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The Relationship Between Body Mass Index and the Level of Complaints in Third Trimester Pregnant Women at the Kobe Community Health Center

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Abstract *The third trimester of pregnancy is the final phase of pregnancy, characterized by various physiological changes and increased physical complaints in pregnant women. The level of complaints experienced can be influenced by the mother's physical condition, one of which is Body Mass Index (BMI) as an indicator of nutritional status. This study aims to determine the relationship between BMI and the level of complaints in pregnant women in the third trimester. The study used a descriptive analytical design with a cross-sectional approach. The study was conducted at the Kobe Community Health Center in November with a sample of 30 pregnant women in the third trimester selected using a purposive sampling technique. BMI was categorized as underweight, normal, and overweight/obese, while the level of complaints was measured using a structured questionnaire that assessed physical complaints such as back pain, shortness of breath, fatigue, leg cramps, pelvic pain, and sleep disturbances. Data analysis was performed descriptively and bivariately using the Fisher's Exact Test. The results showed that mothers with underweight and overweight/obese BMI experienced higher complaints than mothers with normal BMI. The statistical test showed a p-value of 0.045, indicating a significant relationship between BMI and the level of complaints in the third trimester. This study concludes that BMI plays an important role in influencing the comfort of pregnant women in the final trimester, so monitoring nutritional status needs to be an integral part of antenatal care.*

Keywords*: Antenatal Care; Body Mass Index; Nutritional Status; Pregnant Women; Third Trimester.*

1. INTRODUCTION

Pregnancy is a physiological process experienced by women and lasts approximately nine months. Although a natural process, pregnancy still brings various changes to the expectant mother's body, including physical, hormonal, and psychological changes (Puspitasari & Indrianingrum, 2020) . Each of these changes can elicit different responses in each individual. As pregnancy approaches its end, particularly in the third trimester, the changes tend to become more complex. During this period, pregnant women begin to experience an increasingly enlarged abdomen, significant weight gain, changes in fetal position, and the body's preparation for labor. These conditions often give rise to various complaints such as lower back pain, mild shortness of breath, difficulty sleeping, fatigue, pelvic pain, leg cramps, and discomfort during daily activities (Nadeak et al., 2025) .

The level of complaints that arise in the third trimester of pregnancy can be influenced by many factors, one of which is Body Mass Index (BMI). BMI is a simple measure to assess a person's nutritional status based on a combination of weight and height (III et al., 2024) . Although it cannot describe a person's overall health, BMI remains an important indicator in maternal health because it is related to the risk of complications and comfort during pregnancy. Nutritional status before and during pregnancy significantly determines the mother's physical readiness to face the physiological changes that occur. If BMI is categorized as underweight,

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normal, overweight, or obese, each has consequences that can affect the mother's condition during the third trimester. (Meilani et al., 2023) .

Pregnant women with a normal BMI generally experience more balanced physiological adaptations. Conversely, a BMI that is too low can indicate a lack of energy and nutrient reserves, making the body more easily fatigued and causing more intense physical complaints. Meanwhile, pregnant women with an overweight or obese BMI often experience additional stress on the musculoskeletal system, an increased risk of leg swelling, sleep disturbances, and complaints of back and pelvic pain due to the heavier body weight. Pressure on the diaphragm due to increased weight can also trigger discomfort such as shortness of breath. Therefore, a BMI that is not in the ideal category has the potential to exacerbate complaints experienced in the final trimester of pregnancy (Andini, 2019) .

Complaints in the third trimester are actually a natural part of the body's adaptation process. However, a high level of these complaints can impact various aspects, including the mother's quality of life, ability to function, sleep patterns, mental health, and preparedness for childbirth. In some cases, intense complaints can make the mother feel anxious, uncomfortable, and easily stressed. Furthermore, pregnant women who experience many complaints tend to have reduced physical activity, even though light, safe physical activity can help maintain fitness and facilitate labor. Therefore, it is important to understand the factors that can increase or worsen these complaints so that preventive and treatment efforts can be implemented early (Lestari et al., 2019) .

Nutritional status, as measured by BMI, has been shown to be associated with maternal and fetal health. Previous studies have shown that pregnant women with a BMI outside the normal range are more susceptible to discomfort during pregnancy. For example, a high BMI is associated with a greater risk of lower back pain, fatigue, and mild respiratory distress. Conversely, a low BMI can make mothers easily tired, prone to anemia, and experience decreased stamina, which can exacerbate complaints during the third trimester. This suggests that pregnancy complaints are not solely due to fetal growth but are also influenced by the mother's physical condition (Murniasih et al., 2025) .

