

Maternal Parity Effect on Spine Posture Changes and Back Pain during Pregnancy

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Abstract

Background: During pregnancy, many women experience low back pain. This condition, on average, affects 50-90% of women and is associated with postural balance instability, and high risk of falling. These effects are likely to be the ultimate result of several hormonal and biomechanical changes that occur during pregnancy. Identifying the influence of parity on the occurrence and severity of low back pain is essential for understanding its impact on maternal health and developing preventive strategies.

Aim of Study: This study was conducted to assess the lower back pain intensity between primigravida and multigravida women during pregnancy.

Patients and Methods: Forty females with low back pain participated in this study. Their ages ranged from 25 to 35 years and their body mass index ranged from 30 to 35 kg/m². They were selected from outpatient clinic of physical therapy in October 6 University (Obstetrics and Gynecology Department), from August 2024 to February 2025. Subjects were divided into two groups (A&B), twenty in each group. Group (A) primigravida female in 2nd and 3rd trimester while group (B) multigravida female in 2nd and 3rd trimesters. Low back pain intensity was evaluated using the Visual Analog Scale (VAS), a validated and widely used tool for pain measurement in clinical research. The VAS consists of a 10-centimeter horizontal line, with endpoints labeled as "no pain" (0cm) and "worst imaginable pain" (10cm). Participants were instructed to mark a point on the line that best represented the average intensity of their low back pain. The distance in centimeters from the "no pain" end to the participant's mark was measured and recorded

as the VAS score, ranging from 0 to 10. The VAS assessment was conducted in a quiet and private setting, ensuring participant comfort and minimal distractions.

During the second and third trimesters, in line with the study's aim to compare pain intensity across different stages of pregnancy.

Participants were seated comfortably, and verbal instructions were given using simple language to ensure understanding. In case of any difficulties (e.g., literacy issues), the scale was explained verbally, and the marking was assisted without influencing the participant's choice. VAS scores were then used to compare pain intensity between primigravida and multigravida groups.

Results: There was no significant difference in VAS between primigravida and multigravida in second and third trimesters.

Conclusion: Our results suggest that there is no significant difference in VAS between primigravida and multigravida women.

Key Words: Low back pain – Second trimester – Third trimester – Primigravida – Multigravida – VAS.

Introduction

LOWER back pain (LBP) is a common musculoskeletal complaint with a prevalence of approximately 40%, affecting individuals due to various underlying causes. Among these, pregnancy is a significant contributor, with the incidence of pregnancy-related LBP ranging from 24% to 90% [1].

Pregnancy back pain refers to a type of back pain that appears during pregnancy, and the person has no history of back pain before that. Pregnancy back pain is one of the most common musculo-

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skeletal pains that most women experience for the first-time during pregnancy and may cause many problems and disabilities for them [2].

Pregnancy induces numerous physiological and biomechanical changes in a woman's body. One of the most frequent discomforts reported is low back pain (LBP), affecting up to 50–70% of pregnant women. LBP during pregnancy can be influenced by multiple factors including hormonal changes, weight gain, altered posture, and muscle strain. The experience of LBP may vary between primiparous and multiparous women due to differences in anatomical adaptation, physical conditioning, and psychosocial factors [3].

During pregnancy the female body is exposed to certain factors causing dynamic instability of the pelvis, and that LBP may be secondary to hormonal changes. Relaxin increases during pregnancy causing ligamentous laxity and discomfort, not only in the sacro-iliac joint, but also generalized discomfort, pain of the entire back, instability of the pelvis and misalignment of the spine [4].

The exact cause of LBP in pregnancy is poorly understood, often considered multifactorial in nature, and associated with biomechanical, vascular and hormonal changes during pregnancy and there is also a positive relationship between the number of full-term pregnancies or the total number of children a woman experiences and the prevalence of subsequent LBP [5].

Low-back pain (LBP) and pelvic pain (PP) are common during pregnancy and tend to increase as pregnancy advances; in some cases, the pain radiates into the buttock, leg and foot. Global prevalence is reported to range from 24% to 90%, in part, because there is currently no universally recognised classification system for the condition [6].

The prevalence of lower back pain is high in women during pregnancy. The relationship between stiffness of the trunk and lower back pain has also been reported in the non-pregnant population.

Pregnant women, particularly in the third trimester, exhibit an increase in abdominal volume, which would cause a decrease in the range of motion of the trunk. It is thus likely that the trunk of pregnant women would be relatively stiff [7].

Muscle strength of pregnant women in their first and second trimesters found a decrease in the strength of the back muscles and quadriceps of pregnant women. From the perspective of the

musculoskeletal system, it can be readily seen how movement becomes difficult and balance function declines in pregnant women. It is manifested by a decrease in the muscle strength of the trunk and leg muscles that must support the increased body weight.

Postural changes are very common problems of women during pregnancy which ultimately causes low back pain, during pregnancy the growing fetus add stress on postural muscles as the centre of gravity shifts forward and upward, and the spine shifts to compensate and maintain stability, causing enormous strain on the lower back and shifting the centre of gravity. The centre of gravity of pregnant women is displaced anteriorly and superiorly, compared to non-pregnant women.

