

ASSOCIATION BETWEEN DIETARY HABITS AND PREHYPERTENSION AMONG INDONESIAN YOUNG ADULTS IN PROF KANDOU HOSPITAL

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ARTICLE INFO

Article History:

Received 20th Dec, 2018
Received in revised form
21th Jan, 2019
Accepted 24th Feb, 2019
Published online 31st Mar, 2019

Key words:

*Dietary Habits, Prehypertension,
Young Adults.*

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ABSTRACT

Prehypertension is a warning sign, early in age which denotes the risk of hypertension later on in life. Clinical and academic challenges of medical students may have adverse effect on their lifestyle, predisposing vulnerable subjects to elevated blood pressure. This study aimed to determine the association between dietary habits and prehypertension among Indonesian young adults in Manado. This was a cross-sectional study done in 111 medical students (undergraduate and postgraduate) aged between 20-30 years, of either sex. A pre-tested questionnaire was used to elicit the details on physical activity, family history of hypertension, tobacco use, and dietary habits. According to JNC-7 guidelines, a systolic blood pressure (SBP) of 120 to 139 mmHg and/or diastolic blood pressure (DBP) of 80 to 89 mmHg is considered as prehypertension. Of the 111 medical students in the sample, 22.5% showed Blood Pressure levels within the range of prehypertension. Chi-square analysis revealed that junk food consumption (OR=3,152; 95% CI=1,253-7,925; p=0,023), and soft drink consumption (OR=4,747; 95% CI=1,797-12,539; p=0,002) were the risk factors of prehypertension. **Conclusion:** Dietary habits were associated with the prehypertension among young adults in Manado.

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Citation: Ribka Wowor^{1*}, 2019 "Association Between Dietary Habits And Prehypertension Among Indonesian Young Adults In Prof Kandou Hospital", *International Journal of Health Medicine and Current Research*, 4, (01), 1175-1179.

INTRODUCTION

Prehypertension is a warning sign, early in age which denotes the risk of hypertension later on in life.¹ It has also been noted that even asymptomatic

adolescents with mild blood pressure elevation can have target organ damage^{2,3} People with prehypertension have a three fold risk of developing hypertension compared with normotensive people.⁴ Prehypertension is often linked to target organ damage, such as early arteriosclerosis, small vascular damage coronary artery calcification, vascular remodeling, and left ventricular hypertrophy.^{5,6} In India, hypertension is responsible for 57% of the death caused due to stroke and 24% caused due to coronary heart disease.⁷

Clinical and academic challenges of medical students may have adverse effect on their lifestyle, predisposing vulnerable subjects to elevated blood pressure.⁸ Identifying risk factors for prehypertension in younger adults can help in giving intervention to prevent or minimize its progression to advanced stages of hypertension. So, we conducted this study to determine the association between dietary habits and prehypertension in medical students in Sam Ratulangi University, Manado.

METHODS

This study was conducted in a Dept. of Internal Medicine, RSUP Prof dr. RD Kandou Manado, North Sulawesi Province, in August 2018. This was a cross-sectional study done in 111 medical students (undergraduate and postgraduate) aged between 20-30 years, of either sex. In study subjects, Blood Pressure, Body Weight, and Waist Circumferences was measured.

According to JNC-7 guidelines, a systolic blood pressure (SBP) of 120 to 139 mmHg and/or diastolic blood pressure (DBP) of 80 to 89 mmHg is considered as prehypertension.² A sphygmomanometer Riester was used. Subject's blood pressure were taken in a sitting position from the left arm of all the patients twice with a 10 minutes rest in between. The mean of both the readings were taken as the subject's blood pressure.

A pre-tested questionnaire was used to elicit the details on family history of hypertension, and dietary habits. Frequency of intake of junk foods was defined as more than/ less than two times in a week. Junk food was defined as food that is high in calories and low in nutritional content. It includes food items like potato chips, cold drinks, etc.⁹

We used Chi-square test to determine the association between dietary habits and prehypertension among Indonesian Young Adults in Prof Kandou Hospital. The statistical analysis was performed with SPSS.

RESULTS

Of the 111 medical students in the sample, 22,5% showed Blood Pressure levels within the range of prehypertension.

Chi-square analysis revealed that junk food consumption (OR=3,152; 95% CI=1,253-7,925), and soft drink consumption (OR=4,747; 95% CI=1,797-12,539) were the risk factors of prehypertension.

Table 1. Demographic Characteristic of The Subjects

	N	Min-Max	Mean (SD)
Age (years)	111	20-30	24,57 ± 2,92
Systolic Blood Pressure (mmHg)	111	100-135	115,41 ± 10,6
Diastolic Blood Pressure (mmHg)	111	60-85	74,32 ± 7,37
Waist Circumference (cm)	111	64-127	84,4 ± 12,54

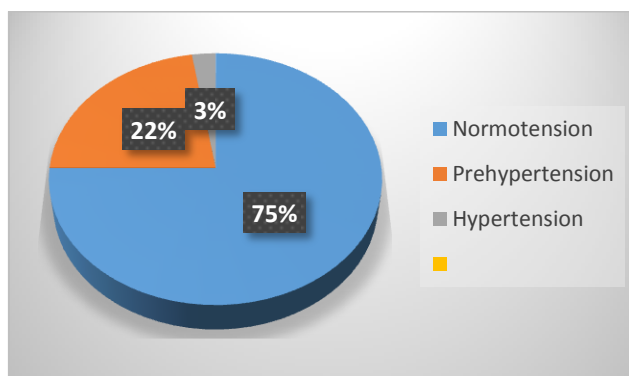


Figure 1. Distribution of Blood Pressure.

