Detection of Factors That Influence Preeclampsia in Pregnant Women

Erlina Hayati[1], Husna Sari[1], G. F. Gustina Siregar[1], Stefani Anastasia S.[1], Fitriani[2]

[1]*Faculty of Midwifery, Deli Husada Deli Tua Health Institute*
[2]*Postgraduate of Public Health North Sumatra University*

Keywords: Parity, Preeclampsia, Pregnant Woman.

Abstract: Preeclampsia and eclampsia are health problems that require special attention because they are as causes death of pregnant women and high perinatal. This research type was analytical study with case control design. The population of this research were all pregnant women who check their womb at Sembiring General Hospital. The sampling technique used random sampling method. The research sample consisted of 62 pregnant women consisting of 31 cases and 31 controls in which the case group were pregnant women diagnosed with preeclampsia and the control group were pregnant women diagnosed with no preeclampsia. Primary data collection methods obtained through direct interviews with research subjects. The research instruments were standardized questionnaires. Data analysis used univariate analysis, bivariate with chi-square test and multivariate analysis with multiple logistic regression tests. The research sample consisted from 31 cases and 31 controls. The results showed that respondents who experienced preeclampsia were 29 people with abnormal weight gain and among respondents who did not experience preeclampsia there were 33 people with normal weight gain. Chi square test results obtained p value <0.05, it shows that there was an influence of weight gain on preeclampsia incidence in pregnant women. Obtained OR = 8.338 means that pregnant women who have preeclampsia have 8.338 times chance of having abnormal weight gain compared to women who don't have preeclampsia.

1 INTRODUCTION

Maternal Mortality Rate (MMR) is one indicator to see the degree of women's health. United Nations International Children's Emergency Founder (UNICEF) (2015) states every year nearly 10,000 women die due to pregnancy and childbirth problems.

Preeclampsia is the second cause after bleeding as specific immediate cause of maternal death, on the other hand the incidence of eclampsia in developing countries is around 1 case per 100 pregnancies to 1 case per 1700 pregnancies. In African countries, the preeclampsia incidence is around 1.8% to 7.1%, in Nigeria, the prevalence is around 2% to 16.7 and the cause of preeclampsia is not only caused by one factor, but many factors that cause preeclampsia and eclampsia (S. Shoda et al; Gerda G. Zeeman, ; Lars J. Vatten & Rolv Skjærven ; M Knight,Osungbade, 2015).

Some experts conclude that women with better socioeconomic conditions will suffer from preeclampsia less often, without regard it,

preeclampsia suffered by women from capable family can still be as severe and life-threatening as eclampsia that affects women at slums (Carl A. Hubel et al., 1989; Gordon CS Smith et al., 2002; Baha M Sibai, 2003; James M. Roberts & Hilary S. Gammill, 2005; Richard J. Levine et al, ; Mary Beth Terry et al., 2016; Labib Ghulmiyyah & Baha M Sibai, 2012; Cunningham, 2016).

Risk factors of preeclampsia include age, parity, weight gain during pregnancy, physical activity and socioeconomic. Control of risk factors plays an important role in connection with the preeclampsia prevention. Early diagnosis of preeclampsia with careful handling gives good prognosis. Preeclampsia which is handled too late give the worst impact that is death for mother and fetus (Chobanian, 2016).

The above data illustrates that the problem of preeclampsia needs to get attention and good handling, considering the high prevalence and quite severe complications and knowledge in the community that is still lacking in handling the preeclampsia problem in pregnant women and can get

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a more precise picture then research is needed to know the factors which influence occurence in pregnant women.

2 METHODOLOGY

The research type was analytic study with case control design. The study was conducted from January to July 2018. The population of this study were all pregnant women who examined the womb at Sembiring General Hospital. The sample consisted of 62 pregnant women consisting of 31 cases and 31 controls in which the case group consisted of pregnant women who were diagnosed with preeclampsia and control group of pregnant women who were diagnosed with no preeclampsia.

