

Adherence to Consumption of Calcium Supplement for Preeclampsia and Non-Preeclampsia

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Abstract: *The high incidence of preeclampsia in the South Tangerang City General Hospital in 2020, because pregnant women are not adherence in taking calcium supplements. In fact, many pregnant women do not consume calcium. The needed for calcium increases during pregnancy, besides being important for the health of the bones of the mother and fetus, it is also known that adequate calcium intake can reduce the incidence of hypertension in pregnancy and prevent premature birth and osteoporosis. **Purposes:** This study aims to analysis of adherence to the consumption of calcium supplements in preeclamptic and non-preeclamptic mothers at the General Hospital of South Tangerang City in 2020. **Method:** Analytical Research with a retrospective cohort approach. The sample in this study were 124 women who gave birth at South Tangerang City General Hospital, divided into 2 groups, namely 62 women who had preeclampsia and 62 others who did not experience preeclampsia according to the inclusion and exclusion criteria. The analysis used the Mann-Whitney test. **Result:** Results of the study there was a difference in the average level of adherence between the non-preeclamptic and preeclamptic groups with p -value = 0.000. Mean rank no preeclampsia 79.52 and the mean rank of preeclampsia 45.48, it was concluded that the level of adherence in the non-preeclampsia group was higher than the preeclampsia group. **Conclusion:** The conclusion of this study can be concluded that mothers who give birth obediently taking calcium supplements will reduce the risk of preeclampsia.*

Keywords: Adherence, Calcium, Preeclampsia

1. Introduction

Preeclampsia is one of the main causes of maternal death, Preeclampsia has a major contribution to fetal mortality and low birth weight due to associated asphyxia and prematurity.[1] WHO (2013) recommends consumption of calcium by pregnant women at a dose of 1.5-2.0 g / day, from 20 weeks of gestation until the end of pregnancy. This recommendation is made to reduce the risk of preeclampsia. Calcium supplementation as part of antenatal care is recommended for the prevention of preeclampsia in pregnant women, especially among those with a higher risk of hypertension.[2]

Observational studies (WHO, 2013) found that calcium supplement intake reduced 41% low risk of developing hypertension, and a high risk reduced 78% of developing hypertension.[3] Serum calcium and magnesium levels are lower in preeclampsia compared to normal pregnancy.[4] Widiastuti's research (2018) Calcium supplementation during pregnancy can be one of the prevention of preeclampsia in pregnancy.[5] Imdad's study (2011) Consumption of calcium supplements can reduce the risk of gestational hypertension, neonatal mortality, preeclampsia and preterm birth in developing countries.[6]

Poor calcium intake generally occurs in developing countries,[7] The lowest calcium intake is found in Asia, among others in Thailand (313 mg / day), China (338 mg / day), Indonesia (342 mg / day), Vietnam (345 mg / day) Malaysia (399 mg / day) and the Philippines (440 mg / day). Compared to other Asian

countries, the average calcium intake is higher found in Singapore (794 mg / day).[8]

The role of calcium supplementation in preventing preeclampsia is by preventing a decrease in serum calcium levels resulting in a decrease in intracellular calcium concentration, which will reduce smooth muscle contractility and stimulate vasodilation.[3] Recognizing that there is a low consumption of calcium is the first step to developing strategies and policies to address this problem.[8]

South Tangerang City General Hospital is the hospital with the largest referral case which has 29 public health service centers.[9] The initial survey was obtained from the medical records of the South Tangerang City General Hospital in the last 2 years that the incidence of preeclampsia has increased from 58 people in 2018 to 79 people in 2019. However, the number of mothers giving birth decreased from 1468 to 980. It can be concluded that this figure has increased significantly from 3.95% to 8.06%.[10]

1.1 Preeclampsia

Preeclampsia is a disease characterized by hypertension, proteinuria and edema that occurs during pregnancy, generally occurs at ≥ 20 weeks of gestation and up to 48 hours postpartum.[11] [12]

Diagnosis; [13] [14]

Minimum criteria; Blood pressure $\geq 140/90$ mmHg after 20 weeks of gestation, Proteinuria ≥ 300 mg / 24 hours or dip $\geq +1$.

Preeclampsia Increasingly; Blood pressure $\geq 160/110$ mmhg, Proteinuria 2.0 g / 24 hr or dip $\geq +2$, Serum creatinine > 1.2 mg / dl unless previously known to be elevated, Platelets $< 100,000 / \mu\text{l}$, Microangiopathic hemolysis – increased LDH, Increased serum transaminase levels –ALT or AST, Persistent headaches or cerebral disorders, and persistent epigastric pain

Pathology

Vasospasm is the basis of the pathophysiology of preeclampsia and eclampsia. Vascular constriction causes resistance to blood flow and contributes to arterial hypertension. Changes in blood vascular will cause local hypoxia in the surrounding tissue, which is thought to cause bleeding, necrosis, and organ abnormalities.[13]

Impact of Preeclampsia on Mother and Fetus [13]

Impact on mother is Eclampsia risk, Kidney disorders, Pulmonary Edema, Hemolysis Syndrome, Elevated Liver Enzymes and Low Platelet Count (HELLP). Impact on the fetus is Impaired fetal growth, Fetal death, Respiratory disorders, Metabolic disease in the future.

