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Relationship of Gravidity And Body Mass Index With The Incident Of Hypertension In Pregnancy

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Abstract

Background: Hypertension in pregnancy is one of the complications of pregnancy which is characterized by the emergence of hypertension during pregnancy with systolic blood pressure of 140 mmHg or higher, persistent diastolic blood pressure > 90 mmHg and urinary protein > 0.3 g/24 hours. Objective: This study aims to determine the relationship between gravidity and body mass index with the incidence of hypertension in pregnancy in pregnant women at the Dr Nurdin Wahid Clinic Cibinong Bogor.

Methods: This research is a quantitative type with a cross sectional research design, the total population was 187 pregnant women with a sample of 36 pregnant women. The statistical test in this study used the Chi Square correlation test.

Results: Univariate results showed that 69.4% of pregnancies had hypertension, 72.2% of pregnant women had >2 multigravidity and 27.8% were primigravida, 69.4% had obesity and 30.6% had BMI <26. Bivariate results show that there is no relationship between gravidity and the incidence of hypertension in pregnancy in pregnant women at the dr. Clinic. Nurdin Wahid with statistical results obtained a p-value of 0.454 and there was a relationship between body mass index and the incidence of hypertension in pregnancy in pregnant women atthe dr. Clinic. Nurdin Wahid with statistical results obtained p-value 0.000.

Conclusions: it is hoped that after carrying out this research, researchers can then carry out research by adding maternal age to the research title, which is one of the risk factors for hypertension in pregnancy

Keywords: Gravidity, Body Mass Index, Hypertension in Pregnancy

Introduction

Hypertension during pregnancy is one of the three main causes of maternal death, in addition to bleeding and infection. Hypertension during pregnancy refers to pregnancy complications where systolic blood pressure is ≥ 140 mmHg, diastolic blood pressure is continuously >90 mmHg, and urine protein >0.3 g/24 hours during pregnancy. Gestational hypertension is a specific disorder in pregnancy that complicates about 3–5% of pregnancies (Trisnawati and Mogan 2023). Hypertension during pregnancy is a cause of severe acute morbidity, long-term disability, and maternal and infant mortality.

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Hypertension during pregnancy is different from hypertension in general, If not handled properly, it can develop into preeclampsia, increasing the morbidity and even mortality of mothers and fetuses (Ministry of Health of the Republic of Indonesia, 2022). According to WHO (World Health Organization) data in 2020, the incidence of hypertension during pregnancy globally was 0.51% -38.4%. In 829 developing countries, the incidence of gestational hypertension was 5-6%. Globally, 80% of maternal deaths are caused by direct causes of maternal death, including postpartum hemorrhage (27%), maternal hypertension (14%), obstructed labor (11%), miscarriage (8%), and other causes (7%) (World Health Organization, 2022). In Indonesia, the number of maternal deaths in 2020 was 4,627, of which 1,110 were caused by gestational hypertension, increasing to 7,389 in 2021, of which 1,140 were caused by gestational hypertension (Ministry of Health of the Republic of Indonesia 2021).

Based on data from the 2021 Indonesian Health Profile, there are three main causes of maternal death in Indonesia that have been identified, namely bleeding, gestational hypertension (hypertension during pregnancy), and infection. Gestational hypertension is the third largest cause of maternal death after bleeding in Indonesia and is the main cause of maternal death after bleeding. The proportion of gestational hypertension in Indonesia continues to increase, contributing to almost 30% of maternal deaths. (Ministry of Health of the Republic of Indonesia, 2022).

West Java has the highest number of maternal deaths in Indonesia. In 2018, there were 700 maternal deaths, dropping to 684 maternal deaths in 2019 before increasing again in 2020. The maternal mortality rate in West Java was 96 deaths per 100,000 live births in 2020. Bleeding is the main cause of maternal death (27.92%), gestational hypertension (28.86%), infection (3.76%), heart disease (10.7%), metabolic disorders (3.49%), and other factors reached 25.91% (West Java).