The sampling technique used random sampling. Primary data collection methods obtained through the distribution of questionnaires directly on the research subjects. The research instruments were standardized questionnaires. Data analysis used univariate analysis, bivariate with chi-square test and multivariate analysis with regression tests multiple logistics.
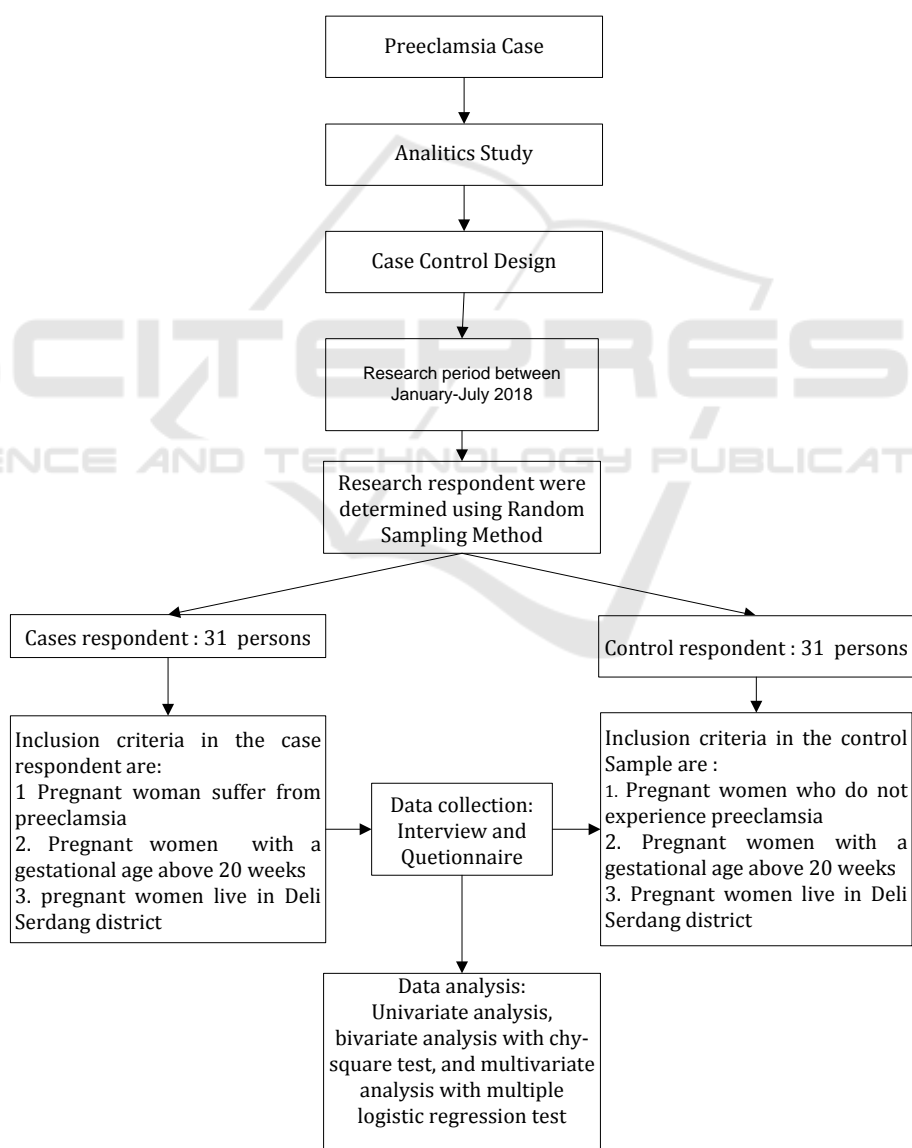
The research roadmap is as follows:

Preeclamsia Case

Analitics Study

Case Control Design

Research period between January-July 2018

Research respondent were determined using Random Sampling Method

Cases respondent : 31 persons

Control respondent : 31 persons

Inclusion criteria in the case respondent are:
1 Pregnant woman suffer from preeclamsia
2. Pregnant women with a gestational age above 20 weeks
3. pregnant women live in Deli Serdang district

Data collection: Interview and Quetionnaire

Inclusion criteria in the control Sample are :
1. Pregnant women who do not experience preeclamsia
2. Pregnant women with a gestational age above 20 weeks
3. Pregnant women live in Deli Serdang district

Data analysis:
Univariate analysis, bivariate analysis with chy-square test, and multivariate analysis with multiple logistic regression test

Figure 1: Research Roadmap

3 RESULTS AND DISCUSSION

Table 1: Detection Respondents Data of Factors that Influence the Preeclampsia Occurrences in Pregnant Women

Note : Table :
K = Case
C = Control
Total of respondents = 62 Respondents

Based on above table, it can be explained that:

a. age: if 1 is <20 and 2 is> 35 years old 20-35 years old,
b. Parity is given by code 1 Primipara and code 2. Multipara,
c. Income is given code 1 <CMW and code 2 for ≥ CMW,
d. Activity is given code 1 Weight (PAL value 1.70-2.40) and given code 2 for the easy category (PAL value 1.40-1.69),
e. Weight is given code 1 for not Normal (<7 and> 12kg) and code 2 for normal (7-12 kg).

