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Influence between Body Mass Index and Blood Pressure With Results of Urine Protein Examination in Pregnant Women at Bangkalan Health Center

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ABSTRACT

Background: Preeclampsia is an increase in blood pressure that occurs after the 20th week of gestation. Until now, the exact cause of preeclampsia is not known. During the second trimester of pregnancy the pressure in the renal veins (renal venous pressure) changes and increases. Increased renal venous pressure causes proteinuria, especially in the orthostatic position, which causes a slightly greater change in kidney size.
Purpose: The aim of this study was The Relationship Between Body Mass Index And Blood Pressure With Results Of Urine Protein Examination In Pregnant Women At Bangkalan Health Center.
Methods: Analytical Research Design with a cross sectional approach. Independent variable Body Mass Index and Blood Pressure, dependent variable results of urine protein examination. The sample of this study were 210 pregnant women who carried out Integrated ANC at the Bangkalan Health Center, the sampling technique used Simple random sampling. Secondary data collection by looking at medical record data, statistical tests using Rank Spearman.
Results: Based on statistical tests using Rank-Spearman, the results showed ρ value (0.024) <α (0.05) indicating that there is a relationship between Body Mass Index and urine protein examination results. The results of the study ρ value (0.020) <α (0.05) there is a relationship between blood pressure and the results of urine protein examination.
Conclusion: Detection of proteinuria is very important in the diagnosis and treatment of hypertension in pregnancy. Proteinuria is the last symptom to appear in patients with preeclampsia.

Keywords: body mass index, blood pressure, preeclampsi, urine protein

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BACKGROUND

Preeclampsia is an increase in blood pressure that occurs after reaching 20 weeks of gestation (Juwita et al., 2022). Until now, the exact cause of preeclampsia is not known (Rimawati et al., 2019). Eclampsia is a continuation of severe preeclampsia with additional symptoms of seizures or coma. During a seizure, the temperature can rise to 40ºC, the pulse rate will increase, and blood pressure will increase. (Maya, 2021).

Proteinuria is one of the diagnostic criteria for preeclampsia and eclampsia (Ridwan and Arwie, 2021). During the second trimester of pregnancy, the pressure in the renal veins (renal venous pressure) changes and increases. Increased renal venous pressure causes proteinuria, especially in the orthostatic position which causes a slightly larger change in kidney size (Nurlaelah R, 2021). Examination of urine protein that can be done on pregnant women is one type of laboratory examination to identify the presence of preeclampsia (Eliyani, 2022). Proteinuria detection is very important in the diagnosis and treatment of hypertension in pregnancy. Proteinuria is the last symptom to appear in preeclamptic patients (Jeovan et al., 2019).

Based on the data obtained at the Bangkalan Health Center in November 2022, data were obtained from 49 pregnant women who performed Integrated ANC. Of the 49 people, there were 18 people (36.7%) who had positive urine protein and 31 (63.2%) people who tested negative for urine protein. And of the pregnant women who got positive test results there were 12 (66.6%) pregnant women who had risk factors for Pre-Eclampsia and 6 (33.3%) of pregnant women who did not have risk factors for Pre-Eclampsia. Meanwhile, out of 31 pregnant women who had negative urine protein results, 11 (35%) had risk factors for Pre-Eclampsia and 20 (55%) of pregnant women who were not at risk for Pre-Eclampsia had negative urine protein.

The presence of urine protein in pregnant women can be caused by several things, kidney disease, hypertension, pregnancy poisoning or pre-eclampsia and urinary tract infections (Susanti, 2020). In addition, being overweight will also increase the risk of cardiovascular disease (Rimawati et al., 2019), one of which is high blood pressure which can cause protein in the urine in pregnant women.

People with a high BMI category (obesity) will work hard to burn the excess calories in their bodies, this burning requires an adequate supply of oxygen in the blood. The more calories burned, the more oxygen supply in the blood. An abundance of blood supply will make the heart work harder so that it has an impact on blood pressure, that's why blood pressure in people with high BMI (obesity) tends to be higher (Masruroh et al., 2020).

In cases of uncontrolled hypertension, it can cause damage to the fine blood vessels in the kidneys, thereby reducing the ability of the kidneys to filter blood properly, causing an increase in the progression of proteinuria (presence of protein in the urine), both micro albuminuria and macro albuminuria (Siahaan, 2021).

Pregnant women are advised to limit their consumption of foods with high salt content, fast food, caffeinated foods and foods with high fat and cholesterol content. And the last component of self-care in preventing Pre-Eclampsia is avoiding excess weight gain. Being overweight or obese is a predisposing factor to the occurrence of pre-eclampsia (Mulyani, 2022).