Regardless of gestational age, gravidity refers to the total number of pregnancies. According to statistical records, 5-8% of pregnancies experience gestational hypertension, and more than 12% of them occur in primigravida pregnancies. The condition of the mother who has just given birth for the first time is a factor that influences gestational hypertension. Repeated labor also increases the risk of subsequent pregnancies. (Winingsih 2021).

Body Mass Index (BMI) is an anthropometric measure that is an error of the ratio of body weight and height, and can be used to assess the nutritional status of pregnant women. 5-8% of pregnancies experience gestational hypertension, and more than 12% of them occur in primigravida pregnancies. As a result, obesity can cause hypertension during pregnancy. Hypertension in pregnancy can increase threefold if the mother is obese (Trisnawati and Mogan 2023).

Research by Luthfiatuzzaqiyah Rasyid, Febria Listina, and Nova Nurwinda Sari in 2023 found a relationship between gestational hypertension and BMI in pregnant women at Mardi Waluyo Hospital, Metro City. The results showed that most respondents had less than two pregnancies, namely 45 respondents (55.6%), hypertension, and most respondents had a normal body mass index (BMI no more than 26 kg/m2). it can be concluded that there is a correlation between gestational age and BMI with hypertension in pregnancy.

According to Febyan's study, Ida Bagus Rumbawa Pemaron conducted in 2020 at the Bayangkara Hospital, Denpasar This cross-sectional observational study was conducted. The study sample was pregnant women who visited the Outpatient Clinic of the Department of Obstetrics and Gynecology, Bhayangkara Hospital in Denpasar from October to December 2018. There was a correlation between body mass index and maternal age with gestational hypertension, but there was no significant correlation between gestational hypertension and gravidity.

According to a study conducted by Annisa Fitri Rahmadini et al., "Factors that cause hypertension in pregnant women", conducted at PMB Bidan Eneng, Bogor City from December to July 2023, there is a correlation between hypertension in pregnancy and BMI. In this study, 42 pregnant women (35.3%) experienced hypertension, 46 pregnant women (38.7%) experienced unsafe pregnancies before 24 weeks, and 79 pregnant women (66.4%) experienced normal weight gain.

According to a 2015 study by Diana Ratih Puspitasari et al, "the relationship between age, gravidity, and body mass index with the incidence of hypertension in pregnancy in the Obstetrics and Gynecology Outpatient Clinic of Tugurejo Hospital Semarang from October to December 2015." In this study, a prospective cross-sectional observational study method was used. A population of 531 was surveyed, and 43 pregnant women were diagnosed with hypertension. There was no significant

correlation between BMI and the incidence of hypertension in pregnancy, but there was a significant correlation between pregnancy and the incidence of hypertension.

According to Marlika Farlen et al, "Factors Affecting Hypertension in Pregnant Women at Dr. H. Moch Ansari Saleh Hospital, Banjarmasin", which was conducted in 2023 by Laurensia Yunita, et al. The study at Dr. H. Moch Ansari Saleh Hospital, Banjarmasin found a relationship between BMI and hypertension in pregnant women: 22 pregnant women (46.8%) experienced gestational hypertension, 25 pregnant women (53.2%) experienced chronic hypertension, and pregnant women who experienced hypertension based on BMI (19.8-25.0%).

As a participant and provider of services is the main role of nurses that is most understood and emphasized by the community. By using the nursing process approach, nurses can help patients directly or indirectly by providing care. Nurses teach patients about acceptable medical care and actions is one of their roles in nursing and family services, and as counselors, nurses help clients make decisions about their illnesses. To facilitate decision making, customers must question the actions taken against them. The role of nurses in consultation is to determine changes in customer interaction patterns regarding their health and illness., changes in interaction patterns are the "foundation" for increasing the adaptability of planning methods, providing individuals or families with counseling or educational guidance to combine health experiences with previous experiences with a focus on solving problems in nursing problems.

