

The Relationship of Body Mass Index in Third Trimester of Pregnancy with Low Back Pain Incidence

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Abstract

Background: *Low Back Pain* is pain in the lower back which is a sign of disorder that causes a state of discomfort in performing daily activities and is felt in the anatomical area, especially in the fifth lumbar and sacral area. *Low Back Pain* will increase as gestational ages. This discomfort begins between the fifth and seventh months of pregnancy. **Purpose:** To find the relationship between body mass index in the third trimester of pregnancy with *Low Back Pain* incidence. **Method:** This research is an observational analytical research with cross-sectional approach. The population of this research is pregnant women in the third trimester who visited poly Obstetrics and Gynecology Hermina Padang Hospital with 77 samples by using consecutive sampling technique. Data analysis uses univariate and bivariate analysis with data processing using the computerized SPSS 23.0 version. **Results:** The most age were 26-35 years which is 44 people (57,1%), the most likely respondents were those who did not work which is 48 people (62,3%), and the most respondents gestational age is > 36 weeks that is 40 people (51,9 %). The average body weight of the respondent is 65.8277 kg with a minimum body weight 51.51 kg and maximum 80.40 kg. The average height of respondent is 157.99 cm with a minimum height 148 cm and maximum 170 cm. The majority of respondents with an overweight body mass index were 50 people (64,9%), the highest level of LBP pain is 2 (a little pain) which is 26 people (33,8%), with respondents experienced LBP of 61 people (79,2%). Based on the bivariate analysis, it is known that there is a relationship between body mass index in the third trimester of pregnancy with Low Back Pain incidence ($p=0.022$). **Conclusion:** The third trimester of pregnant women, the most age is early adulthood (26-35 yrs), with the most work is not working, and the most gestational age >36 weeks. The average body weight of the respondent is 65.8277 kg and the average height of the respondent is 157.99cm, the most body mass index is overweight, the highest level of LBP pain is 2 (a little pain), and in the third trimester pregnant women experience the most LBP incidence is yes and there is a relationship between body mass index in the third trimester of pregnancy with low back pain incidence.

Keywords: Body Mass Index, Low Back Pain Incidence

I. INTRODUCTION

Low Back Pain (LBP) is a pain in the lower back which is a sign of a disorder that causes discomfort in performing daily activities and is felt in the anatomical area, especially in the fifth *lumbar* and *sacral* area (L5-S1).¹ Musculoskeletal disorders, waist disorders, psychological disorders, as well as wrong posture and movement can be the cause of LBP.²

This situation is divided into 2 factors, namely mechanical factors related to the anatomical condition of the body (lumbar) and non-mechanical factors related to neurological signs.³ LBP risk factors increases with age, body weight ($BMI > 25 \text{ kg/m}^2$), smoking habits, inactivity and heavy work.⁴ LBP are still a major public health problem and can occur at all ages, including pregnant women. The prevalence of LBP in pregnancy varies from 3.90% to 89.88%.⁵

Pregnancy is a period in the life cycle associated with physiological changes, including physical and psychological.⁶ The changes that occur during pregnancy cause a sense of discomfort is felt differently in each particular pregnant women with symptoms according to the stages of pregnancy that consists of three trimesters. Pregnant women will feel nausea, vomiting, shivering and weakness in early pregnancy which will gradually disappear until the end of the first trimester.⁷

In the second trimester, the body begins to adapt so that nausea and vomiting begin to disappear. However, in the third trimester, the main discomfort are caused by hormonal changes, enlargement of the stomach, and anatomical changes. Discomfort felt by pregnant women include shortness of breath, sleep disturbances, constipation, varicose veins, urinary disorders, and low back pain.⁷

Lower back pain will increase with increasing gestational age. This discomfort,

starting between the fifth and seventh month of pregnancy. The period in the third trimester is of particular concern, because in this period there is an increase in fetal growth and development and is also included in the period of weight gain which is quite prominent so that the center of gravity moves forward as the uterus enlarges.⁸