Furthermore, changes are seen in body shape [8]. The exaggerated lumbar lordosis increases the mechanical strain on the lower back and put stress on the intervertebral disc. The abdominal muscles also stretch to accommodate the expanding uterus. As they stretch, the muscles become tired and lose their ability to maintain normal body posture causing the lower back to support most of the increased weight of the torso [9].

Subjects and Methods

Subjects:

This study was conducted on forty pregnant women (in second and third trimesters) suffering from low back pain, they were assigned into two groups (A&B), twenty in each group. Group (A) primigravida female in 2nd and 3rd trimester while group (B) multigravida female in 2nd and 3rd trimesters. The females participated in the study after signing an informed consent form were selected from October 6 University Hospital (Department of Obstetrics and Gynaecology). This study was conducted from August 2024 to February 2025. It was performed after the Ethical Committee approval from the ethical committee of Faculty of Physical Therapy, Cairo University, Egypt (No:P.T.REC/012/005384).

The inclusion criteria as follow: All women were Pregnant in 2nd and 3rd trimesters, Their Age ranged from 20-35 years, Their Body mass index (BMI) ranged from 30 to 35kg/m², All Pregnant women were suffering from low back pain. The exclusion criteria were as follow: If they are non-pregnant, Women with any history of diseases associated with balance disorder (Neurological, optical, cerebrovascular diseases), Women with BMI greater than 35kg/m².

Materials (equipments):

- Measurement equipment:

The following measurement instruments were used in this study:

- Informed consent form which is a voluntary free written consent that assigned by each female before participating in the research study.
- Recording data sheet where tabulate personal and demographic data of each female.
- Weight and height scale, which is a health scale was used to evaluate height and weight to calculate BMI before starting the study for both groups.
- Visual analogue scale which is self-reported scale that is used to measure the low back pain intensity.

Methods (Procedures):

All females received a full detailed information concerning current study and a written approval consent form was signed at the beginning of the current study.

Evaluation procedures:

All study procedures were performed at the beginning of study protocol. History taking in details, Obstetric, medical and present history were taken from each female in both groups to be sure for their inclusion criteria or other issue might exclude any of them or even influence current trial and recorded in such case.

Weight and height measurement: Weight, height and BMI were measured, females wore thin layer of clothes and no shoes.

Visual analogue scale: The Visual Analogue Scale (VAS) is a unidimensional instrument used to assess pain intensity. It is a 10cm line with pain scales ranging from 0 to 10, divided into mild (0 to 2), moderate (3 to 7), and severe (8 to 10) groups. The scale also uses visual resources such as drawings representing facial expressions. Participants

were instructed to mark a point on the line that best represented the average intensity of their low back pain. The distance in centimeters from the “no pain” end to the participant’s mark was measured and recorded as the VAS score, ranging from 0 to 10.

The VAS assessment was conducted in a quiet and private setting, ensuring participant comfort and minimal distractions. The assessment was done twice, the first assessment session was in the 2nd trimester and the other one was in the 3rd trimester, in line with the study’s aim to compare pain intensity across different stages of pregnancy. Participants were seated comfortably, and verbal instructions were given using simple language to ensure understanding. In case of any difficulties (e.g., literacy issues), the scale was explained verbally, and the marking was assisted without influencing the participant’s choice. VAS scores were then used to compare pain intensity between primigravida and multigravida groups.

Results

Comparison of VAS between primigravida and multigravida groups in the second and third trimesters:

Second trimesters:

The mean value $\pm$ SD of the VAS during the 2nd trimester in the primigravida group was 4.00 ± 0.73 , and in the multigravida group was 4.35 ± 0.75 . The mean difference was -0.35 . There was no significant difference in VAS between the primigravida and multigravida groups during the 2nd trimester ($p=0.14$). (Table 1, Fig. 1).

Third trimesters:

The mean value $\pm$ SD of the VAS during the 3rd trimester in the primigravida group was 5.35 ± 0.67 , and in the multigravida group was 5.55 ± 0.76 . The mean difference was -0.2 . There was no significant difference in VAS between the primigravida and multigravida groups during the 3rd trimester ($p=0.38$). (Table 1, Fig. 1).

Table (1): Comparison of VAS between primigravida and multigravida groups in the second and third trimesters.

VAS	Primigravida	Multigravida	MD	t-value	p-value	Sig.
	X $\pm$ SD	X $\pm$ SD				
2 nd trimesters	4.00 ± 0.73	4.35 ± 0.75	-0.35	-1.51	0.14	NS
3 rd trimesters	5.35 ± 0.67	5.55 ± 0.76	-0.2	-0.88	0.38	NS

X : Mean

SD : Standard deviation.

MD: Mean difference.

t-value : Unpaired t-value.

p-value: Probability value.

NS: Non significant.

