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Knowledge and Attitude with Hypertension Prevention Behavior in Adolescents

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Abstract
Background: prevalence of hypertension worldwide reaches more than 1.3 billion people (31%) The prevalence of hypertension in Indonesia is 34.1%. This is an increase compared to the prevalence of hypertension in Riskesdas in 2013 of 25.8%. This study aims to determine the relationship between knowledge and attitudes with hypertension prevention behavior in adolescents. Methods: This research used type of descriptive quantitative research with a cross sectional approach. The number of samples used was 384 adolescent respondents in the Sidorejo Health Center were using nonprobability sampling technique, namely accidental sampling. The research instrument used a questionnaire to adolescent respondents and for data analysis using univariate and bivariate analysis. Results: Knowledge about hypertension prevention is still lacking, attitudes towards hypertension prevention are mostly supportive and hypertension prevention behavior is categorized as good. The results showed that there was no relationship between adolescent knowledge and hypertension prevention practices, and there was a relationship between attitudes and hypertension prevention practices in adolescents. Conclusion: There is no relationship between knowledge and hypertension prevention practices, there is a relationship between attitude and hypertension prevention practices in adolescents. Efforts are needed to improve adolescents' attitudes towards hypertension, so as to support the practice of hypertension prevention.

Keywords: knowledge, attitude, preventive behavior, hypertension

INTRODUCTION

Non-communicable diseases are the leading cause of death worldwide. Non-communicable diseases kill more people each year than all other causes of death combined (Piovani, Nikolopoulos and Bonovas, 2022). As a global cause of death, non-communicable diseases were responsible for 38 million (68%) of the world's 56 million deaths in 2012. More than 40% of deaths (16 million) were premature deaths under the age of 70 years. Hypertension is one of the most dangerous health problems in the world, because hypertension is a major risk factor that leads to cardiovascular diseases such as heart attack, heart failure, stroke and kidney disease which in 2016 ischemic heart disease and stroke became the two leading causes of death in the world (WHO, 2018). Hypertension is characterized by the results of systolic pressure measurements ≥ 140 mmHg and diastolic ≥ 90 mmHg, with two measurements 5 to 10 minutes apart using a blood pressure measuring device with the body in a calm state and or sufficient rest (Tan and Thakur, 2023).

The incidence of hypertension worldwide reaches more than 1.3 billion people, which represents 31% of the world' adult population which has increased by 5.1% greater than the global prevalence in 2000-2010 (Bloch, 2016). Hypertension is currently most prevalent in developing countries (Tibazarwa and Damasceno, 2014). Data from the Global Status Report on Communicable Disesases 2010 from WHO states, 40% of developing economies have people with hypertension, while developed countries only 35%. The African region holds the top position of hypertension sufferers as much as 46%. While the American region is 35%. In the Southeast Asian region 36% of adults suffer from hypertension.

Based on the Basic Health Research (Riset Kesehatan Dasar (Riskesdas), 2018) the prevalence

of hypertension in Indonesia is 34.1%. This is an increase compared to the prevalence of hypertension in the 2013 Riskesdas of 25.8%. It is estimated that only 1/3 of hypertension cases in Indonesia are diagnosed, the rest are undiagnosed. Based on Riskesdas 2018, the prevalence of hypertension based on measurement results in the population aged 18 years was 34.1%, the highest in South Kalimantan (44.1%), while the lowest in Papua was (22.2%). Hypertension occurs in the age group 31-44 years (31.6%), age 45-54 years (45.3%), 55-64 years old (55.2%). Riskesdas 2018 data on the population aged 15 years and over obtained risk factor data such as the proportion of people who eat less vegetables and fruit by 95.5%, the proportion of physical inactivity 35.5%, the proportion of smoking 29.3%, the proportion of central obesity 31% and the proportion of general obesity 21.8%. The above data shows an increase when compared to the 2013 Riskesdas data. (Riset Kesehatan Dasar (Riskesdas), 2018).

According to research conducted by (Shaumi and Achmad, 2019), hypertension that occurs in adolescents is caused by sleep quality, IMT / U a measurement used to detect the incidence of fat and obesity) and family history of hypertension significantly affects the onset of hypertension in adolescents. Adolescents with poor sleep quality had a 4.1 times greater risk, high BMI/U had a 4.85 times greater risk, and a family history of hypertension had a 3.9 times greater risk of developing hypertension. BMI/U is the dominant factor for the risk of hypertension in adolescents. Meanwhile, Yuliaji, et al (2020) in their research stated that the incidence of hypertension in adolescents begins with overweight or obesity related to lifestyle. The results of this study indicate that the incidence of hypertension is experienced more by female respondents (36.5%) compared to male respondents (30.1%). This can be due to lifestyle, especially the diet of adolescent girls who prefer to consume fatty foods or high sodium.

