The Relationship Between Nutritional Status and Age on the Incidence of Preeclampsia in Pregnant Women

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Editorial

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CROSS-SECTIONAL STUDY

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Abstract

Background: Preeclampsia is a significant pregnancy complication and a primary contributor to maternal death, especially in underdeveloped nations. The condition may compromise maternal and fetal health by processes including diminished uteroplacental perfusion, vasospasm, and endothelial injury. **Purpose:** The objective of this study was to investigate the correlation between nutritional status and maternal age about the prevalence of preeclampsia among pregnant women at RSUD Dr. H. Abdul Moeloek, Lampung Province, in 2024. **Methods:** A quantitative cross-sectional design was utilized. The study population comprised all laboring moms diagnosed with mild or severe preeclampsia, totaling 38 cases. Data were obtained from medical records, encompassing dietary state, maternal age, and the severity of preeclampsia. The analysis utilized the chi-square test with a significance threshold of $p < 0.05$. **Results:** A significant proportion of respondents were classified as underweight (54.3%) or overweight (31.4%), with nearly half (48.6%) being under the age of 20. The chi-square test revealed a significant correlation between nutritional status and the incidence of preeclampsia ($p = 0.046$), as well as between maternal age and the incidence of preeclampsia ($p = 0.013$). Mothers exhibiting inadequate nutritional status (either underweight or overweight) and those outside the optimal reproductive age range (20–35 years) had an increased likelihood of developing preeclampsia. **Conclusion:** The nutritional status and maternal age are critical risk factors for preeclampsia. Enhancing maternal nutrition and encouraging pregnancy within the optimal reproductive age are crucial for decreasing the occurrence of preeclampsia and associated maternal mortality. Healthcare practitioners must emphasize early identification and focused instruction for high-risk populations.

Keywords: nutritional status, maternal age, preeclampsia, pregnancy

Introduction

Preeclampsia is one of the most common complications of pregnancy and a major cause of maternal and perinatal morbidity and mortality worldwide, especially in developing countries. According to the World Health Organization [15], preeclampsia is a hypertensive condition that appears after 20 weeks of gestation, accompanied by proteinuria or other signs of organ damage. This condition can cause serious disorders in both the mother and the fetus, such as decreased uteroplacental perfusion, vasospasm, and endothelial damage to the placental blood vessels [12].

Globally, the prevalence of preeclampsia in pregnancy ranges from 2% to 10%, with a higher incidence in developing countries [15]. In Indonesia, preeclampsia is one of the three leading causes of maternal death, along with bleeding and infection (Indonesian Ministry of Health). Data from the Indonesian Ministry of Health in 2023 showed that 36.7% of maternal deaths were caused by preeclampsia, while severe preeclampsia accounted for 63.3% of these cases. The largest age group of mothers who experience preeclampsia is in the productive age range, namely 20-35 years.

Lampung Province is also facing the same problem. Based on data from the Lampung Provincial Health Office, there was an increase in cases of severe preeclampsia from 390 cases in 2021 to 430 cases in 2022, with an increasing mortality rate. At RSUD Dr. H Abdul Moeloek, as the main referral hospital in Lampung Province, secondary data recorded 148 cases of preeclampsia in 2022, and 135 cases in 2023 with 3 deaths. In 2024, until October, there were fluctuations in the number of preeclampsia cases every month, with a peak of 27 cases occurring in October.

Preeclampsia is known as a "disease of theories" because the exact cause is still unknown. However, various risk factors have been identified, including nutritional status and age of pregnant women [5]. Poor nutritional status can increase the risk of preeclampsia through the mechanisms of inflammation, oxidative stress, and impaired endothelial function. Meanwhile, maternal age that is too young (<20 years) or too old (>35 years) is also known to contribute to the increased risk of preeclampsia, both through physiological factors and hormonal changes that occur during pregnancy [8].

The impact of preeclampsia is not only felt by the mother, but also the fetus, such as premature birth, low birth weight, intrauterine growth restriction, and perinatal death [9]. Therefore, identification of risk factors and efforts to prevent preeclampsia are very important to reduce maternal and infant morbidity and mortality.

Based on the results of an initial survey in the Delima Room at Dr. H Abdul Moeloek Hospital in 2024, it was found that most of the mothers with preeclampsia had suboptimal nutritional status and were in the high-risk age group. However, research that specifically analyzes the relationship between nutritional status and age with the incidence of preeclampsia in this hospital is still very limited.

