

THE RELATIONSHIP BETWEEN A LOW CALCIUM DIET AND THE INCIDENCE OF HYPERTENSION IN PREGNANT MOTHERS

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ABSTRACT:

Background: According to the Indonesian Demographic and Health Survey (IDHS) in 2012 found that the main cause of maternal mortality in Jakarta is Hypertension (39%). Hypertension in pregnancy is caused by many factors, one of which is a low calcium diet. In the third semester of labor the need for calcium increases as the fetus begins to form and refine its bones, therefore the calcium level in the mother will reduce. This study was conducted to assess the association between a low calcium diet with hypertension in pregnant women. **Method:** This study used a cross-sectional design involving 161 pregnant women in the third trimester in Jakarta. Daily calcium data from the third-trimester mothers are taken by using the Food Frequency Questionnaire and interview, henceforth the blood pressure data is measured using a tensimeter. Data analysis using SPSS V.2.0 and the significance level used is 0.05. **Result:** Analysing using the Chi-square test, there was a significant relationship between a low calcium diet with hypertension in the pregnant woman. (P=0.000). **Conclusion:** This study shows a correlation between a low calcium diet with hypertension in pregnant women.

Keywords: hypertension in pregnant woman, calcium diet, preeclampsia.

INTRODUCTION:

Based on the Indonesian Demographic and Health Survey (IDHS) in 2012, the number of maternal deaths in DKI Jakarta Province was 97 people, with the highest incidence, namely in East Jakarta with as many as 34 maternal deaths and North Jakarta with 23 maternal deaths. The main cause of maternal death in pregnant women in DKI Jakarta Province in 2012 namely hypertension in pregnancy (39%). (1) The definition of hypertension in pregnant women or hypertension in pregnancy is an increase in systolic blood pressure 140 mmHg and/or diastolic blood pressure (2) 90 mmHg. Hypertension in pregnancy includes hypertension chronic hypertension, gestational hypertension, preeclampsia, eclampsia, and chronic hypertension *superimposed* preeclampsia, the most dangerous for the mother and fetus are preeclampsia and eclampsia. (3,4) Risk factors for hypertension in pregnancy include

pregnancy at the age of less than 20 or more than 35 years, BMI > 30, family history or history of preeclampsia, hyperthyroidism, family history, and pre-existing vascular disease. (5,6,7) In some studies that have been carried out showing a low calcium diet can increase blood pressure blood which will increase vascular smooth muscle and result in increased peripheral resistance. (8)

According to the recommendations of the WHO, the recommended dietary calcium for pregnant women per day is 1500-2000 mg. (9) Calcium is one of the nutrients important macromineral for the human body, and the amount is 1.5-2% of Overall human body weight and normal plasma calcium levels are 8.5-10.4 mg/dL. (10,11) The role of calcium in the body is for the formation of bones and teeth, body metabolism, muscle contraction, and nerve activity. Calcium plays an important role in muscle contraction, one of which is for blood regulation through muscle contraction of the walls of blood vessels. (12,13) Lack of dietary calcium causes a lack of calcium in the blood and will stimulate hormones parathyroid which will then increase the absorption of calcium from bone and activates renin release which will increase intracellular calcium in the smooth muscles and blood vessels contract which causes vasoconstriction so that blood pressure increases. (9,14,15)

Several studies have stated that there is a relationship between poor diet and calcium with the incidence of hypertension in pregnant women, but there are different from other studies which state that there is no relationship between dietary calcium deficiency and the incidence of hypertension in pregnant women. Therefore, researchers are interested in studying this problem study to see if It is true that there is a relationship between a calcium-deficient diet and the incidence of hypertension in pregnant women.

RESEARCH METHODS:

This study used a cross-sectional study design with a sampling in this study using the *Non-probability* method *Sampling* is *Consecutive Sampling*, all subjects that meet the criteria are included in the study until all subjects were met. Inclusion criteria in this study were all third-trimester pregnant women aged 20-35 years who are willing to participate in the study and sign the informed consent obstetrics polyclinic at Esnawan Antariksa Air Force Hospital Jakarta. This research was conducted in October – November 2017 at Esnawan Antariksa Air Force Hospital Jakarta. Primary data from this study by filling out a questionnaire for know the calcium diet and also interview. The instrument of this research is a sphygmomanometer used to measure blood pressure.

The data that has been collected is processed using the program Statistical Package for Social Science (SPSS). Analysis of the data used in univariate and bivariate data analysis. To test the hypothesis of this study using the Chi-square test. If obtained p value <0.05 then there is a statistically significant relationship between variables, if obtained p value > 0.05 then there is no significant relationship between the two variables.

RESULTS:

This research was conducted in October – November 2017 in obstetrics clinic of Esnawan Antariksa Air Force Hospital Jakarta. Number of respondents in this study There are 161 people have met the research criteria. In this research the following results were obtained:

Characteristics of Respondents

Univariate analysis was used to determine dietary calcium and hypertension in the third trimester of pregnant women of the study subjects.

