Determinants of Hypertension Incidence in Individuals Aged ≥ 40 Years in the Work Area of the Meranti Health Center, Merangin Regency 2021

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Abstract. The World Health Organization (WHO) presents global data that hypertension causes the highest mortality. There is a projection that 29% of world population will experience hypertension in 2025. This study aims to discover the determinants of hypertension incidence in people aged ≥ 40 years in the work area of Meranti Health Center of Merangin Regency in 2021. This study used quantitative research with a cross sectional design. The population in the study was all people aged ≥ 40 years in the work area of Meranti Health Center of Merangin Regency based on the total population and age groups in 2019, which amounted to 5,429 people. A proportional Random Sampling was used as the sampling technique in the study with 102 respondents as the sample. The analysis was conducted by using the Chi-Square statistic test. The hypertension proportion in Meranti Health Center of Merangin Regency was 46.1%, 55.9% of age, 63.7% of gender, Family Hypertension History of 59.8%, 21.6% of obesity, 49.0% of stress, 36.3% of cigarette consumption, and 63.7% of coffee consumption. The bivariate analysis indicated that there were significant correlations between age and hypertension incidence (p-value: 0.036), family history (p-value: 0.000), stress (p-value: 0.010), and coffee consumption (p-value: 0.022), while there was no correlation between gender (p-value: 0.821), obesity (p-value: 0.861), and cigarette consumption (p-value: 0.522). Age, family history, stress, and coffee consumption have the risk of increasing hypertension incidence in people aged ≥ 40 years in the work area of Meranti Health Center.

Keywords: hypertension · age · family history · obesity · cigarette consumption · coffee consumption

1 Introduction

Trends of changing lifestyle, fertility, and social economy become the underlying factor of high incidence of NCDs. This growth causes change of patterns in cases of communicable diseases that turn into NCDs, including hypertension [1]. The World Health Organization (WHO) states that hypertension causes the highest death in the world. It

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is projected that 29% of global population will experience hypertension in 2025. High prevalence of hypertension is found in many developing countries. The 2010 data of Global Status Report on Non-communicable diseases indicated that there were 40% of hypertension patients in countries with developing economies and 35% in developed countries. The highest hypertension cases were in African region at 46% while the lowest cases were in Americas at 35%, and there were 36% of hypertension cases recorded in Southeast Asia region.

In Indonesia, according to 2018's Basic Health Research, the hypertension prevalence (≥ 18 years of age) was at 34.11% [4]. One of the provinces in Indonesia with the highest prevalence in Jambi Province. According to 2018's Basic Health Research, the hypertension prevalence (≥ 18 years of age) in Jambi Province was fluctuating, which reached 29.9% in 2017 [5], 24.6% in 2013 [6], and increased to 28.99% in 2018 [7].

This hypertension issue is also the community health issue in Merangin Regency as one of the regencies in Jambi Province. According to the data of Basic Health Research of Jambi Province, the hypertension prevalence of Merangin Regency in 2007 and 2017 was 29.6% [5–6], and decreased to 27.97% in 2018 [7]. Although having decreases in prevalence, according to the profile data of Public Health Office of Merangin Regency, one of the diseases with the highest visit was essential hypertension, namely 11,597 cases in 2018 and 12,248 cases in 2019 [8]. Meranti Health Center is one of the public health centers with the highest cases of hypertension in Merangin Regency with a hypertension prevalence of 17.56% in 2018, which increased to 22% in 2019. Based on the profile of Meranti Health Center on 10 highest diseases in this public health center, hypertension ranked first [9].

Based on the 2013 Basic Health Research, the age groups at high risk of hypertension are 35 to 44 years (24.8%), 45 to 54 years (35.6%), and 55 to 64 years (45.9%). This number increased in 2018, namely the age groups of 31 to 44 years (31.6%), 45 to 54 years (45.3%), and 55 to 64 years (55.2%)[4]. Physiologically, hypertension increased in the age groups at high risk of NCDs [10]. Aging causes many physical changes, such as a decreasing immune system that results in the susceptibility to diseases and a decreasing elasticity of blood vessels. Hypertension incidence at the age of ≥ 40 years contains more risk compared to the young ages (< 40 years) [11]. Humans who enter the age of 40 will experience increased blood pressure [12]. The age group of > 40 years is more prone to hypertension than the younger age groups [12]. This study aims to discover determinants of hypertension incidence in people aged ≥ 40 years in the work unit of Meranti Health Center of Merangin Regency.