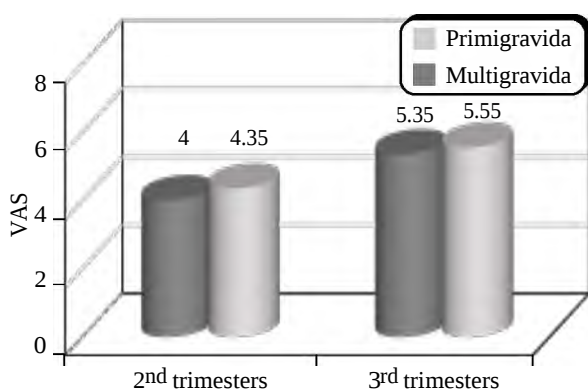


Fig. (1): Comparison of VAS between primigravida and multigravida groups in the second and third trimesters.

Discussion

The main purpose of this study was to assess the low back pain intensity between primigravida and multigravida women during pregnancy, and to find The correlation between low back pain and parity. The subjects were divided into two groups equal in number Group (A&B), Group (A) consists of 20 primigravida women in their second and third trimester that had low back pain according to Visual analogue scale (VAS), Group (B) consists of 20 multigravida women in their second and third trimester that had low back pain according to Visual analogue scale (VAS) the obtained results revealed that there is no significant differences between primigravida and multigravida women in low back pain intensity that assessed by VAS during pregnancy.

That conducted a study on spinal posture changes and back pain in pregnant women and found no statistically significant difference in back pain intensity or spinal alignment between nulliparous and parous participants. The findings suggest that parity does not appear to influence LBP during pregnancy. The results of the current study were supported by Ghanbari et al. [10] that examined the relationship between the number of pregnancies and low back pain. While they observed a higher incidence of LBP with increasing gravidity, the intensity of pain was not significantly different, indicating that the experience of pain is not necessarily affected by the number of previous pregnancies. The result of the study was agreed with Sabino and Grauer [11] that explored women's self-reported experiences of LBP during pregnancy. Although they reported that LBP was slightly more frequent in primigravida women (56.3%) compared to multigravida women (43.7%), the difference was not statistically significant, supporting the idea that parity may not be a major factor influencing the intensity or prevalence of pregnancy-related LBP.

The result of the current study was in the same context with Popajewski et al., [12] which reported that Parity does not affect spine posture during pregnancy or pain intensity. The intensity of LBP was associated with spine posture changes during pregnancy

The result of the current study were disagreed with Mota, M.J., [13] that reported LBP were common (n=71; 67.6%) and slightly more frequent in primiparous (n=40; 56.3%) than multiparous (n=31; 43.7%).

Also, Güngör & Karakuzu Güngör [14] investigated the effect of the number of pregnancies on the development of chronic LBP, lumbar disc degeneration, and lumbar sagittal balance. The findings indicated that women with higher parity, especially grand multipara (five or more pregnancies), had a higher prevalence of Modic changes, Schmorl's nodes, and LBP. However, parity did not significantly influence sagittal balance parameters such as lumbar lordosis, sacral slope, pelvic incidence, and pelvic tilt.

Conclusion:

According to our results the obvious conclusions were: There is no significant difference in visual analogue scale between primigravida and multigravida women in 2nd and 3rd trimesters.

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تأثير تعدد الولادات على تغيرات وضعية العمود الفقري وآلام الظهر أثناء الحمل

الهدف: أجريت هذه الدراسة لدراسة تأثير تغيرات التوازن الوضعي على آلام أسفل الظهر أثناء الحمل. شملت الدراسة أربعين امرأة تعاني من آلام أسفل الظهر. تراوحت أعمارهن بين ٢٥ و ٣٥ عامًا، وتراوح مؤشر كتلة الجسم لديهن بين ٣٠ و ٣٥ كجم/م^٢. تم اختيارهن من العيادة الخارجية للعلاج الطبيعي بجامعة ٦ أكتوبر، خلال الفترة من أغسطس ٢٠٢٤ إلى فبراير ٢٠٢٥. قُسمت المشاركات إلى مجموعتين (أ)، (ب)، ضمت كل مجموعة عشرين امرأة. المجموعة (أ) الحوامل لأول مرة في الثلث الثاني والثالث من الحمل بينما المجموعة (ب) الحوامل لأكثر من مرة في الثلث الثاني والثالث من الحمل. تم تقييم البيانات التي تم الحصول عليها من كلا المجموعتين بواسطة مقياس التناظر البصري لتقييم شدة الألم. كشفت نتائج هذا العمل انه لا يوجد فرق ذو دلالة احصائية في نتائج مقياس التناظر البصري بين النساء الحوامل لأول مرة والنساء الحوامل لأكثر من مرة ($p=0.14$) ($p=0.38$).

الخلاصة: تشير نتائجنا إلى أن لا يوجد فرق ذو دلالة احصائية في مقياس شدة الام أسفل الظهر بمقياس التناظر البصري بين النساء الحوامل لأول مرة والنساء الحوامل لأكثر من مرة.