



Relationship between characteristics and obstetric history with hypertension in pregnancy[☆]



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KEYWORDS

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Abstract

Objective: This study aimed to assess the association of characteristics and history of obstetrics with hypertension in pregnancy.

Methods: The study design was cross-sectional with total sample of 100 pregnant women, 50 normal tension and 50 hypertension in pregnancy. They were selected by purposive sampling. Inclusion criteria were gestational age of more than 20 weeks, and exclusion criteria were essential hypertension, pregnancy gemeli, pregnant mola, diabetes mellitus, and kidney pain. Data collected directly by the researcher include characteristics of age, work status, education, income and income of husband. The obstetric history consists of a history of preeclampsia/eclampsia, history of abortion, parity, pregnancy plan, and gestational distance. Bivariate analysis was used to measure the association of characteristic and obstetric history with hypertension in pregnancy.

Results: There was no correlation between age, working status, education level, income, and husband's income with hypertension in pregnancy where $p > 0.05$ for each variable. There was a significant association between obstetric history of pre-eclampsia history with hypertension in pregnancy (OR 10,286; 95% IK 2,209–47,901; $p = 0.001$).

Conclusion: Hypertension in pregnancy was associated with a history of pre-eclampsia.

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Introduction

The main complications that cause almost 75% of maternal deaths are severe bleeding, postpartum infection and high blood pressure during pregnancy. Globally, almost 99% of maternal deaths occur in developing countries. The maternal mortality ratio in developing countries in 2015 was 239 per 100,000 live births versus 12 per 100,000 live births in

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developed countries, this is far from the 2030 target of 70 per 100,000 live births.^{1,2} In Indonesia, the maternal mortality rate (MMR) in 2012 was 359 per 100,000 live births. Hypertension is the second largest contributor to maternal mortality and even shows an increase from year to year in 2010 (21.5%), in 2011 (24.7%), in 2012 (26.9%) and in the year 2013 (27.1%).³

These three main causes experienced a change in proportion, where bleeding and infection tended to decrease while hypertension increased. In general, hypertension is caused by many factors or multifactorial. Multifactorial that is associated with the pathogenesis of hypertension consists of three important elements, namely: genetic factors, environmental stimuli (especially salt intake, stress, and obesity) and structural adaptations that make the blood vessels and heart require a pressure higher than normal function. These three elements are interrelated where environmental influences can trigger predisposing factors while structural changes will be triggered by genetic factors.⁴ Based on the theory, the risk factors for hypertension in pregnancy are primigravida, mastication, multiple pregnancies, diabetes mellitus, large babies, extreme age, family history of pre-eclampsia/eclampsia, existing kidney disease and hypertension before pregnancy and obesity.⁵ There are also those who say that this is caused by your blood vessels, dietary factors, heredity and so forth.⁶ In the city of Makassar itself, the prevalence of causes of maternal deaths due to hypertension was 33.3%.⁷ This number is quite large when compared to the target to be achieved. Given that until now it is not yet known clearly, what is the direct cause of hypertension in pregnancy, so that researchers are interested in assessing the relationship of characteristics and obstetric history of pregnant women with hypertension in pregnancy.

Method

Study location and design

This research was conducted at the Sitti Khadijah 1 Mother and Child Hospital in Makassar, South Sulawesi. The type of research used was observational using a cross-sectional study design.

Population and samples

The population is all pregnant women who come to do antenatal care (ANC) in the Content Poly. A sample of 100 people consisting of 50 normal tension and 50 hypertension in pregnancy was selected purposively, fulfilled the inclusion criteria, namely gestational age more than 20 weeks, willing to sign an informed consent issued by the Ethics Committee of the Faculty of Medicine, Hasanuddin University and exclusion criteria, namely essential hypertension, twin pregnancy, mola pregnancy, diabetes mellitus and kidney disease.

Data and analysis

Data collection was carried out by researchers directly using a questionnaire. Characteristic data (age,

education, employment status, maternal income and husband's income) and obstetric history (history of pre-eclampsia/eclampsia, parity, history of abortion, pregnancy plan and pregnancy distance) were measured using a questionnaire.

Data were processed using SPSS for Windows version 22. To assess the relationship of characteristics and obstetric history with hypertension in pregnancy, bivariate analysis "Chi-Square" was used. Data was to see the strength of data relating to assessing associations of odds ratio (OR).

Results

Table 1 shows the relationship between the characteristics of pregnant women who were sampled in this study. Age was not associated with HDK ($p=0.803$) where the risk was low and the high risk of the majority experienced HDK with a proportion of 48.8% and 55% for each. The majority of pregnant women who work HDK (53.2%) and those who do not work are the majority of normal-tension (52.9%) with a p -value = 0.689. The level of education is also not related to HDK ($p=0.686$).

The majority of high-educated pregnant women experienced normal tension (52.6%) and the majority of those with low education experienced HDK (53.5). Pregnant women with an income of 2.7 million, the majority of HDK (63.6%) and less than 2.7 million the majority experienced normal tension (53.8%) with $p=0.227$. Likewise, with the husband's income, there was no association with HDK ($p=0.999$).