Lifestyle changes have led to an increase in cases of non-communicable diseases in Indonesia, including hypertension and diabetes mellitus (Arifin *et al.*, 2022). Unhealthy eating behavior, smoking, high-fat foods, and lack of physical activity are risk factors for degenerative diseases, in addition to other factors such as age, gender and heredity (Sinta Septiyawati, Hary Cahyati and Raffy Rustiana, 2022). In this case, as Public Health experts have an important role by making preventive, promotive, rehabilitative and curative efforts (Wazed and Dhillon, 2024). Preventive is an effort to prevent a disease that can reduce the degree of public health, while promotion seeks to increase public knowledge about a disease so as to increase motivation to prevent the occurrence of the disease. Promotive efforts are closely related to the process of changing behavior in the community in improving health status, especially adolescents (Nadra, 2017). Changing people's behavior is not an easy thing, it takes a long time to provide understanding of a disease until awareness grows to prevent it early on. Many diseases arise due to unhealthy community behavior, or unhealthy lifestyles, including hypertension.

According to Salatiga's health profile in 2021, there were 60,247 estimated hypertensive patients and about 20,310 received health services (Salatiga city health office). Of the 6 health centers in Salatiga, one of the health centers that treat hypertension is Puskesmas Sidorejo Kidul. Of the six health centers in Salatiga city, Puskesmas Sidorejo Kidul is the fourth health center with a high hypertension rate. Puskesmas Sidorejo Kidul has a high population. Knowledge and attitude are predictors of practice/behavior. Based on this, the researcher is interested in conducting a study that analyzes the relationship between knowledge and attitude with hypertension prevention behavior in adolescents.

METHOD

This research used descriptive quantitative research with a cross sectional approach. The number of samples used was 354 adolescent respondents in the Sidorejo Kidul Health Center, using nonprobability sampling techniques, namely accidental sampling. The research instrument used a questionnaire to adolescent respondents and for data analysis using univariate & bivariate analysis.

RESULT & DISCUSSION

Table 1. Distribution of Respondent Characteristics

Respondent Characteristics	Frequency	Percentage (%)
Age		
(10-14 years)	93	24,2
(15-17 years old)	161	41,9
(18-21 years old)	130	33,9

Gender		
Male	169	44,0
Female	215	56,0
Education Level		
Elementary	60	15,6
Junior	61	15,9
Senior	223	58,1
University	40	10,4
Total	**354**	**100**

Table 1. shows that the characteristics of adolescents in the working area of Puskesmas Sidorejo Kidul Salatiga City mostly aged 15-17 years, 161 respondents (41.9%), mostly female, 215 respondents (56.0%) and mostly high school education, 223 respondents (58.1%).

Table 2. Frequency Distribution Based on Knowledge of Hypertension Prevention with Practice of Hypertension Prevention in Adolescents

Knowledge	**Hypertension Prevention Practice**						**Total**	**%**	***P***
	Less		**Simply**		**Good**				
	F	**%**	**F**	**%**	**F**	**%**			
Less	41	18,9	83	38,2	93	42,9	217	100	
Simply	27	17,9	49	32,5	75	49,7	151	100	
Good	5	31,3	7	43,8	4	25,0	16	100	0,305
Not in Favor	29	33,7	40	46,5		19.8		100	0,001
Support	44	14,8	99	33,2		52,0		100	
Total	73	19,0	139	36,2		44,8		100	

Based on table 2, it is known that poor knowledge with good hypertension prevention practices is 42.9%, while good knowledge with moderate hypertension prevention practices is 43.8%. The results of the chi square test obtained a p value of 0.305 (p>0.05). This means that there is no relationship between the level of knowledge and the practice of preventing hypertension in adolescents. It is known also that a favorable attitude with good hypertension prevention practices is 52%, while an unfavorable attitude with moderate hypertension prevention practices is 46.5%. The results of the chi square test obtained a p value of 0.001 (p< 0.05). This means that there is a relationship between attitude and hypertension prevention practices in adolescents.