Methods

This study is a quantitative type with a cross-sectional research design, namely finding the relationship between independent variables and dependent variables where data is collected simultaneously and adjusted to the situation at the time of the study. In this case, the incidence of hypertension in pregnant women is the dependent variable and gravidity and body mass index are independent variables which are divided into several sub-variables, namely factors that affect age, education, and occupation. Data collection was carried out only once using primary data in the form of questionnaires and secondary data from the Dr. Nurdin Wahid Clinic.

Determination of the number of samples can be done by statistical calculation, namely by using the Slovin Formula. The formula is used to determine the sample size from a population whose number is known, namely 187 respondents. To avoid drop out, the researcher added 10% of the total sample size above 35.9 + 10% = 39.49 So the sample used in this study was 39 respondents. Inclusion criteria Pregnant women who are checking their pregnancy at the Dr. Nurdin Wahid clinic and are willing to be respondents.

Results

Univariate Analysis

Table 1. Characteristics of respondents

Age	Freq	%
<20	0	0
20-35	21	58.3
>35	15	41.7
Total	36	100

Based on this table, the majority of respondents were aged 20-35 years, 21 people (58.3%), then those aged >30 years as many as 15 people (41.7%) and those aged <20 years were 0 people (0%).

Table 2. Respondent characteristics based on education

Education	Freq	%
Elementary	0	0
Junior High School	1	2.8
Senior High School	26	72.2
Bachelor	9	25
Total	36	100

Based on this table, the majority of respondents had a high school education of 26 people (72.2%), while those with tertiary education were 9 people (25.0%), then 1 person had a junior high school education (2.8%) and 0 people had an elementary school education (0%).

Table 3. Respondent characteristics based on jobs

Jobs	Freq	%
Civil Servant	3	8.3
Private Employee	11	30.6
Businessman	8	22.2
Housewife	14	38.9
Total	36	100

Based on the table, it was found that the majority of respondents were housewives, as many as 14 people (38.9%), while there were 11 private employees (30.6%), then there were 8 entrepreneurs. people (22.2%), and 3 civil servants (8.3%).

Table 4. Frequency of gravidity

Gravidity	Freq	%
1 Primigravida	10	27.8
>2 Multigravida	26	72.2
Total	36	100

Based on table, it can be seen that out of 36 pregnant women, 10 respondents (27.8%) had

1 primigravida pregnancy and 26 respondents (72.2%) had >2 multigravida pregnancies.

Table 5. Body Mass Index (BMI) in Pregnant Women

BMI	Freq	%
<26	11	30.6
>26	25	69.4
Total	36	100

Based on the above, it can be seen that out of 36 pregnant women, 11 respondents (30.6%) had a BMI ≤26 and 25 respondents (69.4%) had a BMI >26.

Table 6. Hypertension in Pregnancy Frequency

BMI	Freq	%
No	11	30.6
Yes	25	69.4
Total	36	100

Based on the table above, it is known that the distribution of the frequency of occurrence of hypertension in pregnancy is that most respondents experience hypertension, namely 25 respondents (69.4%), and 11 respondents (30.6%) do not experience hypertension.

Bivariat Analysis

Table 7. Relationship between Gravidity and the Incidence of Hypertension

Gravidity	No		Yes		Amount		P-Value
	n	%	n	%	n	%	
1 Primigravida	4	40	6	60	10	27.8	0.454
>2 Multigravida	7	28	19	76	26	72.2	
Total	11	30.6	25	69.4	36	100	

Based on the table above, it is known that out of 10 pregnant women, 1 (Primigravida) there are 6 pregnant women (60%) who experience hypertension in pregnancy and there are 4 pregnant women (40%) who do not have hypertension in pregnancy. While out of 25 pregnant women who are >2 (Multigravida) there are 19 pregnant women (76%) who experience hypertension in pregnancy and there are 7 pregnant women (28%) who do not experience hypertension in pregnancy. From the statistical results obtained p value of 0.454 or p value> a (0.05) which means that there is no relationship between gravidity and the incidence of hypertension in pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic.

