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# **Exposure Relationship of Cigarette Smoke with Calcium Levels in Blood in Pregnant Women in Coastal Areas of BREBES Regency**

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**ABSTRACT:** Exposure to cigarette smoke contains chemicals that are harmful to the body, one of them lead. Lead in cigarette smoke will disturb the metabolism of calcium in the body. Calcium is an essential mineral for pregnant women, calcium helps the growth of fetal bone in the womb. The need for calcium will increase until the last week of pregnancy, if the mother lacks calcium, pregnant women at risk of hypocalcemia and osteoporosis in pregnancy. This study aims to determine the relationship of exposure to cigarette smoke with calcium levels in the blood in pregnant women in the coastal region of Brebes regency. This study was an observational analytic study with cross sectional study design. The number of samples in this study were 92 pregnant women selected proportional random sampling. Data collection used questionnaires for cigarette smoke exposure and laboratory tests for blood calcium levels. data analysis using Chi-Square Test. The results of this study showed no significant relationship between exposure to cigarette smoke with blood calcium levels in pregnant women with a value of p-value 1.00 PR 1.125 CI 95% (0.364-3,3473.MThe results of this study showed no significant relationship between exposure to cigarette smoke with blood calcium levels in pregnant women, low blood calcium levels not only influenced by exposure to cigarette smoke, but there are other variables that must be studied such as calcium intake.

**KEYWORDS:** Cigarette Smoke, Blood Calcium, Pregnant Women

## **I. INTRODUCTION**

Cigarette smoke is known to contain more than 7,000 chemicals and cancer-triggering particles such as vinyl chloride, tar and nicotine. Cigarette smoke other than harmful to smokers is also dangerous to the surrounding environment is passive smokers. Cigarette smoke that pollutes the air around smokers and passive smokers can cause health problems, the most important is the disruption of the cardiovascular system and respiratory system. Exposure to cigarettes during pregnancy jeopardizes both the mother and the fetus. The impact of cigarette exposure on pregnant women is to increase the risk of LBW (Low Birth Weight), premature birth and pre-eclampsia (Hikita, 2017)

According to WHO (World Health Organization) in 2010, 36% of Indonesians are active smokers (about 60,270,600 lives) and if no tobacco control is conducted in 2025 the number of active smokers becomes 45% (about 96,776,800). In the World more than 600,000 deaths are caused by exposure to secondhand smoke (secondhand smoke). WHO, 2012 Based on Riskesdas (Basic Health Research) Indonesia In 2013 at least 25,000 deaths in Indonesia occur due to cigarette papyrus from others. (riskedas, 2013).

One of the harmful substances in cigarette smoke that has been detected is lead. In lead-containing cigarettes can cause disruption of growth, metabolism and damage to the brain. Lead can interfere with calcium metabolism in the body. (Noor, 2005) Calcium plays an important body-physiological role in intracellular and extracellular fluids. Some important role of calcium is to assist blood clotting process, forming bone structure and signal transception between receptors (Bambang, 2009).

Calcium is one of the most needed minerals by pregnant women. The large amount of this calcium requirement causes reduced calcium in the blood and symptoms of hypocalcemia (low blood calcium). If the calcium in the blood of the pregnant woman is reduced then calcium needs will be taken from the storage of calcium in the mother's bone that result in early osteoporosis. In addition, the lack of calcium in pregnant women can cause pregnant women suffer from distorsia, abnormalities of pelpis, shake teeth and hypertension. (Vatanparast 2006)

Brebes is a district with the highest case during 2015 with 52 cases and AKI 156 per 100,000 live births. MMR may show the risk experienced by pregnant women is influenced by several factors, one of them nutritional status (Brebes Health Office, 2015). Based on the above statements, the researcher intends to conduct research to see "Cigarette smoke exposure relationship With Calcium In Blood in Coastal North Coast of Brebes Regency"

## II. METHOD

This research uses descriptive research method with Cross sectional approach. Population in this research is pregnant woman who live in Coastal area of Brebes Regency covering work area of Wanasari Public Health Center, Bulakamba, Kluwud, Tanjung, Kecipir and Losari Kabupaten Brebes. The time of the research is October - December 2017. The technique of collecting samples by proportional random sampling and obtained the total sample amount of 92 people. The collection of cigarette smoke exposure data using questionnaires with in-depth interview method and for data of blood calcium level using laboratory examination. Laboratory tests were conducted with the help of laboratory officer Cito Tegal. Analytical technique of blood calcium level examination using OCP method (Ortho Cresol Phthalin).