OBJECTIVE

The aim of this study was The Relationship Between Body Mass Index And Blood Pressure With Results Of Urine Protein Examination In Pregnant Women At Bangkalan Health Center.

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METHOD

Analytical Research Design with a cross-sectional approach. Independent variable Body Mass Index and Blood Pressure, dependent variable results of urine protein examination. The sample of this study were 210 pregnant women who carried out Integrated ANC at the Bangkalan Health Center, the sampling technique used Simple random sampling. Inclusion criteria for pregnant women in trimesters 1, 2 and 3 who perform integrated ANC. Complete medical record data includes: age, parity, BMI, blood pressure, gestational age. Exclusion Criteria: Incomplete medical record data. Pregnant women who have comorbidities include: heart disease, autoimmune and other chronic diseases. The research was conducted in May 2023. Secondary data collection by looking at medical record data, statistical tests using Rank Spearman. This research is ethically feasible from STIKes Ngudia Husada Madura with No. 1718/KEPK/STIKES-NHM/E/C/V/2023.

RESULTS

General data for pregnant women

Variable	**Frekuensi (N)**	**Persentase (%)**
Age		
No risk	185	88
risky	25	22
Amount	210	100
Variable	**Frekuensi**	**Persentase (%)**
Parity		
Primigravida	71	34
Multigravida	137	65
Grand multigravida	2	1
Amount	137	100
Variable	**Frekuensi**	**Persentase (%)**
Trimesters		
First	5	2.3
Second	90	43
Third	115	54.7
Amount	210	100
Variable	**Frekuensi (N)**	**Persentase (%)**
Body mass index		
Not enough	8	3.8
Normal	57	27.1
Normal Over	32	15.3
Obesity	113	53.8
Amount	210	100
Variable	**Frekuensi (N)**	**Persentase (%)**
Blood pressure		
Hypotension	2	0.9
Normal	201	95.7
Normal High	3	1.4
Hypertension	4	2
Amount	137	100

Based on table 1 above, it can be seen that most of the ages are not at risk as many as 185

people 88%, some parity mothers are multigravida as many as 137 people 65%, some of the third trimester of pregnancy is 115 people 54.7%. The body mass index is mostly obese 53.8% and blood pressure is mostly normal as much as 95.1%.

Body Index Mass	**Urine Protein**					
	Negatif		**Positif**		**Amount**	
	N	%	N	%	N	%
Not enough	8	100	0	0	8	100
Normal	40	70,2	17	29,8	57	100
Normal Over	23	71,9	9	28,1	32	100
Obesity	67	59,3	46	40,7	113	100
Amount	138	65,7	72	34,3	210	100
Rank Spearman tets	ρ value 0,024 < α 0,05					

Based on table 2, it can be explained that pregnant women with low body mass index, most of the urine protein test results were negative, as many as 8 people (100%). Pregnant women with normal body mass index mostly had negative urine protein test results as many as 40 people (70.2%). Pregnant women with excess normal Body Mass Index mostly had negative urine protein test results as many as 23 people (71.9) while pregnant women with obese Body Mass Index most of the urine protein test results were negative as many as 67 people (59.3%).

Based on statistical tests using Rank-Spearman, the results showed ρ value (0.024) <α (0.05) indicating that there is a relationship between Body Mass Index and the results of urine protein examination at the Bangkalan Health Center.

Blood pressure	**Protein urin**					
	Negatif		**Positif**		**Jumlah**	
	N	%	N	%	N	%
Hypotension	2	100	0	0	2	100
Normal	134	66,7	67	33,3	201	100
Normal High	1	33,3	2	66,7	3	100
Hypertension	1	25	3	75	4	100
Amount	138	65,7	72	34,3	210	100
Rank Spearman tets	ρ value 0,020 < α 0,05					

Based on table 3, it can be explained that 2 pregnant women with hypotensive blood pressure all got negative urine protein test results (100%). Pregnant women with normal blood pressure mostly had negative urine protein test results as many as 134 people (66.7%). Pregnant women with normal high blood pressure mostly had positive urine protein test results in 2 people (66.7%) while pregnant women with obese Body Mass Index most of the urine protein test results were positive in 3 people (75%). Based on statistical tests using Rank-Spearman, the results obtained were ρ value (0.020) <α (0.05) indicating that there was a relationship between blood pressure and the results of urine protein examination at the Bangkalan Health Center.

DISCUSSION

The relationship between body mass index and urine protein examination results at the Bangkalan Health Center

Based on statistical tests using Rank-Spearman, the results obtained were ρ value (0.020) <α (0.05) so that H0 was rejected and H1 was accepted and. This shows that there is a

relationship between blood pressure and the results of urine protein examination at the Bangkalan Health Center.