Respondents	Age		Parity		Income		Activity		Weight	
	K	C	K	C	K	C	K	C	K	C
1	1	2	1	2	1	1	1	2	1	2
2	2	1	1	2	1	2	1	2	1	2
3	2	2	1	1	2	2	1	1	1	1
4	2	2	1	1	1	1	1	1	1	2
5	2	2	1	2	1	2	1	2	1	2
6	1	2	1	2	1	2	1	2	1	2
7	1	1	1	1	1	1	1	2	1	2
8	1	2	1	1	1	1	2	1	1	1
9	2	2	1	1	1	2	2	1	2	2
10	2	2	1	2	2	2	1	2	2	2
11	2	2	1	2	1	2	2	2	2	2
12	1	1	1	2	1	1	1	1	2	1
13	2	2	2	2	2	1	1	1	1	2
14	2	2	2	2	2	1	1	2	1	2
15	2	1	2	2	1	2	2	2	1	2
16	1	2	1	2	1	2	1	2	1	2
17	1	1	1	2	2	2	1	2	1	1
18	1	2	1	2	2	2	1	1	1	2
19	2	2	1	2	1	2	2	2	2	2
20	1	2	1	1	2	1	1	2	1	2
21	1	1	1	2	1	1	2	2	1	2
22	2	2	2	2	2	1	1	1	1	2
23	2	2	1	2	1	1	2	1	2	1
24	2	2	1	1	1	1	2	2	2	2
25	1	2	2	2	1	1	1	2	2	2
26	1	2	2	2	1	1	1	2	2	2
27	1	2	2	1	1	1	2	2	1	2
28	1	1	1	1	1	1	2	2	1	2
29	1	2	1	1	2	2	1	1	1	2
30	1	2	1	1	2	2	1	1	1	1
31	1	1	1	1	2	2	1	1	1	1

Physical activity can be grouped into three groups, namely:

a. Easy (activity types 25% of time is used for sitting or standing, 75% for standing or moving) or PAL value 1.40 - 1.69
b. Medium (activity types 40% of time is used for sitting or standing, 60% for standing or moving) or PAL value 1.70 - 1.99
c. Weight (activity types 75% time used for sitting or standing, 25% to stand or move) or PAL value 2.00 - 2.40

Respondents	PAL
Depends on chair or bed	1,2
Sitting job with little or no choice to move and little or no reaction activity	1,4 – 1,5
Sitting job with must move and little or no reaction activity.	1,6 - 1,7
Standing work	1,8
Intensive reaction activities with a significant amount (> 3 times a week)	+ 0,3
Heavy manual work or very active reaction activities.	2,0-2,4

Questions and data collected are taken based on the results of data collection such as the respondents' identities which there are questions namely income, number of children and weight gain during pregnancy and physical activity.

Based on the study results note that the majority of pregnant women who experience preeclampsia under age 20 and above 35 years old are 29 people from the study respondents, and those aged 20 to 35 years are 10 respondents. Respondents with income above City Minimum Wage (CMW) are 20 people. While the majority of pregnant women who do not experience preeclampsia are age 20 to 35 years old, as many as 24 people and with an income above the CMW, as many as 16 people.

The results obtained data that the majority of pregnant women who experience preeclampsia with abnormal weight gain where pregnant women have weight gain below 7 kg and above 12 kg are 38 people, while the majority of pregnant women who do not experience preeclampsia with normal weight gain where the mother pregnant who have weight gain between 7 to 12 kg are 24 people.

It is also known from the study results that age and income variables do not affect the preeclampsia incidence. If we look at the age variable, it is known that among respondents who experienced

preeclampsia there were 17 mothers with age under 20 years or over 35 years and among respondents who did not experience preeclampsia were 23 mothers with ages 20-35 years.