Data analysis used in this research is univariate and bivariate. Univariate analysis in this research is done to know and get result to description of exposure of cigarette smoke to pregnant mother while bivariate analysis is done to know the relation of exposure of cigarette smoke with blood calcium level using Chi-Square test in SPSS program. This research has been stated to meet the ethical requirements by the Medical Research Ethics Commission of the Faculty of Medicine Diponegoro University of Semarang with a description of ethical eligibility No.664 / EC / FK-RSDK / XI / 2017

## III. RESULT

Based on table 1, it is known that the respondent's age in the 2nd trimester is 34 people with 37% proportion and in the 3rd trimester there are 58 people with the proportion of 58 people. Most of the respondent's primary education is elementary school (SD) which is 51 people (55,4%). Most of the respondent's work is housewife that is 72 people (78,3%)

Table 1 Distribution of frequency characteristics of respondents

Characteristics of Respondents	N=92	%
Age of pregnancy		
Trimester 2	34	37
Trimester 3	58	63
Education		
No school	3	3,3
Graduated from elementary school	51	55,4
Graduated from junior high school	23	25
Graduated high school	10	10,9
Graduated PT	3	3,3
Etc	2	2,2
Type of work		
Housewife	72	78,3
Private employees	1	1,1
Farm workers	11	12
Etc	8	8,7

Based on table 2 it is known that pregnant women are exposed to cigarettes as much as 83.7% and as much as 59.8% exposed by one orag smokers, from the results of in-depth interviews pregnant women get cigarette exposure from her husband. While smokers account for 67.4% of smoking in the home. While from the results of laboratory tests found that most of the calcium content of pregnant women are in sufficient category that is ( $\geq 8.9$  mg / L.

Table 2 Frequency Distribution of Cigarette Smoking Exposure and Blood Calcium Levels

Variable	N=92	%
Exposure of Cigarette Smoke		
Exposed	77	83,7
Not Exposed	15	16,3
Number of Smokers		
1 person	55	59,8
> 1 person	22	23,9
Smoking Location		
Inside the house	62	67,4
Outdoors	15	16,3
Blood Calcium Level		
Low (<8.9 mg / L)	39	42,4
Enough (≥ 8.9 mg / L)	53	57,6

Based on Table 3. It shows that there is no significant relationship between exposure to cigarette smoke with blood calcium levels in pregnant women with a p-value value of 1.00 PR 1.125 CI 95% (0.364-3.3473)

Table 3. Analysis Result of Cigarette Smoke Exposure Relation with Calcium Level

Variable	Category Calcium Level		PR (95%CI)	pValue
	Low (≥ 8,9 mg/L)	enaough (<8,9 mg/L)		
<b>History of Cigarette Exposure</b>				
Yes (N=77)	33 (42,9%)	44 (57,1%)	1,125 (0,364-3,3473)	1,00
No (N=15)	6 (40,0%)	9 (60,0%)		

#### IV. DISCUSSION

Pregnant women on the north coast of Brebes are at risk of disrupting the health of the mother and fetus. Several studies have shown that pregnant women exposed to cigarette smoke have a risk of LBW, one of which is research conducted by Hanifah in 2016. Hanifah found that there is a relationship of pregnant women passive smokers with the incidence of LBW with p value = 0.004. (Hanum, 2016) Approximately 43 million children and 65.6 million women in Indonesia become passive smokers. Mostly because smokers smoke inside the house. Facts in the field found that the results of most pregnant women in the north coast of Brebes Regency is 65.2% exposed to cigarettes in the house. Exposure of pregnant women's cigarettes in this study can be from pregnant mother who summed up smoking, that is 60,9% husband pregnant mother smoking and when smoking near mother as much as 55,4%. While the number of cigarettes in the suction averaged 7.16 sticks per day.

