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# Prevalence and Risk Factors for Low Back Pain in Primiparous Women Visiting Maternity Hospitals During Different Months of Pregnancy

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## Abstract

**Objectives:** Pregnancy is one of the pleasant periods of a woman's life that turns into a bitter experience by common complications such as low back pain (LBP). Due to prevailing climatic conditions in Iran and the harmful social norms concerning Iranian women, the present study aimed to investigate the prevalence of pregnancy-related LBP and its influencing factors during different months of pregnancy.

**Materials and Methods:** This descriptive cross-sectional study was conducted in 2019 on 550 pregnant women for LBP who were eligible based on the inclusion criteria. The research instruments were a demographic questionnaire, a LBP examination, and the visual analog scale (VAS). The obtained data were analyzed using the chi-square test, the independent *t* test, and multiple logistic regression in SPSS 20, and a $P<0.05$ was considered statistically significant.

**Results:** The prevalence of LBP was 67.27%, and the most important factors influencing pregnancy-related LBP were maternal age (OR = 950, $P<0.008$), gestational age (OR = 1.023, $P=0.015$), body mass index (OR = 802, $P=0.045$), duration of sitting (OR = 1.812, $P=0.036$), and the duration of standing (OR = 1.625, $P=0.042$).

**Conclusions:** Overall, there was a high prevalence of pregnancy-related LBP in primiparous women in the present study and its predisposing risk factors included advanced maternal age, obesity, and low level of ability to sit and stand for a long time.

**Keywords:** Low back pain, Primiparous, Prevalence, Risk factor

## Introduction

Pregnancy is one the most important and valuable periods in a woman's life (1,2) although some complications may accompany this experience, including infections (3), varicose veins (4), and musculoskeletal disorders (5,6) leading to disabilities in 25% of pregnant women. The most common type of musculoskeletal pain during pregnancy is low back pain (LBP), which appears in 50% of pregnancies on average (7,8).

Pregnancy-related LBP may continue and delay the mother's return to her active life. In addition, it may remain in approximately 20%-80% of women for up to two years following pregnancy (9,10). This problem has gained special attention because two of every 10 women who experience pregnancy-related LBP strongly refuse to become pregnant again and pregnancy-related LBP accounts for at least 60% of absence from work and approximately 20% of maternity leave (11).

There is a high prevalence of pregnancy-related LBP in Iran, and it is often thought that this type of LBP, the etiology and pathophysiology of which have not been accurately determined yet, is an inevitable part of the pregnancy experience. Further, no accurate reports exist on the prevalence of pregnancy-related LBP in Iranian pregnant women. Furthermore, Iranians have special behavioral habits in relation to posture when standing, sitting, and doing activities, as well as using traditional squat toilets and taking improper care during pregnancy. Moreover, climatic and cultural conditions play a role in the lifestyle of Iranian women. Therefore, this study evaluated the prevalence of LBP in Iranian primiparous pregnant women separately for each trimester and the factors that influence its appearance. It is hoped that the results can prepare the preliminary ground for developing preventive methods, reducing the pain caused by this common complication, and findings methods for its treatment.

## Materials and Methods

This descriptive cross-sectional study was performed on 550 participants in Al-Zahra and Taleghani hospitals affiliated to Tabriz University of Medical Sciences in 2019. The sample size was 515considering the estimated 70% prevalence of LBP in the study by Mohseni-Bandpei et al (12) and using a 95% confidence interval, 80% statistical power, and Morgan's table. To compensate for the possible sample attrition, it was increased to 550 cases. Additionally, the random sampling technique was used at

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**Key Messages**

- Low back pain is the most common neuromuscular problem in pregnancy.
- The prevalence of low back pain in pregnancy in our study was 67%.
- The prevalence of low back pain in pregnancy rises with increasing gestational age.

both hospitals, and the participants were selected based on the inclusion criteria (i.e., first pregnancy, pregnancy confirmed by a gynecologist, and maternal age >18 years). On the other hand, the exclusion criteria were no history of intervertebral disc disease, lumbar discectomy, lumbar tumors or inflammatory diseases (including diabetes and hypertension), and no spinal deformities including scoliosis. In addition, gestational age was performed by ultrasound and confirmed by a gynecologist. All study participants were included in the study and met the inclusion and exclusion criteria.