Therefore, this study aims to analyze the relationship between nutritional status and age with the incidence of preeclampsia in pregnant women in the Delima Room of Dr. H Abdul Moeloek Hospital Lampung Province in 2024. It is hoped that the results of this study can provide empirical evidence that can be used as a basis in efforts to prevent and treat preeclampsia, as well as a reference in the development of maternal nursing policies and practices in the future.

Methods

This study used a quantitative design with a cross-sectional approach to analyze the relationship between nutritional status and age with the incidence of preeclampsia in pregnant women. The sample consisted of 38 laboring mothers in the Delima Room of Dr. H Abdul Moeloek Hospital, Lampung Province. Data were collected through medical records that included information on nutritional status, age, and severity of preeclampsia. Data analysis was performed using the Chi-Square test, with the significance level set at $p < 0.05$. This study also received ethical approval from the ethics committee of Dr. H Abdul Moeloek Hospital with ethics number 439/KEPK-RSUDAM/II/2025.

Result

Table 1. Characteristics of Respondents (n = 38)

Characteristics	Frequency (n)	Percentage (%)
Education		
Bachelor's degree	10	28,6%
High school		48,6%
Junior high school	17	22,9%
	8	
Occupation		
Laborer	6	17,1%
Honorary	3	8,6%
Housewife	13	37,1%
Trader	9	25,7%
Civil servant	4	11,4%
Laborer	6	17,1%

Characteristics	Frequency (n)	Percentage (%)
Gestational age		
37 weeks	7	20,0%
38 weeks	5	14,3%
39 weeks	11	31,4%
40 weeks	12	34,3%
Parity		
Grandemultiparous	5	14,3%
Multiparous	18	51,4%
Primiparous	12	34,3%
Total	**35**	**100,0%**

The characteristics of the majority of respondents have a high school education, totaling 17 respondents (48.6%). The majority of respondents' employment category worked as housewives, 13 respondents (37.1%). The category of gestational age of the majority of respondents was 40 weeks old, with 12 respondents (34.3%). The parity category of the majority of respondents was multiparous, with 12 respondents (34.3%) (Table 1).

Table 2. Frequency of Preeclampsia Incidence in Maternal Women

Incidence of preeclampsia	Frequency (n)	Percentage (%)
Mild preeclampsia	20	57,1%
Severe preeclampsia	15	42,9%
Total	**35**	**100,0%**

The frequency distribution of the incidence of preeclampsia in laboring mothers in the Delima Room of Dr. H Abdul Moeloek Hospital, Lampung Province, in 2024, the majority of respondents experienced mild preeclampsia, as many as 20 respondents (57.1%), while those who experienced severe preeclampsia were 15 respondents (41.9%) (Table 2).

Table 3. Frequency of Nutritional Status in Maternal Mothers

Maternal Nutritional Status	Frequency (n)	Percentage (%)
Underweight	19	54,3%
Normal weight	5	14,3%
Overweight	11	31,4%
Total	**35**	**100,0%**

Frequency of Nutritional Status in Maternity Mothers It is known that the frequency distribution of nutritional status in maternity mothers in the Delima Room of Dr. H Abdul Moeloek Hospital Lampung Province in 2024 the majority of respondents had underwight as many as 19 respondents (54.3%), respondents who had normal nutritional status (normal weight) as many as 5 respondents (14.3%) and respondents who had overweight (overweiht) as many as 11 respondents (31.4%) (Table 3).

Table 4. Frequency of Maternity Age

Mother's age	Frequency (n)	Percentage (%)
Age <20 years	17	48,6%
Age 20-35 years	8	22,9%
Age >35 years	10	28,6%
Total	**35**	**100,0%**

Frequency of Maternity Age It is known that the frequency distribution of age in laboring mothers in the Delima Room of Dr. H Abdul Moeloek Hospital Lampung Province in 2024 the majority were less than 20 years old as many as 17 respondents (48.6%), while respondents

aged 20-35 years were 8 respondents (22.9%) and respondents aged> 35 years were 10 respondents (28.6%) (Table 4).

Table 5. Relationship between nutritional status and the incidence of pre-eclampsia in laboring mothers

Nutrition Status	Incidence of Preeclampsia						p-value
	Light		Heavy		Total		
	N	%	N	%	N	%	
Under Weight	14	40,0	5	14,3	19	54,3	
Normal Weight	3	8,6	2	5,7	5	14,3	0,046
Over Weight	3	8,6	8	22,9	11	31,4	
Total	**20**	**57,1**	**15**	**42,9**	**35**	**100**	

