

THE FACTORS THAT ARE RELATED TO HYPERTENSION IN ADOLESCENTS IN THE PALU CITY

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ABSTRACT--Hypertension continues to increase from year to year. Where hypertension is not only a problem for adults and the elderly but hypertension is also a problem in. Hypertension in adolescents can continue into adulthood so this will lead to a higher risk of morbidity and mortality. known the factors associated with the incidence of hypertension in the city of Palu. quantitative research with analytic design that used a cross sectional approach, where the risk factors in this study are stress, BMI (Body Mass Index), diet, activity, smoking habits and alcoholic, while the effect is hypertension. showed an independent variable that was significantly related to the incidence of hypertension in adolescents was adolescent nutritional status (BMI) with a value of $p < 0.05$ ($p = 0.018$), stress level with a value of $p < 0.05$ ($p = 0.002$), alcoholic with p value < 0.05 ($p = 0.016$), and smoking behavior with a value of $p < 0.05$ ($p = 0.05$), and dietary habit with a value of $p < 0.05$ ($p = 0.002$). Conclusion: Factors related to the incidence of hypertension in adolescents are nutritional status (BMI), stress levels, alcoholic and smoking behavior, and dietary habit.

Keywords-- Adolescents, Hypertension, BMI, Stress, Activity, Diet, Alcoholic, Smoking Behavior

I. INTRODUCTION

Hypertension from year to year continues to increase. Where hypertension is not only a problem for adults and the elderly but hypertension is also a problem in adolescents (Ewald and Haldeman, 2016). Hypertension in adolescents can continue into adulthood which will lead to a higher risk of morbidity and mortality. Someone who has hypertension is sometimes not aware of it because hypertension does not show signs and symptoms that are typical, except when it goes into advanced stages and cause complications such as stroke, heart and kidney failure, therefore hypertension is also called a “Silent Killer”.

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The highest increase in hypertension prevalence in the African Region in 46% of adults aged 25 years and over, while the lowest prevalence in 35% is found in America. Overall, high-income countries have 35% lower hypertension prevalence compared to other countries (WHO, 2011). In Indonesia the incidence of hypertension in children and adolescents varies from 3.11% - 4.6%. Riskesdas data shows that the prevalence of hypertension in Indonesia has increased from 2013 by 25.8% to 34.1% (Balitbangkes, 2018).

Likewise, the prevalence of hypertension in Central Sulawesi in 2017 was 30.5%, and in 2018 the prevalence increased to 31.5% (Profile of the Central Sulawesi Health Office, 2017). And the data from the Palu City health department in 2016 showed the prevalence of hypertension as high as 12.30% of cases. Then in 2017 people with hypertension are 14.46% of cases (Profile of Palu City Health Office, 2017). The results of hypertension screening on September 4th in 2019, showed that the researchers conducted on adolescents with a total of 272, who experienced prehypertension as many as 83 people (30.1%), stage 1 hypertension were 22 people (8.1%) and stage 2 hypertension as many as 12 people (4.4%).

Based on these data the incidence of hypertension in adolescents is very high, in the city of Palu, this could have a negative impact on adolescents in the future if it is not immediately treated, because hypertension can continue in dangerous directions such as stroke, heart and kidney failure. When this situation occurs it will affect the future and quality of life of adolescents. One of the risk factors that can cause hypertension in adolescents is lifestyle. Where an unhealthy lifestyle can increase the incidence of hypertension in adolescents. Things that are unhealthy lifestyles include dietary habit that are less nutritious, lack of activity, stress, smoking habits and alcoholic (Nisa, 2012). Therefore, we need to find out what are the factors causing the cases of hypertension that occur in adolescents in the city of Palu, so the problem can be intervened appropriately.

II. METHOD

This research is a quantitative research with analytic research design that uses a cross sectional approach. Where the principle of this study is to determine the relationship between the independent variable (risk factor) and the dependent variable (effect) through a one-time measurement and carried out simultaneously. The risk factors in this study were stress, BMI (Body Mass Index), diet, activity, habit of smoking and drinking alcohol, while the effect was hypertension. This research was conducted at SMA Negeri 1 and SMA Negeri 4 Palu, in September 2019. And the sampling technique was by accidental sampling, and a total sample of 269 people was obtained.