A questionnaire was used to obtain data about maternal age, gestational age, height, weight, body mass index due to its importance regarding the anesthetic technique and pregnancy outcome (13,14), employment status, and exercise during pregnancy (walking 30 minutes a day or exercising three times per week. Further, other obtained data were related to a history of underlying diseases and the ability to stand and sit for a long time (more or less than 3 hours). The second form dealt with LBP assessment and its intensity. Furthermore, the existence of LBP was based on the presence or absence of any pain that pregnant women felt in the lower lumbar region (15). Based on the results of this checklist, LBP was confirmed and then it was also confirmed by the physician. Its symptoms included spinal pain, back and leg pain, back pain, and the lower limbs that followed the activity appeared, and its intensity was measured on a visual analog scale (VAS). This scale was graded from 0 to 100. Scores lower than 20, in the range of 20-40, 40-60, and 60-80, and higher than 80 indicated mild (somewhat annoying), moderate and distressing, severe, very severe, and unbearable pain, respectively, and pregnant women were asked to score their pain intensity based on this scale.

The most important ethical considerations in this study were obtaining informed consent, ensuring data confidentiality, exempting the participants from paying anything for their participation in the research, and receiving the approval of the Ethics Committee of Tabriz University of Medical Sciences. The data were interred into SPSS 20 after a researcher in the research team collected the data and confirmed that they were recorded in the way that was explained to the participants. Then, the chi-square (for the prevalence of LBP) test and the independent *t* test (for the comparison of demographic factors, as well as pregnancy-related LBP factors) were used to determine the relationship between the variables. Finally, a multiple logistic regression was applied to estimate the matched chance of each variable with LBP, and a $P < 0.05$ was considered statistically significant.

## Results

This study was conducted on 550 eligible pregnant women visiting Al-Zahra (n = 350) and Taleghani (n = 200) hospitals in Tabriz considering the inclusion and exclusion criteria. The evaluation of the filled forms revealed that they were completed correctly and thus there was no sample attrition. Among the participants, 118 (21.45%), 259 (47.10%), and 173 (31.45%) cases were in their first, second, and third trimesters, respectively. The mean ± standard deviation values for the age and body mass index (BMI) of the participants were 25.49 ± 0.51 and 28.15±4.89 years, respectively. Moreover, 198 (36%), 175 (31.81%), and 177 (32.18%) participants were in their first, second, and third trimesters, respectively. Additionally, 370 (67.27%) had LBP out of whom, 350 (63.63%) and 20 (3.63%) cases attributed it to pregnancy and reported that they had it before the pregnancy, respectively. Table 1 presents the complementary information about LBP for each trimester. Among the participants whose pain was confirmed after pain assessment (VAS), pain intensity increased month by month (Figure 1).

Based on the results, there was a significant difference between the groups with and without LBP regarding maternal age ($P$=0.045), duration of sitting ($P$=0.012), and duration of standing ($P$=0.009), the details of which are provided in Table 2. Based on the data in Table 3, significant differences were found between the groups with and without LBP in terms of factors related to maternal age ($P$=0.009), gestational age ($P$=0.009), and BMI ($P$=0.009).

The related and significant factors were determined (Tables 2 and 3) and multiple regression analysis was performed at the significance level of 95%. The results showed that maternal age (OR = 950, $P$ = 0.008),

**Table 1.** Prevalence of LBP Among the Participants in Their First, Second, and Third Trimesters

| Variable | Total, No. (%) | LBP, No. (%) | No Back Pain, No. (%) | *P* value[a] |
|---|---|---|---|---|
| First trimester | 198 (36) | 117 (59.10) | 81 (40.90) | |
| Second trimester | 175 (31.81) | 110 (62.85) | 65 (37.15) | |
| Third trimester | 177 (32.18) | 123 (69.49) | 54 (30.51) | 0.005 |

*Note*. LBP: Low back pain; [a] Chi-square.