It is known that the category of respondents who have underweight nutrition is 19 respondents (54.3%). Of these 19 respondents, there are 14 respondents (40.0%) experiencing mild preeclampsia, while those experiencing severe preeclampsia are 2 respondents (14.3%). The category of respondents with normal nutrition was 5 respondents (14.3%). Of these 5 respondents, there were 3 respondents experiencing mild preeclampsia as many as 3 respondents (8.6%), and the rest experienced severe preeclampsia as many as 2 respondents (5.7%). The category of respondents with overweight was 11 respondents (31.4%). Of these 11 respondents, there were 8 respondents (22.9%) experiencing severe preeclampsia, and those experiencing mild preeclampsia were 3 respondents (8.6%). The results of the chi-square test obtained a p-value of 0.046, which means the p-value <0.05; it can be concluded that there is a significant relationship between nutritional status and the incidence of preeclampsia in laboring women at Dr. H Abdul Moeloek Hospital, Lampung Province, in 2024 (Table 5).

Table 6. Relationship between age and the incidence of pre-eclampsia in laboring mothers

Age	Incidence of Preeclampsia						p-value
	Light		Heavy		Total		
	N	%	N	%	N	%	
Age < 20 years	14	40,0	3	8,6	17	48,6	0,013
Age 20-35 years	3	8,6	5	14,3	8	22,9	
Age >35 years	3	8,6	7	20,0	10	28,6	
Total	**20**	**57,1**	**15**	**42,9**	**35**	**100**	

The Relationship of Age to the Incidence of Preeclampsia in Maternity Mothers, it can be seen that the relationship of age to the incidence of preeclampsia in maternity mothers in the Delima Room of Dr. H Abdul Moeloek Hospital Lampung Province in 2024, the age category <20 years with mild preeclampsia was 14 (40.0%) respondents and with severe preeclampsia was 3 (8.6%) respondents. The age category of 20-35 years with mild preeclampsia was 3 respondents (8.6%), and with severe preeclampsia was 5 respondents (14.3%). The age category >35 years with mild preeclampsia was 3 respondents (8.6%), and with severe preeclampsia was 7 respondents (20.0%). The results of the chi-square test yielded a p-value of 0.013, which means the p-

value <0.05; it can be concluded that there is a relationship between age and the incidence of preeclampsia in laboring mothers in the Pomegranate Room of Dr. H Abdul Moeloek Hospital, Lampung Province, in 2024 (Table 6).

Discussions

The results of the analysis showed that the incidence of preeclampsia in laboring women in the Delima Room of Dr. H Abdul Moeloek Hospital in 2024 consisted of 20 respondents (57.1%) who experienced mild preeclampsia and 15 respondents (42.9%) who experienced severe preeclampsia. Preeclampsia is a condition that can be dangerous, often appears in the third trimester of pregnancy, and

is characterized by increased blood pressure and protein in the urine.

In terms of nutritional status, 19 respondents (54.3%) were identified as underweight, while 11 respondents (31.4%) were overweight. This shows that poor nutritional status can increase the risk of preeclampsia, in line with the findings of Ginting (2020) which states that suboptimal nutrition contributes to pregnancy complications [6]. Research by Amalina (2022) also found a significant relationship between nutritional status and the incidence of preeclampsia (p=0.003), emphasizing the importance of nutritional monitoring during pregnancy [1].

In terms of age, 17 respondents (48.6%) were less than 20 years old, a group at high risk of complications such as preeclampsia. Research by Dartiwen et al. (2019) showed that those under 20 years old and over 35 years old have a greater risk of developing preeclampsia [3]. Research by Dasarie (2023) supports these findings, with the result of p value = 0.031 which shows a significant relationship between age and the incidence of preeclampsia.

Another factor that needs to be considered is parity. Research by Handayani (2020) shows that pregnant women with high parity tend to be more prone to preeclampsia, with the risk increasing in mothers who have given birth more than three times [7]. In addition, education and knowledge about health also play an important role. Mothers with higher education tend to be more aware of the importance of nutrition and regular check-ups, which may contribute to reducing the risk of preeclampsia [11].

Psychological aspects should not be overlooked either. Stress and anxiety experienced by pregnant women can affect their physical and mental health, potentially increasing the risk of preeclampsia. Research by Supriatun and Insani (2020) shows that emotional support from family and health workers is very important in helping pregnant women cope with stress.

The results of this study are also in line with research by [10] which found that preeclampsia is one of the leading causes of maternal mortality, and factors such as nutritional status and age contribute significantly to its occurrence. Research by Bobak (2015) confirms that women under 20

years of age or over 35 years of age have a higher risk of developing preeclampsia [2].

