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Exposure Relationship of Cigarette Smoke With FT4 Levels in Pregnant Women in Brebes District

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Abstract
Exposure to cigarette smoke can cause serious effects such as impaired thyroid function. Cigarette smoke contains several toxins such as thiosionate. Tiosionate has potential goitrogenic properties, which in the body of thiosionate can inhibit the absorption of iodide by the thyroid gland. Impaired thyroid function during pregnancy can lead to various health problems such as premature birth, low birth weight (LBW), perinatal mortality and developmental disturbance of Intelligence quotient (IQ). This study aims to determine the relationship of exposure to cigarette smoke with FT4 levels in pregnant women in Brebes District. This was an observational analytic study with cross sectional study design conducted in Brebes District with 92 samples selected by simple random sampling. Data collection through measurement of FT4 levels and interviews. Data analysis using Fisher exact test. The results showed no significant relationship between exposure to cigarette smoke with FT4 levels in pregnant women with a p-value of 0.141 or> 0.05. Based on research and FT4 level measurement results found as much as 1.1% of respondents with normal FT4 levels. To prevent negative effects of exposure to environmental chemicals it is necessary to socialize to pregnant women about the dangers of exposure to secondhand smoke for mother and fetus in the biological, it is advisable to pregnant women not to be near family members who smoke when they are smoking

***Keywords*:** *Cigarette Smoke, FT4, Pregnant Women*

I. INTRODUCTION

Tobacco smoke contains over 7,000 deadly chemicals. There are about 70 can cause cancer. When chemicals enter the body tissue it will cause damage. Chemicals in tobacco smoke can reach the lungs quickly while inhaling, after the lungs then enter into the blood and then blood flows through the arteries that will carry the chemicals throughout the body tissues (CDC: 2010) World Health Organization (WHO) estimates worldwide annually more than 585,000 died during pregnancy and childbirth. According to data WHO Indonesia is the third country with the largest number of smokers after China and India. Increased consumption of cigarettes has an impact on the higher burden of smoking diseases and increased mortality from smoking. By 2030 it is estimated that the death rate of smokers in the world will reach 10 million people and 70% of them are from developing countries. More than 5 million people died from active smoking, while as many as 600 thousand more people died from exposure to secondhand smoke. Indonesia is one of the countries with the largest prevalence of smokers in the world (WHO: 2017, Ministry of Health of the Republic of Indonesia: 2009). The ASEAN Tobacco Control Atlas (SEACTA) in 2014, states that Indonesia is the country that ranks first as the country with the highest prevalence of smokers in ASEAN. The prevalence of smokers in Indonesia is 50.68%. Based on the Basic Health Research (Riskesdas) 2013, 85% of households in Indonesia are exposed to secondhand smoke, the estimate is eight smokers die from active smokers, one passive smoker dies from exposure to secondhand smoke. Based on the calculation of this ratio, at least 25,000 deaths in Indonesia occurred due to cigarette smoke of others (Ministry of Health of the Republic of Indonesia: 2013)

FT4 is one of the thyroid hormones produced by the thyroid gland and is used as an indicator of thyroid dysfunction. Exposure to cigarette smoke can affect free thyroxine (FT4) and free triiodothyronine (FT3) levels. Jorde and Sundsfjord reported free thyroxine concentration (FT4) and free triiodothyronine (FT3) were found to be higher in people exposed to secondhand smoke than those not exposed (Jorde and Sundsfjord, 2006: 343-347). One cigarette contains a variety of chemicals. Chemicals contained in burning tobacco that contains 400 types of chemicals and 200 of them are toxic. According Suratno 2012 exposure to secondhand smoke received by passive smokers for 5 minutes will cause changes in arterial and cardiac artery changes (CCOHS: 2016, Surono: 2016). Previous thyroid disorders are more commonly found in mountainous areas due to the lack of iodine content in the soil due to erosion by rainwater. But now it has undergone a change of area that has thyroid disorders. Currently thyroid disorders have started to appear in the lowlands, especially in coastal areas and agriculture. Some studies have shown that exposure to chemicals in the environment can disrupt thyroid function (Samsudin and ohamad: 2007). Smoking habits in the elderly may have an impact on fetal thyroid function or a one-year-old infant, according to Gasparoni

et al. There is a reciprocal link between smoking and thyroid dysfunction. They found that infants whose mothers and fathers smoked had higher serum thyroglobulin and thiocyanate concentrations than babies whose parents did not smoke. Smoking habits are also associated with thyocyanate, because serum thyocyanate concentrations are higher in smokers and infant smokers. Thyocyanate may inhibit iodide absorption, thyroid hormone synthesis and increase iodide effect of the gland (Gasparoni et.all: 1998, 79-382).

Brebes district is an endemic area of disturbance due to iodine deficiency (GAKY). In 2010, the Brebes District Health Office found several sub-districts that became endemic areas of iodine deficiency (GAKY) among others Kersana, Bulakamba and Losari districts (Brebes District Health Office: 2010). Thyroid disorders during pregnancy can affect both the mother and the fetus in her birth. Some of the impacts are: health disorders, placental obruptio, preeclampsia, growth disorders, low birth weight and neurological disorders (Reid et.all: 2010, Groot et.all: 2012, Stagnaro et.all: 2011). Based on preliminary study conducted by researchers in October 2017 from 20 pregnant women who got 15 of them have family members who smoke. Therefore researchers interested in conducting research on the relationship of exposure to cigarette smoke with FT4 levels in pregnant women in Brebes District.