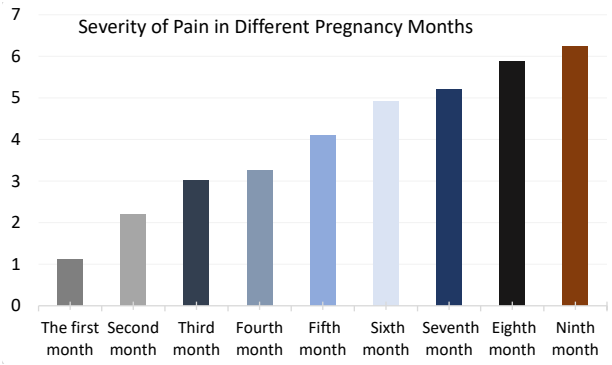


**Figure 1.** The Severity of in Different Months in Participants With Back Pain.

gestational age (OR = 1.023, $P = 0.015$), BMI (OR = 802, $P = 0.045$), duration of sitting (OR = 1.812, $P = 0.036$), and duration of standing (OR=1.625, $P = 0.042$) were the most important factors influencing pregnancy-related LBP (Table 4).

**Table 2.** Comparison of Demographic Factors Between the Groups of Pregnant Women With and Without LBP

| Variable | | LBP No. (%) | No Back Pain No. (%) | *P* Value[a] |
|---|---|---|---|---|
| Age (y) | <20 | 36 (10.28) | 19 (9.50) | 0.045* |
| | 20-25 | 129 (36.85) | 92 (46) | |
| | 26-30 | 156 (44.57) | 48 (24) | |
| | >30 | 187 (08.28) | 41 (20.50) | |
| Job | Housewife | 169 (48.28) | 109 (54.50) | 0.103 |
| | Employed | 181 (51.72) | 91 (45.50) | |
| Sport | Yes | 190 (54.28) | 115 (57.50) | 0.211 |
| | No | 160 (45.72) | 85 (42.50) | |
| Diabetes | Yes | 59 (16.85) | 55 (27.50) | 0.063 |
| | No | 291 (83.14) | 145 (72.50) | |
| Hypertension | Yea | 61 (17.42) | 59 (29.50) | 0.052* |
| | No | 289 (82.57) | 141 (70.50) | |
| Time to sit | <3 h | 211 (60.28) | 63 (31.50) | 0.012* |
| | >3 h | 139 (39.71) | 137 (68.50) | |
| Long stand | <3 h | 239 (68.28) | 59 (29.2850) | 0.009* |
| | >3 h | 111 (31.71) | 141 (70.50) | |

*Note*. LBP: Low back pain. [a] *t* test, *Significant.

**Table 3.** Comparison of Pregnancy-Related LBP Factors Between the Groups of Pregnant Women With and Without LBP

| Variable | LBP No. (%) | No Back Pain No. (%) | *P* Value[a] |
|---|---|---|---|
| Mother age (y) | 21.23±03.11 | 27.49±04.43 | 0.014* |
| Pregnancy age (wk) | 26.12±05.81 | 22.59±03.19 | 0.012* |
| BMI | 31.69±05.45 | 27.59±04.18 | 0.009* |

*Note*. LBP: Low back pain; BMI, BMI: Body mass index. [a] *t* test, *Significant.

## Discussion

This study investigated the prevalence of LBP and its related factors in primiparous women at different gestational ages visiting two maternity hospitals. The results showed a pregnancy-related LBP prevalence of 67.27%. In addition, the study of the factors influencing pregnancy-related LBP revealed that maternal age, gestational age, high BMI, and the ability to stand and sit only for less than 3 hours were the most important risk factors. Pregnancy-related LBP is one of the most common complications during pregnancy, and most people perceive it as a part of the pregnancy process. As a result, enough attention is not given to its causal factors or treatment. Consequently, pregnancy-related LBP causes problems for primiparous women in their future pregnancies and after that. Back pain has a variety of reasons, including severe phlegm, trauma, BMI and high weight, inactivity, exercise, and pregnancy(16-18).