Overall, this analysis emphasizes the importance of attention to nutritional status, age, parity, education, and psychological factors of pregnant women in the prevention of preeclampsia. Education and regular health check-ups are necessary to reduce the risk of complications and improve maternal and fetal health. Collaborative efforts from health workers, families, and communities should be enhanced to ensure pregnant women receive optimal attention throughout pregnancy.

Based on the results of statistical tests using chi-square, a p-value of 0.046 was obtained for the relationship between nutritional status and the incidence of preeclampsia. This value is smaller than the significance level of 0.05, so it can be concluded that there is a significant relationship between the nutritional status of pregnant women and the incidence of preeclampsia in the Delima Room of Dr. H Abdul Moeloek Hospital Lampung Province in 2024. These results indicate that pregnant women with under or overnutrition have a higher risk of developing preeclampsia compared to pregnant women with normal nutritional status.

Biologically, nutritional status plays an important role in maintaining the function of the vascular system and metabolism during pregnancy. Nutritional imbalances can lead to impaired placental perfusion, insulin resistance, and systemic inflammation that contribute to endothelial damage and vasospasm, key mechanisms in the pathogenesis of preeclampsia. As stated by Ginting (2020), undernourished pregnant women may experience impaired blood circulation and decreased oxygen supply to the placenta, while overnourished mothers (including obesity) are more at risk of hypertension and inflammation that aggravate the condition of preeclampsia [6].

This study also found a significant association between maternal age and the incidence of preeclampsia, with a p-value of 0.013. This means that the further the mother's age is from the ideal reproductive age range (20-35 years), the higher her risk of developing preeclampsia. This result is consistent with previous studies which state that mothers who become pregnant at the age of <20 years or >35

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years have greater physiological vulnerability to blood pressure disorders during pregnancy [1].

At a young age, the mother's reproductive and hormonal systems are not fully developed, causing the body to be unprepared for major changes during pregnancy. In contrast, at the age of >35 years, degenerative processes have occurred that cause blood vessel elasticity to decrease and increase the likelihood of hypertension and endothelial disorders, all of which are key factors in the occurrence of preeclampsia [3]. This is reinforced by data from the Ministry of Health (2023), which shows that preeclampsia is most commonly found in pregnant women outside the healthy reproductive age group.

Thus, the results of this study reinforce the importance of paying attention to two main factors, namely nutritional status and age, in efforts to prevent preeclampsia. Nutritional interventions since preconception and education of adolescents about healthy pregnancy can help reduce the incidence of preeclampsia. Health workers are also expected to be more active in conducting early detection and regular monitoring of pregnant women with under-/over over-nutritional status and are in high-risk age groups [8].

Limitation

This research possesses multiple limitations. The sample size was relatively small (38 responders) and confined to a single hospital setting, thus diminishing the generalizability of the findings to other populations or geographies. The cross-sectional methodology solely collects data at a single time point, rendering it incapable of establishing causal links among nutritional status, maternal age, and the occurrence of preeclampsia. Third, the study utilized secondary data from medical records, which may be prone to insufficient recording or reporting bias. Furthermore, additional possible confounding variables, including socioeconomic status, parity, frequency of antenatal care, and comorbidities, were not accounted for in the research. Future investigations utilizing a bigger, more heterogeneous sample and a prospective design are advised to validate these findings and examine further risk variables.

Conclusion

Based on the results of research conducted on 38 pregnant women in the Delima Room of Dr. H Abdul Moeloek Hospital, it can be concluded that there is a significant relationship between nutritional status and maternal age with the incidence of preeclampsia. Pregnant women with abnormal nutritional status, either under- or overnutrition, have a higher risk of developing preeclampsia compared to mothers who have a normal nutritional status. In addition, mothers who become pregnant at the age of under 20 years or over 35 years also tend to be more prone to preeclampsia compared to mothers who are in the healthy reproductive age range. These findings suggest that nutritional status and age are two important factors that need attention in efforts to prevent preeclampsia. It is hoped that the results of this study can be taken into consideration for health workers in providing education to pregnant women, as well as a basis for increasing efforts to detect early and prevent preeclampsia, in order to reduce the number of complications and maternal deaths during childbirth. In addition, this study is also expected to be a reference for future researchers to develop a more in-depth study of other risk factors for preeclampsia.

Author Contribution

Contributions of Authors Ni Wayan Sinta Dewi: Conceptualization, data acquisition, formal analysis, manuscript composition. Amalia: Methodological design, data validation, statistical analysis, and paper reading and editing. Nurwinda Sari: Conducted literature review, interpreted data, prepared text, and granted final approval for publication.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data underpinning the findings of this investigation can be obtained from the corresponding author upon a reasonable request.

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