The woman reproductive age is 20 to 35 years. It is the safest period for pregnancy and childbirth because at that age the risk of complications during pregnancy is lower. Age less than 20 years and above 35 years are also referred as high-risk age to experience complications during pregnancy. At the age less than 20 years, the uterus size has not reached the normal size for pregnancy, so the possibility of disruption in pregnancy such as preeclampsia becomes greater. At the age over 35 years, it occurs degenerative processes that results structural and functional changes in peripheral blood vessels that are responsible for changes in blood pressure, so they are more vulnerable to experiencing preeclampsia (Gafur, 2011).

If we see income variable, based on the study results there is no difference between mothers with income ≥ CMW and mothers with income <CMW in their influence toward preeclampsia incidence, it is possible because high and low income does not guarantee what kind of food will be consumed by pregnant women and depends on the frequency of eating and other factors.

Physical activity does not significantly influence the preeclampsia incidence. The study results indicate that among respondents who experienced preeclampsia there are 21 mothers with strenuous physical activity and among respondents who do not experience preeclampsia there are19 mothers with easy physical activity.

Based on the study results, it can be assumed that easy and heavy activities do not affect the preeclampsia incidence for pregnant women. It may be due to physical activity experienced by pregnant women is difficult to measure by using questionnaire and observation needs to be done so that in this study found how physical activities carried out daily during pregnancy.

Physical activity does not significantly influence the preeclampsia incidence. The study results indicate that among respondents who experienced preeclampsia there are 21 mothers with strenuous physical activity and among respondents who do not experience preeclampsia there are19 mothers with easy physical activity.

From the research, it is known that weight gain affects the preeclampsia incidence. The results showed that among respondents who experienced preeclampsia with abnormal weight gain there were 22 thousand cases and 7 mothers of controls and

among respondents who did not experience preeclampsia with normal weight there were 9 people from cases and 24 people from controls.

Table 2: Analysis Results of Multiple Logistic Regression Test

Variable	B	Sig.	Exp (B)	95% CI
Age	0,72	0,273	2,060	0,566-7,494
Parity	1,40	0,026	4,087	1,181-14,139
Physical Activity	0,22	0,746	1,252	0,322-4,869
Weight Gain	1,67	0,019	5,310	1,323-21,306
Constant	1,98	0,001	0,137	
Age	0,70	0,285	2,015	0,557-7,287
Parity	1,43	0,022	4,200	1,225-14,399
Weight Gain	1,77	0,005	5,896	1,698-20,479
Constant	1,92	0,001	0,146	
Parity	1,46	0,019	4,328	1,271-14,742
Weight Gain	1,95	0,001	7,067	2,120-23,557
Constant	1,76	0,002	0,171	

After it is done multivariate analysis, it was found that there were four research variables that entered the candidates, namely age, parity, physical activity and weight gain. The most dominant variable influence the preeclampsia incidence in pregnant women at Sembiring Hospital was weight gain, which has Exp B value of 7.067 meaning that pregnant women who experience preeclampsia had chance of 7.067 times having abnormal weight gain compared to pregnant women who did not experience preeclampsia.

The data is presented in the table below:

Table 3: The Effect of Weight Gain on the Preeclampsia Incidence

Weight Gain	Preeclampsia Incidence				P value	OR (95 % CI)
	Cases		Control			
	N	%	N	%		
Abnormal	22	71,0	4	22,6	< 0,001	8,6
Normal	9	29,0		77,4		
Total	31	100	1	100		32

The cross tabulation analysis results of weight gain toward the preeclampsia incidence obtained that among respondents who experienced preeclampsia were 22 people (71.0%), mothers with abnormal weight gain and among respondents who did not experience preeclampsia were 24 people (77.4%) mothers with normal weight gain. Chi square test results obtained p value <0.05, it showed that there was effect of weight gain on the preeclampsia incidence in pregnant women at Sembiring General Hospital. It is obtained OR = 8.338 means that pregnant women who have preeclampsia have 8.3381 chance of having an abnormal weight gain compared to women who don't have preeclampsia.

One of the abnormal weight gain risk for pregnant women is preeclampsia (E. R. Hillesund et al., 2018; Ernawati et al., 2018; Jovian M Wat et al., 2018; Y Sherf et al., 2019).