Table1. Calcium Diet

Calcium Diet	Total (n)	Percentage (%)
In accordance	73	45.3
Not enough	88	54.7

Based on table 1, it is known that from 161 respondents who have dietary calcium according to WHO recommendations were 73 respondents (45.3%) and 88 respondents

Table 3. Gestational Age

Gestational Age	Total (n)	Percentage (%)
Week 27-33	119	73.9
Week 34-40	42	26.1

(54.7%) had dietary calcium that was less than the recommendation of WHO.

In addition, based on table 2 it is known that 87 respondents (54%) have normal blood pressure in third-trimester pregnant women and 74 respondents (46%) had hypertension category in third-trimester pregnant women.

It is also known that out of 161 respondents with a gestational age of 27-33 are as many as 119 respondents (73.9%) and the gestational age of the week 34-40 are 42 respondents (26.1%).

The relationship between dietary calcium and hypertension in pregnant women**Table 4.** The Relationship between Dietary Calcium Deficiency, Hypertension

	Blood pressure		P-value
	Normal (n)	Hypertension (n)	
Calcium diet			0.000 ^a
- In accordance	51	22	
- Not enough	36	52	

^a : Chi-square statistical test

n : Number of respondents

Based on the table above describes the relationship between poor diet calcium and hypertension in the third trimester of pregnant women showed that 51 Respondents with a calcium diet according to WHO recommendations had category normal blood pressure and the remaining 22 respondents had the category hypertension. While as many as 36 respondents with a diet that lacks calcium According to the WHO recommendation, the blood pressure category is normal and 52 other respondents have hypertension category. Chi-square. statistic test results the probability value of $p = 0.000$ is obtained which is less than the value of $= 0.05$ so It can be concluded that there is a significant relationship between dietary calcium deficiency and hypertension in third trimester pregnant women.

Table 4. Relationship between gestational age and hypertension in pregnant women

Gestational age	Normal (n)	Blood pressure	P-value
		Hypertension (n)	
- Week 27-33	69	50	0.091 ^a
- Week 34-40	18	24	

a : *Chi-square* statistical test

n : Number of respondents

Based on the table above describes the relationship between gestational age and hypertension in pregnant women, the results showed that 69 respondents with age 27-33 weeks of gestation have a normal blood pressure category and 50 the remaining respondents have a hypertension category. While as many as 18 respondents with gestational age 34-30 weeks have a pressure category normal blood and 24 other respondents had hypertension category. Results *chi-square* statistical test obtained a probability value of $p = 0.091$ which is less than the value of $= 0.05$ so it can be concluded that there is no significant relationship between gestational age and hypertension in pregnant women.

DISCUSSION:

The independent variable in this study was a diet lacking in calcium, with the dependent variable being hypertension in pregnant women. The independent variable in This study has 2 categories, namely, according to WHO recommendations and under WHO recommendations. After testing the hypothesis and with the help of the SPSS program, obtained p-value of 0.000. The p-value obtained describes the hypothesis. The results obtained stated that there was a significant relationship

between diet calcium with the incidence of hypertension in third-trimester pregnant women.

The results of this study are by several studies that have been carried out, namely: lack of dietary calcium in pregnant women is one of the factors for hypertension in pregnancy. (14,15,16) In contrast to research that has been done by Febriana E, *et al.* In his research, dietary calcium did not show an association with blood pressure in pregnant women.(17) Differences in the results of research are likely because the variables studied not only calcium.

The results of hypothesis testing regarding the relationship between gestational age and the incidence of hypertension in pregnant women obtained a p-value of 0.091 which states that there is no significant relationship between gestational age and incidence of hypertension in pregnant women. The results of this study are also by research that has been done that there is no significant relationship between gestational age and the incidence of preeclampsia, so it can conclude that at all gestational ages the incidence of preeclampsia can occur.(18)

Research Limitations

In this study, there are several weaknesses, one of which is the research method used is the *cross-sectional method*. Method *cross-sectional* is one of the drawbacks is that this method does not follow by *follow-up* and the study of the two variables was carried out separately simultaneously and in a short time. Given the time constraint and costs, the researchers chose cross-sectional as the method in the study. In addition to the method, the limitations of the instrument in this study are also one of the drawbacks is that in calculating dietary calcium, researchers only used the FFQ questionnaire.

CONCLUSION:

Based on the results of the research that has been done, it is obtained the conclusions are as follows, from 161 third trimester pregnant women at Esnawan Antariksa Air Force Hospital Jakarta. The prevalence of pregnant women with hypertension is 46%, pregnant women with diet lack calcium as much as 54.7%, and pregnant women with a low calcium diet less and hypertension obtained as many as 52 pregnant women. After the test hypothesis analysis obtained p-value of 0.000 which states that there is a relationship between a diet lacking calcium and the incidence of hypertension in mothers pregnant. Hypertension in pregnant women or hypertension in pregnancy is still one of the problems that need special attention in various services health, given that gestational hypertension has an incidence rate of quite high and has a large effect on maternal morbidity and mortality as well as the fetus. In addition, the researcher also suggests to further researchers who are interested in researching the relationship between dietary calcium and the incidence of hypertension in pregnant women, that it is advisable to use a different method. For measurement of dietary calcium can use different methods such as *Food Recall*, and for research design can use a more specific, like *case-control*.

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