Pain intensity			Total	*P*-value*
	Moderate (3-5)	Sever (6-9)	Very sever (10)		
Complained of lower back pain in their previous pregnancies					
No	15	27	22	64	0.002
	23.40%	42.20%	34.40%	100%	
Yes	0	28	18	46	
	0.00%	60.90%	39.10%	100%	
Complaining of lower back pain before being pregnant					
No	13	30	20	63	0.042
	20.60%	47.60%	31.70%	100%	
Yes	2	25	20	47	
	4.30%	53.20%	42.60%	100%	
Consulting any health professionals for their current lower back pain?					
No	14	37	28	79	0.132
	17.7%	46.8%	35.4%	100%	
Yes	1	18	12	31	
	0.32%	58.1%	38.7%	100%	
Other family members complained of lower back pain					
No	4	18	10	32	0.698
	12.5%	56.3%	31.3%	100	
Yes	11	37	30	78	
	14.1%	47.4%	38.5%	100	

*Chi-square test

Table 4. Association of body mechanics (practice and knowledge) with pain intensity

Variables	Pain intensity			Total	P-Value*
	Moderate (5-6)	Sever (7-9)	Very severe (10)		
Body mechanics – Practice (BM-P) (%)					
0-21 Score[1]	4	31	26	61	0.038
	6.60%	50.80%	42.60%	100%	
21-44 Score[2]	11	24	14	49	
	22.40%	49.00%	28.60%	100%	
Body mechanic – Knowledge (BM-K) (%)					
0-21 Score[3]	4	22	25	51	0.024
	7.80%	43.10%	49.00%	100%	
21-44 Score[4]	11	33	15	59	
	18.60%	55.90%	25.40%	100%	
Total	15	55	40	110	
	13.60%	50.00%	36.40%	100%	

*Chi-square test, 1. 0-21 Score = Practice BM incorrectly; 2. 21-44 = Practice BM correctly; and 3. 0-21 = Poor knowledge, 4. 21-44 = Good knowledge

A lower score (0-21=poor knowledge), in contrast, denoted a lower level of understanding and a higher degree of pain severity (49% extremely severe, 43% severe, and 8% moderate pain) in (51%) of the individuals.

Table 5 highlights the impact of body mechanics knowledge and practice on pain severity. Individuals with poor body mechanics skills had a higher likelihood of experiencing severe lower back pain compared to those who correctly practiced body mechanics (OR=3.552, 95% CI (1.005-12.552)).

Furthermore, individuals with extremely severe pain who did not adhere to proper body mechanics had an increased likelihood [OR=5.107, 95% CI (1.37-19.041)] of

experiencing pain as compared to those who correctly performed body mechanics. Individuals with limited knowledge of proper body mechanics had a higher likelihood of experiencing severe back pain [OR=1.833, 95% CI (0.517-6.497)] compared to those who had a better understanding of it. Conversely, individuals with a proper understanding of body mechanics had a greater potential [OR=4.583, 95% CI (1.235-17.008)] of avoiding extreme pain compared to those who lacked knowledge of body mechanics.

Table 5. Odds ratio and confidence interval of body mechanics (Knowledge and Practice)

Variable	Reference	OR	CI	P-Value
Body mechanics - Practice				
Practice BM Incorrectly				
Severe	Practice BM Correctly	3.552*	(1.005-12.552)	0.036
Very severe		5.107*	(1.37-19.041)	
Body mechanics – Knowledge				
Poor knowledge				
Severe	Good Knowledge	1.833*	(0.517-6.497)	0.023
Very severe		4.583*	(1.235-17.008)	

Multinomial logistic regression model, *significant 5%, the reference category is moderate.
BM: body mechanics; OR: Odds ratio; CI: confidence interval

Discussion

The primary goal of this study was to assess BM knowledge and practice among pregnant women with LPP and to identify the association of BM awareness and practice with LPP. Despite the fact that more than half of the participants had a good understanding of BM, the majority of participants had incorrectly habituated daily activities. However, our findings revealed a significant relationship between BM knowledge and pain severity, indicating that having good BM knowledge can reduce pain. In addition, pain severity was discovered to be related to practice level. The greater the habituation of daily mobilities based on BM principles, the less pain experienced during pregnancy. The present study highlights that poor body mechanics (knowledge and practice) were identified as more significant risk factors compared to other variables.

The majority of the characteristics of the participants in this study have previously been identified as contributors to LBP during pregnancy. Younger mothers (< 35 years) and those with a BMI ≥ 25 kg/m2 were associated with LBP, multiparity (24), family history of LBP (25), lack of exercise (26), history of LBP, or previous pregnancy-related LBP. Abortion increases the risk of LBP during pregnancy (27), gestational age (28), Lower levels of maternal education (6), and previous CS (29). Additionally, cultural and environmental factors may influence the discomfort experienced by pregnant women. Pregnancy is a risk factor for LPP (30). Although pregnancy progresses, it changes the BM and posture (8) to compensate for this physiological and anatomical transformation.

Many researchers have investigated BM and posture as practical skills and knowledge associated with LBP risk factors, preventive techniques (31), and LBP treatment among nurses (11), lessening fatigue and muscle strain (32). However, exercise and conservative therapy have been utilized to treat LPP due to pregnancy (33-34).