2 Method

This study used quantitative research design with a cross-sectional approach. People aged ≥ 40 years and reside in the area of the working unit of Meranti Health Center of Merangin Regency became the population in this study. Therefore, the total population of the study was 5,429 people. The sample in this study amounted to 102 respondents obtained from Lemeshow formula. The bivariate analysis was performed through Chi-Square analysis tests operated by using SPSS data processing application. Questionnaire, materline, and scale were used as the instrument of this study. Proportional Random Sampling was applied as the sampling technique of this study.

3 Result and Discussion

a. Univariate Analysis

Research results in Table 1 acquire that there are 46.1% respondents with hypertension and 53.9% without hypertension, there are 55.9% of respondents in late adulthood and 44.1% of respondents in adulthood, 63.7% are female and 36.3% are male, 59.8% of respondents with family history and 40.2% without family history, 21.6% of respondents are obese and 78.4% are not obese, 49.0% of respondents are stress while 51.0% are not, 36.3% of respondents smoke while 63.7% do not, 63.7% of respondents consume coffee while 36.3% do not.

Table 1. The Distribution of Respondents by Hypertension Incidence

Characteristic	n	%
Blood Pressure		
≥ 140/90 Mmhg	47	46.1
< 140/90 Mmhg	55	53.9
Age of Respondents		
Late adulthood > 60 years	57	55.9
Adulthood 40–59 Years	45	44.1
Gender		
Female	65	63.7
Male	37	36.3
Family History		
Yes	61	59.8
No	41	40.2
Obesity		
Obese	22	21.6
Not obese	80	78.4
Stress		
Stress	50	49.0
Not stress	52	51.0
Cigarette Consumption		
Smoking	37	36.3
Not Smoking	65	63.7
Coffee Consumption		
Consuming coffee	65	63.7
Not consuming coffee	37	36.3

b. Bivariate Analysis

Table 2 shows that the prevalence of hypertension in the late adulthood group is higher than in adulthood, the prevalence of hypertension is higher for female than male, the prevalence of hypertension in the group with a history is higher than in those without a family history, the prevalence of hypertension in the obese group is higher than in the non-obese group, the prevalence of hypertension in the stressed group is higher than in the non-stressed group, the prevalence of hypertension in the smoking group is lower than in the non-smoker group, and the prevalence of hypertension in the group with the habit of consuming coffee is higher than in the non coffee consumption group.

The results of bivariate analysis showed that elderly respondents (>60 years) had a 1.68 times higher risk of developing hypertension compared to adults (40–59) with a PR value of 1.68; 95%CI: 1.050 to 2.702. Respondents who have a family history had a 3.84 times greater risk than those without a family history of hypertension (PR = 3.84; 95% CI: 1.910 to 7.724). Respondents who experience stress had a risk of hypertension 1.83 times higher than those who do not experience stress (PR = 1.83; 95%CI: 1.169 to 2.881). The results also showed that respondents who have the habit of consuming coffee had a 1.86 times higher risk of developing hypertension than those who do not have the habit of consuming coffee (PR = 1.86; 95%CI: 1.084 to 3.201).

Discussion

The prevalence of hypertension at the age of 40 years at the Meranti Health Center, Merangin Regency was 46.1% and it is also known that the incidence of hypertension in obesity was 21.6%, stress was 49.0%, cigarette consumption was 36.3% and coffee consumption was 63.7%. Based on the socio-demography in this study, it is known that the incidence of hypertension is most dominant in the elderly at 55.9%, female at 63.7% and family history of hypertension at 59.8%. This study has almost the same characteristics as the study conducted by Anggraini, I (2021), which found that the prevalence of hypertension at the age of >40 years in Jambi Province based on the results of blood pressure measurements was 44.7%. The proportion of female respondents with high blood pressure was 50.7%. The high blood pressure was 57.9% in the obesity category, the proportion of respondents in a stressed state who have high blood pressure was 51.0% [13].

