The influence of Individual Characteristics and Risk Behavior on The Incidence of Hypertension among Community in Medan City

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Abstract. Hypertension is the third cause of death in Indonesia. The incidence of hypertension in Medan City remains high. The disease is related to risk behavior that could be prevented. The purpose of study is to determine the influence of individual characteristics and risk behavior on the incidence of hypertension. This was an observational study with case control design. The study samples was 208 at a case: control ratio of 1:1. Data was analyzed using *Simple* and *Multiple* Logistic Regression. The results showed that Individual characteristics including age (adjusted OR 7.608, 95% CI 2.73, 21.22), education (adjusted OR 1.93, 95% CI 1.03, 3.61), overweight (adjusted OR 2.44, 95% CI 1.31,4.65) and risk behavior including smoking habit (adjusted OR 2.32, 95 % CI 1.22, 4.43) were associated with incidence of hypertension. It was recommended to strengthen health promotion regarding healthy behaviour and maintain body weight.

Keywords: hypertension, individual characteristics, risk behavior

1 Introduction

Hypertension is a global health problem with the prevalence tend to increase and the disease often causes complications. World Health Organization data shows that it is estimated that in 2025 there are 1.5 billion (29.2%) adult population in the world who suffer hypertension. As much as 17.3 % of hypertension cases found in developing countries [1]. Hypertension is main cause of death in the worldwide and contributes to 51% of deaths from stroke and 45% due to coronary heart disease [2].

The prevalence of hypertension varies widely among different populations, and influenced by differences in genetic and environmental factors such as diet pattern and physical activity [3]. The prevalence of hypertension in Indonesia tends to increase. Based on Basic Health Research, the prevalence of hypertension increased from 7.6 per 100,000 population in 2007 to 25.8 per 100,000 population in 2013 and 34.1 per 100,000 population in 2018. However, only 4% are controlled hypertension and most of hypertension people have no feel symptom of hypertension and unaware of suffering from hypertension [4]. Furthermore, hypertension is the third leading cause of death

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after stroke and tuberculosis, with the proportion of deaths reaching 6.7% of the population Indonesia [5].

In North Sumatra Province, the prevalence of hypertension increased from 24.7% in 2013 [6] to 30% in 2018 [4]. Medan is one city in North Sumatera and the prevalence of hypertension in Medan City remains high. The number of hypertension cases in 2017 was 48,816 cases (22.53%) [7].

The high prevalence of hypertension makes hypertension a public health and the disease is related to behavior that can actually be prevented. Several studies show that the demographic and socioeconomic characteristics of individuals, environmental factors in places where people live are also associated with health problems including hypertension [8]. In addition, lower education levels of residence promote unhealthy habits related to diet, physical activity, and use of health services can also increase the risk of hypertension [9]. In reducing the prevalence of hypertension, identify the risk factors of hypertension is necessary. Therefore, this study is important to determine the influence of individual characteristics and risk behavior on the incidence of hypertension.

2 Methods

This study was quantitive study with unmatched case control design . The study was conducted in 26 villages from six Health centers in Medan city from August - September 2019. Samples in this study involved 104 people with hypertension and 104 people have no symptom of hypertension.

Data was collected using questionnaires that was developed by researchers to obtain information about the characteristics of individual (gender, age, education level, occupation, income, family history of hypertension, nutritional status), and risk behaviour (alcohol consumption, smoking habits).

The distribution of individual charactersitic and behavior was analyzed by univariate analysis by presenting numbers and percentages. Furthermore, bivariate analysis was performed using the Simple Logistic Regression to examine the association between individual characteristics and risk behavior and the incidence with hypertension and further followed by Multiple Logistic Regression to determine significant variables were associated with the incidence of hypertension.

3 Methods

Individual characteristic of respondents were presented in Table 1. The majority of respondent with age 40 years old or more was 169 (81.2 %), female was 156 (75.0%), with high education level was 117 (56.3 %), have income less than 2.9 million was 105 (51 %), have no family history with hypertension was 150 (72.1%) and with nutritional status overweight was 119 (57.2 %). Whereas behavior of respondents presented in Table 2. Overall the majority of respondent did not have smoking habit was 136 (65.4 %), and have no habitual in alcohol consumption was 206 (99.0%).

Table 1. Individual characteristics of respondents

Variables	Hypertension	Non hypertension	Total
Age			
< 40 tahun	6(5.8%)	33 (31.7%)	39 (18.8%)
≥ 40 tahun	98 (94.2%)	71 (68.34%)	169 (81.2%)
Sex			
Male	28(26.9%)	24 (23.1%)	52 (25.0%)
Female	76 (73.1%)	80 (76.9%)	156 (75.0%)
Education			
High	47 (45.2%)	70 (67.3%)	117 (56.3%)
Low	57 (54.8%)	34 (32.7%)	91 (43.7%)
Income			
≥ 2,9 million	48(46.2%)	55 (52.9%)	103 (49.0%)
< 2,9 million	56 (53.8%)	49(47.1%)	105 (51.0 %)
Family history			
Yes	32 (30,8%)	26 (25,0%)	58 (27.9%)
No	72 (69.8%)	78 (75,0%)	150 (72.1%)
Nutritional status			
overweight	69 (66.3%)	50(48,1%)	119 (57.2%)
Normal	35 (33,7%)	53 (51,9%)	88 (42,8%)

Table 2. Risk behavior of respondents

Variables	Hypertension	Non hypertension	Total
Smoking habits			
Yes	43 (41,3%)	29 (27,9%)	72 (34,6%)
No	61 (58,7%)	75 (72,1%)	136 (65,4%)
Alcohol consumption			
Yes	1 (1.0%)	1 (1.0%)	2 (1.0%)
No	103 (99.0%)	103 (99.0%)	206 (99.0%)

Of bivariat analysis using Simple logistic Regression found that 4 variables were significant with p value < 0.25 such as age, education, smoking habit and overweight as presented in Table 3. Then these variable enter into Multivariate Logistic Regression to determine the significant variables associated with the incidence of hypertension and the results were presented in Table 4.

