

## Risk Factors Analysis Of Low Back Pain In Pregnancy

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**Abstract.** Low back pain (LBP) is a common thing that happen in the population. Interestingly, for women, LBP generally occurs for the firsttime during pregnancy. Reported approximately 60% of pregnant women experience LBP at various levels. Although the frequency of LBP in pregnancy is relatively high, the exact data on the prevalence of LBP in pregnancy is still limited. Identification of risk factors and the effectiveness of interventions has not been widely reported. This study aimed to identify the prevalence, characteristics, and risk factors for LBP in pregnant women. This research was a cross sectional study using structured interview and physical examination to build diagnosis and define risk factors in pregnant patient in all trimester. The risk factors obtained statistically significant ( $p < 0.05$ ) were the previous history of LBP, either while pregnant or not pregnant (PR 8,786, CI 2,747-28,095), occupation at risk (PR 5,057, CI 1,821-14,046), lack of physical activity (PR 3,958, CI 1,554-10,084), as well as vacation habit (PR 3,091, CI 1,246-7,669). After a multivariate analysis, vacation habit was no longer defined as significant risk factor ( $p=0.379$ ). The knowledge about the risk factors is expected to be beneficial to help clinicians determine appropriate interventions to prevent and manage LBP in pregnancy.

### 1. Introduction

Pregnancy is a natural event that occurs in women, which bring tremendous physical as well as physiological changes as an adaptive consequence to bring successful outcome. These changes include musculoskeletal system including posture, abdominal and pelvic muscle elongation and softening of pelvic ligaments and joints, especially in the pelvis [1]. These postural changes are suspected to be the etiology of Low Back Pain (LBP) in women with certain risk factors.

LBP could affect majority population, at least 80% among them will experience LBP at least one episode during lifetime. LBP can occur in men and women. Smoking habit and body mass index significantly relate to LBP in major young population [2]. LBP is a symptom that is often complained by pregnant women and tends to increase with gestational age. Pregnancy associated LBP generally begins to appear around 18<sup>th</sup> week of pregnancy, and reaches its peak around 24<sup>th</sup> week to 36<sup>th</sup> week of pregnancy. These symptoms could, at some condition, come up earlier at first trimester of pregnancy, or later, no later than three weeks after giving birth [3].

Pain characteristics in pregnancy is mostly dull pain (60%). Others might suffer stabbing pain, cutting pain, or burning pain [3]. LBP in pregnancy defines as pain at lumbal region, above sacral area, with or without spreading to lower extremities. Pain is usually dull and worsen with anteflexed movement. Vertebral

movement is usually limited and palpation on vertebral erector muscles will provoke the pain [4].

There is much debate about LBP risk factors during pregnancy. The most common and well accepted are history of pelvic injury, chronic LBP, and previous LBP in pregnancy. Eighty five percent women with previous LBP in pregnancy will complained another episode of LBP in subsequent pregnancy [5]. Number of previous pregnancies also increases LBP risk. Number of previous pregnancies also increases LBP risk. Women with LBP history is at risk for more severe and longer pain during pregnancy and after delivery. Women who experience menstrual LBP also likely to experience LBP during pregnancy [5]. Conversely, exercise regularly before pregnancy reduces the risk of suffering from low back pain during pregnancy. Women diagnosed with hypermobility joint often experience LBP during pregnancy. However, no significant correlation between hypermobility and LBP during pregnancy [5].

Though LBP is commonly complained by pregnant woman, most of them consider it to be 'normal', inevitable and does not need treatment. Pregnant women suffering from LBP or pelvic pain that come to treatment is only about 50% [6]. Most who come for treatment, experienced LBP with high VAS score and are usually given more than one type of therapy.

## 2. Methods

This was a cross sectional study which evaluated pregnant women visiting al-Syifa Women Health Clinic in Palembang, Indonesia from September till November 2017. The methods used were structured interview and physical examination to build diagnosis and define risk factors in pregnant patient in all trimester. Women with gestational age of 36 week or less were included in this study. Women with chronic hypertension, chronic lung and heart disease, and those with vertebrae or pelvic anomalies were excluded. Occupation at risks defined as static position, unnatural posture or movement, force and load, and repetition. Physical activity was measured with international physical activity questionnaire (IPAQ) by asking physical activity of respondents in the last seven days

[7]. Data were analysed by using SPSS 24.0 version.