The results of bivariate analysis showed that elderly respondents (>60 years old) were 1.68 times more likely to develop hypertension compared to adults (40–59). Aging has a major effect on the incidence of hypertension that one may experience. The results of the study by Maulidina, et al. (2019) stated that the age variable and the incidence of hypertension were significantly related and it was found that respondents aged more than 40 years had a 9.245 times greater chance of suffering from hypertension than people aged < 40 years (95% CI 3.085 – 27.708).[11] Such results are consistent with the study of Nuraeni, E (2019) which stated that elderly patients were 8.4 times more at risk than patients in young ages (C.I 95%: OR 2.9–24.2) [14]. Likewise, the elderly are at risk for stroke, heart disease, and kidney failure [15].

Research results showed that there was no correlation between gender and hypertension incidence. However, based on the results of the study, it was found that the prevalence of hypertension in female (47.7%) was higher than in male (43.2%). After

Table 2. The Correlation between Dependent and Independent Variables

Variable	Hypertension				Total		*POR (95% CI)*	*p*	*POR (95% CI)*	*p*
	Yes		No							
	n	%	n	%	n	%				
Age										
Late adulthood (>60 years)	32	56.1	25	43.9	57	100	1.68 (1.050 – 2.702)	0.036	-	-
Adulthood (40–59 years)	15	33.3	30	66.7	45	100				
Gender										
Female	31	47.7	34	52.3	65	100	1.103 (0.704 – 1.727)	0.821	2.615 (2.110 – 3.242)	0.435
Male	16	43.2	21	56.8	37	100				
Family History										
Yes	40	65.6	21	34.4	61	100	3,84 (1.910 – 7.724)	0.001	1.685 (1.313 – 2.163)	0.000
No	7	17.1	34	82.9	41	100				
Obesity										
Obese	11	50.0	11	50.0	22	100	1.11 (0.685 – 1.801)	0.861	1.807 (1.319 – 2.478)	0.873
Not obese	36	45.0	44	55.0	80	100				

(*continued*)

Table 2. (*continued*)

Variable	Hypertension				Total		*POR (95% CI)*	*p*	*POR (95% CI)*	*p*
	Yes		No							
	n	%	n	%	n	%				
Stress										
Stressed	30	60.0	20	40.0	50	100	1.83 (1.169 – 2.881)	0.010	1.590 (1.237 – 2.044)	0.015
Not stressed	17	32.7	35	67.3	52	100				
Cigarette Consumption										
Smoking	15	40.5	22	59.5	37	100	0.82 (0.519 – 1.307)	0.522	-	-
Not smoking	32	49.2	33	50.8	65	100				
Coffee Consumption										
Consuming coffee	36	5.4	29	44.6	65	100	1.86 (1.084 – 3.201)	0.022	-	-
Not consuming coffee	11	29.7	26	70.3	37	100				

menopause, women over 45 have an increased risk of high blood pressure. For postmenopausal women, estrogen levels decrease. Estrogen plays a role in increasing the content of high-density lipoprotein which can maintain the health of blood vessels. Therefore, in postmenopausal women, if there is no good lifestyle, then when estrogen levels decrease, HDL levels will also decrease. Respondents in this study may also experience the effects of decreasing estrogen and subsequently decreasing HDL levels. Low HDL and high LDL affect the incidence of atherosclerosis and cause an increase in blood pressure [16].

