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THE RELATIONSHIP BETWEEN SODIUM CONSUMPTION AND BLOOD PRESSURE OF ADOLESCENT GIRLS IN TASIKMALAYA, WEST JAVA

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ABSTRACT

The incidence of hypertension in adulthood begins with an increase in blood pressure since adolescence and high blood pressure in adolescents is also associated with an increased risk of Chronic Heart Disease (CHD) as an adult. Consumption of natrium may lead positively associated with an increase in blood pressure in adolescence. The novelty of this study is because it examines the relationship between sodium consumption and blood pressure in adolescent girls. This study aims to analyze the relationship between sodium consumption and blood pressure in adolescent girls in Tasikmalaya, West Java. This research is an observational study with a cross-sectional study design. The population in this study were all female adolescents aged 12-18 years. The independent variables in this study were total sodium consumption, sodium consumption in snacks, sodium consumption in the main menu and sodium contribution from snacks. The natrium intake was measured by non consecutive recall method. The dependent variable was blood pressure measured by sphygmomanometer Omron HEM8712. The data were analyze by Pearson product moment test. The average total sodium consumption is 506.6mg and blood pressure is 113mmH. There was a positive relationship between total daily sodium (p=0.00; r=0.240), sodium in snacks (p=0.002; 0.162), and sodium in daily menus (p=0.001; r-0.182) with blood pressure. The conclusion natrium intake was correlated with blood pressure in adolescent girls, therefore, they should aware with high sodium food.

Keywords : Sodium; Blood pressure; Snacks; Adolescent girls.

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INTRODUCTION

The number of adolescents aged 10-19 years around the world is estimated at 1.8 million people, and the majority (90%) live in developing countries (developing countries) (1). Young women living in developing countries are faced with limited resources and various health problems (2). Adolescence is a critical time to form good eating habits, but adolescence is a phase of life with bad eating patterns (3). Changes from children to adolescents also reduce healthy eating consumption behavior (4). The problem of overweight (overweight) in adolescents is starting to increase in developing countries until it is almost the same as the prevalence in developed countries (5). Overweight has consequences for serious public health problems such as an increased risk of Non Communicable disease (NCDs) (6)(7).

Besides cardiovasculer diseases and diabetes Mellitus, hypertension is an NCDs which is known as the silent killer(8)(9). The prevalence of hypertension in Indonesia has increased from 25.8% in 2013 to 34.1% in 2018(10). The incidence of hypertension in adulthood begins with an increase in blood pressure since adolescence(11), and high blood pressure in adolescents is also associated with an increased risk of CHD as an adult(12). Hypertension in adolescents is based on the normal distribution of blood pressure in healthy adolescents(13). Normal blood pressure (normotension) is a condition when systolic blood pressure (SBP) and diastolic (DBP) are less than the 90th percentile based on gender, age, height. Hypertension is a condition when the average SBP and DBP are equal to or above the 95th percentile based on age, sex and height in three different conditions(14).

Modernization causes lifestyle changes which include eating habits and physical activity patterns (15)(16). Consumption of salt is positively associated with an increase in blood pressure, while consumption of fruits that contain lots of potassium is negatively associated with hypertension (17)(18). The factor of snacking or consuming snack food at rest increases the risk of hypertension(19). The frequency of snacking also increases when the main meal frequency is less than 3 times a day due to impaired appetite control. Increased snack consumption may increase the risk

of obesity and NCDs in adolescents(20). Consumption of snacks made from processed sources of carbohydrates such as flour, using high-saturated fat oils for frying, and tasting salty because they contain sodium is associated with increased cases of obesity and hypertension. Snacks also contribute almost half of the total sodium requirement in one day, so they are associated with increased blood pressure in adolescents (21).

The composition of the productive age population in Tasikmalaya City reaches 67.63% of the total population. Tasikmalaya is an area in West Java which is an area inhabited by the Sundanese with a penchant for various types of vegetables. Therefore this study wanted to investigate whether sodium consumption is related to increased blood pressure in young Sundanese women who like plant foods.

RESEARCH METHODS

The research design used was an observational method with a cross-sectional study approach because the variables studied were measured simultaneously at one time. The population in this study were all young women living in the city of Tasikmalaya. The sample calculations were carried out to obtain the results of 349 respondents. The sample in this study was 349 young women, the sample technique used in this study was probability sampling, samples were taken from each sub-district using proportional random sampling technique. The independent variable in this study is sodium consumption which consists of sodium consumption and snack foods and daily menus. The sodium intake was measured by recall 3x24 hour non consecutive, and the data was analysis using nutrsurvey. The dependent variable in this study is blood pressure, and we measure using digital sphygmomanometer Omron HEM8712.