## 3. Results

Samples obtained was 97 samples. Of the 97 samples, 69 suffered from LBP (66.7%). The mean age of LBP group was 26.71 while in the non-LBP group was 28,31. Likewise, the average BMI in the non-LBP and LBP were almost equal (24.96 and 25). The gestational age of both groups of respondents were at the end of the second trimester (26.71 versus 28.32 week).

From demographic data, we found no significant difference between the two groups in terms of age, education level, and BMI so that it can be said samples were distributed homogeneously. Likewise, the prevalence of LBP in each trimester were relatively equal with p value was not significant (0.428).

**Table 1.** Obstetrics characteristics.

Characteristics	Group		p value
	LBP	Non LBP	
Gestational age (weeks), mean $\pm$ SD	26 $\pm$ 3.754	28.32 $\pm$ 4.019	0,159
Gestation, n (%)			
• Trimester 1	16 (23.2)	10 (35.7)	0,428
• Trimester 2	33 (47.8)	12 (42.9)	
• Trimester 3	20 (29.0)	6 (21.4)	
Pregnancy history, n (%)			
• Primigravidas	43 (62.3)	14 (50)	0,061
• Multigravida	26 (37.7)	12 (42.9)	
• Grandemultigravida	0 (0)	2 (7.1)	
Labor history, n (%)			
• Nullipara	50 (72.5)	19 (67.9)	0,383
• Primiparas	10 (14.5)	3 (10.7)	
• Multiparas	9 (13.0)	5 (17.9)	
• Grandemultipara	0 (0)	1 (3.6)	

Bivariate analysis was then performed to determine relationship between the characteristics with LBP in pregnant women. Bivariate analysis showed that patients characteristics which were significantly at risk for the occurrence of LBP were occupation at risk, a history of previous LBP, less physical

activity, as well as vacation habit. Other risk factors also showed differences in the incidence of LBP but not statistically significant ( $p > 0.05$ ), including maternal age, education, BMI, gestational age, history of pregnancy and childbirth, and history of menstrual pain.

**Table 2.** Demographic characteristics.

Characteristics	Group		p value
	LBP	Non LBP	
Age (years), mean $\pm$ SD	26.71 $\pm$ 3.754	28.32 $\pm$ 4.019	0,064
Age, n (%)			
• <20 years	1 (1.4)	0 (0)	0,804
• 20-35 years	66 (95.7)	27 (96.4)	
• > 35 years	2 (2.9)	1 (3.6)	

Education, n (%)			
• Middle education	30	10	
• Higher education	39	18	0,322
BMI (kg /m2), mean ± SD	24.96 ± 3.912	25.00 ± 4.823	0,960
IMT n (%)			
• Underweight	3 (4.3)	1 (3.6)	0,560
• Normoweight	31 (44.9)	15 (53.6)	
• Overweight	27 (39.1)	7 (25.0)	
• Obesity	8 (11.6)	5 (17.9)	

**Table 3.** Relationship between behavioral characteristics of respondents with the incidence of LBP.

Characteristics	LBP		Total	PR (CI 95%)	p value
	Yes	No			
<b>Smoking habit</b>					
• Passive smoker	41	20	61	0.586	.380
• No	28	8	36	(0.226 to 1.515)	
<b>Coffee Drinking Habit</b>					
• Yes	4	2	6	0,800	1,000
• No	65	26	91	(0.138 to 4.637)	
<b>Vacation habit</b>					
• Yes	46	11	57	3.091	<b>0,024</b>
• No	23	17	40	(1.246 to 7.669)	
<b>Physical activity</b>					
• Less	45	9	54	3,958	<b>0,006</b>
• Moderate	24	179	43	(1.554 to 10.084)	

From logistic regression of table. 3 and 4, it was concluded that occupation at risk, history of previous LBP (before and during previous pregnancy), and physical inactivity were risk factors for LBP during pregnancy.

#### 4. Discussions

Prevalence of LBP in pregnant women is high at 66.7%. This result is consistent with reports from previous studies showing that the incidence of LBP in pregnant women by more than 60% regardless of gestational age. Shu-

Ming Wang *et al.* [8] reported that about 60% of pregnant women experiencing LBP at different levels, mostly only mild level while ± 10% of them had complaints severe enough.

Analysis of the risk factors of age showed no significant difference between the two groups. Somewhat different from the study reported by Shu-Ming Wang *et al.*[8] and Kovaks *et al.* [9] which states LBP affects more pregnant women young age (<20 years) and the incidence decreased with increasing maternal age.

