Article

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The Role of Socioeconomic Status, Stress, and Lipid Profile in Hypertension: A Sex-Specific Analysis in Indonesia

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Abstract

Hypertension is a condition of the cardiovascular system with multiple causes. This type of research is an observational study with an epidemiological approach. The research design used was cross-sectional, where the researcher made a momentary observation. The subjects studied were observed only once, with variable measurements measured and analyzed during examination or assessment only. 100 individuals which consisting of 50 people with hypertension and 50 people with normal tension (as control group) were recruited. Every participants were signed an informed consent and only subjects whom have wiilingness to be a participants that will be recruited. Lipid profile (HDL, LDL, Trigliseride, and Total cholesterol) will be examined. Gender was significantly associated with the hypertension incidence (signed by p=0.017). Smoking and stress levels were also correlated with hypertension incidence (signed by p=0.037 and p=0.000). In hypertension patients, there is a significant correlation between cholesterol and TG, HDL and LDL, where the higher the cholestrol, the higher the TG HDL and LDL. Apart from that, there is a significant negative correlation between HDL and LDL, where if HDL is high, then LDL is low and vice versa. Female gender is 2.656 times more at risk of experienced hypertension than man. Patients with moderate stress are 5.445 times more at risk of experienced hypertension than with low stress.

Keywords

Sex Different, Socioeconomic, Hypertension, Profil Lipid

Introduction

High blood pressure (BP), one of the leading global disease risk factors, has led to a large number of premature fatalities. Globally, 1 in 4 men and 1 in 5 women have hypertension. Hypertension is a condition of the cardiovascular system with multiple causes. It is a significant risk factor for chronic cardiovascular disease, ischemic cardiovascular disease, and stroke. Globally, 54% of strokes and 47% of ischemic heart disease are caused by hypertension. Untreated and uncontrolled hypertension can damage the kidneys, brain, and cardiovascular system, leading to renal failure, blindness, blood vessel ruptures, and memory and cognitive impairments (1).

An increase in the prevalence of hypertension occurs in developed and developing countries, with the increase occurring in developing countries still relatively high. This is based on meta-analysis data showing 1 in 3 adults in developing countries suffer from hypertension. One of the factors causing hypertension is related to social status issues. Economic. Low socioeconomic status is associated with better health status; it is related to lifestyle and a low-quality or unhealthy diet. Indonesia includes low- and middle-income countries, which are marked by many people still living in rural areas with low socioeconomic status (2,3).

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Hypertension is prevalent in many low- and middle-income countries (LMICs), whereas it is stable in high-income countries. In 2015, two-thirds of the 1.13 billion hypertensives resided in low- and middle-income nations. The leading cause of mortality and disability in Indonesia is hypertension (4 5). 1% of Indians and 15% of cardiovascular disease fatalities are attributable to hypertension. The risk factors for hypertension include socioeconomic status, family history, regional heterogeneity, diet, behavior, obesity, and age.5

Due to a paucity of regular data, hypertension research in Indonesia has been conducted on a limited scale or in conjunction with other non-communicable disorders. A district-level study estimated the prevalence of hypertension. In Indonesia, sex-specific hypertension risk factors and their effects on men and women have not been studied. This study predicts that biological and modifiable behavioral variables will influence the prevalence and incidence of hypertension across the sexes in Indonesia. Increasingly, public health is concerned with gender differences in disease susceptibility and risk factors.6-7

Several middle- and high-income studies have demonstrated gender differences in hypertension. The susceptibility, prevalence, and incidence of hypertension are influenced by biological and modifiable behaviors, which lead to cardiovascular diseases (CVDs). A recent Korean adult study concluded that gender-specific prevalence and control require gender-specific blood pressure (BP) treatment. The SDGs seek to prevent and cure one-third of premature fatalities due to noncommunicable diseases by 2030. This study aims to examine the health effects of socioeconomic status on hypertension incidence and explore the sex differences among Indonesian adults.8