Table 2 shows a significant association between the history of preeclampsia and eclampsia with HDK, $p=0.001$; OR = 10.286; 95% IK 2,209–47,9. That is, pregnant women who have a history of PE/E have a tendency to experience hypertension in pregnancy by 10 times compared to pregnant women who do not have a history of PE/E.

Discussion

The study found that the characteristics had no association with hypertension in pregnancy, but for obstetric history, a history of pre-eclampsia and eclampsia was significantly associated with hypertension in pregnancy. Age-based on risk factors between pregnant women with normal-tension and hypertension is not different. In line with previous studies which included 200 pregnant women in Sudan and found that there was no age difference in pregnant women with preeclampsia (mean 28 years) were and were normal tension (mean 27 years).⁸ The meta-analysis of the 5 results of research on the risk of age for hypertension in pregnancy found that there was no difference in the incidence of hypertension in pregnancy for groups of young women (<20 years) and adult women (20–34 years).⁹ But the risk for hypertension is higher in women older (>34 years) at 2 times compared to young age. Contrary to other studies that included 21,928 in Jordan and dividing age into 6 categories, namely 14–19 years, 20–24 years, 25–29 years, 30–34 years, 35–39 years and ≥ 40 years. The results stated that there were significant differences in the age of pregnant women were observed in the normal tension and hypertension group in pregnancy.¹⁰ This is due to physiological changes including vasospasm, activation of the coagulation system and

Table 1 Analysis of the characteristic relationship with hypertension in pregnancy.

Characteristic	Normal-tension		HDK		p-Value
	n	(%)	n	(%)	
Age					
Low risk	41	51.3	39	48.8	0.803 ^a
High risk	9	45	11	55	
Working status					
Work	23	46.9	26	53.1	0.689 ^a
Not work	27	52.9	24	47.1	
Level of education					
High	30	52.6	27	47.7	0.686 ^a
Low	20	46.5	23	53.5	
Income of pregnant women					
≥2.7 Million	8	36.4	14	63.6	0.227 ^a
<2.7 Million	42	53.8	36	46.2	
Husband's income					
≥2.7 Million	32	49.2	33	50.8	0.999 ^a
<2.7 Million	18	51.4	17	48.6	

^a Chi-Square Test.**Table 2** The relationship between obstetric history and hypertension in pregnancy.

Variable	Normal-tension		HDK		p-Value	OR (IK 95%)
	<i>n</i>	(%)	<i>n</i>	(%)		
<i>History of PE/E</i>						
No	47	56.6	36	43.4	0.001 ^a	10.286 (2.209–47.901)
Yes	3	17.6	14	82.4		
<i>History of abortion</i>						
No	44	51.8	41	48.2	0.575 ^a	1.610 (0.527–4.920)
Yes	6	40.0	9	60.0		
<i>Parity</i>						
Primi	17	47.2	19	52.8	0.835 ^a	0.841 (0.371–1.904)
Multi	33	51.6	31	48.4		
<i>Plan to pregnant</i>						
Yes	44	48.9	46	51.1	0.739 ^a	0.638 (0.168–2.413)
No	6	60.0	4	40.0		
<i>Distance of pregnancy</i>						
≥24 Month	40	47.6	44	52.4	0.413 ^a	0.545 (0.182–1.637)
<24 Month	10	62.5	6	37.5		

^a Chi-Square Test.

cardiovascular disorders associated with aging of the uterine Arteries and rigid arteries. Apart from age, the level of education also did not show differences between the normal tension and hypertension groups. In line with the study which divided education into two groups, namely ≤SMP and >SMP. It was found that there was no difference in the level of education between the normal tension group and hypertension in pregnancy. Likewise, in the study who divided education levels into three categories: <13 years; 13–16 years and ≥16 years said that there were no significant differences in education levels between normal pregnant

mothers with hypertensive pregnant women ($p=0.216$).^{11,12} In his study also said the level of education did not have a relationship with hypertension in pregnancy with a value of $p=0.083$. Research also obtained the same results, namely, there was no difference in education level (<12 years) in the normal tension and hypertension group in pregnancy. Work status was also not different between the two groups.⁹ In line with previous findings that the employment status of normal-tension pregnant women has no difference with the employment status of preeclamptic pregnant women ($p=0.827$).¹²

Other researchers on hypertension in pregnancy involving 300 pregnant women divided the work status of husbands into 5 categories, namely working, entrepreneurship, retirement, employees and not working. In the results of his research, he said that there was no relationship between the husband's working status and the incidence of hypertension in pregnancy.¹² The results of this study state that the history of hypertension is associated with the incidence of hypertension in pregnancy. Pregnant women who have a history of PE/E tend to experience hypertension at 27 weeks' gestation by 10 times and at 32 weeks' gestation by 2 times compared to pregnant women who don't have a history of PE/E. In line with previous findings that have found that there is a correlation between the history of hypertension and hypertension in current pregnancies.¹⁰ And pregnant women who have a history of preeclampsia have 7 times the tendency to experience hypertension or preeclampsia in pregnancy.¹³⁻¹⁵ In line with the theory that systolic blood pressure is determined by stroke volume and elasticity of the aorta and large arteries. diastolic blood pressure reflects peripheral resistance which basically depends on the pressure of the small arteries which decrease performance in the event of stiffness in the aorta.¹⁶ Pregnant women who have a history of preeclampsia/eclampsia have experienced damage to their endothelial cells and are a risk factor for placental abnormalities which will ultimately have an effect on increasing blood pressure in current pregnancies.¹⁷ In addition, mothers who had history hypertension were also indicated to carry the M235T and T174M angiotensinogen genes. The high M235T frequency of minor alleles significantly increases the risk of preeclampsia ($p = 0.000$). So that gene variants contribute to the increased risk of preeclampsia and its complications.¹⁸