**Table 4.** Relationship between general characteristics of respondents with the incidence of LBP.

Characteristics	LBP		Total	PR (CI 95%)	p value
	Yes	No			
<b>Age</b>					
• <20 years and> 35 years	3	1	4	1,227	1,000
• 20-35 years	66	27	93	(0.122 to 12.328)	
<b>Work</b>					
• at	40	6	46	5.057	<b>0,002</b>
• not at risk	29	22	51	(1.821 to 14.046)	

<b>Education</b>					
• Junior and Senior high	30	10	40	1,385	0.634
• University	39	18	57	(0.559 to 3.432)	
<b>Body mass index</b>					
• Overweight and Obesity	35	12	47	1,373	0.632
• Underweight and Normal	34	16	50	(0.567 to 3.325)	
<b>age Pregnancy</b>					
• 3rd Trimester	20	6	26	1,497	0.611
• 1st and 2nd Trimester	49	22	71	(0.528 to 4.242)	
<b>Pregnancy history</b>					
• Primigravida	43	14	57	1,654	.374
• Multigravida and Grandmultigravida	26	14	40	(0.682 to 4.013)	
<b>Labor History</b>					
• Nullipara and primipara	60	22	82	1,818	0.468
• Multipara and Grandmultipara	9	6	15	(0.580 to 5.700)	
<b>LBP history</b>					
• Yes	41	4	45	8.786	<b>0,000</b>
• No	28	24	52	(2.747 to 28.095)	
<b>A history of menstrual pain</b>					
• Yes	45	15	60	1.625	0.401
• No	24	13	37	(0.665 to 3.986)	

While the type of work is closely related to LBP with a risk factor of 5,057 than non-occupation at risk ( $p=0.002$ ). From this study, we found that pregnant women with occupation at risk (one among the below) have a higher risk of having LBP, which are static position and repetition [10], non-ergonomic position [11], as well as excessive burden through one or more joints.

The relationship between BMI and the incidence of LBP during pregnancy are varied and inconsistent. Systematic reviews conducted by Rahman, et al states that overweight increases the risk of LBP by 1.33 whereas obesity by 1.53 than those with normal weight. However, this study did not distinguish between LBP occurrence in pregnant women and the general population [12].

Gestational age, history of pregnancy and childbirth, do not indicate an increased risk of LBP. Some studies show an increase risk in LBP on primigravida still have limitations because of many confounding factors include young age and previous history of LBP [11]. While the history of LBP is consistently reported as a predictor of the incidence of LBP in pregnancy [13]. History of menstrual pain reported differently by Wang *et al.* [8] who

show significant increases the incidence of LBP during pregnancy in women who previously suffered from painful menstruation with an OR of 2.5 ( $p = 0.01$ ).

Lack of physical activity is said to increase the risk of LBP. This study used IPAQ method (International Physical Activity Questionnaire) with the scoring system. Lack of physical activity and exercise give a strong relationship with incidence of LBP during pregnancy. Pregnant women with sedentary lifestyle are more likely to suffer from LBP than mothers who are more active.

The results of logistic regression in this study correspond with several other researchers who mention a significant risk factor of the LBP is standing and sitting for long as well as a history of LBP [11], a risk factor for age, history of LBP and a history of menstrual pain [8], while Kovaks *et al.* [9] reported the close connection in addition to a history of LBP is younger age, anxiety and depression, high BMI and gestational age .

This study used a limited sample size and, as a cross sectional design, was not followed prospectively. Data obtained with interviews performed by some persons may also lead to researcher bias. In this study, we did not include the onset of LBP during pregnancy, the

characteristics and location of pain. Further study with cohort design might be needed to explore pain onset and progressivity during pregnancy to determine specific intervention.

### 5. Conclusions

This research identifies the prevalence of LBP in pregnant women with a mean of 66.7% (approximately two-thirds of all pregnant women). This result is quite high and in line with many previous studies regarding the incidence of LBP. The demographic characteristics and obstetric characteristics of patients in this study are relatively homogeneous. No significant difference was found between the two groups on these variables between non-LBP and LBP.

The analysis results showed a strong relationship between occupation at risk, history of previous LBP, and lack of physical activity and the incidence of LBP in pregnancy. Other variables include maternal age, high BMI, gestational age, and primigravida also showed an increased risk, but were not statistically significant.

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