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RESEARCH ARTICLE

THE EFFECT OF EXCESS WEIGHT GAIN DURING PREGNANCY ON THE INCIDENCE OF PREECLAMPSIA

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ABSTRACT

Introduction: Preeclampsia incidence ranges from 1: 1000 to 1: 1700, and 50,000 mothers died of preeclampsia and eclampsia (MOH 2005). Increasing excessive weight gain during pregnancy is one of the factors thought to increase the incidence of preeclampsia. **Objective:** The purpose of this study was to determine the effect of Excess weight gain during pregnancy on the incidence of preeclampsia. **Methods:** This is a cohort study design, with the entire population of the sample of pregnant women and pregnant mothers are elected by their inclusion criteria. The type of data this research is primary data taken accidental a research or a visit to the respondents if the data is needed. **Results:** Univariate analysis of the results obtained by the average weight gain during the study (10 weeks), the lowest and the highest 2.3 12:50 with an average of 6.17 and the Standard Deviation 2:50. As many as 12 respondents (16.7%) had preeclampsia while adding weight during late pregnancy indicates the amount of weight gain over as many as 26 respondents (36.1%). Bivariate analysis results obtained from respondents who experienced more weight gain (> 7 kg) amounted to 34.6% the proportion is greater than those who have normal weight gain is 6.5%. With the value of RR (relative risk) of 5:30. Hypothesis test results demonstrate the hypothesis is rejected with value of 0.021. Multivariate analysis showed the effect of weight gain is more at risk of 16.76 times (OR / RR indirect = 16.76) on the incidence of preeclampsia with a p-value 0.004, after being controlled by the variable age with OR of 8.92, parity primi with OR for 9:57, multi parity with OR at 2:47, and the Pre-Eclampsia family history with OR at 7:17. The confounding variables that have significant (p <0.05), is a risky age group with a p-value 0.045 and parity primi with p value 0.042.

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INTRODUCTION

An ante Natal Care (ANC) national coverage and delivery coverage by trained health workers has increased compared to 2010 (Reseach and Develovment, Ministry of Health, Republic of Indonesia, 2013). Behind the increase in ANC coverage and delivery by trained health workers, problems arise related to the condition of pregnancy for a woman. Women who start their pregnancy with a state of obesity, or experience excessive weight gain during pregnancy will be at high risk of developing hypertensive disorders, including hypertension due to pregnancy (Myles, 2009). Severe preeclampsia is a state of systolic blood pressure ≥ 160 mmHg and diastolic blood pressure ≥ 110 mmHg with proteinuria ≥ 5 g / 24 hours (Prawirohardjo, 2010). The combination of proteinuria and hypertension during pregnancy significantly increases the risk of perinatal mortality and morbidity (Cunningham, 2005). Excess weight gain during pregnancy is one of the factors suspected to be associated with the incidence of preeclampsia.

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Weight gain during pregnancy should be linear during the second and third trimesters with an average of 0.4 kg / week. Roughly weight gain is approximately 0.65 kg at 10 weeks, 4 kg at 20 weeks, 8.5 at 30 weeks and 12.5 kg at 40 weeks (Depatemen of Health, 2010).

MATERIALS AND METHODS

Desain: The design of this study used a cohort design, where excessive weight gain was the main exposure variable, with variables of age, parity, history of hypertension, and comorbidities / disorders (Diabetes Miletus, kidney, hydatidiform mole, gemelli) and hereditary history of preeclampsia as confounding variables. The research implementation was carried out at several Community Health Centers in the Regency area.

Population and Sample: The population in this study were all early third trimester pregnant women in the work area of the District Public Health Center (PHC). The determination of the PHC working area was carried out by purposive sampling. Determined As many as 5 PHC as working areas taken as

research location areas with consideration of these areas of high incidence of preeclampsia. Based on the calculation of the sample size, there were 72 respondents. The sampling technique at the Puskesmas level was done by accidental sampling, where respondents who visited PHC by fulfilling the inclusion criteria were taken as respondents. The inclusion criteria: early third trimester pregnant women who had a Healthy Towards Card for pregnant women, visited Ante Natal Care (ANC) every two weeks and weighed them and did not have chronic diseases (Tuberculosis, kidney function disorders and Diabetes Miletus).

Measurement: Measurements are made when the respondent visits the research contract for the first time when visiting PHC. Data collection was done by interviewing and physical examination of body weight, as well as examining the signs of the incidence of preeclampsia (examination of protein uria, examination of odema and blood pressure) and comorbidities. Measurements are carried out every 2 weeks when the respondent visits PHC or is visited at home if they cannot come to the PHC. Measurements are carried out prospectively until the end of pregnancy / childbirth. As an ethical consideration, when a respondent is suspected of having excess body weight, information is conveyed to maintain weight stability during pregnancy.

