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Hypertension in Suburban Communities: Study in Gedawang Semarang

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ABSTRACT

Background: uncontrolled high blood pressure over long periods of time can lead to serious disease. The prevalence of hypertension in 2023 based on measurement results in Central Java Province is 31.3%, while the proportion of controlled hypertension based on a doctor's diagnosis is only 14.5%. Hypertension is the second largest disease in Semarang City health centers with 153,386 reported cases.
Purpose: this study was aimed to determine factors associated with hypertension in Gedawang District.
Methods: the research was conducted with an observational analytic with cross-sectional approach. The population of study were people who lived in four highest age specific morbidity rate of hypertension area in Gedawang. The total sample for this study was 86 participants aged over 17 years who were selected using cluster random sampling. Data analysis was performed using chi square-test to test the correlation between independent variable which is behavioral factors (smoking, consume caffeine, physical activity, sleep time, self-medical check-up, consumption of full-fed food) and health care (accessibility of health care, free medical check-up, health promotion, home visit by health worker, health service satisfaction) and hypertension as dependent variable
Results: there is significant correlation between smoking (p= 0.028- OR= 3.48), physical activity (p= 0.045- OR= 3.2), accessibility of health care (p= 0.013- OR= 4.91) and health promotion (p=0.000- OR= 7.83) with hypertension.
Conclusion: Hypertension is significantly related to smoking behavior, physical activity, ease of access to health services, and health education.

Keywords: *Behavioral factors; Health care; Hypertension*

INTRODUCTION

Hypertension can cause heart disease, which is the leading cause of death in the world (WHO, 2021). An estimated 46% of adults with hypertension are unaware that they have the condition and only 42% adults with hypertension are diagnosed and treated (WHO, 2023). In Indonesia, the number of hypertension cases is 63,309,620 and the death rate due to hypertension is 427,218 deaths. Hypertension cases in the 31-44 year age group were 31.6%, 45-54 year olds were 45.3%, and 55-64 year old hypertension cases were 55.2% (Casmuti and Fibriana, 2023). The prevalence of hypertension in 2023 based on measurement results in Central Java Province is 31.3%, while the proportion of

controlled hypertension based on a doctor's diagnosis is only 14.5% (BKPK, 2024). Hypertension is the second most common disease in Semarang City Health Centers with 153,386 cases reported by the end of 2023 (Dinas Kesehatan Kota Semarang, 2023).

Based on Pudak Payung Health Center data from March 2017 to March 2018, hypertension was in second place with a total of 113 cases and was included as a priority health problem in the results of the Musyawarah Mufakat Desa (MMD) (Tim Riskesdas 2018, 2019).

Hypertension or high blood pressure is a condition where blood pressure is higher than normal, namely 120/80 mmHg (Desai, 2020). WHO states that blood pressure that is higher than 140/90 mmHg is said to be hypertension. Hypertension often shows no symptoms, so people with hypertension cannot feel it. Although hypertension is one of the most preventable causes of disease and death (James *et al.*, 2014), if it is not controlled for a long time it will cause heart failure or coronary heart disease, stroke, vision problems and kidney failure (WHO, 2023).

Hypertension is a disease that has a complex pathogenesis and treatment management. Even though there have been many public health campaigns, it is still not able to control everyone's hypertension (Umanath, 2019). Identification of risk factors and behavior can contribute to improving the accuracy of health services for people with hypertension. The aim of this research is to provide an overview of behavioral factors and health services related to the incidence of hypertension in Gedawang Village, Banyumanik District which is located on the outskirts of Semarang City to formulate strategies for treating hypertension.

MATERIALS AND METHODS

This research using analytical observational with a cross-sectional approach was carried out in Gedawang Village, Banyumanik District, Semarang City. Data collection was carried out from September to October 2018. The research population was 605 residents aged over 17 years old in four Rukun Warga (RW) which had the most cases of hypertension based on Pudak Payung Community Health Center data. The total sample was 86 participants which was determined using the Slovin formula. Sample selection used a cluster random sampling technique where clusters were selected from each Rukun Tangga (RT) in the population area.