III. RESULTS

Table 1: Characteristics of Respondents

Characteristics	n (269)	%
Age		
16	44	16,4
17	187	69,5
18	38	14,1

Sex		
Male	112	41,6
Female	157	58,4
Ethnic group		
Kaili	102	37,9
Bugis	96	35,7
Lainnya	71	26,4

Table 1 shows that the majority of respondents aged 17 years were 69.5% with 58.4% of female, 37.9% of Kaili and 35.7% of Bugis ethnic group.

Table 2: Bivariate Analysis

Independent Variable			Hypertension			Total	P
			Hyperten- sion	Pre Hypertension	Normal		
Body Mass Index	Obesity	n	11	11	19	41	0,018
		%	26,8%	26,8%	46,3%	100,0%	
	Normal	n	15	50	107	172	
		%	8,7%	29,1%	62,2%	100,0%	
	Underweight	n	4	12	40	56	
		%	7,1%	21,4%	71,4%	100,0%	
Stress	Middle and Overweight	n	9	21	63	93	0,002
		%	9,7%	22,6%	67,7%	100,0%	
	Mild	n	14	32	94	140	
		%	10,0%	22,9%	67,1%	100,0%	
	Normal	n	7	20	9	36	
		%	19,4%	55,6%	25,0%	100,0%	
Physical Activity	Low	n	13	21	26	60	0,392
		%	21,7%	35,0%	43,3%	100,0%	
	Medium	n	9	19	103	131	
		%	6,9%	14,5%	78,6%	100,0%	
	Severe	n	8	33	37	78	
		%	10,3%	42,3%	47,4%	100,0%	
Alcohol	Yes	n	2	3	1	6	0,016
		%	33,3%	50,0%	16,7%	100,0%	
	No	n	28	70	165	263	
		%	10,6%	26,6%	62,7%	100,0%	
Smoke	Yes	n	5	8	11	24	0,057
		%	20,8%	33,3%	45,8%	100,0%	

	No	n	25	65	155	245	
		%	10,2%	26,5%	63,3%	100,0%	
Dietary habit	Bad	n	24	59	101	184	0,002
		%	13,0%	32,1%	54,9%	100,0%	
	Good	n	6	14	65	85	
		%	7,1%	16,5%	76,5%	100,0%	

Table 2 shows the independent variables that are significantly related to the incidence of hypertension in adolescents are Body Mass Index (BMI) with p value <0.05 ($p = 0.018$), stress level with p value <0.05 ($p = 0.002$), alcohol with p value <0.05 ($p = 0.016$), and smoking behavior with p value <0.05 ($p = 0.05$), and dietary habit with p value <0.05 ($p = 0.002$).

IV. DISCUSSION

1. The relationship of Nutrition Status (BMI) with the incidence of hypertension

The results of statistical analysis found that there is a relationship between BMI with the incidence of hypertension in adolescents in the Palu city with p value <0.05 ($p = 0.018$). People with overweight body will need more oxygen supply to the body. The increased blood volume in the circulation of blood vessels will increase blood pressure in artery walls, this situation will improve the work of the heart. And then obesity will be followed by excess body fat levels, especially in abdominal obesity can cause of risk for hypertension and other degeneration diseases (Price & Wilson, 2006).

2. The relationship between stress with hypertension

The results of statistical analysis obtained there is a relationship between the level of stress with the incidence of hypertension that is with p value <0.05 ($p = 0.002$). Stress is the body's reaction consisting of responses developed for depression (Mariotti, 2015). Stress is a state of inability to face physical, mental, psycho-social and spiritual challenges, which can affect a person's physical state. Stress states make the body produce more hormones so that the heart works stronger and faster. If it occurs for a long period of time, there will be a reaction from other organs. Functional changes in blood pressure caused by pressure can cause cardiovascular hypertrophy if repeatedly intermittent, there will be an increase in blood pressure which can increase or increase can cause an increase in blood pressure (Tackling and Borhade, 2020).

3. The relationship between physical activity with hypertension

The results of statistical analysis showed that there was no relationship between physical activity and the incidence of hypertension in adolescents in Palu city, with the p value > 0.05 ($p = 0.392$), where respondent's activity was mild, moderate, or severe, the incidence of hypertension was almost balanced between hypertension patient and no hypertension patient, so statistically it produces an analysis that there is no relationship between physical activity and the incidence of hypertension. This is contrary to previous studies, such as Hasanudin & Pertiwi's research in 2018, showed there is a significant relationship between physical activity and blood pressure with a sig = 0.005 ($\alpha = 0.05$) (Hasanudin et al., 2018). The results there is a significant relationship between physical activity and the level of hypertension in outpatients in the Tagulandang health center with p value <0.05 ($p = 0.035$) (Karim et al., 2018).

