RESEARCH ARTICLE

Association between Clinical Characteristics of Pregnant Women in the Third Trimester and Low Back Pain

Mira Dyani Dewi,[1] Meike Rachmawati[2]

[1]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[2]Department of Anatomy Pathology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

Pregnancy is a physiological condition characterized by growth in both the fetus and the mother. Various biomechanical, physiological, and structural changes in pregnant women cause body posture changes, impacting low back pain (LBP). In the third trimester, LBP pain felt by pregnant women is usually accompanied by activity limitations and a decreased quality of life. This study aimed to determine the association between the clinical characteristics of pregnant women in the third trimester and low back pain. This research was conducted at the Department of Obstetrics and Gynecology and Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung from June to December 2017. The method is observational analysis with a cross-sectional approach with a sample of pregnant women in their third trimester who complained of lower back pain and lived in Bandung. According to the findings, the majority of pregnant women with LBP in the third trimester were under the age of 35 (33 of 38), had multiparous parity (25 of 38), had normal pre-pregnancy weight (21 of 38), gained an average of 11.28 kg during pregnancy, and had a median pain intensity of 5. Age was the only factor significantly correlated with LBP pain intensity; parity and weight gain during pregnancy did not. The study concludes a significant association between age in the third trimester of pregnancy and the intensity of LBP pain. Still, no significant association was found between parity and weight gain during pregnancy with the intensity of LBP pain.

Keywords: Low back pain, pain intensity, pregnancy, third trimester

Introduction

Pregnancy is a physiological condition characterized by growth in both the fetus and the mother. Biomechanical, physiological, and structural changes occur in pregnant women. This situation causes changes in body posture which results in low back pain.[1,2]

Low back pain (LBP) affects the muscles, nerves, and spine below the costal margin and the inferior gluteal folds.[3,4] LBP in pregnancy has become a global issue, affecting both developed and developing countries.[5] The prevalence of LBP during pregnancy differs per subregion, ranging from 24 to 90%.[6] Clinical characteristics of patients, such as age and parity, have been indicated as the most common risk factors for LBP.[7] The mother's pre-pregnancy weight and BMI are also risk factors for LBP during pregnancy. LBP usually begins to appear in pregnant women in the second and third trimesters of pregnancy.[8]

The peak severity of LBP occurs in the third trimester. Previous studies have shown that the prevalence of LBP increases with gestational age, reaching 20% before pregnancy, 40% in the first trimester, and 44–70% in the third trimester.[9] As the gestational age increases, there is an increase in the lumbar lordotic curve, causing LBP and limited movement, which ultimately leads to activity restrictions.[10] During the third trimester, pregnant women's pain is frequently accompanied by a decrease in activity and quality of life.[11] LBP frequently interferes with activities and negatively impacts the life quality of pregnant women. Previous research indicates that one-third of the population suffering from LBP reports that acute pain is frequently related to limitations in women's capacity to work efficiently, resulting in a low quality of life.[12] As a result, women's productivity in routine daily activities is reduced.

Correspondence: Mira Dyani Dewi. Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: miradyani@gmail.com

Understanding the association between clinical characteristics of pregnant women and LBP, as defined by pain intensity indicators, is crucial for improving the quality of health care, particularly for pregnant women in the third trimester. Previous studies have discussed the association between LBP and the clinical characteristics of pregnant women, but not many have focused on the association among pregnant women in the third trimester.[13,14] This research aims to fill this gap by determining the association between the clinical characteristics of pregnant women in the third trimester and low back pain.

Methods

The research method used is observational analysis with a cross-sectional approach. This research activity was conducted at the Department of Obstetrics and Gynecology and Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Universitas Padjadjaran/ Dr. Hasan Sadikin General Hospital, Bandung from June to December 2017. The sample in this study were pregnant women in their third trimester who complained of lower back pain and lived in Bandung. The sampling technique used in this study was nonprobability sampling with the consecutive sampling method. In this consecutive sampling method, researchers took all subjects diagnosed with low back pain in the third trimester of pregnancy until the minimum number of subjects was met. The sample size was determined following the study's research objectives and data types in the study. The total sample was 38 patients. In this study, low back pain was described using pain intensity indicators. Pain intensity is measured using a numeric rating scale (NRS) from 0–10. A score of 0 means no pain, 1–3 means mild pain, 4–6 means moderate pain, and 7–10 means severe pain. The collected data was then processed and analyzed statistically using univariate and bivariate analysis methods. Univariate analysis aims to determine the description of the characteristics of respondents, while bivariate analysis is to determine the association between the characteristics of pregnant women in the third trimester and the intensity of low back pain using the chi-square, Mann-Whitney, and Spearman rank correlation statistical tests. The ethical clearance of the study is No. LB.04.01/

A05/EC/008/I/2018.