Discussion

The results showed that hypertension prevention knowledge among adolescents in the Working Area of Puskesmas Sidorejo Kidul Salatiga City was mostly lacking as many as 217 people (56.5%). This is due to the lack of information obtained about the prevention of hypertension. In addition, the education of respondents who are still in elementary and junior high school affects their understanding of information may be obtained. A person's understanding is obtained through knowledge which is the result of knowing and this occurs after people perceive a certain object (Zhang *et al.*, 2025). Knowledge related to hypertension can be interpreted as the result of of respondents' knowledge related to all aspects of hypertension including definition, causes, signs, effects, prevention, risk factors, and physical activity/exercise. Knowledge about hypertension has an important role in determining intact behavior because knowledge will shape a person in determine their behavior (Estrada *et al.*, 2020). In this study, the majority of respondents already had a good level of knowledge regarding the prevention of hypertension.

Good and sufficient knowledge is likely to be influenced by the age that has entered late adolescence where there has been experience and association that is full of information and more mature in receiving information (Kapur, 2015). Age is related to experiences such as experiences (self or others) and sources of information. The higher a person's knowledge, the higher their concern in maintaining health, on the other hand the less or lower a person's knowledge, the person will have less concern in maintaining their health (Oo, Sakunhongsophon and Terathongkum, 2018). Good knowledge can be caused by the fact that most respondents' education is high school, which is a sufficient age. A person's ability or knowledge to understand something is associated with his level of education. Education is part of human development and aims develop quality resources (Raghupathi and Raghupathi, 2020). Respondents in this study had a level of education in the majority of high school level as many as 223 respondents (58.1%) so that they were more mature in thinking.

The results showed that the attitude about the prevention of hypertension in adolescents in the Working Area of Puskesmas Sidorejo Kidul Salatiga City was mostly supportive as many as 298 people (77.6%). The supportive attitude is due to awareness of health and prevention of hypertension, in addition to being supported by adequate and good knowledge so as to form a supportive attitude towards efforts made to prevent. Attitudes related to hypertension prevention in this study can be interpreted as understanding and responding to statements related to behavioral descriptions in hypertension prevention. Attitudes can be influenced by many factors, including experience (self and others), mass media, educational institutions, and emotional factors. (Buang, Rahman and Haque, 2019). This study shows that most respondents already have a good attitude in preventing hypertension. This can be influenced by respondents' good knowledge as well. In this study, the respondent's attitude is still in the act of responding, where the respondent will give an answer when asked do and the task given. However, the results of study still have an unsupportive attitude, this attitude is due to incorrect information about hypertension obtained by adolescents. Unsupportive attitudes related to the prevention of hypertension due to inappropriate information. Health information can increase individual awareness of health issues, health risks and best health solutions that need to be understood and used as information in improving and maintaining their health so as to prevent disease.

The results showed that hypertension prevention behavior among adolescents in the Working Area of Puskesmas Sidorejo Kidul Salatiga City was mostly in the good behavior category as many as 172 respondents (44.8%). This is supported by good knowledge and supportive attitude towards the prevention of hypertension by adolescents. Behavior is formed from awareness that is influenced by knowledge and attitudes from the information obtained.

Hypertensive disease prevention behavior in the form of healthy behavior can consist of CERDIK (regular health checks, get rid of smoking, diligent physical activity, balanced diet, adequate rest, and manage stress) (Pangesti, Tamtomo and Murti, 2020). Behavior is the result of all kinds of experiences and human interactions with the environment which are manifested in the form of knowledge, attitudes and actions. Behavior is the response / reaction of an individual to a stimulus that comes from outside or from within himself (Kilic, Uzunçakmak and Ede, 2016). Behavior is a function of individual characteristics and the environment. Individual characteristics include various variables such as motives, values, traits, personality, and attitudes that interact with each other and then interact with environmental factors in determining behavior. Environmental factors have great power in determining behavior, even greater power than individual characteristics. Teenagers still lack healthy lifestyle behaviors, often sleep late, eat carelessly, lack of exercise and various other bad activities. The rapid development of information technology makes teenagers tend to choose to stay sitting in front of a computer or laptop with the excuse of finding information related to school assignments or just for entertainment. They also rarely exercise, as a result their bodies are often less fit, tired and often sleepy. Unhealthy lifestyles, poor sleep quality, poor physical activity cause hypertension in adolescents (Putri *et al.*, 2024).

Based on the results of this study, although knowledge about hypertension varies among adolescents, it does not directly affect their prevention practices. A similar study in Poland by (Grad, Mastalerz-Migas and Kilis¨-Pstrusińska, 2015) found that the level of knowledge about hypertension among adolescents was influenced by factors such as age, gender, and parental educational background. However, this study did not explicitly examine the relationship between knowledge and hypertension prevention practices. Furthermore, a literature review by (Tabrizi *et al.*, 2024) identified various factors that influence health promotion behavior in adolescents, including educational, economic, socio-cultural, spiritual, psychological, and personal factors. Although knowledge is an important component, other factors such as social support, individual attitudes, and access to health information also play a significant role in hypertension prevention practices (Grad, Mastalerz-Migas and Kilis¨-Pstrusińska, 2015).