Several determinants of hypertension have been identified, including age, obesity, physical inactivity, excess sodium intake, and more recently, socioeconomic status (SES). Socioeconomic inequalities in hypertension have been widely described and several indicators of SES measured at various levels have been associated with hypertension. In high-income countries, it is now well established that SES is inversely related to hypertension with greater risks generally observed among individuals with a lower level of education, a lower income and for those living in more disadvantaged areas. In France, a lower educational level in particular has been associated with a higher prevalence of hypertension. As for other risk factors, social inequalities in hypertension are a major public health issue, and reducing inequalities is one of the Sustainable Development Goals defined by the United Nations Member States in 2015. However, whether associations between SES and hypertension differ between men and women is not clear, and to date, only a few studies have investigated gender differences in these associations, most of them having been conducted in non-European countries. Exploring gender differences and highlighting specificities or similarities between men and women could help understand the mechanisms underlying socioeconomic disparities in hypertension, identify effective targets to act on to close the gap between socioeconomic groups, and improve the general health of the population.9

This study is the first to investigate the socioeconomic status and molecular characteristics of hypertension patients in Indonesia. The previous study in Indonesia revealed that nurses and healthcare should improve the PROLANIS program, especially in hypertension management, as well as develop new nursing interventions according to the barriers and challenges. Another study revealed that the age of 60 was the highest risk of having hypertension. Among men, there was an increased risk of having hypertension with age, but at the age of 60 years old, the increased risk of having hypertension was not as high as in women. Additionally, among males, having quit smoking and depressive symptoms were favorably related to hypertension, but continuing to smoke was adversely related to it. Additionally, hypertension was linked to poorer subjective economic status in women.10

Material and method

This type of research is an observational study with an epidemiological approach. The research design used was cross-sectional, where the researcher made a momentary observation. The subjects studied were observed only once, with variable measurements measured and analyzed during examination or assessment only. 100 individuals which consisting of 50 people with hypertension and 50 people with normal tension (as control group) were recruited. Every participants were signed an informed consent and only subjects whom have wiilingness to be a participants that will be recruited. Lipid profile (HDL, LDL, Trigliseride, and Total cholesterol) will be examined.

Participants were also asked to answer some points in questionnaire. The questionnaire consisting of demographical variable (sex, age, occupation, family history of hypertension, family history of diabetes, comorbidity, body mass index, alcohol consumption, tobacco consumption and sodium intake). Participants who completed questionnaire and attended health examination, without cardiovascular diseases, cancer, stroke, renal failure, asthma and mental illnesses were included in the

study. Data analysis was performed with SPSS Statistics v20. Statistical analysis is used to detect the relationship between sociodemographic variable and the incidence of hypertension.

Results

Table 1. Bivariat Analysis of Demographical Characteristics of Hypertension and non-Hypertension Group

		Hypertension				Total	p
		Yes		No			
		n	%	n	%		
Gender	Male	40	58	29	42	69	0.017*
	Female	10	32.3	21	67.7	31	
Age	Elderly	43	48.9	45	51.1	88	0.538
	Adults	7	58.3	5	41.7	12	
Education	Primary School	33	44.6	41	55.4	74	0.095
	Junior High School	7	53.8	6	46.2	13	
	Senior High School	10	76.9	3	23.1	13	
Income	1-2 millions	41	48.2	44	51.8	85	0.401
	3-4 millions	9	60	6	40	15	
Smoking	Yes	5	27.8	13	72.2	18	0.037*
	No	45	54.9	37	45.1	82	
Alcohol Consumption	Yes	1	100	0	0	1	1
	No	49	49.5	50	50.5	99	
Physical Activity	1-2x/week	23	48.9	24	51.1	47	0.899
	3-4x/week	13	48.1	14	51.9	27	
	5-6x/week	14	53.8	12	46.2	26	
Stress	Low	28	38.9	44	61.1	72	0.000*
	Moderate	22	78.6	6	21.4	28	

Table 1 shows that gender was significantly associated with the hypertension incidence (signed by p=0.017). Smoking and stress levels were also correlated with hypertension incidence (signed by p=0.037 and p=0.000).