Furthermore, the third trimester is a critical phase as the mother's body prepares for labor. The uterus reaches its maximum size, the fetus begins to descend into the pelvis, and hormones like relaxin increase to prepare the birth canal for opening. This hormone can cause joints to loosen, leading to more frequent complaints of pelvic and back pain. When this condition occurs in mothers with an overweight or underweight BMI, the symptoms can be more severe because the body is not in optimal condition. Therefore, BMI can act as a factor that aggravates

or alleviates the complaints experienced by mothers in the final trimester (Merdayanti & Fauzi2, 2024) .

On the other hand, problems related to pregnant women's complaints are often considered normal, resulting in some mothers receiving insufficient education about the importance of maintaining ideal nutritional status before and during pregnancy. Many mothers are unaware that a low or high BMI can impact physical well-being, stamina, and quality of life during pregnancy (Handayani & Nurjanah, 2021) . Knowledge regarding nutrition, nutrition, and weight management during pregnancy still needs to be improved. This is crucial so that pregnant women can take steps to support their health, such as maintaining a balanced nutritional diet, engaging in safe physical activity, and regularly undergoing pregnancy check-ups (Meilinda, 2024) .

Studying the relationship between BMI and third-trimester complaint rates is crucial to understand how nutritional status can impact maternal comfort during labor. This information is invaluable for healthcare providers in developing targeted educational and intervention programs, such as nutrition counseling, weight gain monitoring, and recommendations for safe physical activity. With a better understanding of the relationship between BMI and pregnancy complaints, it is hoped that pregnant women can experience the final trimester more comfortably and be prepared for labor (Safitri & Triana, 2021) .

Furthermore, knowledge of this can also serve as a basis for pregnant women to develop self-awareness about their physical condition. For example, women with a high BMI can be more aware of the risk of certain physical discomforts and begin working towards healthy weight management before their next pregnancy. Similarly, women with a low BMI can pay more attention to nutritional needs to maintain optimal stamina. Therefore, research on the relationship between BMI and third-trimester complaint levels is beneficial not only for healthcare professionals but also for pregnant women and their families in improving the quality of their pregnancies (Manik & Rindu, 2023) .

Based on this description, it can be concluded that BMI has the potential to significantly influence the level of complaints experienced by pregnant women in the third trimester. Each BMI category carries a different risk of complaints. Therefore, further research is needed to determine the extent of this relationship, which can serve as a foundation for efforts to improve the quality of maternal health services . This research is expected to contribute to a greater understanding of the importance of ideal nutritional status for maternal comfort during the final trimester, as well as supporting the achievement of a healthy pregnancy and optimal preparation for childbirth.

2. RESEARCH METHOD

This study used a descriptive analytical design with a cross-sectional approach to analyze the relationship between Body Mass Index (BMI) and the level of complaints in third-trimester pregnant women. The study was conducted at the Kobe Community Health Center in November, with a population of all third-trimester pregnant women undergoing routine check-ups. A sample of 30 respondents was selected using a purposive sampling technique, with the following inclusion criteria: pregnant women in their third trimester, willing to participate, and not experiencing serious pregnancy complications.

The independent variable in this study was the BMI of pregnant women, categorized as underweight (<18.5) , normal (18.5 - 24.9), and overweight/obese (≥25). The dependent variable was the level of third-trimester complaints, measured using a Likert-scale questionnaire assessing the intensity of physical complaints such as back pain, shortness of breath, leg cramps, pelvic pain, fatigue, and sleep disturbances. BMI was measured using a digital scale and stadiometer, while complaints were measured using a structured questionnaire that had been tested for validity and reliability. Additional interviews were conducted to obtain data on daily activities, occupation, and pregnancy history.

The data obtained were analyzed using descriptive statistics to describe respondent characteristics, BMI distribution, and complaint levels. Furthermore, Fisher's exact test was used to determine the relationship between BMI and third-trimester complaint levels. The results are presented in tabular and narrative form to facilitate data interpretation and understanding of the relationship between nutritional status and complaints experienced by pregnant women in the final trimester.

3. RESULTS AND DISCUSSION

Results

Table 1. Respondent Characteristics (n = 30).