II. RESEARCH METHOD

This research uses descriptive research method with Cross sectional approach. The population in this study were pregnant women who live in the working area of community Health centers Wanasari, Bulakamba, Kluwud, Tanjung, Kecipir and Losari Kabupaten Brebes. The study time is March - April 2018. The sample in this study according to the inclusion criteria of residing in the area of research, willing to participate in research and age of pregnancy trimester 2 and 3. Selection of research subjects conducted by simple random sampling by lottery and obtained the amount the overall sample of 92 people. The dependent variable in this research is FT4 content, the free variable is exposure to cigarette smoke. In addition, variables were also collected on maternal characteristics (gestational age, education level and occupational status). Data collection through interview questionnaires in each home repondent and laboratory examination. After all the data collected, the researchers perform data processing several stages of checking the accuracy and completeness of the data, then input in the program SPSS. 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 exposure of cigarette smoke with FT4 level using Fisher exact test. This study has been stated to meet the ethical requirements by the Commission of Health Research Ethics Faculty of Public Health Diponegoro University of Semarang with a description of ethical feasibility No.009 / EC / FKM / 2018

III. RESULTS AND DISCUSSION

The result of FT4 examination on the respondents found that the value of FT4 levels in the abnormal category was 1 (1.1%) and the normal category was 91 (98.9%). Laboratory results showed the majority of pregnant women had normal FT4 levels and only one person had abnormal levels of FT4. But this has not been able to get rid of the alleged thyroid disorders in pregnant women. In patients with subclinical hypothyroidism is characterized by decreased levels of thyroid stimulating hormone (TSH) while free thyroxine (FT4) in normal conditions (Carney: 2014: 89).

Based on table 1 it is known that the respondent with 2nd trimester of pregnancy is 34 people (37,0%) and 3rd trimester of pregnancy is 58 people (63,0%). Respondents with the highest education are in elementary school graduates as many as 48 (52.2%). Respondents with the highest occupation status were 72 (78,3%) work unemployment status. In detail the distribution of respondent characteristics can be seen in table 1 below:

Table 1 Frequency Distribution of Respondent Characteristics

Characteristics of respondents	n=92	%
Age of pregnancy		
Trimester 2	34	37,0
Trimester 3	58	63,0
Education		
No school	5	5,4
Graduated from elementary school	48	52,2
Graduated Junior High School	25	27,2

Graduated high school	12	13,0
Graduated PT		2,2
Job status		
Work	20	21,7
Does not work	72	78,3

The results of the study are known from 92 respondents there are 77 respondents who live at home with family members who smoke. Table 2 shows that the respondents who lived with the number of smokers 1 person were 55 (59.8%). Respondents with exposure to the number of cigarettes ≥ 5 cigarettes per day amounted to 65 (70.7%). Respondents with the location of cigarettes family members in the house as much as 62 (67.4%). Respondents with smoker reactions did not dodge as much as 55 (59.8%). In detail the distribution of cigarette smoke exposure to the respondents can be seen in table 2 below:

Table 2 Distribution of Frequency of Exposure of Cigarette Smoke to Respondents

Variables	n=77	%
Number of smokers		
1 Person	55	59,8
>1 Person	22	23,9
Number of cigarettes		
< 5 cigarettes / day	12	13,0
≥ 5 cigarettes / day	65	70,7
Cigarette location		
Inside the house	62	67,4
Outside the house	15	16,3
Smokers reactions		
Dodge	22	23,9
Not dodging	55	59,8

In table 3 analysis of exposure relationship of cigarette smoke with FT4 content using Fisher's exact test. The results obtained p-value value 0.141 (> 0.05), meaning there is no significant relationship between exposure to cigarette smoke with FT4 levels in pregnant women trimester 2 and 3.

The results of this study are in line with the research conducted by Bantarwati DA et al. There is no relationship between cigarette smoke exposure with hypothyroid incidence with p value = 0.317 (> 0,05) (Bantarwati, 2013: 12).

The results of this study found no relationship between exposure to cigarette smoke with FT4 levels, because the possibility of changes in levels of FT4 caused by other factors such as the level of consumption of iodine.

Some theories explain that exposure to cigarette smoke can interfere with thyroid function. Cigarette smoke contains several toxins like thiocyanate. The Tiocyanate has a potential goitrogenic property, which in the body of the thiosionate inhibits the iodide absorption by the thyroid gland or inhibits the iodine transport active into the thyroid gland.

Table 3 Analysis of Cigarette Smoke Exposure Analysis With FT4 Levels In Pregnant Women in Brebes District

Exposure to smoke Cigarette	Content FT4 Abnormal (%) *p-value*	Normal(%) (95% CI)	Value	RP
Exposed	0 (0,0%)	79 (100,0)	0,141	1,083
Not exposed	1 (7,7%)	12 (92,3)	(0,926-1,267)	

IV. CONCLUSION

This study concluded: 1) Of 92 pregnant women who measured FT4 levels there were 91 (98.9%) pregnant women with normal FT4 levels while 1 (1.1%) with abnormal FT4 levels. 2) There is no correlation between exposure of cigarette smoke of FT4 with p-value 0,141.

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