Approximately 67%prevalence of pregnancy-related LBP in this study was lower than that of the study by Weis et al (19) while extremely higher than that of the research by Acharya et al (20). It seems that the differences in the prevalence between various countries result from differences in their customs and traditions, culture, exercise habits, and pain levels. Further, the high prevalence of pregnancy-related LBP among the primiparous women in this study can be due to their inexperience during pregnancy and their unfamiliarity with the specific factors that predispose them to this problem. Sencan et al (21) and Gutke et al (22) reported pregnancy-related LBP prevalence rates of 52% and 70%-86%, respectively. Therefore, it is necessary to educate primiparous women about pregnancy symptoms to visit a doctor if symptoms such as LBP occur before they worsen and cause disease in the future.

In this study, advanced maternal age, increased gestational age, high BMI, and duration of standing and sitting for less than 3 hours were the important and influential risk factors for pregnancy-related LBP. In other words, the incidence rate of pregnancy-related LBP increased by increasing maternal age, and as pregnancy reached its final weeks. In another study, Ramezanpour et

**Table 4.** Multiple Regression Analysis of Factors Influencing Pregnancy-related LBP

| Variable | 95% CI | OR | *P* Value[a] |
|---|---|---|---|
| Mother age (y) | 936-375 | 950 | 0.008 |
| Pregnancy age (wk) | 1.015-1.045 | 1.023 | 0.015 |
| BMI | 759-859 | 802 | 0.045 |
| Time to sit | 1.178-1.950 | 1.812 | 0.036 |
| Long stand | 1.589-1.790 | 1.625 | 0.042 |

*Note*. LBP: Low back pain; BMI: Body mass index; OR: odds ratio.
[a] Multiple logistic regression.

al found that increasing age can increase the prevalence of LBP. It appears that as the age increases, the body flexibility decreases and the activity of LBP and its prevalence represent an increase. The results of our study are in line with those of the above-mentioned study. Moreover, the incidence rate of LBP increased at higher BMI. The ability to sit and stand for more than three hours continuously is another factor that is specifically related to LBP. A person unable to sit or stand continuously for more than 3 hours is vulnerable to LBP. As in the present research, Rabiee et al reported that advanced maternal age and increased gestational age exacerbated pregnancy-related LBP (24). Additionally, Wuytack et al noticed that BMI was an influential risk factor for pregnancy-related LBP (25), which corroborates with the finding of our study. The results of the study by Rabiee et al (25) indicated that the ability to sit or stand for a long time was related to pregnancy-related LBP, which is consistent with those of the present study. Based on the results of the present research, there are many risk factors for pregnancy-related LBP. In addition, advanced maternal age decreases pregnant women's ability and their tolerance of pain, and this decreased ability and tolerance is intensified in late pregnancy. Furthermore, increases in gestational age and lumbar curvature and changes in lumbar positions lead to the appearance of LBP. Obesity and high BMI also increase the pressure applied to the lumbar region during pregnancy. These three factors together intensify LBP. Further, limitations in exercises of the pregnant woman following obesity can influence LBP. The low level of ability of a pregnant woman to sit and stand for a long time continuously also can indicate that she changes her position after a short duration. These changes in position, if carried out improperly, can result in pregnancy-related LBP. Therefore, training the right positions when jumping and standing during pregnancy can reduce the risk of pregnancy back pain.

The findings of our study revealed that hypertension and diabetes mellitus cannot cause LBP whereas they are among the factors that have led to LBP in some individuals, and the prevalence of LBP in people with these factors (26) is more than other people. Diabetes mellitus appears to affect the peripheral and central nerves of the person, and high blood pressure may also be associated with inactivity and indirectly affect back pain. However, these cases require further investigation.

### Limitations

The research limitations were many factors including stress and psychological pressure have a role in the appearance of pain in the lumbar region such as LBP that, unfortunately, were not considered in this research. Finally, the lack of information about the type and quality of physical exercises that can affect LBP did not allow us to investigate their effects on LBP.

### Suggestions for Future Studies

The researchers recommended that preventive measures be taken before pregnancy for women who intend to get pregnant. Moreover, non-pharmaceutical interventions such as corrective exercises are recommended during pregnancy. It is also suggested that future studies investigate the prevalence of LBP in obese women and those under moderate and high stress levels.