This difference in results may be due to variations in respondents' demographic characteristics, data collection methods, or other variables that influence hypertension prevention behavior. For example, family support and individual attitudes towards health may also play an important role in hypertension prevention practices.International research also supports these findings. The study by Mu et al. (2003) in China found that family-based health education improved hypertension prevention knowledge, attitudes and behaviors in adolescents. After a two-year intervention, there were significant improvements in all three aspects in the intervention group compared to the control group. These findings emphasize the importance of health education in improving hypertension prevention

knowledge and practices.

In addition, a study by (Ihm *et al.*, 2022) in South Korea found that positive attitudes towards hypertension were associated with increased adherence to prevention programs, especially in adolescents with adequate access to health education. This study emphasizes the importance of school-based interventions in shaping positive attitudes and hypertension prevention behaviors in adolescents. Furthermore, research by (Tabrizi *et al.*, 2024) identified various factors that influence health promotion behavior in adolescents, including education, social support, and access to health information. This study underlines that positive attitudes do not stand alone, but are influenced by various external factors, such as social environment and family support. Therefore, positive attitude formation should be accompanied by a comprehensive intervention approach.

Overall, improved knowledge about hypertension plays an important role in promoting effective prevention practices in adolescents. Appropriate educational interventions, whether through electronic media, school-based programs, or family-based health education, can improve adolescents' knowledge and attitudes towards hypertension prevention, which in turn can improve hypertension prevention practices. Thus, although knowledge is an important component, other factors such as attitude, social support, and access to health information also need to be considered in an effort to improve hypertension prevention practices in adolescents. Based on the results of this study, there is a significant relationship between attitudes and hypertension prevention practices in adolescents. This finding suggests that positive attitudes towards hypertension prevention play an important role in promoting effective prevention behaviors among adolescents. Previous research supports these findings. For example, a study by (Puspita, Tamtomo and Indarto, 2017) used the Health Belief Model to analyze factors influencing hypertension prevention behavior in adolescents in Surakarta. The results showed that perceived threat, perceived benefits, self-efficacy, and cues to action had a direct positive effect on hypertension prevention behavior, while perceived barriers had a direct negative effect. Perceived vulnerability, seriousness, and cues to action also affect prevention behavior indirectly through perceived threat (Pramitasari and Cahyati, 2022).

In addition, a study by Mu, Liu, and Zhu (2003) evaluated the effects of family-based health education on knowledge, attitudes, and behaviors in the prevention of hypertension in adolescents. After two years of intervention, there was a significant increase in the level of knowledge, attitudes, and behaviors in hypertension prevention in the intervention group compared to the control group. These findings emphasize the importance of family-based health education in improving hypertension prevention attitudes and practices in adolescents. Furthermore, a study by (Sa'Adeh *et al.*, 2018) examined the relationship between knowledge, attitudes, and practices of hypertensive patients towards prevention and early detection of chronic kidney disease in Palestine. The results showed that higher knowledge and attitude scores were associated with better prevention practices. Although this study focused on hypertensive patients, the findings are relevant as they highlight the relationship between positive attitudes and effective prevention practices. Differences in the results of this study could be due to variations in the demographic characteristics of respondents, data collection methods, or other factors that influence hypertension prevention behavior. For example, family support and access to health information may also play an important role in hypertension prevention practices. Thus, a positive attitude is an important component in the prevention of hypertension in adolescents. However, other factors such as knowledge, social support, and access to health information also need to be considered in an effort to improve hypertension prevention practices in adolescents.

CONCLUSIONS

Knowledge about prevention of hypertension in adolescents was highest in the poor category, attitudes towards prevention of hypertension in adolescents were highest in the supportive category, the practice of preventing hypertension in adolescents is mostly in the good category. There is no relationship between knowledge and hypertension prevention practices in adolescents. There is a relationship between attitude and hypertension prevention practices in adolescents. Adolescents whose knowledge is still lacking, their attitudes are less supportive and their behavior is still lacking are expected to increase knowledge about hypertension by seeking information from the media and health workers and changing their attitudes and behavior in preventing hypertension.The results of this study are expected to be input for Puskesmas to improve services and counseling about hypertension, especially in adolescents with counseling and counseling about hypertension prevention behavior.

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