Characteristics	Category	Number (n)	Percentage (%)
Mother's age	< 25 years	6	20.0
	25 - 35 years	19	63.3
	> 35 years	5	16.7
Education	Elementary/Middle School	9	30.0
	Senior High School	15	50.0
	College	6	20.0

Characteristics	Category	Number (n)	Percentage (%)
Work	Housewife	16	53.3
	Work	14	46.7

Based on Table 1, the majority of respondents were aged 25–35 years, as many as 19 people (63.3%), followed by those under 25 years old (6 people) (20.0%) and those over 35 years old (5 people) (16.7%). In terms of education, the majority had a high school education of 15 people (50.0 %), elementary/junior high school education of 9 people (30.0%), and college education of 6 people (20.0%). Most respondents were housewives, namely 16 people (53.3 %), while 14 people (46.7%) worked outside the home. This picture shows that respondents were generally at a mature reproductive age with secondary education, and were divided between those who worked and those who focused on household activities, factors that can influence comfort and complaints during the third trimester of pregnancy.

Table 2. Distribution of BMI and Level of Complaints.

BMI	Number (n)	%	High Complaints n (%)	Low Complaints n (%)
Less (<18.5)	6	20.0	5 (83.3)	1 (16.7)
Normal (18.5 - 24.9)	15	50.0	6 (40.0)	9 (60.0)
Overweight/Obese (≥25)	9	30.0	7 (77.8)	2 (22.2)

Based on Table 2, most respondents had a normal BMI, namely 15 people (50.0%), followed by overweight/obese BMI as many as 9 people (30.0%) and underweight BMI as many as 6 people (20.0%). Third trimester complaints were more often experienced by mothers with underweight BMI, where 5 of 6 respondents (83.3%) reported high complaints, and only 1 person (16.7%) reported low complaints. In the overweight/obese BMI group, 7 of 9 respondents (77.8 %) experienced high complaints, while 2 people (22.2%) reported low complaints. Meanwhile, mothers with normal BMI reported more low complaints, namely 9 of 15 respondents (60.0%), while 6 people (40.0%) experienced high complaints. These findings indicate that BMI outside the normal category, whether underweight or overweight/obese, has the potential to increase the intensity of complaints in the third trimester of pregnancy.

Table 3. Relationship between BMI and Level of Complaints in the Third Trimester.

BMI	High Complaints n (%)	Low Complaints n (%)	Total	p-value*
Not enough	5 (83.3)	1 (16.7)	6	0.045
Normal	6 (40.0)	9 (60.0)	15	

BMI	High Complaints n (%)	Low Complaints n (%)	Total	p-value*
Overweight/Obesity	7 (77.8)	2 (22.2)	9	

Based on Table 3, there is a significant relationship between BMI and the level of complaints in the third trimester. Mothers with a low BMI mostly experienced high complaints, namely 5 of 6 respondents (83.3 %), while 1 person (16.7%) reported low complaints. In the overweight/obese BMI group, 7 of 9 respondents (77.8 %) experienced high complaints, and 2 people (22.2%) reported low complaints. Conversely, in the normal BMI group, the majority of respondents reported low complaints, as many as 9 of 15 people (60.0%), while 6 people (40.0%) experienced high complaints. The results of the Fisher's Exact test showed a p value = 0.045, which indicates a significant relationship between BMI status and the level of complaints in the third trimester, so that BMI plays a role as a factor that influences the intensity of complaints in pregnant women.

Discussion

The results of this study indicate a significant relationship between Body Mass Index (BMI) and the level of complaints experienced by pregnant women in the third trimester. This finding confirms that maternal nutritional status, as reflected by BMI, plays a significant role in determining physical comfort during late pregnancy. Mothers with both underweight and overweight/obese BMIs tend to experience higher levels of complaints than those with normal BMIs. This condition reinforces the view that pregnancy, although physiological, still requires optimal physical readiness for a smooth adaptation process (Puspitasari & Indrianingrum, 2020) .

In the group of mothers with a low BMI, most respondents reported high levels of complaints. This condition can be explained by the mother's limited energy and nutrient reserves. During the third trimester, energy needs increase along with rapid fetal growth and increased maternal metabolic activity. When nutritional intake is inadequate, the mother's body becomes more susceptible to fatigue, muscle cramps, back pain, and sleep disturbances. Furthermore, a low BMI is often associated with anemia and decreased stamina, which ultimately exacerbates the physical complaints experienced by pregnant women (Murniasih et al., 2025) . This indicates that nutritional deficiencies not only impact the fetus but also directly affect the mother's comfort and quality of life during pregnancy.

Meanwhile, in the group of mothers with an overweight or obese BMI, complaints of high blood pressure were also found in a large proportion. Excessive weight gain causes additional mechanical stress on the musculoskeletal system, particularly on the spine, pelvis,

and lower extremities. This pressure can trigger lower back pain, pelvic pain, and swelling in the legs. Furthermore, the accumulation of fatty tissue can increase pressure on the diaphragm, making mothers more prone to shortness of breath, especially when lying down or performing light activities. This condition is consistent with findings (Andini, 2019) which state that excessive BMI contributes to increased physical discomfort in the final trimester of pregnancy.