Table 2. Correlation test of lipid profile with hypertension incidence

		Hypertension			No Hypertension		
		TG	HDL	LDL	TG	HDL	LDL
Cholestrol	Pearson Correlation	0.349*	0.355*	0.441**	0.366**	0,20421973	0.291*
	Sig. (2-tailed)	0,013	0,011	0,001	0,009	0,155	0,040
Triglyceride	Pearson Correlation		-,145	,215		,072	-,013
	Sig. (2-tailed)		0,316	0,133		0,621	0,930
High Density Lipoprotein	Pearson Correlation			-0.466**			-0.582**
	Sig. (2-tailed)			0,001			0,000

Table 2 were shown Pearson Correlation test result between lipid profile and hypertension incidence. In hypertension patients, there is a significant correlation between cholesterol and TG, HDL and LDL, where the higher the

cholestrol, the higher the TG HDL and LDL. Apart from that, there is a significant negative correlation between HDL and LDL, where if HDL is high, then LDL is low and vice versa

Table 3. Multivariat Analysis of Demographic Characteristics

		B	Sig.	OR	95% C.I.for EXP(B)	
					Lower	Upper
Gender	Male			Reff		
	Female	0,977	0,043	2,656	1,030	6,846
Stress	Low			Reff		
	Moderate	1,695	0,001	5,445	1,927	15,388

Table 3 shows the significant correlation between gender and the incidence of hypertension. Female gender is 2.656 times more at risk of experienced hypertension than man. Patients with moderate stress are 5.445 times more at risk of experienced hypertension than with low stress.

Discussion

Hypertension is prevalent in many low- and middle-income countries (LMICs), whereas it is stable in high-income countries.6,7 In 2015, two-thirds of the 1.13 billion hypertensives resided in low- and middle-income nations.2 The leading cause of mortality and disability in Indonesia is hypertension.8 5.1% of Indians and 15% of cardiovascular disease fatalities are attributable to hypertension.9 The risk factors for hypertension include socioeconomic status, family history, regional heterogeneity, diet, behavior, obesity, and age.10 Due to a paucity of regular data, hypertension research in Indonesia has been conducted on a limited scale or in conjunction with other non-communicable disorders.6,11

Hypertension (HTN), defined as a systolic blood pressure (SBP) or diastolic blood pressure (DBP) > 140 or 90 mmHg, is a global health concern.1,5 Approximately two-thirds of 60-year-olds are affected.1,14 Uncontrolled HTN results in 7,5 million fatalities worldwide.15 And over 47 billion dollars in health care, medication, and lost employment in the United States.7 By 2025, despite advancements, 1.56 billion people will have HTN. Diverse randomized controlled studies have demonstrated that even small blood pressure reductions, such as 10 mmHg, reduce the patient's risk of cardiovascular disease-related death by 25% and stroke-related death by 40%.11

In 1733, Stephen Hales measured intra-arterial pressure on a horse, establishing central aortic pressure and the term "blood pressure".11 In the late 1800s and early 1900s, sphygmomanometric devices that could monitor blood pressure noninvasively were introduced into clinical practice.9 Even in the 1940s, fluctuations in blood pressure due to physical, affective, and sleep-wake cycles were observed.9 When electronic devices replaced mercury manometers at the end of the 20th century, blood pressure measurements became safer and more practical. US insurance companies initiated high blood pressure risk research in 1906.17

Clinically, dyslipidemia and hypertension frequently coexist, which may be related to the pathophysiological mechanisms they share, such as obesity and endothelial dysfunction.5 Moreover, research has demonstrated a synergistic effect between dyslipidemia and hypertension, meaning that patients with both conditions have a markedly increased risk of cardiovascular events and death compared to those with just one of the two conditions.7 Therefore, more research is needed to fully understand the link between dyslipidemia and hypertension. Prior research has demonstrated a strong correlation between dyslipidemia and the onset of hypertension, but the majority of these studies have concentrated on Europe and the Americas8-12, with comparatively scant and still erratic results in Asia .13-1

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