Meditory
(The Journal Of Medical Laboratory)

CORRELATION BETWEEN BLOOD PRESSURE AND URINE PROTEIN PREGNANT WOMEN AT PUSKESMAS KEDIRI II

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Abstract

Background: Preeclampsia is a complication during pregnancy characterized by elevated blood pressure followed by proteinuria, the presence of protein in the urine of pregnant women who previously did not have hypertension. ***Aims****: The aim of this study is to determine the relationship between blood pressure and urinary protein in pregnant women at the Puskesmas Kediri II.* ***Methods****: This study is an observation alanalytical research with a cross-sectional design. The study subjects were 50 pregnant women selected through total sampling. Secondary data were used to determine the blood pressure and urinary protein levels of pregnant women.* ***The results*** *The research findings indicate that dominant normal blood pressure occurred in 45 individuals (90%), while dominant negative proteinuria was found in 48 individuals (96%). Based on the Spearman Rank statistical test for both variables, a p-value of 0.639 was obtained, indicating that p-value > 0.05, meaning there is no relationship between blood pressure and urinary protein in pregnant women at the Puskesmas Kediri II. The correlation coefficient result of -0.068 indicates a very weak relationship between the two variables.* ***Conclusions****: Statistical analysis yielded a p-value of 0.639 (>0.05), indicating acceptance of the null hypothesis (Ho) and rejection of the alternative hypothesis (Ha). Thus, there is no significant relationship between blood pressure and urine protein levels in pregnant women at Puskesmas Kediri II. Meanwhile, the correlation coefficient of -0.068 indicates a very weak relationship between the two variables.*

Keywords: Blood pressure, Urinary protein, Pregnant women

1. Introduction

Pregnancy is a condition in which the egg is fertilized by sperm, forming a zygote that later develops into a fetus in the womb. This phase needs to be carefully maintained for the well-being of both the mother and the safety of the fetus. One key indicator to assess the success of maternal health programs is the Maternal Mortality Rate (MMR). MMR represents the number of maternal deaths that occur during pregnancy, childbirth, or the postpartum period per 100,000 live births, excluding deaths caused by accidents or other non-pregnancy-related factors[1].

According to the World Health Organization[2], the global Maternal Mortality Rate (MMR) is 303,000 deaths, while in ASEAN, the MMR data is 235 per 100,000 live births[3]. The MMR situation in Indonesia is also a matter of serious concern. Based on the 2018 Riskesdas Report [1], Indonesia has the highest MMR in Southeast Asia and is still far from reaching the global Sustainable Development Goals (SDGs) target of 70 per 100,000 live births by 2030. In 2019, the maternal mortality rate in Indonesia was 88 per 100,000 live births[4]. The province of Bali had a maternal mortality rate of 67.6 per 100,000 live births in 2019[5].

The causes of maternal mortality are categorized into two, namely direct causes and indirect causes. Direct obstetric causes (direct) occur due to conditions directly related to pregnancy and childbirth, while indirect causes (indirect) result from diseases unrelated to pregnancy or childbirth. The most common direct causes of maternal mortality in Indonesia are bleeding, accounting for 28%, and preeclampsia at 24%[6]

Preeclampsia is one of the causes of maternal mortality, apart from being caused by bleeding. Preeclampsia is a complication during pregnancy characterized by an increase in blood pressure accompanied by proteinuria, the presence of protein in the urine of pregnant women who previously did not have hypertension. Preeclampsia can have adverse effects on both the mother and the fetus, and this condition usually occurs in the late second to third trimester of pregnancy[7]. Preeclampsia is characterized by an increase in blood pressure above 140/90 mmHg and the presence of proteinuria and edema after the 20th week of pregnancy[8].

In diagnosing severe preeclampsia, the minimum criteria are established with a blood pressure of $\geq$140/90 mmHg and proteinuria of $\geq$300 mg/24 hours or a dipstick test result of $\geq$+1 in urine obtained at any time during pregnancy after 20 weeks of gestation [9]. Law Number 36 of 2009 regarding Health states that maternal health efforts aim to preserve the health of pregnant women so as to give birth to a healthy and high-quality generation, while also reducing maternal mortality rates.

Maternal mortality rates in Bali Province due to preeclampsia remain high and show an increasing trend. In 2013, the rate was 18.37%, which rose to 22.92% in 2014. It decreased to 18.18% in 2015 and further declined to 14% in 2016. However, in 2017, maternal mortality increased again to 17.39%[5].