The difference in results can be due to the bias of the respondents. Where the physical activity questionnaire used in this study is self-report due to limited time in data collection, and respondents answer their own questions in the questionnaire. This can reduce the accuracy of the answers given because respondents could have exaggerated or reduced the actual amount of time for physical activity.

4. The relationship of alcohol consumption with the incidence of hypertension

The results of statistical analysis found that there is a relationship between alcohol consumption with the incidence of hypertension, with p value <0.05 ($p = 0.016$). The habit of consuming alcoholic beverages is also related to the incidence of hypertension because in alcohol there are chemical compounds that can cause an increase in blood pressure, one of which is hydro gonium which has an effect on the incidence of hypertension. In addition, alcohol can increase blood acidity so that the blood becomes thicker. This blood viscosity forces the heart to pump blood even stronger so that the blood can reach the required tissues adequately.

5. The relationship of smoking with the incidence of hypertension

The results of statistical analysis found that there is a relationship between smoking behavior and the incidence of hypertension, with p value <0.05 ($p = 0.05$), this statistic result shows that the smoking behavior of adolescents is very related to the incidence of hypertension, the nicotine in cigarettes can affect the pressure a person's blood, can be through plaque formation, or the direct effect of nicotine on the release of the hormones epinephrine and norepinephrine, or through the effect of Cardiac Output (CO) which can bind to red blood cells (Setyanda, 2015)

6. The relationship between dietary habit with hypertension

Based on the results of statistical analysis, we found that there was a relationship between dietary habit with the incidence of hypertension, namely the value of $p <0.05$ ($p = 0.002$). This shows that the dietary habit of adolescents in Palu City are still not good, where based on the answers to the questionnaire the type of food they consume most often is junk food, such as instant noodles, sausages and burgers, coconut milk foods, such as *utadada*, *utakelo*, and coconut milk jackfruit and fried food. In addition, most respondents also like to add their food with soy sauce, sauce and salt. And there are teenagers who don't like vegetables at all. Dietary habit like this should be a concern for parents and adolescents themselves, where they must be wise in consuming this type of food. Junk food or which means low nutritional food is the term for foods that are not healthy or have little nutrient content.

Utadada and *Utakelo* are typical Kaili vegetables. This menu is the pride of Palu City, because it has a delicious taste. But because the basic ingredients of *Utadada* and *Utakelo* are coconut milk, then this type of food must also be consumed wisely. Coconut milk contains various nutrients such as carbohydrates, fats, vitamins and minerals. This fat is dangerous if consumed in excessive amounts. The pathophysiology of fat metabolism that causes hypertension is lipoprotein as a means of transporting circulating lipids in the body to muscle cells and other cells (Linton et al., 2000). Likewise the triglycerides in the blood are broken up into glycerol and free fatty acids by the enzyme lipoproteinlipase that is present in capillary endothelial cells (Pirahanchi and Sharma, 2020). Coconut milk also contains LDL cholesterol, which can accumulate in the walls of blood vessels and form plaque (Singh, 2000). This plaque will cause narrowing of blood vessels so that blood flow resistance in the coronary vessels also rises, which will later lead to hypertension

The addition of soy sauce, sauce and salt to food, and consume salted fish and dried “*duo*” or “*penja*”, it is also a typical kaili food that tastes a bit salty but savory, preferred by teenagers in the Palu city. Excess salt intake will increase the amount of sodium which can cause the body to retain fluid so that it will increase blood volume. Sodium is associated with the occurrence of high blood pressure, because the consumption of sodium in more quantities can reduce the diameter of the artery blood vessels, so the heart must pump harder to push the increased blood volume through increasingly narrow spaces and will cause blood pressure to increase (Brunner & Suddart, 2001). Sodium is the main cation in extracellular fluid which plays an important role in maintaining plasma and extracellular volume, acid base balance and also neuromuscularity. Excessive sodium intake can cause the concentration of sodium in the extracellular fluid to increase so as to normalize intracellular fluid being withdrawn out and result in increased blood volume and have an impact on increasing blood pressure (Astawan, 2007).

V. CONCLUSION

There is a significant relationship between nutritional status (BMI), stress, consumption of alcohol, smoking and dietary habit on the incidence of hypertension in adolescents in the Palu city. There is no significant relationship between physical activity and the incidence of hypertension in adolescents in the city of Palu.

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