This displacement causes the pregnant woman's shoulders to be pulled back and to maintain body balance triggers a lumbar curve (lordosis) and a thoracic spinal compensatory arch (kyphosis).⁹ Changes in posture due to the addition of body weight one of them is weight.¹⁰ Research yang dilakukan in Poli Neurology GatotSubroto Army Hospital by Roland shows that there is a significant relationship between risk factors and body mass index (BMI) and the incidence LBP ie $BMI \geq 25 \text{ kg/m}^2$ at risk 2,244 times through events LBP compared with $BMI \leq 25 \text{ kg/m}^2$.¹¹

Body Mass Index (BMI) is a measurement made to see the nutritional status of all groups, where this measurement can be carried out to determine a person's underweight and overweight.⁴ Excess weight will aggravate the work of the spine and pressure on the discs, spinal structures and herniation of the lumbar discs which can cause pain.¹²

Pain is the body's defense response process that can arise subjectively when there is an unpleasant stimulus and emotion due to tissue damage. In pain, there are intensity, quality, duration, and distribution which are included in the group of stages of pain.¹³ Subjective pain assessment can be done using the *Numerical Rating Scale*, *Verbal Rating Scale*, *Visual Analog Scale*, and *Wong Baker Faces Pain Rating Scale*.¹⁴

Wong Baker FACES Pain Rating Scale is a scale measuring pain consists of six faces for his portrayal of the pain is felt, starting from that seen smiling face to face crying.¹⁴ This

measuring scale is widely used to report pain ranging from children > 3 years to adults. This pain scale is quite easy to do because by looking at and pointing to facial expressions when you feel pain when you meet face to face without having to touch.¹⁴ This measuring scale is suitable for use during a pandemic like now.

Based on the description above, the researcher is interested in conducting research on the relationship between Body Mass Index in Third Trimester of Pregnancy and Low Back Pain Incidence.

II. METHODS

The scope of this research covers several fields of clinical and non-clinical sciences such as neuroscience, neurosurgery, orthopedics, obstetrics and gynecology, medical rehabilitation, physiology and anatomy. This research was conducted in the obstetrics and gynecology department of Hermina Padang Hospital from March until the research is completed.

This type of research is *analytical observational* with a *cross sectional* approach which is a type of research that emphasizes the time of measurement or observation of data on the independent variable (independent variable), namely nutritional status based on BMI in third trimester pregnant women with the dependent variable (dependent variable), namely the incidence of LBP carried out only once at a time. The target population in this study were all third trimester pregnant women in the poly of Obstetrics and Gynecology of Hermina Padang Hospital and the reasonable population in this study were third trimester pregnant women who visited the Obstetrics and Gynecology polyclinic at Hermina Padang Hospital.

Based on data in 2020, the number of pregnant women who had their pregnancy checked in January-July was 658 people.

The research sample used was third trimester pregnant women in Obstetrics and Gynecology polyclinic of Hermina Padang Hospital who met the inclusion criteria and exclusion criteria. The sampling technique used in this research is *consecutive sampling technique*. In this study, the number of samples minimum required was 70 people with a reserve sample of 7 people, so the number of samples was 77 people.

III. RESULTS

This study aims to determine the relationship between body mass index in the third trimester of pregnancy with the incidence of *Low Back Pain*, which was conducted on 77 study samples that met the inclusion and exclusion criteria. Based on the results of data collection and analysis that has been obtained, the authors can describe the results of the research in the exposure below:

1. Age

Based on research that has been conducted on third trimester pregnant women at the Obstetrics and Gynecology Polyclinic of Hermina Padang Hospital, the age frequency distribution of respondents is as follows:

Table 1. Age Frequency Distribution of Respondents in Third Trimester Pregnant Women at Hermina Hospital, Padang.

Age	Frequency (f)	%
Late Adolescent (17-25 years old)	17	22,1
Early Adult (26- 35 years old)	44	57,1
Late Adult (36-45 years old)	16	20,8
Total	77	100

Based on table 1, out of 77 respondents, the largest age group of respondents for third trimester pregnant women is 26-35 years, namely 44 people (57.1%), respondents aged 17-25 years, namely 17 people (22,1%), while respondents aged 36-45 years are 16 people (20,8%).

2. Working Status

Based on research that has been conducted on third trimester pregnant women in the Obstetrics and Gynecology polyclinic of Hermina Padang Hospital, the distribution of the frequency of working status of respondents is as follows:

Table 2. Distribution of Working status Frequency of Respondents in Third Trimester Pregnant Women at Hermina Hospital Padang.