Statistical Analysis: Statistical analysis using descriptive statistics and Inferential Statistics was conducted to answer the research hypothesis with a value of α (<0.05) and a degree of accuracy of 95%. Relative Risk Value is the main variable (weight gain) to the incidence of preeclampsia. The analysis included univariate, bivariate and multivariate to determine the effect of excess weight gain on the incidence of preeclampsia through confounding vriabel testing of age, parity, comorbidities, hypertensive disease and family history of preeclampsia.

RESULTS

The results and discussion of the study present the results of univariate, bivariate and multivariate statistical analysis:

Univariate analysis

Variation in values

Table 1.above shows the age of the youngest respondent is 17 years and the oldest is 45 years, with an average age of 29.94 years. The lowest parity is 0 and the highest is 6, the average weight gain during the study (10 weeks) is the lowest 2.3 and the most is 12.50 with an average of 6.17 and Standard Deviation 2.50. Graph 3 above shows the variation of weight gain during the end of pregnancy (> 28 weeks) in every 2 weeks cumulatively measuring around 6 kg.

Distribution of frequency of incidence of preeclampsia: Tabel 4. di atas menggambarkan, dari 72 responden sebesar 16.7 % mengalami preeclampsia, sedangkan responden yang mengalami penambahan berat badan lebih selama akhir kehamilan sebesar 36,1 %.

Bivariate Analysis Results: The results of this bivariate analysis examined the main independent variables, namely weight gain during the final month of pregnancy against the incidence of preeclampsia.

The 26 respondents who experienced an excess of 34.6% experienced preeclampsia, this proportion was far more than the respondents who experienced normal weight gain during pregnancy, which was only 6.5%. The results of the statistical test showed that the hypothesis was rejected with a p value of 0.006, which means that there was a significant difference in the proportion between excess weight gain and normal weight gain in the incidence of preeclampsia. The OR value (Odss Ration) is 5.30 which indicates that excess weight gain during pregnancy has a 5.30 times risk of preeclampsia compared to those who experience normal weight gain during pregnancy.

Multivariate Analysis: Multivariate analysis examined the effect of weight gain on the incidence of preeclampsia after controlling for a number of confounding variables, namely age group, parity, comorbidities, history of hypertension and a history of severe family preeclampsia. The analysis is carried out in 2 stages:

Full model analysis: In this analysis, full modeling (full model) was carried out, in which all the variables both the main independent variables and confounding variables were included in one analysis with statistical regression logistic. the results are as follows:

Table 6. above shows that there are 4 variables that have significance (p value <0.05), namely more weight gain, age group, primi parity and concomitant disease in the incidence of peeklampsia, with the highest adjusted OR value of co-morbid disease at 150.55, followed by variables more weight gain that is equal to 41.36, primi parity and multi parity.

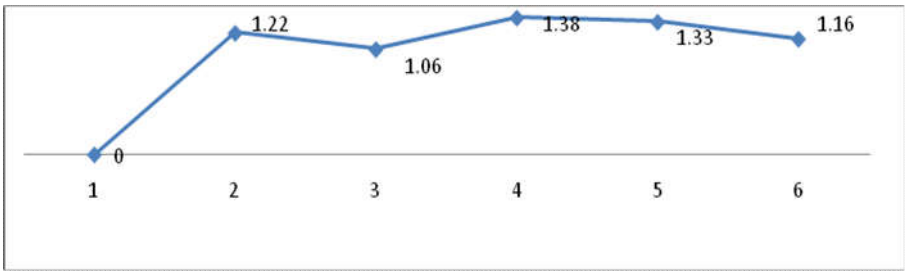
Analysis of confounding variables: Confounding variable analysis was carried out to see the effect of weight gain variables more on the incidence of preeclampsia by entering and issuing confounding variables at the time of the test, if there was a change in RR value of> 10% then this variable was a confounding variable. The results of the analysis are described in the following table able 8. shows the effect of excess weight gain at a risk of 16.76 times (OR / indirect RR = 16.76) on the incidence of preeclampsia with p value 0.004, after being controlled by the age variable with OR 8.92, primi parity with an OR value of 9.57, multi parity with an OR value of 2.47, and a history of preeclampsia in families with an OR value of 7.17. The confounding variables that have significant value (p value <0.05) are the risky age group with a p value of 0.045 and the primary parity with a p value of 0.042.