Univariate analysis is used to describe the independent and dependent variables by calculating the value of central tendency because the data is in numerical form. Bivariate test using the Pearson product moment test, because all variables are normally distributed. Test the normality of data distribution using the Kolmogorof Smirnov test. Significance at p value<0.05.

RESULTS AND DISCUSSION

The population of Tasikmalaya City in 2016 reached 659,606 people consisting

of 331,885 male residents and 327,721 female residents with a growth rate of 0.32%. The population pyramid of Tasikmalaya City is an expansive population pyramid where the composition of the population is dominated by young people and shows that the population is growing and developing.

Consumption of sodium in young women comes from the daily menu and the snacks they consume. In this study, there were subjects whose total sodium consumption only came from snacks, because in one day they did not consume the main food menu at home. Conversely, there are also subjects whose entire sodium consumption comes from the food menu provided at home.

The results show that the average consumption of sodium from snacks (313.9mg) is greater than the average consumption of sodium from the main food menu (192.68mg). The average total consumption of sodium is 506.6 mg with a sodium contribution from snacks of 55.8%.

Table 1. Description of the variables Sodium Consumption and Blood Pressure

Variabel	mean±SD
Consumtion sodium in snack (mg)	313.9±486.3
Consumtion sodium in daily menus (mg)	192.68±366.3
Consumption of total sodium (mg)	506.6±607.0
Contribution sodium from snack (mg)	55.8±40.0
Blood pressure (mmHg)	113.36±12.2

The results of the correlation test using the Pearson product moment show that the higher the consumption of sodium in snacks, the consumption of sodium in the daily menu and the consumption of total sodium is associated with an increase in blood pressure. However, the contribution of sodium in snack foods to total sodium consumption is not related to blood pressure.

Table 2. Correlation between consumption of natrium with Blood Pressure

Variabel	p-Value	r
Consumtion sodium in snack	0.002	0.162
Consumtion sodium in daily menus	0.001	0.182
Consumption of total sodium	0.000	0.240
Contribution sodium from snack	0.226	-0.065

This study shows statistically that the higher the total sodium consumption, the blood pressure of female adolescents will also increase. High sodium intake and increased blood pressure are associated with fluid retention, increased peripheral systemic resistance, changes in endothelial function, changes in the structure and function of arterial elasticity, modification of sympathetic activity, and autonomic nerves. cardiovascular system modulation (22). Choi's research, et al showed an interaction between high sodium consumption and an increased risk of hypertension (23).

Sodium intake is positively related to blood pressure in children and adolescents, with findings consistent in experimental and observational studies. The increase in blood pressure tends to increase with the life course, and the results of a meta-analysis of studies support the finding that reducing sodium intake during childhood and adolescence may be a means of lowering blood pressure and preventing the development of hypertension(24). Strong evidence links excessive dietary sodium intake with high blood pressure, which is a major risk factor for cardiovascular disease in both children and adults(25).

Most of your sodium intake from snacks comes from foods that are generally considered unhealthy, such as desserts or sweets and salty snacks. These two snack food sources account for more than 25% of the sodium from snack foods in both adults and children. The results of Bleich and Wolfson's research (2016), show that snacks made from grains or salty snacks are the number one source of sodium intake from snacks (26).

Intake of salty snacks more than doubled from 1977–1978 to 2011–2014 in both adults and children ($p < 0.01$). Research also shows that the energy from consumption of salty and sweet snacks has increased greatly over time (27). Salt consumption in children and adolescents is increasing worldwide due to increased intake of processed foods high in sodium rather than natural foods, which are low in sodium and high in potassium (28). Most of sodium intake comes from street food and food eaten away from home. Increased consumption of fast food high in sodium can cause prehypertension and hypertension in adolescents (29). Kayode Ajayi's research (2021) shows that sodium

intake from snacks, the frequency of consuming salty snacks every day is significantly related to blood pressure among students(30).

Sodium intake from snacks is almost half of the average daily sodium consumption and is significantly associated with blood pressure values in adolescents(21). Sodium contributions in children aged 6-18 years mostly come from table salt, noodles, spices, fresh fish and processed fish. Snacks contributed 23% to total sodium intake and the contribution of sodium intake came from foodstuffs by 47.6 percent and 52.4 percent from salt. The results of Prihatini's research, et al showed that the average sodium intake of the Indonesian population over 5 years of age has exceeded 2000 mg/day or exceeded the recommended limit (31).

CONCLUSION

Careful examination of patients with abdominal masses is required. Lymphoma with a primary tumor in the intestine and clinical intussusception is rare. To diagnose LBL, it is important to perform a bone marrow puncture as well as histopathological and histoimmunochemical examinations. This examination has an effect on therapy. Surgery and chemotherapy are effective therapies.

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The study concluded that there is a relationship between total sodium consumption and blood pressure in young women in Tasikmalaya City. It is recommended to reduce consuming daily snacks that contain sodium and other foods that contain high sodium.

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