Work Status	Frequency (f)	%
Working	29	37,7
Not working	48	62,3
Total	77	100

Based on table 2. it can be seen that of the 77 respondents, most of the respondents did not work, namely 48 people (62.3%), and there were 29 people (37.7%) who worked.

3. Gestational Age

Based on research that has been conducted on third trimester pregnant women at the Obstetrics and Gynecology Polyclinic of Hermina Padang Hospital, obtained the frequency distribution of respondents gestational age as follows:

Table 3. Frequency Distribution of Respondents gestational age in Third Trimester pregnant women at Hermina Padang Hospital

Gestational Age	Frequency (f)	%
28-31 weeks	14	18,2
32-36 weeks	23	29,9
> 36 weeks	40	51,9
Total	77	100

Based on table 3. of 77 respondents, the highest gestational age was >36 weeks, namely 40 people (51.9%), respondents with gestational age 32-36 weeks, namely 23 people (29.9%), while respondents with gestational age 28-31 weeks namely 14 people (18.2%).

4. Weight and Height of Respondents

Based on research that has been conducted on third trimester pregnant women in the Obstetrics and Gynecology polyclinic of Hermina Padang Hospital, the average weight and height of respondents was obtained as follows:

Table 4. Average Weight and Height of Trimester Pregnant Women third Hermina Hospital in Padang

Variable	Mean (min-max)	Std. Dev
Weight (kg)	65,8277 (51,51-80,40)	7,6368
Height (cm)	157,99 (148-170)	4,598

Based on table 4. of 77 respondents the average weight of pregnant women in the third trimester of 65.8277 kg with a minimum weight of 51.51 kg, a maximum weight of 80.40 kg and a standard deviation of 7.6368. The average height of respondent is 157.99 cm with a minimum height of 148 cm, a maximum height of 170 cm and a standard deviation of 4.598.

5. Body Mass Index

Based on research that has been conducted on third trimester pregnant women in the Obstetrics and Gynecology polyclinic of Hermina Padang Hospital, the respondent's body mass index is obtained as follows:

Table 5. Frequency distribution of BMI of Third Trimester Pregnant Women in Hermina Hospital Padang

Body Mass Index	Frequency(f)	%
Underweight (<18,5 kg/m ²)	0	0
Normal (18,5-25,0 kg/m ²)	27	35,1
Overweight (>25 kg/m ²)	50	64,9
Total	77	100

Based on table 5, of 77 respondents, 50 people (64.9%) had a BMI in overweight category and 27 people (35.1%) had a BMI in normal category.

6. Pain Levels of Low Back Pain

Based on research that has been conducted on third trimester pregnant women in the Obstetrics and Gynecology polyclinic of Hermina Padang Hospital, the respondents' LBP pain levels were obtained as follows:

Table 6. Frequency Distribution of LBP Pain Levels for Third Trimester Pregnant Women at Hermina Hospital Padang

Pain Level	Frequency(f)	%
0 (no pain)	16	20,8
2 (slight pain)	26	33,8
4 (more painful)	23	29,9
6 (painful)	11	14,3
8 (further pain)	1	1,3
Total	77	100

Based on table 6. of 77 respondents, the highest level of LBP pain was 2 (slight pain), namely 26 people (33.8%).

7. Low Back Pain Incidence

Based on research that has been conducted on third trimester pregnant women at the Obstetrics and Gynecology polyclinic in Hermina Padang Hospital, obtained the incidence of Low Back Pain experienced by respondents as follows:

Table 7. Frequency Distribution of LBP in Third Trimester Pregnant Women at Hermina Hospital, Padang

Low Back Pain Incidence	Frequency (f)	%
No	16	20,8
Yes	61	79,2
Total	77	100

Based on table 7. of the 77 respondents obtained 61 people (79.2%) who experienced *Low Back Pain* and 16 people (20.8%) who did not experiencing *low back pain*.

8. Bivariate Analysis of the Relationship of BMI in Third Trimester Pregnancy with Low Back Pain

The results showed the relationship between

BMI in third trimester of pregnancy and the incidence of Low Back Pain can be described as follows:

Table 8. Relationship of BMI in Third Trimester Pregnancy with Low Back Pain incidence.