DISCUSSION

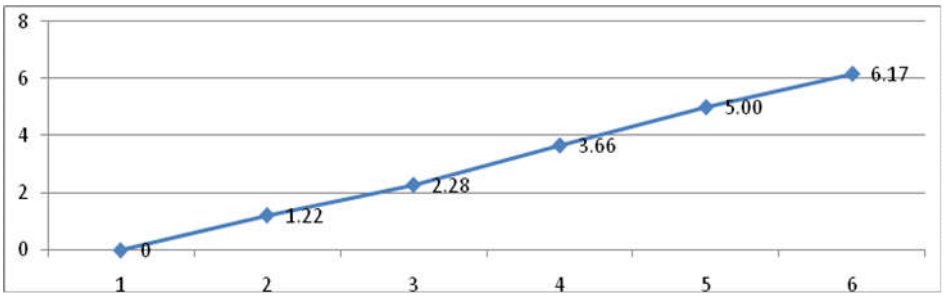
Preeclampsia and the factors that influence it: Preeclampsia is the onset of hypertension, proteinuria, and / or edema. Another opinion is that preeclampsia is a pregnancy-specific syndrome in the form of reduced organ perfusion due to vasospame and endothelial activation characterized by hypertension and proteinuria. The high average uterine artery pressure can increase the onset of hypertension and is a risk factor for pregnancy hypertension (Espinoza et al., 2011). Of the 72 respondents studied, 16.7% experienced preeclampsia. This incidence is quite small compared to respondents who did not experience preeclampsia. In terms of the substance of events and consequences or complications that may arise, several sources explain severe preeclampsia in mother and fetus.

Table 1.Distribution of Respondents Based on variations in age, parity, weight gain

No	Variable	ValueMin-Max	Mean	SD
1	Age	17-45	29.94	8.07
2	Parity	0 – 6	1.52	1.45
3	Weight gain	2.3-12.5	6.17	2.5



Graph 1. Shows the weight gain of pregnant women in the range of> 1 kg per 2 weeks



Graph 2 above shows the variation of weight gain during the end of pregnancy (> 28 weeks) in every 2 weeks cumulatively measuring around 6 kg.

Table 2. Frequency distribution of respondents based on the incidence of preeclampsia and weight gain (n = 72)

Variable	Frekuensi	%
Preeclmpsia		
1. Preeclampsia	12	16.7
2. Non Preeclampsia	60	83.3
Penambahan Berat Badan		
1. Excess weight gain	26	36.1
2. Normal weight gain	46	63.9

Table 3. Frequency distribution of respondents based on the effect of weight gain on the incidence of preeclampsia

Weight gain	The incidence of preeclampsia				Total		*P* Value	OR/RR Indirect
	Yes		No					
	f	%	f	%	F	%		
Excess weight gain	9	34.6	17	65.4	26	100		
Normal weight gain	3	6.5	43	93.5	46	100	0.006	5.30
Total	12	16.7	60	83.3	72	100		

Table 4. Full analysis table model of variable weight gain, age, parity 1, parity 2, comorbidities, history of hypertension and family history

Variable	*B*	*S.E.*	*Wald*	*Sig.*	*Exp(B)/ OR*
Excess weight gain	3.72	1.33	7.330	0.005	41.36 (2.99 -570.50)
Age	2.83	1.39	4.14	0.042	17.04 (1.11-261.760
Primy parity	3.53	1.51	5.43	0.020	34.21 (1.75-666.00)
Multy parity	3.38	2.20	2.35	0.125	29.58 (0.39-2244)
Comorbidities	5.01	2.15	5.39	0.020	150.55 (2.19-1034.05)
history of hypertension	0.86	1.01	0.73	0.391	2.38 (0.32-17.34)
family history	2.67	1.37	3.76	0.052	14.48 (0.974-215.39)

Table 5. Confounding test results

Variable	*B*	*S.E.*	*Wald*	*Sig.*	*Exp(B)*
Excess weight gain	2.81	0.97	8.28	0.004	16.76 (2.45-114.29)
Age	2.18	1.08	4.03	0.045	8.92 (1.05-75.51)
Parity 1	2.25	1.11	4.11	0.042	9.57 (1.08-84.92)
Parity 2	0.90	1.62	0.31	0.57	2.47(0.10-60.30)
Family history	1.97	1.09	3.24	0.07	7.17(0.84-61.34)