Preeclampsia is estimated occur in five percent pregnancies and it usually appears after 20 weeks' gestation. It is more common in the first pregnancy. If preeclampsia has occurred, prevention efforts are made so that it doesn't become more severe. Disease recognition and antenatal testing play important role in avoiding death and the possible risk factors. (Octaviana Yoseffin, 2011; Jennifer A. Hutcheon et al, 2018; Lisa M. Bodnar et al, 2018; Marianne Lønnebotn et al, 2018; Argyro Syngelaki et al, 2019).

Multivariate analysis was performed to analyze the effect of independent variables on the characteristics of pregnant women (age, parity and income), physical activity and weight gain with dependent variables (preeclampsia events) at Sembiring General Hospital. Multivariate analysis used multiple logistic regression analysis. Before conducting multivariate analysis, the selection of variables which will become candidates for the multivariate model is done first. Variables that become multivariate candidates are independent variables with p values <0.25 in bivariate analysis. It is known that from five variables, three of them should be included as model candidates, namely parity, activity and weight gain toward the preeclampsia incidence in pregnant women.

Table 4: Selections of Model Candidates for Multivariate Modelling Phase

No	Variable	p value
1.	Age	0,038*
2.	Parity	0,005*
3.	Income	0,440
4.	Activity	0,042*
5.	Weight Gain	< 0,01*

After multivariate analysis, it was found that there were four research variables that entered the candidates, namely age, parity, physical activity and weight gain. The most dominant variable influence the preeclampsia incidence in pregnant women at Sembiring General Hospital is weight gain, which has an Exp B value of 7.067 meaning that pregnant women who experience preeclampsia have chance of 7.067 times having abnormal weight gain compared to pregnant women who did not experience preeclampsia.

After multivariate analysis, it was found that there were four research variables that entered the candidates, namely age, parity, physical activity and weight gain. The most dominant variable influence the preeclampsia incidence in pregnant women at Sembiring General Hospital is weight gain, The percentage correct value obtained 74.2% means age, parity, physical activity, and weight gain variables explain the effect on the preeclampsia incidence in pregnant women at Sembiring General Hospital as much as74.2%, while the remaining 25.8% is influenced by other factors which are not included in this research variable.

Variables that are proven did not have effect on the preeclampsia incidence namely age, income and physical activity, it is recommended:

a. It is hoped that the government and relevant agencies review existing programs by emphasizing the importance of ANC (Ante Natal Care) counseling to primigravida pregnant women for early detection of the preeclampsia risk and how to prevent it early

b. It is hoped that health workers will be more active in providing health education to pregnant women to increase understanding about preeclampsia dangers, especially for primigravida mothers and pregnant women with abnormal weight gain to periodically carry out pregnancy checks and conduct special examinations (laboratory tests) routinely such as blood and urine tests so that they can be detected early. If abnormalities are found related to the maternal pregnancy condition, especially to monitor maternal blood pressure and other examinations to monitor the preeclampsia symptoms so that immediate action can be taken if problems are found related to maternal pregnancy, besides that it is needed to keep blood pressure within normal limits during pregnancy and how to prevent it from an early age by regulating the weight of pregnant women to stay in ideal conditions and still maintain adequate and balanced nutrition.

c. For further researchers are expected to conduct further research to find out other variables that are thought as the influence of preeclampsia occurrence.

4 CONCLUSIONS

It can be concluded that variable which is proven to influence the preeclampsia incidence is weight gain. Referring to the frequency distribution of weight gain respondents, study results showed the majority of pregnant women who experience preeclampsia with abnormal weight gain.

a. Variables that are proven influence the preeclampsia incidence are parity and weight gain.
b. Variables that are proven do not have effect on preeclampsia incidences are age, income and physical activity.
c. Weight gain is proven become the most influential factor on preeclampsia incidence in pregnant women with Exp B value of 7.067 (95% CI; 2.120-23.557) which means pregnant women who have preeclampsia have 7.067 times chance to experience excess weight gain compared to pregnant women who do not experience preeclampsia.

Chi square test results obtained p value <0.05, it shows that there is an effect of weight gain on the preeclampsia incidence in pregnant women at Sembiring General Hospital. It is obtained OR = 8.338 means that pregnant women who have preeclampsia have 8.3381 chance for having an abnormal weight gain compared to women who don't have preeclampsia.

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