Body mass index	Low Back Pain Incidence				Total		P-value
	Tidak		Iya		N	%	
	F	%	f	%			
Normal	10	13,0	17	22,1	27	35,1	0,022
Overweight	6	7,8	44	57,1	50	64,9	
Total	16	20,8	61	79,2	77	100,0	

Based on table 8. it is found that from 77 respondents, the most incidence of low back pain is in overweight respondents as 44 people (57.1%) compared to normal BMI which is 17 people (22.1%). The results of the statistical test (*chi-square*) obtained a value of $p = 0.022$ ($p < 0.05$), it can be concluded that there is a relationship between BMI and the incidence of Low Back Pain in third trimester of pregnancy at Hermina Hospital Padang.

IV. DISCUSSION

A. Univariate Analysis

1. Age

Based on the research, the results obtained from 77 respondents of third trimester pregnant women, the most age was 26-35 years, namely 44 people (57.1%), respondents aged 17-25 years, namely 17 people (22.1%), while the respondents aged 36-45 years were 16 people (20.8%).

The results is similar with a research conducted by (Resmi, 2017) about Effect of Yoga Against Low Back Pain in thir trimester of Pregnancy in Kalikajar I Public Health Center Wonosobo, the most age of respondents are 20-35 years old (92.9%) and research conducted by (Cahyani, 2020) about the Intensity of Lower Back Pain in Third Trimester Pregnant Women who do Prenatal Yoga, the highest maternal age is 20-30

years, namely (38.9 %).^{16,17}

Based on existing theory, the most ideal maternal age for pregnancy is 20-35 years because women at this age can give birth safely and the period of female fertility is at its peak, and also women at this age are usually psychologically ready to become a mother and have the least risk during pregnancy and childbirth.¹⁸

The age of pregnant women is said to be at risk if <20 years and >35 years, because at the age of <20 years there is a high risk of complications during pregnancy. Pregnant women aged <20 years have a risk of physical conditions related to reproductive and psychological health. Pregnant women are not too ready to undergo labor and also during pregnancy, while those aged >35 years also have a high risk in pregnancy and childbirth such as prolonged labor, hypertension. in pregnancy and bleeding. The results of this study indicate that most of the respondents are in the safe age category for pregnancy and have the least risk to mother and child.¹⁹

2. Working Status

Based on the research that from 77 respondents, the majority of respondents did not work, namely 48 people (62.3%) while respondents who worked were 29 people (37.7%). The results of this study are similar with a research conducted by (Apriyenti, 2019) about the Description of Back Pain in Third Trimester Pregnant Women at the Mlati II Public Health Center, Sleman Yogyakarta, the most working status for pregnant women are not working or as IRT (85.7%) and also research conducted by (Candra, 2020) about the Effect of Acupressure on Low Back Pain in Third Trimester Pregnant Women, most respondents was not working, namely (57.1%).^{20,21}

This study is also in accordance with

previous research conducted by (Resmi, 2017) on third-trimester pregnant women at Kalikajar I Public Health Center Wonosobo, where the most respondents was not working (64.3%).⁵² Unemployed status (IRT) is not an easy job. Even though the mother does not work as an office woman or works outside the home, pregnant women also have to do housework and take care of her husband and children's education, so that the mother does not pay attention to herself and the fetus she is carrying.²² The work of housewives is indeed a job that requires extra energy and even lower back muscle mobility. This happens because the mother's daily activities at home such as lifting objects, carrying children, the wrong sitting position or the wrong back position at work cause lower back injuries.¹⁶

Woman also do not pay attention to body health when they tired, nutritional intake and rest that must be met every day, so that even though pregnant women have a lot of time at home, the health of the mother and fetus must be maintained properly by doing healthy activities and always consuming balanced nutritious foods.²²

According to Notoatmojo's theory, work is something that is done to earn a living. Someone who is busy with daily activities or work has less time to obtain information, so knowledge about information is also reduced. The results of the study indicate that most of the respondents fall into the category of not working which gives them the opportunity to obtain more information and thereby increase their knowledge.²²