Many factors influence the occurrence of hypertension, but not necessarily caused by the same thing in the incidence of hypertension. As well as reducing consumption of low salt and increase consumption of vegetables or fruits. In the incidence of preeclampsia there is no association found with the high consumption of fruits, cereal or milk, eggs (Torjusen et al., 2014). The results showed that comorbidities had a high OR (RR indirect) value of OR 150.55 (95% CI: 2.19-1034.05) to the incidence of preeclampsia. High risk also occurs in mothers who experience comorbidities such as Diabetes Miletus, Hypertension is also reported in the US (United States) there is an increase in the prevalence of preeclampsia caused by predisposing factors such as hypertension, diabetes, obesity, late in childbirth and the use of reproductive aids relates to an increase in high pregnancy rates (Manuscript, 2014). From the results of the analysis obtained OR (RR indirect) in respondents who have a history of hypertension of OR 2.38 (95% CI: 0.32-17.34). The amount of the Indels Body Period (BMI) and the age at the time of pregnancy are closely related to the occurrence of hypertension. Likewise, a history of chronic hypertension can increase the risk of early onset of preeclampsia (Maria et al., 2013). An intervention study was carried out on the female population, one of which showed an association with a decrease in excess weight gain (RR 0.72, 95% CI 0.54 to 0.95); (Muktabhant et al., 2014). Based on the data, the results showed that primi and multi parity had OR 34 values and multi parity of 2.4. this is in line with the results of research showing that the incidence of eclampsia is 3% - 7% in nulliparous and 1% - 3% in multiparous. Pre-eclampsia is a cause of morbidity and death of preterm birth, infant mortality and failure of growth of babies in the womb (Uzan et al., 2011).

Effect of weight gain during pregnancy: The results showed the effect of excess weight gain had a risk of 16.76 times (OR / indirect RR = 16.76) on the incidence of preeclampsia with p value 0.004 after being controlled by the age variable with an OR value of 8.92, primi parity with an OR value of 9.57, multi parity with OR value of 2.47, and family history of PEB with OR value of 7.17. The confounding variable that has significance (p value <0.05) is a risky age group with a p value of 0.045 and a primary parity with a p value of 0.042. a cohort study in China evaluated the relationship of the Body Mass Index (BMI) before pregnancy and Gestational Weigh Gain (GWG) with the risk of hypertensive disorders of pregnancy (HDP) whose results showed a BMI before pregnancy, total GWG, and GWG before pregnancy positively all showed there is a relationship with the risk of pregnancy hypertension and preeclampsia. These results suggest that overweight during pregnancy / early Gestational Weigh Gain (GWG) and total Gestational Weigh Gain (GWG) should be considered in a combination of targeting and risk reduction of HDP. Limitations of weight both before and during pregnancy both control HDP. But weight loss during pregnancy may be more (Zhou et al., 2015). Overweight during pregnancy, weight status will be a factor in weight gain. Stronger (Gain et al., 2013). Obesity increases overall risk of preeclampsia 2 to 3 times. The risk of progressive preeclampsia increases with an increase in BMI even in the normal range (Manuscript, 2014). Facts from a cohort study support that total Gestational Weigh Gain (GWG) and excess according to the Institute of Medicine recommend that weight gain is associated with high BMI values and an increased risk of overweight or obesity in offspring. The fact that the high Gestational Weigh Gain (GWG) rate during early and middle pregnancy is suggestive (Lau et al., 2014) During pregnancy, many women gain excessive weight, which is usually associated with maternal loss and neonatal outcomes. Rrate of Gestational Weight Gain (RGWG) is significantly associated with a high risk of developing gestational diabetes. , the impact of hypertension (Cho, Hur and Lee, 2015). Gestational weight gain (GWG) is generally associated with various factors that influence BMI before becoming pregnant (Li, Liu and Zhang, 2015).

In Peru, pregnant women start <12 weeks of pregnancy, the average weight gain is independently associated with preterm birth (Manuscript, 2014). Overweight and obesity in pregnancy record sets for a high proportion of large-forgestational-age (LGA), even in Gestational Diabetes Mellitus (GDM) absences. Interventions that focus on excess weight and excess weight gain during pregnancy without regard to GDM status, have a potential further risk of large-forgestational-Age (LGA) baby ownership (Overweight, 2013). Women with GWG.the possibility of being overweighed (adjOR 2.9 (95% CI 2.2-3.8)) or obese (adjOR 2.5 (95% CI 1.8–3.5)) compared to a normal BMI before pregnancy. Other factors independently related to excess GWG including young age of mother, increase in birth weight, stop smoking 14-16 weeks, increase in sleep duration, high seafood diet, restriction of activity, decrease in exercise 14-16 weeks. Protection (Restall et al., 2014), besides that the addition of excess pregnancy weight (.51.5 lbs / week) is associated with an increased risk of Spontaneous Preterm Births (SPTB) over excess body weight (BMI 25–29) and in women with more bodies (Lauren A. Wise, 2011).

Conclusion

Respondents who experienced excess weight gain had a greater proportion than those who experienced normal weight gain. The results of hypothesis testing showed that there was a significant proportion difference between excess weight gain and normal weight gain. the effect of excess weight gain has a risk of 16.76 times the incidence of preeclampsia, after being controlled by variables of age, parity, history of preeclampsia. The implication of the results of this study is that health workers, especially midwives, should be able to identify pregnancy danger signs including signs of preeclampsia.

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