Conclusion

Based on the research that has been done, the researcher concludes that the characteristics are not related to hypertension in pregnancy, but the obstetric history is the history of pre-eclampsia associated with hypertension in pregnancy. Thus, mothers who have a history of pre-eclampsia should pay more attention to the current condition of pregnancy and adhere to the ANC to health workers to prevent complications that can be caused by HDK. In addition, health workers must also pay more attention to pregnant women who have a history of pre-eclampsia.

Conflict of interest

The authors declare no conflict of interest.

References

1. Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, et al. United Nations Maternal Mortality Estimation Inter-Agency Group collaborators and technical advisory group Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet*. 2016;387(10017):462-74. [http://dx.doi.org/10.1016/S0140-6736\(15\)00838-7](http://dx.doi.org/10.1016/S0140-6736(15)00838-7).
2. WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Executive Summary. Geneva: World Health Organization; 2015. p. 14.
3. Kementerian Kesehatan Republik Indonesia. Profil Kesehatan Indonesia. Jakarta: Sekretariat Jenderal; 2015. Available from: <http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/profil-kesehatan-Indonesia-2015.pdf>
4. Majid A. Fisiologi Kardiovaskular. 2nd ed. Medan: Fakultas Kedokteran Universitas Sumatera Utara; 2005.
5. Prawirohardjo S. Ilmu Kebidanan. Jakarta: Yayasan Bina Pustaka Sarwono Prawirohardjo; 2009.
6. Kementerian Kesehatan Republik Indonesia. Hipertensi Infodatin than 2014; 2014. Available from: file:///C:/Users/CaroN/Downloads/infodatin-hipertensi%20(1).pdf.
7. Sukfitrianty A, Lagu AM. Faktor risiko hipertensi pada ibu hamil di Rumah Sakit Hikmah Kota Makassar, Al-Sihah. *Publ Health Sci J*. 2016;8:79-88.
8. Ahmed MA, Sharif ME, Rayis DA, Nasr AM, Adam I. Hepatitis B infection and preeclampsia among pregnant Sudanese women. *Virol J*. 2018;15:20. 10.1186/s12985-018-0927-5.
9. Berhe AK, Kassa GM, Fekadu GA, Muche AA. Prevalence of hypertensive disorders of pregnancy in Ethiopia: a systemic review and meta-analysis. *BMC Pregnancy Childbirth*. 2018;18:34.
10. Khader YS, Batieha A, Al-Njadat RA, Hijazi SS. Preeclampsia in Jordan: incidence, risk factors, and its associated maternal and neonatal outcomes. *J Matern Fetal Neonatal Med*. 2018;31:770-6.
11. Zhang S, Wang L, Leng J, Liu H, Li W, Zhang T, et al. Hypertensive disorders of pregnancy in women with gestational diabetes mellitus on overweight status of their children. *J Hum Hypertens*. 2017;31:731-6.
12. Kordi M, Vahed A, Rezaee Talab F, Mazloun SR, Lotfalizadeh M. Anxiety during pregnancy and preeclampsia: a case-control study. *J Midwifery Reprod Health*. 2017;5:814-20.
13. Peres GM, Mariana M, Cairrão E. Pre-eclampsia and eclampsia: an update on the pharmacological treatment applied in Portugal. *J Cardiovasc Dev Dis*. 2018;5.
14. Quan LM, Xu QL, Zhang GQ, Wu LL, Xu H. An analysis of the risk factors of preeclampsia and prediction based on combined biochemical indexes. *Kaohsiung J Med Sci*. 2018;34:109-12.
15. Sabarudin U. *Penatalaksanaan Intensif Obstetri*. Jakarta: Sagung Seto; 2015.
16. Lai J, Poon LC, Bakalis S, Chiriack R, Nicolaides KH. Systolic, diastolic and mean arterial pressure at 30-33 weeks in the prediction of preeclampsia. *Fetal Diagn Ther*. 2013;33:173-81.
17. Sava RI, March KL, Pepine CJ. Hypertension in pregnancy: taking cues from pathophysiology for clinical practice. *Clin Cardiol*. 2018;41:220-7.
18. Zitouni H, Ben Ali Gannoum M, Raguema N, Maleh W, Zouari I, Faleh RE, et al. Contribution of angiotensinogen M235T and T174M gene variants and haplotypes to preeclampsia and its severity in (North African) Tunisians. *J Renin Angiotensin Aldosterone Syst*. 2018;19, 1470320317753924.