## Conclusions

In general, there was a high prevalence of pregnancy-related LBP in primiparous women in the present study. Various factors predispose pregnant women to this complication, including advanced maternal age, increased gestational age, obesity, and the inability to sit or stand for a long period continuously.

## Authors' Contribution

BN participated in Study design and diagnose low back pain in pregnancy. MZE provides a checklist from patient information. AD helped in pain diagnosis and statistical analysis. FM managed low back pain in pregnancy and handled submission of the manuscript.

## Conflict of Interests

None.

## Ethical Issues

The research project was approved by the Ethics Committee (ethics no. IR.TBZMED.REC.1397.1059).

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## References

1. Sinesi A, Maxwell M, O'Carroll R, Cheyne H. Anxiety scales used in pregnancy: systematic review. BJPsych Open. 2019;5(1):e5. doi:10.1192/bjo.2018.75
2. Soltani F, Maleki A, Shobeiri F, Shamsaei F, Ahmadi F, Roshanaei G. The limbo of motherhood: women's experiences of major challenges to cope with the first pregnancy. Midwifery. 2017;55:38-44. doi:10.1016/j.midw.2017.08.009
3. Haghdoost M, Mousavi S, Khanbabayi Gol M, Montazer M. Frequency of chlamydia trachomatis infection in