Table 7. Relationship between Body Mass Index (BMI) and the Incidence of Hypertension

BMI	No		Yes		Amount		P-Value
	n	%	n	%	n	%	
<26	9	81.9	2	18.1	11	30.6	0.000
>26	2	8	23	92	25	69.4	
Total	11	30.6	25	69.4	36	100	

Based on Table above, it is known that out of 11 normal pregnant women (BMI ≤26 Kg/M2), there were 2 pregnant women (18.9%) who experienced hypertension during pregnancy and 9 pregnant women (81.2%) who did not experience hypertension during pregnancy. Meanwhile, out of 25 obese pregnant women (BMI>25 Kg/M2), there were 23 pregnant women (92%) who experienced hypertension during pregnancy and 2 pregnant women (8%) who did not experience hypertension during pregnancy. From the statistical results, a p value of 0.000 was obtained or a p value <a (0.05), which means that there is a relationship between BMI and the incidence of hypertension during pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic.

Discussion

Age characteristics

Based on age characteristics, the majority of respondents were aged 20-30 years, as many as 21 people (58.3%), then those aged >30 years were 15 people (41.7%) and those aged <20 years. Meanwhile, according to the results of a study conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) entitled "The Relationship between Gravidity and BMI with the Incidence of Hypertension in Pregnancy in Pregnant Women at Mardi Waluyo Hospital, Metro City", namely respondents aged <30 people were 46 people (56.8%) and >30 people were 35 people (43.2%). Based on research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) in line with research conducted by researchers because the majority of respondents were aged <30 years followed by those aged >30 years.

Characteristics of Education

Based on educational characteristics, the majority of respondents had a high school education of 26 people (72.2%), while college was 9 people (25.0%), then junior high school was 1 person (2.8%). Based on research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) entitled "The Relationship between Gravidity and BMI with the Incidence of Hypertension in Pregnancy in Pregnant Women at Mardi Waluyo Hospital, Metro City" showed that the majority of respondents had a high school education of 44 people (54.3%), bachelor's degree of 36 people (44.4%), junior high school of 1 person (1.3%) out of 81 people. The results of this study of respondents based on education

are in accordance with research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) where the majority of respondents' last education was high school, followed by bachelor's degree and the lowest education was junior high school. Pregnant women who have primary and secondary education tend to experience more anxiety than mothers who have higher education. Mothers who have higher education tend to pay more attention to their own and their family's health (Muzayyana & Saleh, 2021).

Job Characteristics

Based on the characteristics of the work, the majority of respondents were housewives as many as 14 people (38.9%), while private employees were 11 people (30.6%), then entrepreneurs were 8 people (22.2%), and civil servants were 3 people (8.3%). Based on previous research from Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) "The Relationship Between Gravidity and BMI with the Incidence of Hypertension in Pregnancy in Pregnant Women at Mardi Waluyo Hospital, Metro City" showed that the majority of housewives were 42 people (51.9%), civil servants 24 people (29.6%), entrepreneurs 15 people (18.5%). In the characteristics of work based on research conducted by researchers and previous research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) more respondents are housewives, in this study there were 14 people out of 36 respondents, in the study of Luthfiatuzzaqiyah Rasyid et al there were 42 out of 81 respondents. According to Wawan and Dewi (2010) the work environment can make someone gain experience and knowledge both directly and indirectly.

