

Research article

Relationship Between Nutritional Status and Preeclampsia in West Bandung District

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Abstract.

Preeclampsia is a condition characterized by hypertension, proteinuria and edema which occurs during pregnancy. Several factors can lead to the onset of preeclampsia, one of which is nutritional status. The objective of this study was to determine the relationship between nutritional status and the incidence of preeclampsia in West Bandung District in Indonesia. This was quantitative research with a case-control design. The sample included 159 people consisting of 53 cases and 106 controls. Data analysis involved univariate analysis with frequency distribution analysis, and bivariate analysis using the Chi-square test (α : 0.05 and CI: 95%). Secondary data were collected on the number of preeclampsia cases from mother card records and medical records from January - June 2021. The results showed that of the 53 respondents with preeclampsia, 31 (58.5%) were overweight, and this factor was shown to have a significant relationship with the incidence of preeclampsia (OR = 2.42; 95% CI = 1, 71-5.01; p value = 0.01). Therefore, a balanced nutritional intake is needed during pregnancy.

Keywords: pregnant women, preeclampsia, nutritional status

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1. Introduction

Preeclampsia is an event in women who experience pregnancy > 20 weeks with signs such as hypertension, proteinuria, and edema. Hypertension in preeclampsia can be said to be the cause of an increase in systolic blood pressure of about 140 mmHg or can be said to be a diastolic pressure of about 90 mmHg. Proteinuria is urine that contains excessive protein. But edema is considered non-specific in diagnosing preeclampsia [1]. Preeclampsia is defined by the World Health Organization (WHO) as hypertension during pregnancy, characterized by: Persistent hypertension (diastolic blood pressure 90 mm Hg) and substantial proteinuria (> 0.3 g/24 hours). Globally 76,000 women and 500,000 infants die each year from hypertension and preeclampsia during pregnancy, making this disorder one of the leading causes of maternal and perinatal morbidity and mortality [2]. Preeclampsia is one of the most feared complications of pregnancy, often presenting as new-onset hypertension and proteinuria during the third trimester,

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preeclampsia can rapidly progress to serious complications, including maternal and fetal death [3].

Reproductive health plays a very strategic role and is the key to creating a generation that is superior, competitive, and advanced in Indonesia which is Indonesia's main asset. Reproductive health is closely related to the achievement of priority targets for reducing maternal mortality [4]. Indonesia's MMR is still high, according to the 2015 Inter-Census Population Survey (SUPAS), which is 305 per 100,000 live births. This figure is still far from that stated in the TPB Goal 3 which is to ensure healthy lives and promote well-being for all individuals of all ages and reduce the global MMR to less than 70 per 100,000 live births by 2030 [5].

In Indonesia, the number of maternal deaths by the province in 2018-2019 where there was a decrease from 4,226 to 4,221 maternal deaths. In 2019, the most common causes of maternal death were bleeding (1,280 cases), hypertension in pregnancy (1,066 cases), infection (207 cases). The province with the highest number of deaths in West Java, wherein in 2018 there were 700 maternal deaths and in 2019 there were 684 maternal deaths. In 2019 the most common causes of maternal death were bleeding (226 cases), and hypertension in pregnancy (218 cases) [6].

Several factors can support the onset of preeclampsia, including reproductive factors consisting of age, parity, pregnancy spacing, heredity, and multiple pregnancies. Health factors consist of a history of hypertension, a history of preeclampsia, a history of diabetes mellitus, nutritional status, and psychology. Healthy behavior factors include antenatal care and a history of family planning acceptors [7].

Based on reports of maternal deaths in January-July 2020 from the Prov. West Java showed maternal deaths up to July as many as 416 cases, almost the same as in 2019 which was 417 cases. The cause of maternal death is still dominated by bleeding 28% and hypertension 29%. West Bandung District ranks 5th highest maternal mortality (23 cases), after Bogor (39 cases), Karawang (38 cases), Garut (31 cases), and Sukabumi (27 cases) [8]. In the 2020 West Bandung District, there were quite high maternal mortality cases, namely 38 cases, 5 of which were caused by hypertension in pregnancy [9]. Researchers have not found published studies that specifically discuss nutritional status with preeclampsia. Previous studies discussed nutritional status with other diseases. Research needs to be done because it has been explained above that maternal mortality is quite high, especially bleeding and hypertension in pregnancy, researchers have not found published research and maternal mortality is one of the national priorities as well as input for making a program/policy in preventing preeclampsia in pregnant women. There are still high cases of preeclampsia in the West Bandung District area,

the authors are interested in researching "The relationship between nutritional status and the incidence of preeclampsia in West Bandung District".

2. Methods

This study design is a case-control with sample size uses a total sampling of 53 cases in population. The ratio of cases and controls was 1:2 so that the total sample was 159 people consisting of 53 cases and 106 controls. Case: Mothers who have a history of preeclampsia based on maternal card records while Control: Mothers who do not have a history of preeclampsia based on maternal card records. Case inclusion criteria: domiciled in West Bandung District, gestational age >20 weeks, the final diagnosis of preeclampsia. Case exclusion criteria have incomplete medical records/mother card. Control inclusion criteria: domiciled in West Bandung District, gestational age > 20 weeks. Case-control exclusion criteria have incomplete medical records/mother cards. Data analysis used two ways, namely univariate analysis with frequency distribution analysis, bivariate with Chi-square test (α : 0.05 and CI: 95%). Data collection procedure start from ethical approval, permission to study, data collection uses secondary data in the form of data on the number of preeclampsia cases, maternal card records, or medical records from January - June 2021. Secondary data is collected by looking at maternal card data. The data to be taken are age, education, and nutritional status.