3. Gestational Age

Based on the research, the results obtained from 77 respondents of third trimester pregnant women, the most gestational age was >36 weeks, namely 40 people (51.9%). The results of this study are in line with previous research conducted by (Rahmadona, 2020) on the Effectiveness of

the William's Flexion and Yoga Methods on the Intensity of Low Back Pain in Third Trimester Pregnant Women in Tanjungpinang City in 2019 obtained the most gestational age in the third trimester with gestational age >35 weeks namely (45%) and also research conducted by (Suyani, 2019) about the Effect of Kinesio Tapping on Back Pain Intensity in Third Trimester Pregnant Women, the most maternal gestational age was 36-40 weeks, namely (58.3%).^{23,24}

At each stage of the pregnancy process, pregnant women need nutritious food with different nutrients that are adapted to the condition of the mother's body and the development of the fetus. Fetal growth in the first three months of pregnancy is still slow so that the increase in maternal nutritional needs is still relatively small. In the second trimester the fetus begins to grow faster than before, so in the third trimester, minerals and vitamins are needed to support the rapid formation of the brain and fetal growth. The energy needs of the fetus are obtained from the energy reserves stored by the mother.²⁵

In the third trimester, the fetus experiences the most rapid brain development, especially the development of neurons. In this situation, good nutritional status is needed for better growth and development. Impaired development and growth of brain cells due to malnutrition can lead to impaired mental development of children, which is manifested in children's poor adaptability to the environment, reduced social skills of children and poor verbal abilities that will affect the level of intellectual intelligence of children.²²

4. Average Height

Based on the research, the results obtained from 77 respondents that the average maternal height was 157.99 cm with a minimum height of 148 cm, a maximum height of 170 cm and a standard deviation of 4.598. The results of this study are in line

with previous research conducted by (Purnamasari, 2019) about the Description of Lower Back Pain in Third Trimester Pregnant Women, the average height of the third trimester pregnant women was 156.46 cm and research conducted by (Aspia, 2017) on Correlation of Mother's Height with Newborn Baby's Body Length In Palu City, the average height of pregnant women is 155.9 cm.^{15,28}

Mother's weight and height factors that can be represented by body mass index need to be known, pregnant women's height is included in the growth and development of the body that affects the process of child growth and development. However, there is the influence of genetic and non-genetic factors, including nutrition during pregnancy. Pregnant women who have short height and poor nutritional status can increase the risk of growth failure in the womb. Inadequate fetal growth during the womb will affect the next child's growth and development.²⁸

5. Average Body Weight

Based on the research, the results obtained from 77 respondents that the average maternal weight was 65.8277 kg with a minimum weight of 51.51 kg, a maximum weight of 80.40 kg and a standard deviation of 7.6368. The results of this study are in line with previous research conducted by (Purnamasari, 2019) about the Description of Lower Back Pain in Third Trimester of Pregnant Women, the average weight of third trimester pregnant women was 62.36 kg and research conducted by (Karima, 2012) about Maternal Nutritional Status and Infant Birth Weight, the average weight of pregnant women was 68.7 kg.^{15,26}

Weight gain during pregnancy is caused by the growth of the fetus, placenta and maternal metabolic changes. However, it should be noted that the weight gain of pregnant women is highly dependent on the

nutritional status of the mother before and during pregnancy.²⁷ A mother in pre-pregnancy who has good nutritional status describes the availability of nutritional reserves in the mother's body that are ready to support fetal growth during pregnancy. In addition, the nutritional status of pregnant women is also influenced by the consumption of nutrients and energy in accordance with the needs of the mother during pregnancy.²⁷

6. Body Mass Index

Based on the research, the results obtained from 77 respondents that the most Body Mass Index were in the overweight category, namely 50 people (64.9%), while respondents in the normal category were 27 people (35.1%). The results of this study are in line with research conducted by (Lestari, 2020) on the incidence of low back pain discomfort in the Body Mass Index group during pregnancy in Leuwiliang District, the most body mass index of pregnant women is overweight (82%).²⁹

This is also in similar with previous research conducted by (Gharaibeh, 2018) in Jordan regarding the Prevalence of Low Back Pain in Pregnant Women and Associated Risk Factors where a high or large body mass index is a factor associated with low back pain discomfort indicating that the prevalence of LBP in pregnant women by (76%).³⁰ This study is not in line with the research conducted by (Urduyana, 2017) on the description of the Nutritional Status of Pregnant Women based on the Body Mass Index (BMI) at the Mergangsan Public Health Center, Yogyakarta City, which shows that the nutritional status of most respondents with normal nutritional status (47.2%).³¹