Gravidity in Pregnant Women

From the results of the research conducted by researchers on independent variables, the results obtained were 10 respondents (27.8%) with primigravida pregnancies and 26 respondents (72.2%) with >2 multigravida pregnancies. Which means that most pregnant women at the Dr. Nurdin Wahid Clinic experience >2 multigravida pregnancies. The results of this study are in line with the research conducted by Diana Ratih Puspitasari, Muhamad Taufiqy Setyabudi, Afiana Rohmani (2015) entitled "Risk Factors for Hypertension in Pregnancy" which stated that out of 531 pregnant women who checked their pregnancy at the Obstetrics and Gynecology Outpatient Clinic, Tugurejo Hospital, Semarang, 132 (24.9%) people had less than 2 pregnancies and 399 (75.1%) people had more than 2 pregnancies. Based on the results of the study conducted by the researcher, the same as the results of the study conducted by Diana Ratih Puspitasari et al. (2015) stated that there were more respondents of pregnant women with primigravida pregnancies than multigravida pregnancies.

Body Mass Index in Pregnant Women

From the results of the research conducted by researchers on the independent variable, the results obtained were 11 respondents (30.6%) with BMI ≤26 and 25 respondents (69.4%) with BMI> 26. Which means that most pregnant women at the Dr. Nurdin Wahid Clinic have a BMI> 26. Based on research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) showed that out of 81 respondents, the Body Mass Index in pregnant women with Obesity (BMI> 26 kg / m2) was 37 respondents (45.7%), Normal (BMI <26 kg / m2) was 44 respondents (54.3%). The results of the study conducted by the researcher are not in line with the results of the study conducted by Luthfiatuzzaqiyah Rasyid et al. because in the results of the study conducted by the researcher, the majority of pregnant women's BMI was in pregnant women with a BMI >26 as many as 25 out of 36 respondents, while in the study conducted by Luthfiatuzzaqiyah Rasyid et al., the majority of pregnant women's BMI had a BMI <26. The difference in the results of this study with previous studies can occur due to differences in the samples taken and the location of the study.

Hypertension in Pregnancy

From the results of the research conducted by researchers on the dependent variable, the results showed that based on the blood pressure category, pregnant women at the Dr. Nurdin Wahid Clinic were 11 people (30.6%) and pregnant women who did not have hypertension in pregnancy and pregnant women who had hypertension in pregnancy were 25 people (69.4%). Which means that most pregnant women at the Dr. Nurdin Wahid Clinic have hypertension in pregnancy.

Based on research conducted by Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024), it was shown that most pregnant women experienced hypertension, namely 43 respondents (53.1%) and there were 38 respondents (46.9%) pregnant women who did not experience hypertension during pregnancy out of 81 pregnant women respondents. Based on the results of the research conducted by the researcher, this is in line with the results of the research conducted by Luthfiatuzzaqiyah Rasyid et al., which stated that more pregnant women have hypertension during pregnancy than pregnant women who do not have hypertension during pregnancy.

Hypertension experienced during pregnancy can have an impact on the mother and fetus, namely preeclampsia and eclampsia which are dangerous for pregnant women because they are very life-threatening and can also cause babies to be born with LBW because high blood pressure affects the flow of nutrients through the placenta to the baby so that babies tend to be born with LBW (Dr. dr. Haidar Alatas SpPD-KGH, MH., 2019).

Relationship Between Gravidity and Hypertension Incidence

Based on the results of the Chi-Square test, it shows that the p value sig value obtained is 0.454 or p value> a (0.05), this means that there is no relationship between gravidity and the incidence of hypertension in pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic. This study is not in line with the research of Luthfiatuzzaqiyah Rasyid, Febria Listina, Nova Nurwinda Sari (2024) at the Mardi Waluyo Hospital in Metro City which states that there is a significant relationship between gravidity and the incidence of hypertension in pregnancy with a p-value of 0.000 or <a (0.05). Primigravida has a 2.173 times risk of experiencing hypertension in pregnancy compared to a woman who has been pregnant several times (multigravida). In theory, primigravida is more at risk of experiencing hypertension in pregnancy, which usually occurs in women who are first exposed to chorionic villi. This happens because in these women the immunological mechanism of blocking antibody formation carried out by HLA-G (human leukocyte antigen G) against placental antigens has not been formed perfectly, so that the process of trophoblast implantation into the mother's decidual tissue is disrupted. The theory states that the placental antigen formed in the first pregnancy becomes blocking antibodies that cause hypertension and even pregnancy poisoning. Primigravida are also susceptible to stress in facing childbirth. The emotional stress that occurs causes an increase in the release of corticotropic-releasing hormone (CRH) by the hypothalamus, which then causes an increase in cortisol. The effect of cortisol is to increase the sympathetic response, so that cardiac output and blood pressure will increase. (Prawirohardjo, 2014).