Table 3. Factors associated with the incidence of hypetension using Simple Logistic Regression

No	Variables	P value	Crude OR (95% CI
1	Age	0.000	7.57 (3.02; 19,23)
2	Education	0.001	2.49 (1.42; 4.39)
3	Smoking habit	0.042	1.82 (1.02; 3.26)
4	Overweight	0.011	2.07 (1.18; 3.62)
5	Sex	0.322	1.23 (0.65; 2.30)
6	Income	0.332	0.764 (0.443; 1.32)
7	Family history	0.354	0.750 (0.408; 1.38)
8	Alcohol consumption	1.000	1.000 90.06 ; 16.20)

Table 4. Factors associated with the incidence of hypetension using Multiple Logistic Regression

No	Variables	P value	Adjusted OR (95% CI
1	Age	0.000	7.60 (2.73; ,21.22)
2	Education	0.032	1.93 (1.03; 3.61)
3	Smoking habit	0.042	2.32 (1.22; 4.43)
4	Overweight	0.008	2.44 (1.31; 4.65)

Of the multivariate Logistic Regression, revealed that age, education, smoking habits and nutritional status were predictors of the incidence of hypertension. People aged ≥ 40 years have 7.6 times at risk to get hypertension compared to <40 years of age (OR7.60, 95% CI (2.73; 21.22). People who have overweight have 2.4 times at risk to get hypertension compared to people who have normal nutritional status (OR2.44, 95% CI (1.31; 4.65). People who have a smoking habit have 2.3 times at risk to get hypertension compared to those who do not have a smoking habit (OR 2.32, 95% CI (1.22; 4.43). People with low education have 1.9 times at risk to get hypertension compared to people with higher education (OR 1.93 95% CI (1.03; 3.61).

4 Discussion

Of those who had hypertension, 94.2% were among 40 years and older and 5.8% were among under 40 years. Most of hypertension people were female by 73.1%, have income less than 2.9 million by 53.8%, have low level of education by 54.8%, with nutritional status overweight by 66.3 %, have smoking habits by 41.3% and most of them have no family history by 69.8%. According to the logistic regression analysis, age, level of education, nutritional status overweight and smoking habit were found to be associated with the prevalence of hypertension.

Age is strongly associated with hypertension. In many studies, it was reported that the prevalence of hypertension increased with age. In the present study, prevalence increased dramatically with age in both sexes, from 5.8% among people in under 40 years to 94.2% among

people older than 40 years. The positive associations between aging and hypertension were illustrated in Table 1. This findings was similar with study by Peltzer K in Indonesia found that hypertension is more common among people plder than 40 years old [10]. Likewise, Anteneh & Abitew (2015) in a study found that the 41-50 year age group has a risk of developing hypertension compared to the age group ≤ 40 years. The risk of hypertension in the 41-50 year age group is 2.18 times and the risk increases to 10.31 times at the age of> 50 years compared to the age group ≤ 40 years [11].

Level of education is a risk factor for hypertension. In this study, low education level have 1.9 times risk for hypertension compared to high education level. The similar findings found In Erem study in Turkey (2008), the prevalence hypertension was highest in illiterate people and lowest in people who graduated from universities or colleges [12]. Therefore, Low education was a risk factor for hypertension. This is related to the risk factors such as stress, working conditions and nutritional habits were common in hypertensive people or people in this group had difficulties in reaching health-care services [13].

Several studies found obesity is risk factor for development of hypertension. The Framingham Heart Study found that overweight and obesity accounted for approximately 26 percent of cases of hypertension in men and 28 percent in women. In this study, overweight have 2.5 times risk to get hypertension compared to normal body weight. This findings is similar Erem study in Turkey found that of study population as much as 66.6% were either overweight or obese. This findings is similar Erem study in Turkey found that of study population as much as 66.6% were either overweight or obese [12].

Smoking habit is a risk factor for hypertension which can damage blood vessels. Nicotine is identified to cause an increase in blood pressure and carbon monoxide can reduce the ability of the blood to carry oxygen. In the present study, smoking habit have 2.3 times to get hypertension compared to non smoking habit. Raihan et al study (2014) found that there is a relationship between smoking habits and the incidence of primary hypertension due to the presence of plaque that can damage the lining of artery walls. Toxic found in all types of cigarette products can also cause vasoconstriction in blood vessels, thereby increasing blood pressure [14].

5 Conclusion

Our study revealed that age, education, overweight and smoking habits as compositional factor that contributed to the incidence of hypertension. For effective reducing the incidence, health promotion and the implementation about healthy living in daily was necessary.

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Ethical Clearance

Human subject approval was obtained from The University of North Sumatera on April 22, 2019. The study was approved by the Research and Ethics Committee, School of Nursing, University of North Sumatera (Reference code number 1766/IV/SP /2019).

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