Primary data was obtained through interviews and observations using questionnaires and documentation containing individual characteristics, behavior, health services and blood pressure. Testing the validity of each research instrument item uses the Pearson Product Moment and the reliability test uses the Cronbach Alpha Statistical Test (**α** = 0.73). Univariate analysis was used to explain the characteristics of research participants. Bivariate analysis used Chi-square to test the correlation between independent variables: behavior (smoking, drinking coffee, physical activity, length of sleep at night, self-health examination, consumption of fatty foods) and health services (ease of accessing health services, implementation of free health services, home visits by health workers, health education, satisfaction with health services) on the dependent variable: blood pressure.

RESULTS

The results of the univariate analysis in Table 1 show that the characteristics of the respondents were 60.5% female and the majority (91.9%) aged 19-59 years old. 24.4% worked as private employees and 27.9% had a high school education.

The results of bivariate data analysis of behavioral variables in Table 2 show that there is a significant correlation between smoking behavior and the incidence of hypertension (p= 0.028; OR= 3.48). The incidence of hypertension was more common in respondents who smoked (40%) compared to those who did not smoke (16.1%). Apart from that, physical activity is also related to the incidence of hypertension (p= 0.045; OR= 3.2). The incidence of hypertension occurred more frequently in respondents who did less than 150 minutes of physical activity per week (59%) compared to respondents who did 150 minutes of physical activity per week (27.7%).

The results of bivariate data analysis of health service variables in table 3 show that there is a correlation between ease of access to health services and the incidence of hypertension (p=0.013; OR= 4.91). The incidence of hypertension occurred more frequently in respondents who had difficulty accessing health services (53.8%) compared to those who had easy access to health services (19.2%). In addition, the provision of health education has a significant relationship with the incidence of hypertension (p=0.000; OR= 7.83). The incidence of hypertension occurred more frequently in respondents who did not receive health education (57.9%) compared to respondents who received health education (14.9%).

DISCUSSION

The results of this research show that smoking behavior is one of the factors associated with the incidence of hypertension in Gedawang Village. Previous research also stated that smoking was significantly related to the prevalence of hypertension (RR = 1.016) for both active and passive smokers (Lee *et al.*, 2017).

One cigarette contains more than 4000 types of chemical compounds, 400 dangerous substances and 43 carcinogenic substances. Apart from that, there is also carbon monoxide, tar and nicotine (Kemenkes RI, 2018). Nicotine primarily acts on the cardiovascular system through stimulation of the sympathetic nervous system leading to release of norepinephrine and increases in heart rate, blood pressure, myocardial contractility and systemic vasoconstriction (Price and Martinez, 2020). Despite awareness and knowledge of the dangers of cigarettes, smokers still continue to smoke because they are addicted (Ichsan, Nuredis and Priscillah, 2020). However, other research shows that respondents who have low knowledge about cigarettes are 0.37 times more likely to smoke than respondents who have high knowledge (Soesyasmoro, Demartoto and Adriani, 2016). There are a variety of strategies that can be used to promote smoking cessation, including advice from a doctor, nicotine replacement therapy, behavior modification, and smoking cessation programs (Samadian, Dalili and Jamalian, 2016).

This study also found that people who did less than 150 minutes of physical activity per week had a 3.2 times greater risk of hypertension compared to those who did at least

150 minutes of physical activity per week. This finding is in line with previous research which found that the risk of hypertension in people who exercised less than 30 minutes per day was 2.09 times greater than those who exercised regularly for at least 30 minutes (Shah *et al.*, 2015). A meta-analysis study that identified 93 RCT articles stated that exercise intervention and administration of anti-hypertensive drugs were effective in lowering blood pressure. Although drug administration has the highest probability of being the best treatment for hypertension (Noone *et al.*, 2020). However, there is another meta-analysis study that identified 391 RCTs, 197 of which evaluated exercise interventions (10,461 respondents) and 194 evaluated antihypertensive drugs (29,281 respondents), showing the results that the difference in the blood pressure lowering effect of exercise interventions compared to administering anti-hypertensive drugs is not much different (Naci *et al.*, 2018), so exercise can also be considered as an additional intervention or main treatment for people with mild hypertension for 3 to 6 months after diagnosis.