1.2 Calcium needs in pregnancy

Calcium is transferred from mother to fetus as much as 30 g during pregnancy. Increased calcium requirements in pregnancy. Fetal calcium needs of about 240 mg / day. Excretion of calcium in pregnancy through urine and insensible loss of about 180 mg. A calcium absorption of 420 mg is expected to be available through an intake of 940 mg (calcium absorption increases in pregnancy, through higher levels of calcitriol) so that the recommended calcium intake for pregnancy is 1200 mg / day (Heaney et al. 1971).[15]

The need for calcium in pregnancy is 1500 grams / day, calcium is needed for fetal growth, and muscle and skeletal development. Easy sources of calcium are milk, cheese, yogurt and calcium carbonate. WHO (2016) recommends consumption of calcium in pregnancy at a dose of 1.5-2.0 g / day, from 20 weeks of gestation until the end of pregnancy.[7] Calcium requirement of adult women according to age group is 1000–1200 mg / day. Then an additional 200 mg / day of calcium intake is required in pregnancy. (Kemenkes RI 2014)[16]

2. Method

This study is an analytical study with a retrospective cohort design. Retrospective cohort is an observation that begins at a point in the past before the start of the study, so that part or all of the observational data is past.[17]

The population in this study were mothers giving birth at the Regional General Hospital of South Tangerang City.[17] The inclusion criteria are respondents willing to be interviewed, the respondent gave birth at the South Tangerang City Regional Hospital, the respondent was conscious. Exclusion Criteria for the respondent did not want to fill out the questionnaire sheet, the respondent was not

willing to be interviewed, the respondent was in an unconscious / critical condition, the respondent consumed formula milk regularly.

The calculation of the sample size in this study used a sample size lemeshow software. The minimum sample in this study is $56 \times 2 + 10\% = 123.2$ to 124 people. A total of 124 respondents were divided into 2 groups, namely 62 respondents each. The data collection tool is a questionnaire with interviews with respondents. Analysis Using the Mann-Whitney test. It is a non-parametric test option if the Independent T Test cannot be done because the assumption of normality is not fulfilled.

3. Result and Discussion

3.1 Result

The data were not normally distributed so the Mann-Whitney test was performed with the results:

Ranks				
	Preeclampsia	N	Mean Rank	Sum of Ranks
Adherence	Non Preeclampsia	62	79.52	4930.50
	Preeclampsia	62	45.48	2819.50
	amount	124		

Test Statistics ^a	
	Adherence
Mann-Whitney U	866.500
Wilcoxon W	2.819.500
Z	-5.479
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: preeclampsia	

These data indicate that there is a difference in the mean level of adherence between the preeclampsia and non-preeclampsia groups with a p-value = 0.000. Mean Rank non Preeclampsia 79,52 and Mean Rank Preeclampsia 45,48, concluded that the level of adherence of the preeclampsia group was higher than the preeclampsia group.

3.2 Discussion

The results of this study indicate that the level of adherence to non-preeclampsia calcium consumption is higher than that of preeclampsia. This means that mothers who adhere to consuming calcium have a smaller risk of developing preeclampsia. The high incidence of preeclampsia in the General Hospital of South Tangerang City is related to low adherence to calcium consumption during pregnancy. This study proves that many pregnant women do not adhere to consuming calcium.

Pregnant women need calcium increases compared to before pregnancy. Calcium can get from foods such as nuts, eggs, meat, tempe, milk and green vegetables. However, some research results show that the calcium data for pregnant women is still low from the WHO recommendation, which is 1500-2000 mg / day. The amount of serum calcium usually falls during pregnancy, which will adversely affect bone health. Because bone is the largest store of calcium and

replaces extracellular fluid.[19]

This research is in line with Anita said there was a significant change in the average blood calcium levels before and after calcium supplements were given in the intervention and control groups ($p < 0.05$). Supplementation Calcium in Pregnant Women at Kuta Baro Community Health Center can prevent the occurrence of preeclampsia. [18]

Daily supplementation of 500 mg oral calcium during pregnancy for at least 180 tablets is associated with a considerably reduced risk of PIH, but this study is unable to confirm whether this association is causal. The causal relationship needs to be confirmed through a large scale randomized controlled trial.[20]

4. Conclusion

There is a difference in the average level of adherence of mothers in consuming calcium supplements. The level of adherence to calcium consumption was higher in the non-preeclamptic group compared to mothers who had preeclampsia. So it is concluded that maternal adherence to consuming calcium is less risk of developing preeclampsia.

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