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Original Article

Smoking Risk Factors Against Hypertension Incidence in Pre-Elderly in the Work Area of the Minasaupa Health Center Makassar City

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Abstract

Background: Hypertension is a health problem that is quite dangerous worldwide because hypertension is a major risk factor that leads to cardiovascular diseases such as heart attack, heart failure, stroke and kidney disease, where in 2016 ischemic heart disease and stroke became the two main causes of death in Indonesia. world.
Aim: The purpose of this study was to analyze the risk factors of smoking on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Public Health Center.
Method: The design of this study used a case-control study, namely 44 pre-elderly hypertension cases and 44 non-hypertensive pre-elderly controls carried out in the working area of the Minasa Upa Health Center Makassar City. The research data was collected by observing and interviewing respondents using a questionnaire. Data analysis was carried out by univariate analysis, bivariate using chi-square test and calculation of Odds Ratio (OR), multivariate analysis using multiple logistic regression test.
Results: There was an influence of smoking risk factors (OR=3.3), occupation (OR=2.7), stress (OR= 2.9) on the incidence of hypertension. And the dominant variable is smoking (OR adjusted 3.3).
Conclusion: Smoking, work, and stress are factors that influence hypertension. It is hoped that the puskesmas will further increase the participation of Posbindu in reducing risk factors for hypertension, such as counseling, making joint sports activities and creating smoke-free areas.

INTRODUCTION

Hypertension is a health problem that is quite dangerous worldwide because hypertension is a major risk factor that leads to cardiovascular diseases such as heart attack, heart failure, stroke and kidney disease, where in 2016 ischemic heart disease and stroke became the two main causes of death in Indonesia. the world (WHO 2018). Based on data in Indonesia obtained from the latest Riskesdas in 2018, the incidence of hypertension reached 34.11%. This incidence rate experienced a significant increase when compared to the data obtained from the previous Riskesdas results in 2013, the results of the measurement of blood pressure of Indonesian people aged >18 years were 25.8% had hypertension and a significant increase occurred in the measurement of blood pressure of the age group. above 60 years, which is 25.8% (Indonesian Ministry of Health 2019).

Based on data obtained from the health profile of South Sulawesi Province in 2016, the prevalence of hypertension in South Sulawesi was 21.90% (South Sulawesi Provincial Public Health Department 2017). Furthermore, in 2018 the prevalence of hypertension decreased to 14.14% (South Sulawesi Provincial Public Health Department 2018). Meanwhile, in 2019 based on data from the health profile of South Sulawesi, the prevalence increased drastically to 25.06%. The highest prevalence which ranks first is in Palopo City, which is 71.51%, second is Sidrap Regency with a presentation of 63.28%, then followed by third, Enrekang Regency, 39.46%, fourth is Barru Regency (35.17%), and the fourth is Barru Regency (35.17%), and the fifth is East

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Luwu Regency (30.27%) (South Sulawesi Provincial Public Health Department 2020)

Smoking is one of the world's growing public health problems. More than 7 million deaths are caused by smoking, more than 6 million deaths are caused by active smokers while around 890,000 are caused by exposure to cigarette smoke (WHO 2017). Hypertension can be influenced by the way and habits of a person's life, one of which is smoking. Where in terms of health, no one agrees or sees the benefits it contains and it is not easy to reduce and eliminate it, therefore this lifestyle is attractive as a health problem and is considered a risk factor for various diseases (Bustan 2007)

Based on the 2018 RISKESDAS data, the prevalence of smoking nationally is 24.3%. The three cities in South Sulawesi Province with the highest smoking prevalence are Makassar City with a prevalence of 21.01%. Second, Palopo City with a prevalence of 20.38% and the third is Pare-Pare City with a prevalence of 19.34% (RISKESDAS Team 2019). Previous research conducted by Ansar (2019) showed that there was a relationship between smoking and the incidence of hypertension at the Ballaparang Health Center in Makassar (p = 0.024). In line with research by Aryantiningsih & Silaen (2018) on risk factors for hypertension at the Harapan Raya Health Center Pekanbaru, the value of OR = 7.286 (95% CI = 2.838-18.705) means that people who have a smoking habit are at risk of developing hypertension 7.28 times compared to people who do not smoke.

Pre-elderly is someone aged 45-59 years. With increasing age, the vascularity of blood vessels will decrease, so the risk of developing hypertension becomes greater. Someone who is at risk of suffering from hypertension is aged 45 years and over. Therefore, efforts to reduce or prevent the occurrence of hypertension can be done at the pre-elderly age to minimize the incidence of hypertension in the elderly (Sutria & Insani 2017).