The number of pregnant women with an overweight body mass index in the third trimester of pregnancy is caused by many factors. Factors that influence the weight

gain of pregnant women include age, maternal activity, knowledge about nutrition, health status, ability to buy food and social environment. Nutritional status is one of the important factors that must be considered during pregnancy because nutritional factors greatly affect the health status of the mother in terms of fetal growth and development.³²

According to Hendrawan Nasedul (Mitayani, 2014) nutrition during pregnancy is a food or menu that has a dose of all the nutrients needed by pregnant women every day and contains balanced nutrients in the amount needed and not excessive.³³

Based on the theory (Maryam, 2016) that pregnant women who experience malnutrition can adversely affect the fetus they contain, including growth failure, premature delivery, low birth weight, or fetal death in the womb. The health condition of the mother determines the success of pregnancy, the nutritional status of the mother at the time of conception must be in good condition and the mother must receive additional energy, protein, vitamins, and minerals during pregnancy.³⁴

7. Pain Level of Low Back Pain

Based on the results of research from 77 respondents, it was found that most of the respondents experienced the incidence of LBP, namely 61 people (79.2%), and there were 16 people (20.8%) who did not experience the incidence of LBP.

Meanwhile, based on the results of the *Wong Baker Faces Pain Rating Scale*, from 61 people who experienced LBP, the highest LBP pain level was 2 (slight pain), namely 26 people (33.8%) and there were 23 people (29.9%) with a pain level of 4 (more painful), while at pain level 6 (painful pain) there were 11 people (14.3%) and there was 1 person (1.3%) at pain level 8 (pain was more painful).

The results of this study are in line with the

research conducted by (Apriyenti, 2019) on the Description of Back Pain in Third Trimester Pregnant Women at the Mlati II Public Health Center, Sleman Yogyakarta obtained the level of pain Back in third trimester pregnant women is mild (54.3%).²⁰ This is also in accordance with previous research conducted by (Widya, 2018) regarding the Effects of Pregnancy Gymnastics on Back Pain in Pregnant Women in Tiron Public Health Center showed that the LBP pain level was mild pain (66.67%).³⁵

This study is not in line with research conducted by (Purnamasari, 2019) on the description of low back pain in third trimester pregnant women. The highest LBP pain level is moderate pain, namely (73.33%).¹⁵ Low back pain is a nuisance experienced by many pregnant women that not only occurs in a particular trimester but may also occur during pregnancy (Fraser, 2010). Back pain in pregnant women is caused by many factors, one of which is the growth of the uterus in line with the development and growth of the fetus, in pregnant women increasing gestational age results in excessive stretching of the ligaments in the spine which is usually felt by the mother as a spasm, this spasm can cause pain due to deep stabbing is called ligament pain, this is what causes back pain.³⁶

The cause of LBP during pregnancy, especially in the third trimester, is hormonal changes, as a result of hormonal changes causing joint relaxation in the area around the pelvis and lower back of pregnant women. In connection with the gradual increase in body weight during pregnancy, resulting in changes in body posture in pregnant women so that the body will be leaning forward as a result of stretching weak abdominal muscles causing muscle imbalance around the pelvis and causing pain in the lower back.³⁷

Increasing gestational age causes changes in the musculoskeletal system. These musculoskeletal adaptations include: weight gain, relaxation, shifting the center of weight of the body due to uterine enlargement and mobility. The greater the possibility of instability of the sacroiliac joint and an increase in lumbar lordosis which will result in pain.³⁷

B. Bivariate Analysis Relationship of BMI in Third Trimester Pregnancy with Low Back Pain Incidence at Hermina Hospital Padang

Based on the results obtained from 77 respondents, the incidence of *Low Back Pain* mostly occurred in body mass index with the overweight category, namely 44 people (57.1%) compared to with a normal body mass index of 17 people (22.1%). The results of the statistical test (*chi square*) obtained a value of $p = 0.022$ ($p < 0.05$), it can be concluded that there is a relationship between BMI in the third trimester of pregnancy with the incidence of *Low Back Pain* at Hermina Hospital, Padang.