The results showed that the majority of people with a family history had more hypertension than people without a family history. Based on the analysis results, it was found that respondents with a family history of hypertension had a 3.84 times greater chance of suffering from hypertension than those without a family history of hypertension. Children whose families have a history of hypertension have a high chance of developing hypertension, especially primary (essential) hypertension. The factor of family history is related to the body's genetic factors, such as metabolic mechanisms and cell membrane renin. The probability of having hypertension from parents who also have hypertension is 60% [17]. Opportunities for hypertension due to a family history of disease can be eliminated by controlling blood pressure regularly at the nearest clinic or health center. Routine health checks can make patients rapidly detect the possibility of dangerous diseases. The hypertension factor is one of the determinants of the hypertension incidence of several other factors [18].

The results of this study indicated that there was no correlation between obesity and hypertension incidence and it is known that most people who are not obese have more hypertension than people who are obese. This condition is different from Kowalski (2010) who stated that the level of obesity has a major effect on the hypertension incidence. The body weight makes the need for nutrients and oxygen in the blood increases. Obesity makes blood vessels more elongated and increases blood resistance. In fact, at first, blood can travel a long distance. In the end, blood pressure becomes high [19]. In the study by Olack et al. (2015) regarding hypertension risk factors and their correlation with hypertension at an average age of 46.7 years in Nairobi, Kenya, found that the prevalence of hypertension was significantly different between obese and non-obese individuals (36.0% and 25.8%, $p < 0.001$) [20].

The results of this study indicated that most people with hypertension experienced stress. Based on the analysis results, it was found that experiencing stress increased the risk of hypertension 1.83 times compared to people without stress. Mental conditions experienced for a long period of time can lead to new body adaptations. From these adaptations, the body will respond and generate a pathological change. Some of the symptoms of such adaptations are the emergence of hypertension and gastritis [23]. Dalimartha, Setiawan (2008) expressed that the role of stress in increasing blood pressure is undoubtable. Stress increases high blood pressure quickly because it has a direct effect on the brain [21]. Stress causes the heart to beat faster and increases the need for blood in the body. As a result, sufferers experience strokes and heart attacks [19]. The study of Muhammad Hafiz, et al. (2016) found that there was a significant correlation between stress levels and hypertension incidence with p value < 0.0001 ($p < 0.05$) 95% CI = 2.043 [17].

The results of this study showed that there was no correlation between smoking habit and hypertension incidence at the age of >40 years. This condition is different from a previous study which stated that hypertension was also stimulated by the presence of nicotine in cigarettes smoked by a person, the results of this study showed that nicotine can increase clotting in blood vessels. In addition, nicotine can also cause calcification of the walls of blood vessels [21]. The difference in the results of these studies is affected by several factors, including most of the respondents who do not smoke, amounting to 65 respondents (63.7%), another thing is that most of the respondents are women.

Cigarette consumption shows a correlation with hypertension incidence at the age of >40 years and it is known that respondents who have a habit of consuming coffee have a 1.86 times risk of experiencing hypertension compared to those who do not have the habit of consuming coffee. Coffee causes high blood pressure because the content of coffee blocks adenosine vasodilation receptors and increases plasma norepinephrine. The increase in blood pressure for each person varies between ¾ mmHg to 15/13 mmHg. Within 1 h, blood pressure peaks and will decrease in the next 4 h [22].

4 Conclusion

Based on the characteristics of respondents who are in the working area of Meranti Health Center, it shows from 102 respondents, 46.1% had hypertension, 55.9% are elderly, 63.7% are female, 59.8% with family history of hypertension, 21.6% with obesity, 49.0% with stress, 36.3% with cigarette consumption and 63.7% with coffee consumption. The results also showed that there was a significant correlation between age and hypertension incidence (p-value: 0.036, family history (p-value: 0.000), stress (p-value: 0.010), and coffee consumption (p-value: 0.022). Routine health checks can control blood pressure of people to be constantly normal. Therefore, it is necessary to conduct regular health checks at Public Health Centers or during the monthly program of any Public Health Centers held at the Integrated Guidance Post in every village. People with hypertension are also expected to avoid over consumption of coffee. Sufferers of hypertension must also balance their conditions with a healthy lifestyle and reduce excessive salt consumption which will trigger the risk of developing hypertension.

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