Results

According to Table 1, the majority of pregnant women in the third trimester with LBP were under the age of 35 (33 of 38), had multiparous parity (25 of 38), had normal pre-pregnancy weight (21 of 38), and gained an average of 11.28 kg during pregnancy.

Pain intensity in low back pain in third-trimester pregnant women who live in Bandung is expressed on the NRS scale with a range of 0–10. According to Table 2, the median pain intensity value for pregnant women in the third trimester is 5, while the maximum pain intensity is 8.

The association between clinical characteristics of pregnant women in the third trimester and LBP pain intensity was analyzed using bivariate analysis. Table 3 shows that only age is significantly associated with LBP pain intensity, with a p-value of 0.029 (p<0.05) and a positive correlation. Parity is not significantly associated with pain intensity, with a p-value of

Table 1 Characteristics of Pregnant Women

Variables	n=38
Age (years)	
<35	33
≥45	5
Parity	
Primiparous	13
Multiparous	25
Body weight before pregnancy	
Underweight	1
Normal	21
Obesity	3
Overweight	13
Weight gain during pregnancy (kg)	
Average (SD)	11.28 (5.02)
Range	3.70–33.00

Table 2 Frequency Distribution of LBP Pain Intensity

	Pain Intensity
Median	5
Range	5–8

Table 3   Association between the Characteristics of Pregnant Women in the Third Trimester and LBP Pain Intensity

Variables	Pain Intensity	
	rs[*]	p
Age	0.354	0.029
Parity	0.261	0.113
Weight gain during pregnancy	−0.208	0.211

Note: [*]Spearman ranks correlation test, [*]significance $p<0.05$

0.113 ($p>0.05$), and the correlation is positive. Weight gain during pregnancy also does not have a significant association with pain intensity, with a p-value of 0.211 ($p>0.05$), and the correlation is negative.

Discussion

LBP usually begins to appear in the second or 18th weeks of pregnancy and peaks in the 3rd trimester.[4,15] In this study, it was found that the median pain intensity in pregnant women in the third trimester was 5, which means moderate pain. Research by Saxena et al.[16] in India showed similar results with an average pain intensity of 4.9. Sencan et al.[17] in Turkey found a lower average of 3.7, while Gutke et al.[18] in England found a higher average of 7. The varying pain intensities in each country reflect social and cultural factors that influence the perception of LBP during pregnancy.[6]

The intensity of LBP typically increases with gestational age. Based on research conducted by Backhausen et al.[9] in Denmark, pregnant women at 32 weeks of gestation have a more excellent pain intensity score than those at 20 weeks. The median pain intensity score during 32 weeks of gestation is 4, whereas, at 20 weeks, it is 2.7.

A shift in the center of gravity causes increased LBP pain during the third trimester of pregnancy.[19] The increased uterus size during pregnancy might weaken the abdominal muscles, putting more strain on the lumbar muscles. The pelvis rotates sagittally around the second sacral segment, which serves as a fulcrum. It creates hyperlordosis, which shifts the woman's center of gravity forward and exacerbates her LBP pain.[4]

In addition, hormonal changes might cause low back pain. Estrogen, progesterone, and relaxin are prenatal hormones that influence the musculoskeletal system in preparation for childbirth.[4] During pregnancy, elevated amounts of relaxin, progesterone, and estrogen can lead to increased joint laxity. Estrogen and progesterone increase fluid and salt retention, while relaxin softens the body's ligaments, making pregnant women particularly sensitive to damage. Although the effects of relaxin are still widely debated, estrogen and progesterone are known to affect the biomechanical structure of a pregnant woman's posture by affecting connective tissue and increasing the mobility of joint capsules and spinal segments.[11]