According to the report from the Family Health and Nutrition Section, the Maternal Mortality Rate (MMR) in Tabanan Regency was 77 per 100,000 live births in 2020. In 2021, MMR in Tabanan Regency reached its highest value compared to the previous year, reaching 342 per 100,000 live

births, including a case in Puskesmas Kediri II [10]. In 2020, one case of maternal mortality was also reported at Puskesmas Kediri II[11].

Puskesmas Kediri II is a health facility in the Kaba-Kaba Village area that serves pregnant patients, both from BPJS participants and the general public. Until now, there has been no research related to pregnant women at this community health center. Based on the above data, it is important to conduct research on the relationship between blood pressure and urinary protein in pregnant women at Puskesmas Kediri II.

2. Research Methods

This study employs an Analytical Observational method, which is a research approach that describes a particular condition or situation. The research was conducted at Puskesmas Kediri II from April 17 to 22, 2023. The research sample includes all the data of pregnant women who underwent blood pressure and urinary protein examinations from July to December 2022 at Puskesmas Kediri II, totaling 50 pregnant women.

The design of this study is cross-sectional, where variables of causes or risks and variables of outcomes or cases occurring in the research subjects are measured or collected simultaneously with total sampling of pregnant women's data within a specific timeframe. The data analysis in this study employs the statistical analysis of the Spearman Rank test, aimed at explaining the relationship between independent variables and dependent variables.

3. Results and Discussions
Research Results

The characteristics of respondents obtained in this study are based on age. The characteristics of respondents are as follows:

Table 1. Characteristics of Respondents Based on Age

Age	Number of Individuals	Percentage (%)
< 20 years	1	2
20 - 35 years	46	92
> 35 years	3	6
Total	50	100

In Table 1, it is evident that the predominant age group among pregnant pregnant women is 20 to 35 years old, comprising 46 individuals (92%). Meanwhile, other age groups include those under 20 years old, represented by 1 person (2%), and those over 35 years old, represented by 3 individuals (6%).

Many pregnant women are aged between 20-35 years old due to several main reasons. During this age range, a woman's reproductive system is at its

optimal condition, resulting in lower risks of pregnancy and childbirth complications compared to those below 20 or above 35 years old [12] . Additionally, women in this age group usually have reached physical and emotional maturity as well as economic and social stability, which are crucial for a healthy pregnancy and child-rearing. This period also marks the peak of fertility, thus increasing the chances of natural conception with lower health risks compared to older ages. Therefore, the age range of 20-35 years old is often considered an ideal time for women to conceive and give birth[12].

This study utilized the entire dataset of pregnant women who underwent blood pressure and urine protein examinations from July to December 2022 as the sample. The sampling method involved including all pregnant women or respondents who underwent examinations at Puskesmas Kediri II during the specified period. The research was conducted in April 2023. The results of the blood pressure examination were categorized into normal and prehypertensive. The findings of the blood pressure examination can be seen in the table 2:

Table 2. The Results of Blood Pressure Examination in Pregnant Women

Examination Results		Frequency	Percentage (%)
Normal	Systolic: <120 mmHg Diastolic: <80 mmHg	45	90
Prehypertension	Systolic: 120-139 mmHg Diastolic: 80-89 mmHg	5	10
Total		50	100

Based on Table 2, it can be observed that the results of blood pressure examinations in pregnant women indicate that 45 individuals (90%) have normal results, while 5 individuals (10%) have prehypertensive results.

According to Basri , there is a correlation between the occurrence of hypertension in pregnant women and the age of pregnant women[13]

Table 3. The Results of Blood Pressure Based on Pregnant Women's Age

Age (Years)	Pregnant Women's Blood Pressure (Number of Individuals)	
	Normal	Prehypertension
17 – 25	14	1
26 - 35	28	4
36 - 45	3	
Total	45	5

There are several factors that can affect blood pressure in pregnant women. The woman's age can be one of the crucial factors influencing this condition. Older women tend to have a higher risk of developing high blood pressure during pregnancy. Additionally, being overweight or obese before pregnancy can also increase the likelihood of high blood pressure in pregnant women. Other contributing factors include a history of hypertension during previous pregnancies and a family history of hypertension. Moreover, placental abnormalities such as preeclampsia, kidney problems, and hormonal changes that occur during pregnancy can also influence pregnant women's blood pressure.