spontaneous abortion of infertile women during first pregnancy referred to Tabriz University of Medical Sciences by nested PCR method in 2015. Int J Women's Health Reprod Sci. 2019;7(4):526-530. doi:10.15296/ijwhr.2019.87
4. Alvandfar D, Alizadeh M, Khanbabayi Gol M. Prevalence of pregnancy varicose and its effective factors in women referred to gynecology hospitals in Tabriz. Iran J Obstet Gynecol Infertil. 2019;22(9):1-7. doi:10.22038/ijogi.2019.13996
5. Rabiee M, Sarchamiee N. Frequency of low back pain in each pregnancy trimester and its related factors in pregnant women visiting Shaheed Mostafa Khomeini hospital in 2015. Iran J Obstet Gynecol Infertil. 2018;20(12):32-39. doi:10.22038/ijogi.2017.10427
6. Anselmo DS, Love E, Tango DN, Robinson L. Musculoskeletal effects of pregnancy on the lower extremity: a literature review. J Am Podiatr Med Assoc. 2017;107(1):60-64. doi:10.7547/15-061
7. Ayanniyi O, Sanya AO, Ogunlade OS. Incidence of back pain among women of child bearing age and its management during pregnancy. J Behav Health. 2016;5(4):162-168. doi:10.5455/jbh.20160804123242
8. Filipec M, Jadanec M, Kostovic-Srzentic M, van der Vaart H, Matijevic R. Incidence, pain, and mobility assessment of pregnant women with sacroiliac dysfunction. Int J Gynaecol Obstet. 2018;142(3):283-287. doi:10.1002/ijgo.12560
9. Sehmbi H, D'Souza R, Bhatia A. Low back pain in pregnancy: investigations, management, and role of neuraxial analgesia and anaesthesia: a systematic review. Gynecol Obstet Invest. 2017;82(5):417-436. doi:10.1159/000471764
10. Morino S, Ishihara M, Umezaki F, et al. Low back pain and causative movements in pregnancy: a prospective cohort study. BMC Musculoskelet Disord. 2017;18(1):416. doi:10.1186/s12891-017-1776-x
11. Malmqvist S, Kjaermann I, Andersen K, Økland I, Brønnick K, Larsen JP. Prevalence of low back and pelvic pain during pregnancy in a Norwegian population. J Manipulative Physiol Ther. 2012;35(4):272-278. doi:10.1016/j.jmpt.2012.04.004
12. Mohseni-Bandpei MA, Fakhri M, Ahmad-Shirvani M, et al. Low back pain in 1,100 Iranian pregnant women: prevalence and risk factors. Spine J. 2009;9(10):795-801. doi:10.1016/j.spinee.2009.05.012
13. Aghamohamadi D, Khanbabayi Gol M. An investigation into the effects of magnesium sulfate on the complications of succinylcholine administration in nulliparous women undergoing elective cesarean section: a double-blind clinical trial. Int J Women's Health Reprod Sci. 2019;7(4):520-525. doi:10.15296/ijwhr.2019.86
14. Fakhari S, Bile Jani I, Atashkhouei S, Khanbabayi Gol M, Soliemanzadeh S. Comparing the effect of hypotension treatment due to spinal anesthesia with ephedrine or phenylephrine on arterial blood gases and neonatal Apgar score during cesarean delivery in obese mothers: randomized clinical trial. Iran J Obstet Gynecol Infertil. 2019;22(10):12-20. doi:10.22038/ijogi.2019.14185
15. Mousavi SJ, Parnianpour M, Mehdian H, Montazeri A, Mobini B. The Oswestry disability index, the Roland-Morris disability questionnaire, and the Quebec back pain disability scale: translation and validation studies of the Iranian versions. Spine (Phila Pa 1976). 2006;31(14):E454-459. doi:10.1097/01.brs.0000222141.61424.f7
16. Beeckmans N, Vermeersch A, Lysens R, et al. The presence of respiratory disorders in individuals with low back pain: A systematic review. Man Ther. 2016;26:77-86. doi:10.1016/j.math.2016.07.011
17. Davenport MH, Marchand AA, Mottola MF, et al. Exercise for the prevention and treatment of low back, pelvic girdle and lumbopelvic pain during pregnancy: a systematic review and meta-analysis. Br J Sports Med. 2019;53(2):90-98. doi:10.1136/bjsports-2018-099400
18. Ibanez G, Khaled A, Renard JF, et al. Back pain during pregnancy and quality of life of pregnant women. Prim Health Care. 2017;7(1):261. doi:10.4172/2167-1079.1000261
19. Weis CA, Barrett J, Tavares P, et al. Prevalence of low back pain, pelvic girdle pain, and combination pain in a pregnant Ontario population. J Obstet Gynaecol Can. 2018;40(8):1038-1043. doi:10.1016/j.jogc.2017.10.032
20. Shijagurumayum Acharya R, Tveter AT, Grotle M, Eberhard-Gran M, Stuge B. Prevalence and severity of low back- and pelvic girdle pain in pregnant Nepalese women. BMC Pregnancy Childbirth. 2019;19(1):247. doi:10.1186/s12884-019-2398-0
21. Sencan S, Ozcan-Eksi EE, Cuce I, Guzel S, Erdem B. Pregnancy-related low back pain in women in Turkey: prevalence and risk factors. Ann Phys Rehabil Med. 2018;61(1):33-37. doi:10.1016/j.rehab.2017.09.005
22. Gutke A, Boissonnault J, Brook G, Stuge B. The severity and impact of pelvic girdle pain and low-back pain in pregnancy: a multinational study. J Womens Health (Larchmt). 2018;27(4):510-517. doi:10.1089/jwh.2017.6342
23. Ramezanpour MR, Mohammad Nezhad M, Akhlaghi F. The effects of 12 weeks body balance and pelvic floor muscles exercise on back pain intensity during pregnancy. Iran J Obstet Gynecol Infertil. 2018;20(11):1-7. doi:10.22038/ijogi.2018.10223
24. Rabiee M, Sarchamie N. Low back pain severity and related disability in different trimesters of pregnancy and risk factors. Int J Women's Health Reprod Sci. 2018;6(4):438-443. doi:10.15296/ijwhr.2018.73
25. Wuytack F, Daly D, Curtis E, Begley C. Prognostic factors for pregnancy-related pelvic girdle pain, a systematic review. Midwifery. 2018;66:70-78. doi:10.1016/j.midw.2018.07.012
26. Davenport MH, Ruchat SM, Poitras VJ, et al. Prenatal exercise for the prevention of gestational diabetes mellitus and hypertensive disorders of pregnancy: a systematic review and meta-analysis. Br J Sports Med. 2018;52(21):1367-1375. doi:10.1136/bjsports-2018-099355