The differences in the results of this study with previous studies can occur due to differences in the number of samples taken, the location of the study and the research methods used so that they will affect the incidence of hypertension in pregnancy. In addition, the formation of blocking antibodies against imperfect antigens and HLA-G which often cause hypertension in pregnancy in primigravida is influenced by activin A. Activin A is a glycoprotein that belongs to the Transforming Growth Factor-ß family, a group of proteins that control the proliferation and differentiation of cells from many body systems, especially the immune system. Differences in the immune system and genetics in each individual can affect the incidence of hypertension in pregnancy in primigravida (Rozikhan, 2017). However, this study is in line with the study of Diana Ratih Puspitasari, Muhamad Taufiqy Setyabudi, Afiana Rohmani (2015) at the Obstetrics and Gynecology Outpatient Clinic, Tugurejo Hospital, Semarang with the results of the Chi-Square test analysis with a p-value of 0.077 which states that there is no significant relationship between gravidity and the incidence of hypertension in pregnancy.

Relationship Between Body Mass Index and Hypertension Incidence

Based on the results of the Chi-Square test, it shows that the p value sig value obtained is 0.000 or p value <a (0.05), this means that there is a relationship between BMI and the incidence of hypertension in pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic. This study is in line with the results of previous studies from Istiana Istahul Ismaroh, Sri Achadi N, and Dharminto (2018) showing that based on the results of statistical tests using the Chi Square test, the p-value is 0.034, which means that there is a significant relationship between body mass index (BMI) and the incidence of

hypertension in pregnancy in pregnant women. However, this study is not in line with the results of research from Marlika Farlen, Ika Mardiatul Ulfa, Laurensia Yunita, Meldawati (2023) conducted at Dr. H. Moch Ansari Saleh Banjarmasin Hospital, which showed that there was no relationship between BMI and Hypertension in Pregnant Women with a p-value of 0.155. Assessment of the nutritional status of pregnant women can be measured using the Body Mass Index (BMI). Body Mass Index (BMI) is one of the anthropometric measurements with the ratio of body weight and height. Obesity can cause high cholesterol in the blood and can also cause the heart to work harder, because the amount of blood in the body is about 15% of body weight, so the fatter a person is, the more blood is in the body, which means the harder the heart's pumping function, so it can cause hypertension in pregnancy. Obesity can cause hypertension in pregnancy 3 times higher (Trisnawati and Mogan 2023).

Conclusion

The highest age percentage of pregnant women is 20-30 years old or 21 respondents, the highest education of pregnant women is high school education with 26 respondents, the occupation of pregnant women as housewives with the highest percentage of 14 respondents. Relationship between Gravidity and Hypertension in Pregnancy in Pregnant Women There is no relationship between gravidity and the incidence of hypertension in pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic with statistical results obtained a p-value of 0.454. Relationship Between Body Mass Index and Hypertension in Pregnancy in Pregnant Women There is a relationship between body mass index and the incidence of hypertension in pregnancy in pregnant women at the Dr. Nurdin Wahid Clinic with statistical results obtained p-value 0.000.

Limitation

The limitations in this research process are the ineffectiveness when filling out the questionnaire, because when filling out the questionnaire the respondents were called to the examination room so that the targeted time was not appropriate. As a result of the limitations of the various factors above, this study still has many shortcomings, for that the researcher is happy to accept criticism and suggestions that are constructive for the perfection of this research.

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