During pregnancy, the mother's weight must be paid attention to so that it does not reach the normal limits for pregnant women's weight gain or is less than these normal limits to reduce the risk of complications in pregnant women. Obese sufferers have the potential to suffer from hypertension which is caused because the veins and arteries are filled with fat. When the arteries are filled with fat, the heart will work harder when pumping blood throughout the body which can cause hypertension which can cause hypertension in pregnancy which results in positive proteinurine.

People with a high BMI category (obesity) will work hard to burn the excess calories in their bodies, this burning requires an adequate supply of oxygen in the blood. The more calories burned, the more oxygen supply in the blood. An abundance of blood supply will make the heart work harder so that it has an impact on blood pressure, that's why blood pressure in people with high BMI (obesity) tends to be higher (Masruroh et al., 2020). Therefore, someone who is overweight is easier to experience hypertension compared to normal people (Rimawati et al., 2019). In cases of uncontrolled hypertension, it can cause damage to the fine blood vessels in the kidneys, thereby reducing the ability of the kidneys to filter blood properly. thus causing an increase in proteinuria progression (presence of protein in the urine), both micro albuminuria and macro albuminuria. (Siahaan, 2021).

In addition, it can be seen from the cross tabulation of mothers with excess normal body mass index there were still 23 people (71.9%) who got negative urine protein results and 67 people (59.3%) who were obese got negative urine protein results. Examination of urine protein can get negative results in mothers with excess normal body mass index and obesity because mothers maintain other predisposing factors that cause positive urine protein, including maintaining blood pressure, limiting excess salt consumption, a healthy lifestyle with exercise, regulating nutritional patterns and management good stress.

Severe proteinuria is called massive which occurs mainly in nephrotic conditions where the protein level in the urine is more than 200 mg or 24 hours in adults. Usually significantly associated with glomerular lesions or leaks. The cause of proteinuria is changes in glomerular permeability and increased filtration of normal plasma proteins, especially albumin, the tubules fail to absorb several types of proteins that normally can be filtered, abnormal glomerular filtration and Low Molecular Weight Protein (LMWP) with an amount that exceeds the reabsorption capacity of the tubules and increased secretion. uroepithelial maculoprotein and IgA secretion. (Maya, 2021).

The relationship between blood pressure and urine protein in pregnant women at the Bangkalan Health Center

Based on statistical tests using Rank-Spearman, the results obtained were ρ value (0.020) <α (0.05) so that H0 was rejected and H1 was accepted and. This shows that there is a relationship between blood pressure and the results of urine protein examination at the Bangkalan Health Center.

Blood pressure is a measure of the pressure exerted by the heart to pump blood throughout the body. If the heart is too hard to pump blood throughout the body it can cause high blood pressure. High blood pressure has many negative impacts on the body, especially the kidneys. One of the negative effects of high blood pressure on the kidneys is glomerular damage which can interfere with the protein filtration function of the urine so that urine that should be absorbed by the body is excreted in the urine.

Hypertension suffered before pregnancy results in disruption/damage to the body's important organs (Utami et al., 2020). According to Aprilia, D (2019) women who have

kidney damage in the moderate to severe category (stage 3-5) have a high risk of complications during their pregnancy to worsen progressive kidney conditions. Progressive kidney damage can interfere with pregnancy related to premature birth, stunted intrauterine fetal growth, difficult-to-control hypertension, to fetal death. So that during pregnancy, women who have kidney damage can be at high risk of worsening kidney damage. This is what can cause urine protein (+) in pregnant women with TM II or gestational age <20 weeks (9). (Aprilia, 2019).

In cross-tabulation, it was found that 67 women (33.3%) had positive urine protein for women with normal blood pressure

In women with normal blood pressure, positive urine protein can occur due to several things, one of which is excessive salt consumption, women with kidney disease, women with urinary tract infections and other comorbidities. In line with Gyselaers' research (2019), where impaired kidney function in pregnant women is closely related to cardiovascular adaptation. Such as the occurrence of abnormal blood circulation or hypertension in pregnant women. Impaired kidney function can be caused by the occurrence of dyslipidemia in pregnant women which causes endothelial dysfunction and oxidative stress which will cause changes in glomerular structure and changes in kidney function. Changes in glomerular structure affect the process of filtration in the kidneys. This change in glomerular structure can result in the kidneys not being able to carry out one of its functions, namely to filter or separate substances needed by the body or substances that are not needed by the body. Changes in glomerular structure and kidney function are the main factors in the occurrence of proteinuria, in which protein, which is an important substance for the body, is not properly filtered by the kidneys and leaves the body with the urine. This causes a protein content (+) in the urine or proteinuria (+) (Gyselaers, 2019).

CONCLUSION

Detection of proteinuria is very important in the diagnosis and treatment of hypertension in pregnancy. Proteinuria is the last symptom to appear in patients with preeclampsia.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest

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