The findings of this study also indicate that mothers with a normal BMI tend to experience fewer complaints. This indicates that the balance between weight and height allows the body to adapt more optimally to the physiological changes of pregnancy. Mothers with a normal BMI generally have a more proportional weight distribution, better physical endurance, and a lower risk of musculoskeletal disorders. This condition supports mothers' ability to remain active comfortably and maintain better sleep quality during the third trimester (Meilani et al., 2023) .

The third trimester is a phase that demands significant physical adaptation. The uterus reaches its maximum size, the body's center of gravity shifts forward, and the hormone relaxin increases in preparation for labor. Relaxin causes ligaments and joints to loosen, which, if not balanced with optimal body condition, can lead to more intense pelvic and back pain. When this physiological condition occurs in mothers with an abnormal BMI, whether low or high, the body becomes more difficult to adapt, resulting in more severe symptoms (Merdayanti & Fauzi, 2024) .

High levels of physical complaints in the third trimester not only impact comfort but can also affect the psychological well-being of pregnant women. Mothers who frequently experience pain, fatigue, and sleep disturbances are at risk of anxiety, stress, and decreased mental preparedness for childbirth. In the long term, these conditions can reduce the mother's quality of life and affect their perception of the overall pregnancy experience (Lestari et al., 2019) . Therefore, understanding the factors that exacerbate complaints, including BMI, is crucial in maternal healthcare.

The results of this study also indicate that some pregnant women with low or high BMIs are still unaware of the impact of nutritional status on their symptoms. This aligns with findings (Handayani & Nurjanah, 2021) , which state that pregnancy symptoms are often considered normal and do not require special attention. Consequently, efforts to maintain ideal nutritional status before and during pregnancy are not a priority for some mothers. However, proper weight management through a balanced diet and safe physical activity can help reduce the intensity of third-trimester symptoms (Meilinda, 2024) .

From a healthcare perspective, these findings have important implications. BMI monitoring should not only be used to assess the risk of medical complications but also as a basis for anticipating physical complaints that pregnant women may experience. Health workers need to provide more targeted counseling on weight management during pregnancy, including nutrition education and recommendations for light physical activity appropriate to the mother's condition. This approach can reduce third-trimester complaints, making mothers more comfortable and prepared for childbirth (Safitri & Triana, 2021) .

This study confirms that BMI is a significant factor associated with the level of complaints in pregnant women during the third trimester. A BMI outside the normal range, whether low or high, has the potential to exacerbate physical complaints experienced by mothers. Therefore, efforts to maintain ideal nutritional status before and during pregnancy need to be an integral part of antenatal care. A preventive approach through education, routine monitoring, and family support is expected to improve maternal comfort, pregnancy quality, and physical and mental readiness for childbirth (Manik & Rindu, 2023) .

4. CONCLUSION

This study concluded that there is a significant relationship between Body Mass Index (BMI) and the level of complaints experienced by pregnant women in the third trimester. Mothers with low, overweight, or obese BMIs tend to experience more physical complaints than those with normal BMIs. This indicates that maternal nutritional status plays a crucial role in determining the body's ability to adapt to the physiological changes that occur before delivery. Therefore, BMI can be used as an important indicator in predicting maternal comfort levels during the final trimester of pregnancy.

The study also showed that mothers with a normal BMI reported more low-grade symptoms, indicating that balanced nutritional status helps maintain stamina, physical comfort, and the quality of activity and rest during pregnancy. Conversely, a BMI that is not within the normal range can potentially exacerbate symptoms such as back pain, fatigue, sleep disturbances, and mild shortness of breath. These findings confirm that third-trimester symptoms are not solely caused by fetal growth but are also influenced by the mother's overall physical condition.

Based on these results, it is recommended that healthcare professionals increase their attention to BMI monitoring from early pregnancy through the final trimester. Nutritional counseling, weight gain monitoring, and education on balanced diets and safe physical activity should be provided continuously throughout antenatal care. This approach is expected to help

mothers maintain ideal nutritional status, thereby minimizing physical complaints and optimizing labor readiness.

Furthermore, pregnant women are expected to raise awareness of the importance of maintaining nutritional status before and during pregnancy. Family involvement also needs to be strengthened to provide support for mothers in adopting a healthy lifestyle. For future research, it is recommended to conduct studies with a larger sample size and consider other factors such as physical activity, psychological well-being, and family support to obtain a more comprehensive picture of the factors influencing third-trimester complaints.

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