The results of the urine protein examination in pregnant women can be seen in the table 3 :

Table 3. Results of Urine Protein Examination in Pregnant Women

Examination Results	Frequency	Percentage (%)
(-) : Negative	48	96
(+) : Positive	2	4
Total	50	100

The test conducted is the Spearman's rho test as the data is on an ordinal scale. The results of the data analysis are shown in the table 4:

Table 4. Cross-Tabulation Results

Blood Pressure	Urine Protein						p-value	r value
	Negative		Positive 1		Total			
	n	%	n	%	n	%		
Normal	43	86	2	4	45	90	0,639	-0,068
Prehypertension	5	10	0	0	5	10		
Total	48	96	2	4	50	100		

The statistical test results in Table 4, using the Spearman rank correlation test, indicate a p-value of 0.639, which means p-value > 0.05. This indicates that the null hypothesis (Ho) is accepted, and the alternative hypothesis (Ha) is rejected, suggesting no significant correlation between blood pressure and urine protein in pregnant women at Puskesmas Kediri II. The correlation coefficient result of -0.068 indicates a very weak relationship between the two variables.

Blood Pressure of Pregnant Women at Puskesmas Kediri II

Hypertension during pregnancy is an early indication of the occurrence of preeclampsia. Monitoring blood pressure throughout pregnancy is crucial in preventing the development of hypertension in pregnant women. Based on the research, it was found that 45 out of 50 pregnant women (90%) had blood pressure classified as normal, while 5 out of 50 pregnant women (10%) had blood pressure classified as prehypertension. Similar findings were also reported by Wulandari in their research, where normal blood pressure was more predominant in pregnant women, both in TM II and TM III[14].

These results are likely due to the influence of maternal age on blood pressure during pregnancy because the prehypertension blood pressure category was only found in pregnant women aged ≥ 25 years. This is supported by Mutiara research, which found a significant relationship between maternal age and blood pressure in pregnant women with preeclampsia[15]. Similar results were also obtained by Saraswati in her study, where a significant relationship was found between age and the occurrence of hypertension in pregnant women[16].

Additionally, according to the The 2018 Riskesdas Report, the age group above 25 years has a 1.56 times greater risk of hypertension compared to those below 25 years [1] . For a woman, the ideal age for entering pregnancy is in the range of 20-35 years. If a pregnant woman is below 20 years old, there is concern about the risk of reproductive health complications, while those above 35 years old have the risk of declining reproductive organ function[17].

Urine Protein in Pregnant Women at Puskesmas Kediri II

Urine protein examination during pregnancy is an essential screening procedure as it serves as an indicator of preeclampsia[18]. Detecting proteinuria plays a crucial role in the diagnosis and management of hypertension during pregnancy. Proteinuria in preeclampsia serves as an indicator of potential risks for the fetus, increases the risk of low birth weight, and elevates the risk of perinatal mortality.

In this study, it was found that 48 out of 50 pregnant women (96%) had negative urine protein results, while 2 out of 50 pregnant women (4%) had positive 1 urine protein results. Similar findings were reported in the research by Eliyani , which found that 96% of pregnant women at Siti Khadijah Islamic Hospital in Palembang in 2021 had negative urine protein results, and the remaining 4% showed positive 1 urine protein results[19].

The Relationship between Blood Pressure and Urine Protein in Pregnant Women at Puskesmas Kediri II

In this study, data were obtained regarding the number of visits by pregnant women from July to December 2022, involving 50 pregnant women who underwent urine protein examinations and blood pressure measurements. Subsequently, the data were analyzed using statistical test computer programs to explore the relationship between blood pressure and urine protein variables, utilizing the Rank Spearman test.

In this study, the use of the Rank Spearman correlation test showed a p-value of 0.639 meaning there is no relationship between blood pressure and urine protein in pregnant women at Puskesmas Kediri II. This result is consistent with the study by Situmorang, where the statistical test yielded a p-value of 0.060 (p>0.05), concluding that there is no significant relationship between a history of hypertension and the occurrence of preeclampsia [20]. Similarly, in the study by Kurniadi involving 97 pregnant women, no relationship was found between hypertension and the occurrence of proteinuria[21].

Meanwhile, in the study by Wulandari, the result shows p: 0.003 (p < 0.05), indicating a relationship between urine protein (+) and high blood pressure in pregnant women in the third trimester (TM III) [14]. It is highly likely that no relationship was found between blood pressure and urine protein in pregnant women at Puskesmas Kediri II.

4. Conclusions

This study indicates that the most common age group among pregnant women is between 20 to 35 years old, comprising 92% of the total sample. The statistical analysis in this study used the Spearman rank correlation test, resulting in a p-value of 0.639, indicating that the p-value is > 0.05. This implies the acceptance of the null hypothesis (Ho) and rejection of the alternative hypothesis (Ha), suggesting no significant correlation between blood pressure and urine protein in pregnant women at Puskesmas Kediri II. Additionally, the correlation coefficient of -0.068 suggests a very weak relationship between the two variables.

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