Dewi et al. (2016) conducted a cross-sectional study involving 24 pregnant women in their third trimester, and their findings are in agreement with the results of the present study (9). Their findings revealed that pregnant women who followed the principles of proper body mechanics during their daily activities experienced fewer problems with low back pain. Individuals who did not practice proper body mechanics reported higher levels of pain. In a quasi-experimental study by Hemed et al. (2017), the impact of a training program on the body mechanics performance of 76 nurses was examined (35). Most nurses reported having back discomfort, having little education, and

having little experience with BM before to the intervention. Between the pre- and post-program phases, a statistically significant difference was shown in the nurses' knowledge, practice, pain severity, and disability.

In an experimental study by Ramadhania & Idhayanti (2020), 31 pregnant women in their third trimester with low back pain were recruited. The study revealed that training on improving balance, body posture, and proper body mechanics resulted in reduced discomfort among the participants (36). To reduce muscular stiffness, enhance blood flow, maintain a healthy spine and body alignment, pregnant women should be able to get into and out of bed and lie down (37).

In contrast to the findings of our study, Jayakrishnan (2016) conducted a cross-sectional study on BM knowledge and practice in 100 nurses. According to their findings, nurses' knowledge (42% vs. 71% practice) was lower. The difference between our study and this one (38) is that their population consisted of nurses, both male and female, who were evaluated at work and were not pregnant.

According to a narrative review, appropriate BM practices with appropriate ergonomic are helpful in the safety of pregnant healthcare workers outcome (39).

It is important to address pregnancy-related LBP since it may be substantially correlated with mobility and posture. Another research examined 12 weeks' worth of LBP-related activities while pregnant. At 12, 24, 30, and 36 weeks, the pain was assessed, and the motions that cause LBP were looked at using free-form descriptive responses. Sixteen actions, including tossing and turning, standing up from a chair, and sitting up, all of which are daily routines rather than specific movements that call for extra work or effort, caused LBP. These findings imply that basic physical advice for expectant women, such as getting up to lighten body burden, may be helpful in managing LBP (8). Training the body to stand, walk, sit, and lay in ways that put the least amount of strain on the back is necessary for good posture throughout pregnancy (40).

Similar to this study, a cross-sectional descriptive study was conducted in Pakistan (2016–2017) to evaluate the understanding and use of BM procedures among 216 nurses. 35% of the nurses had a subpar understanding of BM, whereas 65% had adequate knowledge. 60% of people engaged in BM, compared to 40% who did not. Among nurses, back discomfort is a widespread issue. Even while most nurses are aware of BM procedures, very few actually use them. The findings showed that individuals dramatically increased their practice of BM the more they were knowledgeable about it (41).

Our results are similar to those studies conducted to determine the relationship between body posture and back pain among 100 primiparous women at third trimester. Purposeful sampling was used to choose the sample. Most mothers (44%) experienced moderate pain, followed by no discomfort (20%), mild pain (27%), and severe pain (9%). The study found that a significant majority (78%) of pregnant women in their antenatal stage maintained poor body posture, while only a minority (22%) maintained a good body posture. Back discomfort and poor posture were found to be positively correlated (17). Proper body mechanics are essential for everyone, regardless of their profession or situation. It is crucial to use good body mechanics at all times (14). Mohamed (2018) carried out an exploratory, descriptive study to identify self-care activities that pregnant women perform. One parameter was practicing good BM during pregnancy. They found that only 10.3% practice the correct BM and posture. Other crucial criteria for pregnant women included instruction on correct BM and placement both inside and outside the house. They concluded that this training is crucial for ensuring safety and raising tolerance for extended workdays (42). Furthermore, during pregnancy, it is critical for women to have a scientific reference to consult about their body posture, mechanics, alignment, and daily mobility.

The strength of the present study is that it stimulated pregnant women's minds about their daily mobility and pushed some of them to seek advice on standards. The evaluation of body mechanics practices had a weakness, as some participants required assistance in comprehending the photographs. Additionally, some individuals required more time to complete the questionnaire due to discomfort.

Some participants left in the middle of process, because they did not want to stay in the center any longer due to COVID-19. The COVID-19 pandemic hampered the collection of larger sample sizes. Practical measurement is required for accurately assessing body mechanic's practice. The selection of illustrations, such as BM knowledge and practice, does not provide reality, thus further research on this topic is required.

Conclusion

Women who have a history of pregnancy-related low back pain (LPP), as well as those who have experienced weight gain, advanced gestational age, and increased maternal age, are more susceptible to developing the condition. The findings of the current study' indicate a robust association between the severity of LPP during the second and third trimesters of pregnancy and inadequate knowledge of proper body mechanics, as well as incorrect body movement when performing everyday activities. One of the essential components of antenatal care services is health education provided by the nurses, midwives, and physical therapist); thus, including a session on lower back care combined with ergonomic advice, BM, and posture alignment during pregnancy help to reduce the severity of pain or the prevalence of LPP.

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Conflicts of interest

The authors declared no conflicts of interest.

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