The type of physical activity that is most effective in lowering blood pressure is high intensity interval training such as aerobics because it causes a greater increase in VO2max (Leal, Galliano and Del Vecchio, 2020)(Dassanayake *et al.*, 2022). VO2max or maximum oxygen consumption is considered the main indicator for assessing cardiorespiratory fitness and is directly related to cardiovascular health. The greater the VO2max, the lower the risk of death from cardiovascular disease (Arboleda-Serna *et al.*, 2019).

One of the treatments for hypertension to reduce mortality and morbidity is the administration of long-term, even lifelong, anti-hypertensive drugs. This treatment can be provided by health facilities. WHO also states that hypertension can only be treated effectively if the health system is strengthened, such as governance, finance, information, human resources, provision of health services, and access to quality, low-priced generic medicines. The government must ensure that all people have fair access to health services, both preventive, curative and rehabilitative to prevent hypertension and its complications (WHO, 2013). Previous research stated that one of the factors associated with routine blood pressure checks in hypertensive patients is access to health services (Idrus, Ansariadi and Ansar, 2021).

The results of this study also show that respondents who have difficulty accessing health services are at 4.91 times greater risk than respondents who have easy access to health services. Based on the results of interviews, respondents felt it was difficult to access health services because they had to use a vehicle to come to the community health centers and there were no pedestrian areas along the route to the community health centers. Based on Indonesian Minister of Health regulation number 43 of 2019, every district must have at least one community health center. Community health centers must be established in locations that are easily accessible to the public and can be accessed easily using public transportation (Kementerian Kesehatan Republik Indonesia, 2019).

Banyumanik district is one of the areas that is included in the suburban criteria in the Semarang City which directly borders with Semarang Regency (Ekawati, Hardiman and Pandelaki, 2018)(Prihanto, Purwanto and Pandelaki, 2022). Based on monograph data, Gedawang village only has 12 posyandu for toddler as health facilities. Primary health care facilities such as community health centers merge into the Pudak Payung's work area which

is approximately 2.5 km away. Health facility services can be seen based on Indonesian National Standards (SNI) No. 03 – 1733 – 2004 Procedures for Urban Housing Environmental Planning. For Community Health Centers, the standard service radius for health facilities is set at 3,000 meters (3 Km) (BSN, 2004). Based on this, the coverage radius of the community health centers in Gedawang village has met national standards and in general the community health centers is able to serve the majority of the population. However, it is possible that there are some areas that are not reached by community health centers because the distance is longer and there is no public transportation (Salsabilah *et al.*, 2023)(Suryani and Adharina, 2024).

Research conducted in Saudi Arabia found that only 23.6% of people with hypertension were aware of their condition (Shah *et al.*, 2015). Because few people with hypertension are aware of their disease, support from the surrounding environment is really needed, both from family and health workers or health service facilities. In accordance with Social Support Theory which is defined as verbal or nonverbal information, advice, or behavior provided by people who are familiar with the subject in their social environment or in the form of presence and things that can provide emotional benefits or influence behavior. Knowledge about hypertension can be increased through education or health promotion regarding hypertension (Nasution *et al.*, 2019)(Kang *et al.*, 2019)(Yu *et al.*, 2022).

CONCLUSIONS

Hypertension is significantly related to smoking behavior, physical activity, easy access to health services, and the absence of health education in Gedawang Village. The preventive efforts needed are implementing healthy living behavior by not smoking and doing enough physical activity, as well as increasing knowledge about personal health and expanding the scope of health services.

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CONFLICT OF INTEREST

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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