In line with previous research conducted by (Lestari, 2020) it was found that pregnant women with low back pain discomfort with a body mass index in the overweight category showed the highest percentage value of (94.6%) with a *p-value* = 0.006 (significant).), compared with pregnant women who have a body mass index in the normal weight category.²⁹

This is also in accordance with previous research conducted by (Gharaibeh, 2018) the frequency of low back pain in pregnant women is 76% with body mass index is one of the factors associated with the risk of low back pain in pregnant women with *p-value* = 0,01.³⁰ The results of the above analysis are also consistent with previous studies conducted in Purwokerto by (Purnamasari, 2015) in which the risk factors of body mass index in the overweight category

significantly to low back pain. A person with excess weight, over 5 times greater risk of experiencing low back pain compared to people who weighs normal weight.¹²

For people with excess body weight, there will be accumulation of fat in the abdominal area so that there is an increase in lumbar work to support the body's burden. The presence of weight gain causes the spine to be more depressed in accepting the load, making it easier for damage and danger to the spinal structure, especially the lumbar vertebrae.³⁸

Subcutaneous fat and intra-abdominal fat are found in the abdominal area, which can be identified by conducting additional examinations. Subcutaneous fat is central to obesity and is associated with insulin resistance, but is also significantly different from visceral fat. The accumulation of fat in this area increases the pressure due to the extra weight, which increases the risk of low back pain.³⁶

High body mass index can cause various mechanisms of LBP. Obesity can increase the mechanical load on the spine with higher pressure or the occurrence of shifts in the lumbar vertebrae during activity. Second, body mass index in the obese category causes chronic inflammation, the production of proinflammatory cytokines and increased acute phase reactants can cause pain.³⁹

Third, LBP has a significant relationship with hypertension and dyslipidemia that occurs because the metabolic syndrome is involved in the pathomechanism of low back pain because obesity, hypertension, and dyslipidemia are components. Fourth, a person with an obese body mass index is associated with bone degeneration, and spinal mobility decreases with increasing body weight.³⁹

A person experiencing LBP can do bed rest for the first 2-3 days to reduce pain and

provide mobility, flexibility, and stability exercise therapy. One of the therapies given is aquatic exercise (exercise in water) where therapy is given to improve balance and reduce pain due to the influence of the nature of water, then training in water will have the effect of reducing pain, muscle spasms and direct decompression of the intervertebral disc and providing decompression and stability due to trained abdominal and back muscles.⁴⁰

In the third trimester, pregnant women can follow the pregnancy exercise program regularly for treatment in reducing low back pain. Pregnancy exercise is one of the exercises to strengthen and maintain the elasticity of the abdominal wall muscles, ligaments, and pelvic floor muscles associated with childbirth.⁴¹

In pregnancy exercise, relaxation exercises provide many benefits, one of which is reducing complaints due to stiff and painful joints due to increased body weight in pregnant women, strengthening and maintaining the elasticity of the abdominal wall muscles, reducing complaints that arise as a result of changes in body shape, so that it can prevent or overcome complaints of low back pain.⁴²

V. CONCLUSION

Based on the results of research on the relationship between body mass index in the third trimester of pregnancy with the incidence of *Low Back Pain*, it can be concluded that:

1. The age of the third trimester pregnant women is mostly in the early adult category (26-35 years), namely 44 people (57.1 %).
2. Most of the third trimester pregnant women do not work, namely 48 people (62.3%).
3. The most gestational age in the third trimester was >36 weeks, namely 40

- people (51.9%).
4. The average weight of pregnant women in the third trimester is 65.82 kg with a minimum weight of 51.51 kg, maximum weight of 80.40 kg.
 5. The average height of pregnant women in the third trimester is 157.99 cm with a minimum height of 148 cm, a maximum height of 170 cm.
 6. Body mass index in third trimester pregnant women is mostly overweight, namely 50 people (64.9%).
 7. The highest level of LBP pain in third trimester pregnant women was 2 (slightly painful), namely 26 people (33.8%).
 8. The highest incidence of LBP in third trimester pregnant women is yes, namely 61 people (79.2%).
 9. There is a relationship between body mass index in the third trimester of pregnancy with the incidence of *Low Back Pain* ($p = 0.022$).

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