Cigarettes are known to contain lead, lead in cigarette smoke can be inhaled by smokers and passive smokers and will be absorbed by the body. lead that is absorbed by the body will bind red blood cells. Lead has several effects, lead can interfere with the action of enzyme acidδ-aminolevulinat dehidrase and ferrocellase so that acid enzyme δ-aminolevulinat dehidrase (ALAS) can not change porfobilinogen consequently iron can not enter the cycle of protoporfirin heme cortex, protoporfirin erythrocytes are replaced to zinc protoporfirin, and the formation of heme is decreased, so it can cause anemia. Anemia will reduce the body's metabolism, thus interfering with the growth and development of the fetus in the womb (Chelchowska, 2013).



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## V. CONCLUSION

The result of statistical test of correlation between history of cigarette exposure with blood calcium concentration in pregnant women in this research got the result value  $p = 1.00$  and PR 1,125 (0,364-3,3473) meaning there is no significant correlation between history of cigarette exposure with calcium level blood. These results were consistent with the Eldin study, there was no significant difference between smokers and non-smokers against decreased blood calcium levels with  $p = 0.097$  (Eldin, 2015)

Cigarettes are known to contain lead, lead in cigarette smoke can be inhaled by smokers and passive smokers and will be absorbed by the body. Lead in cigarette smoke may interfere with PTH hormone work, which may inhibit the absorption of calcium and increase serum phosphate. The PTH hormone is involved also in the process of reabsorption of calcium in the bone and in the kidney aids in the reabsorption of calcium and phosphate. In this study there was no evidence of a significant relationship between the history of cigarette exposure with blood calcium levels of pregnant women. The measurement of PTH hormones may need to be done to clarify whether there is a relationship between the history of cigarette exposure with blood calcium levels of pregnant women

## REFERENCES

- [1]. Hikita N, Haruna M, Matsuzaki M, Sasagawa E, Murata M, Oidovsuren O, et al. Prevalence and risk factors of secondhand smoke (SHS) exposure among pregnant women in Mongolia. *Sci Rep [Internet]*. 2017;7(1):1–8. Available from: <http://dx.doi.org/10.1038/s41598-017-16643-4>
- [2]. WHO. Global Report on Trends in Prevalence of Tobacco Smoking. 2015
- [3]. Departemen Kesehatan Republik Indonesia. Hasil Riset Kesehatan Dasar Indonesia. 2013
- [4]. Noor J. Konsentrasi Polonium dan Timbal Pada Tembakau. *South East Asia Congr Med Phys Biomed Eng*. 2011;39:7–8.
- [5]. Bambang S. Struktur dan Metabolisme tulang. 5th ed. Jakarta: Balai penerbit FKUI; 2009.
- [6]. Vatanparast H, Lo E, Henry CJ, Whiting SJ. A negative trend in calcium intake was accompanied by a substitution of milk by noncarbonated soft drinks in Canadian female students. *Nutr Res*. 2006;26(7):325–9.
- [7]. Dinas Kesehatan Kabupaten Brebes. Profil Kabupaten Brebes Tahun 2015. Dinas Kabupaten Brebes; 2015.
- [8]. Hanum H, Wibowo A. Pengaruh Paparan Asap Rokok Lingkungan pada Ibu Hamil terhadap Kejadian Berat Bayi Lahir Rendah. 2016;5(5):2
- [9]. Chelchowska M, Ambroszkiewicz J, Jablonka-Salach K, Gajewska J, Maciejewski TM, Bulska E, et al. Tobacco smoke exposure during pregnancy increases maternal blood lead levels affecting neonate birth weight. *Biol Trace Elem Res*. 2013;155(2):169–75.
- [10]. Eldin S, Hussein O. Effect of Cigarettes Smoking on the Serum Levels of Calcium and Phosphate in Sudanese Males in Khartoum. 2015;2(8):4–9.