There is currently no consensus regarding the risk factors for LBP in pregnancy. However, age has been indicated as a risk factor for LBP.[7] In this study, the majority of pregnant women in the third trimester with LBP who had a moderate pain intensity were under 35 years old (33 of 38) with a p-value of 0.029 ($p<0.05$) and a positive correlation. The p-value of 0.029 suggests a significant association between age and pain intensity in LBP, and the positive correlation implies that as you age, the severity of LBP pain increases. These findings are consistent with Mulati et al.'s[20] research, which suggests a correlation between age and LBP. This happens because older adults, including pregnant women, generally undergo neurophysiological changes that might increase pain threshold and decrease awareness of sensory stimuli. Aside from that, chronic disorders such as heart abnormalities, cardiovascular disease, or diabetes mellitus, which are common in the elderly, begin to impair nerve impulse transmission. This condition is exacerbated by the tendency of older people to consider pain as a natural component of the aging process and not immediately treated by health workers. Hence, the intensity of LBP pain becomes worse in older pregnant women in the third trimester.[21]

Parity has been identified as a risk factor for LBP. The results of the study showed that most pregnant women in the third trimester who experienced LBP with a median pain intensity of 5 had multiparous parity (25 of 38), with a p-value of 0.113 ($p>0.05$) and a positive correlation. The p-value of 0.113 indicates no significant association between parity and pain intensity in LBP. These findings are consistent with Manyozo et al.'s[7] research, which found that gravidity was

not significantly associated with the occurrence of LBP in the sample population when tested at a significance level of 5%. Backhausen et al.'s[9] research yielded different results, indicating that multiparity predicted low back pain ranging from moderate to severe. The study also found that parity has a positive correlation value, implying that the more parity, the higher the pain intensity. Previous studies indicated that the increased risk of LBP at parity has limitations because of numerous confounding factors, such as young age and a history of LBP.[15] The prevalence tended to rise with subsequent births following the first birth, but this increase mostly vanished when the age at first birth was considered.

Weight gain during pregnancy is also a risk factor for LBP. The findings revealed that the average weight gain during pregnancy among pregnant women in the third trimester who suffered LBP with moderate pain intensity was 11.28 kg, with a p-value of 0.211 (p>0.05) and a negative correlation. The p-value of 0.211 suggests no significant association exists between weight gain during pregnancy and pain intensity in LBP. In contrast, the negative correlation indicates that the lower the weight gain during pregnancy, the greater the pain intensity. This finding contradicts Berber and Satılmış's[22] research, which found a statistically significant difference in weight gain during pregnancy between groups of pregnant women who suffered from LBP and those who did not. Pregnant women with LBP tended to gain more weight. The difference in results is assumed to be because the weight of pregnant women who experienced the slightest weight gain had a high weight from the start, so their weight did not increase significantly during pregnancy.

Weight gain during pregnancy is common and important for fetal growth. Generally, pregnant women experience a weight gain of 11 to 15 kilograms. The increase in body weight elevates the load on the spine, causing back pain. Aside from that, increased fetal weight and uterine size contribute to LBP pain by putting more pressure on blood vessels and nerves in the back and pelvis.[23] This results in a higher prevalence of LBP in the third trimester than in the second and first trimesters.

This study has limitations, namely the lack of data on the history of LBP before pregnancy, which is one of the risk factors for LBP in pregnant women.

Conclusions

According to the research findings, a significant association existed between age in the third trimester of pregnancy and the intensity of LBP pain. However, no significant association was found between parity and weight gain during pregnancy with the intensity of LBP pain.

Conflict of Interest

None declared.