Table 2. Risk Factors of Prehypertension among Medical Students in Sam Ratulangi University.

Risk Factor	Odds Ratio	95% CI	p value
Junk Food Consumption	3,152	1,253-7,925	0,023
Soft Drink Consumption	4,747	1,797-12,539	0,002

Table 2 shows that junk food and soft drink consumption were the risk factors of prehypertension among these medical students.

DISCUSSION

Prehypertension *per se* is not a disease, but a warning of risk as cardiovascular disease and stroke increased in a log-linear proportion with both SBP and DBP values over 115/75 mmHg.¹ Persistently raised blood pressure in adolescent or young adults age group are a predictor of adult hypertension.¹⁰ Multiple longitudinal studies have established that Blood Pressure levels track with age such that childhood blood pressure levels are associated with blood pressure levels in later life.¹¹ Falkner et al initially described a rate of progression from prehypertension to hypertension of approximately 7% per year among adolescents included in the National Childhood Blood Pressure Database for whom single serial blood pressure measurements were obtained at 2-year intervals.¹²

The Framingham Heart Study indicated that men and women with high normal Blood Pressure had a more than 2-fold increase in relative risk for CVD compared with those who had optimal Blood Pressure.¹³⁻¹⁴ Some adolescents with prehypertension already demonstrate evidence of target organ damage, especially Left Ventricular Hypertrophy (LVH). This state (LVH) is the most widely recognized abnormality attributed to high blood pressure in children.¹⁵

Previous study found that subjects with prehypertension were also noted to have increase carotid artery intima-media thickness and arterial stiffness.¹⁶ Vascular abnormalities have also been reported in other prehypertensive populations.¹⁷

In this cross sectional study, 22,5% were identified to have prehypertension. This value is lower than the rate reported in a rural area in West Java Province (34,2%)¹⁸. A similar rate was found in a survey in China (21,9%).¹⁹ Overall in Malaysia, the prevalence of prehypertension is in the range of 34%-37%.²⁰ Two studies performed in Malaysia among young adults aged 18-29 years old demonstrated a prevalence of prehypertension of 34%¹⁶ and 30,1%.²¹ However, both of these studies and present study were

conducted among university students located in an urban area and did not truly represent the general population.

The increasing prevalence of hypertension and prehypertension in rural area is the consequence of adoption of Western lifestyle with rapid urbanisation. Dietary intake of higher sodium and lower potassium are widespread.²² The transition to adulthood a complex process in which youth who have been dependent on parents throughout childhood start taking definitive steps to achieve measures of financial, residential, and emotional independence, and to take on more adults roles as citizen spouse, parent, and worker.²³ Clinical and academic challenges of medical students may have adverse effect on their lifestyle, predisposing vulnerable subjects to elevated blood pressure.⁸ They mostly prefer to take a lunch with meals eaten away from home than to having a home-prepared meal. Eating away from home is linked to higher total energy, fat and salt intake, lower micronutrients intake, and becoming overweight or obese, which may modulate increased blood pressure.^{24,25}

In this study, dietary habits (junk food and soft drink consumption) were the risk factors of prehypertension (p=0,023 for junk food and p=0,002 for soft drink consumption). There's a lot of our subjects with prehypertension were found to be indulging in adverse dietary practices such as added salt and pickle intake, and using butter in their meals, and eat junk food. Higher salt intake is associated with higher blood pressure. Intersalt study which investigated the association between 24 h sodium excretion and blood pressure revealed that a higher sodium intake by 2,3 mg/day was reflected in higher SBP 3-6 mmHg.²⁶ Sanjay K et al (2016) found that intake of extra salt in meals was associated with prehypertension among young adults in Coastal Villages of Southern India.²⁷

Other study also found the association of prehypertension with meals eaten away from home in young adults in Singapore.²⁸ In a similar study carried out in Bihar among 15-19 year adolescents by Kumar et al, hypertension was significantly associated with type of diet (p<0,001) and additional salt intake (p=0,008). Additional salt intake in the form of papad/ pickle more than twice a week was having a significantly relation

with hypertension (OR=0,59; 95% CI=0,38-0,90; p=0,008).²⁹

The Dietary Approaches to Stop Hypertension (DASH), which uses a diet that rich in fruits, vegetables, fibers, nuts, low-fat dietary products, and low saturated fats, induced a significant lowering of blood pressure in subjects with high blood pressure.³⁰ Our findings, in most of prehypertension subjects, that weekly consumption of junk food and soft drink were common, while daily consumption of fruits and vegetables was uncommon, indicate that lifestyle modification would probably be the most effective management of prehypertension in young adults.

We suggest that promotion of healthier food habits among university students is likely to be beneficial for prevention of prehypertension and hypertension. It is important for food providers on university campuses to prepare healthier meals so we can prevent this disease.

The limitation of our study is that our subjects were conducted among university students located in an urban area and did not truly represent the general population.

CONCLUSION

Incidence of prehypertension in this study was high (22,5%). Junk food consumption and soft drink consumption were the risk factors of prehypertension in medical students in Sam Ratulangi University, Manado. These risk factors are modifiable by changing our lifestyle. The limitation of our study is that our subjects were conducted among university students located in an urban area and did not truly represent the general population.

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