3. Results

3.1. Univariate Analysis

TABLE 1: Frequency Distribution of Respondents Based on Education Level and Nutritional Status.

Risk Determinants	Preeclampsia			
	Case	%	Control	%
Level of education:				
Low (SD-SMP)	31	58,5	56	52,8
High (SMA-PT)	22	41,5	50	47,2
Jumlah	53	100%	106	100%
Nutritional Status (BMI)				
Normal Overweight	22 31	41,5 58,5	24 82	22,6 77,4
Total	53	100%	106	100%

Table 1 shows that in the preeclampsia group 62.3% were at the age of 20-35 years, while in the control group 44.3% <20 years. Nutritional status in the preeclampsia group was 58.5% Overweight while in the control group it was 77.4% Overweight.

3.2. Bivariate Analysis

TABLE 2: Relationship between nutritional status and incidence of preeclampsia.

Nutritional Status (BMI)	Preeclampsia				OR CI95%	p
	Case	%	Control	%		
Normal (BMI 18.5 - 24,99 kg/m ²)	22	41,5	24	22,6	2,42 (1,71-5,01)	0,01
Overweight (BMI 25 - 27 kg/m ²)	31	58,5	82	77,4		
Total	53	100%	106	100%		

Table 2. It can be seen that of the 53 respondents who experienced preeclampsia, 31 respondents (58.5%) were overweight and 22 respondents (41.5%). Of the 106 control respondents, 82 respondents (77.4%) were overweight and 24 (22.6%) respondents had normal nutritional status. Based on the results of the bivariate analysis with statistical tests using Chi-Square, the results obtained p-value = 0.01 (p <0.05) meaning that the hypothesis states that there is a significant relationship between Nutritional Status and the incidence of pre-eclampsia, where the OR value is 2.42 which means that in pregnant women overweight nutritional status 2.42 times the risk of preeclampsia.

4. Discussion

Nutritional problems are a reflection of the consumption of nutrients that are not sufficient for the body's needs. A person will have a good nutritional status if the nutritional intake is following the needs of his body. Inadequate intake of nutrients in food can lead to malnutrition, on the other hand, people who have excess nutritional intake will suffer from excess nutrition [10]. Being overweight is known to be a factor in the occurrence of various health problems, one of which is preeclampsia. Being overweight is one of the risk factors for preeclampsia based on health status. Nutritional intake greatly determines the health of pregnant women and the fetus they contain. Pregnant women who are overweight/overweight will lead to various complications in pregnancy, one of which is hypertension, where 60% of people with hypertension are obese [11].

Overweight and obesity are more nutritional status which is characterized by weight gain that exceeds normal weight. Besides being able to cause high levels of cholesterol in the blood, it can also affect the work of the heart, because the fatter a person is, the heavier the heart pump and blood pressure increases, which can cause preeclampsia. This is supported by the theory of Angsar, which states that being overweight is a risk factor for preeclampsia. The risk factor for preeclampsia is not only overweight and obesity. In pregnant women who are overweight, preeclampsia can occur through the mechanism of hyperleptinemia, metabolic syndrome, inflammatory reactions, and increased oxidative stress which leads to endothelial damage and dysfunction [12]. Golinska-Grzybala et al, suggested that subclinical left ventricular dysfunction in obese and overweight women, occurring from the first trimester, may lead to placental hypoperfusion and higher resistance in the uterine arteries later in pregnancy [13].

This can cause some women to develop preeclampsia This study is in line with several studies such as Gaillard et al which stated that maternal obesity and excessive weight gain during pregnancy increased preeclampsia (OR (3.61, (95% CI 2.04-6.39) [14]. JJ, F et al stated that maternal excess weight was associated with an increased risk of preeclampsia (OR 3.69; 95% CI: 1.64-8.27) [15]. Kartasurya stated that mothers with obesity had a risk of developing preeclampsia, namely by 2.68 times greater than mothers who are not obese [16]. Likewise, research conducted by Fransiska showed that nutritional status had a significant relationship with the incidence of pre-eclampsia (p-value 0.000) [17]. From this study, nutritional status affected the incidence of preeclampsia. Therefore, it is necessary to have a balanced nutritional intake according to the needs during pregnancy. The limitation in this study is the limited data on respondent characteristics that are not filled in completely in the mother's card records. Therefore, the researcher cannot explore the research more broadly.

5. Conclusions

Based on the results of the study, it can be concluded that there is a significant relationship between nutritional status and the incidence of preeclampsia, p-value = 0.01 ($p < 0.05$), with an OR value of 2.42, meaning that pregnant women with overweight nutritional status are 2.42 times at risk of preeclampsia. For further research can choose other variables that affect preeclampsia in pregnant women.

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