Acknowledgment

References

1. Schröder G, Kundt G, Otte M, Wendig D, Schober HC. Impact of pregnancy on back pain and body posture in women. J Phys Ther Sci. 201;28(4):1199–207.
2. Michoński J, Walesiak K, Pakuła A, Glinkowski W, Sitnik R. Monitoring of spine curvatures and posture during pregnancy using surface topography – case study and suggestion of method. Scoliosis Spinal Disord. 2016;11(Suppl 2):31.
3. Mattiuzzi C, Lippi G, Bovo C. Current epidemiology of low back pain. J Hosp Manag Health Policy. 2020;4:15.
4. Casagrande D, Gugala Z, Clark SM, Lindsey RW. Low back pain and pelvic girdle pain in pregnancy. J Am Acad Orthop Surg. 2015;23(9):539–49.
5. Chen S, Chen M, Wu X, Lin S, Tao C, Cao H, et al. Global, regional and national burden of low back pain 1990–2019: a systematic analysis of the Global Burden of Disease study 2019. J Orthop Translat. 2022;32:49–58.
6. Omoke NI, Amaraegbulam PI, Umeora OUJ, Okafor LC. Prevalence and risk factors for low back pain during pregnancy among women in Abakaliki, Nigeria. Pan Afr Med J. 2021;39:70.
7. Manyozo SD, Nesto T, Bonongwe P, Muula AS. Low back pain during pregnancy:

Prevalence, risk factors and association with daily activities among pregnant women in urban Blantyre, Malawi. Malawi Med J. 2019;31(1):71–6.

8. Fatmarizka T, Ramadanty RS, Khasanah DA. Pregnancy-related low back pain and the quality of life among pregnant women : a narrative literature review. JPHTCR. 2021;4(3):108–16.

9. Backhausen MG, Bendix JM, Damm P, Tabor A, Hegaard HK. Low back pain intensity among childbearing women and associated predictors. A cohort study. Women Birth. 2019;32(4):e467–76.

10. Daneau C, Abboud J, Marchand AA, Houle M, Pasquier M, Ruchat SM, et al. Mechanisms underlying lumbopelvic pain during pregnancy: a proposed model. Front Pain Res (Lausanne). 2021;2:773988.

11. van Benten E, Pool J, Mens J, Pool-Goudzwaard A. Recommendations for physical therapists on the treatment of lumbopelvic pain during pregnancy: a systematic review. J Orthop Sports Phys Ther. 2014;44(7):464–73, A1–15.

12. Mota MJ, Cardoso M, Carvalho A, Marques A, Sá-Couto P, Demain S. Women's experiences of low back pain during pregnancy. J Back Musculoskelet Rehabil. 2015;28(2):351–7.

13. Gutke A, Betten C, Degerskär K, Pousette S, Olsén MF. Treatments for pregnancy-related lumbopelvic pain: a systematic review of physiotherapy modalities. Acta Obstet Gynecol Scand. 201;94(11):1156–67.

14. Hall H, Cramer H, Sundberg T, Ward L, Adams J, Moore C, et al. The effectiveness of complementary manual therapies for pregnancy-related back and pelvic pain: a systematic review with meta-analysis. Medicine (Baltimore). 2016;95(38):e4723.

15. Alkaf S, Zulissetiana EF, Muslimah SU, Masturah F. Risk factors analysis of low back pain in pregnancy. JKK. 2019;6(3):116–22.

16. Saxena AK, Chilkoti GT, Singh A, Yadav G. Pregnancy-induced low back pain in Indian women: prevalence, risk factors, and correlation with serum calcium levels. Anesth Essays Res. 2019;13(2):395–402.

17. 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):33–7.

18. 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):510–7.

19. Rohmawati H, Purnani WT, Lutfiasari D, Widhi AN. The effect of pelvic rocking on back pain intensity in third trimester pregnant women. JGRPH. 2023;8(1):85–8.

20. Mulati TS, Wahyuni T, Kuswati K, Susilowati D. Factors that affect back pain in second and third trimester pregnant women. J Kebidanan Kesehat Tradis. 2022;7(1):30–41.

21. Noviyanti, Azwar Y, Santi E, Larasati DT. Faktor-faktor yang berhubungan dengan keluhan nyeri punggung bawah pada pekerja welding. Health Care. 2021;10(1):168–80.

22. Berber MA, Satılmış İG. Characteristics of low back pain in pregnancy, risk factors, and its effects on quality of life. Pain Manag Nurs. 2020;21(6):579–86.

23. Salari N, Mohammadi A, Hemmati M, Hasheminezhad R, Kani S, Shohaimi S, et al. The global prevalence of low back pain in pregnancy: a comprehensive systematic review and meta-analysis. BMC Pregnancy Childbirth. 2023;23(1):830.