The Minasa Upa Public Health Center is one of the health centers that has a high number of hypertension sufferers. In the last 3 years, hypertension has been included in the 10 highest diseases at the Minasa Upa Health Center based on data from SP2TP (integrated recording and reporting system of Puskesmas). In addition, the number of visits with hypertension sufferers at the Minasa Upa Health Center has also increased in the last 3 years, where in 2019 there were 1867 visits with hypertension sufferers, in 2020 as many as 1871 visits, and in 2022 as many as 1920 visits. Therefore, researchers are interested in choosing the location of the Minasa Upa Public Health Center as the research area. This study aims to examine in more depth the risk factors of smoking on the incidence of hypertension in the pre-elderly in the working area of the Minasa Upa Public Health Center.

METHOD

Type of Research, Population and Sample

Type The research used in this study was a case control study design with a retrospective approach. Case Population; the case population in this study were all pre-elderly men (45-59 years) who suffered from hypertension in the working area of the Minasa Upa Health Center in 2022. The control population in this study were all pre-elderly men (45-59 years) who did not suffer from hypertension in the working area of the Minasa Upa Health Center in 2022. This study uses a ratio of cases and controls 1:1 without maching, the number of case samples is 44 people and the control sample is 44 people. The total sample is 88 people.

The sampling technique used is purposive sampling. The criteria for sampling are as follows: Case Sample Inclusion criteria: Pre-elderly aged 45-59 years who suffer from hypertension in the working area of the Minasa Upa Public Health Center; Man; Domiciled in the working area of the Minasa Upa Health Center; Willing to be a respondent. Exclusion Criteria: Not willing to be a respondent.

Control Sample: Inclusion criteria; Pre-elderly aged 45-59 years who do not suffer from hypertension in the working area of the Minasa Upa Health Center; Man; Living in the working area of the Minasa Upa Health Center Willing to be a respondent. Exclusion Criteria;
Not willing to be a respondent.

Research variable

The incidence of hypertension in this study was the respondent's blood pressure at an interval of 140/90 mmHg. Objective Criteria: Hypertension: If the respondent has blood pressure > 140/90 mmHg; No Hypertension: If the respondent has blood pressure <140/90 mmHg.

Smoking in this study is the behavior of smoking cigarettes or smoking before being diagnosed with hypertension. Objective Criteria: Smoking: If the respondent still smokes or has smoked before being diagnosed

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with hypertension; No Smoking: If the respondent does not smoke.

Work in this study is one of a person's daily activities to meet the needs of life. Objective Criteria: Work: Work more than 5 days a week and have an income. Not working: Having no job and no income.

Education in this study is the last level of education passed by the respondent based on the respondent's diploma. Objective Criteria : High: If the last formal education level is SMA/equivalent – College/academic. Low: If the last formal education level is No School – Junior High School/equivalent.

Family history in this study is if there is a family who has a family history of either mother, father, grandfather, grandmother suffering from hypertension. Objective Criteria: There is a history: If there are among mothers, fathers, grandfathers, and grandmothers who suffer from hypertension or are diagnosed with hypertension; No history: If there is between mother, father, grandfather, grandmother whichhave hypertension or have been diagnosed with hypertension. Obesity in this study is excessive fat accumulation in the body by looking at the body mass index value (kg/m2) showing BMI >= 25 kg/m2. Objective Criteria :Yes: BMI >= 25 kg/m2 No : BMI < 25 kg/m2.

Knowledge in this study is everything that is known by respondents about hypertension. This knowledge includes basic knowledge about hypertension. Knowledge is measured using the Guttman scale using two categories so that the difference in intensity between individuals is clearer, where the correct answer is given a score of 1 and the wrong answer is given a score of 0. Less Objective Criteria: If the score obtained by the respondent is <50% of the highest total score. Enough: If the score obtained by the respondent is > 50% of the highest total score.

Stress in this study is an unpleasant condition that puts pressure on the physical and psychological caused by changes that occur in oneself as measured by the Depression Anxiety Stress Scale (DASS) of 14 questions. The results of the stress score were obtained by adding up the scores for each question from the 14 questions. The score requirements for several levels of stress include: very heavy stress (total score > 34), severe stress (total score 26-33), moderate stress (total score 19-25), mild stress (total score 15-18), and not stressed (total score 0-14). Objective Criteria; Stress: If the respondent experiences stress (very heavy stress, heavy stress, moderate stress, and light stress). Not stressed: If the respondent does not experience stress.

Data collection

Primary data in this study were obtained from respondents by conducting direct interviews using a list of questions (questionnaires). The secondary data in this study were the profile data of the Minasa Upa Health Center and the data of pre-elderly who suffered from hypertension at the SP2TP (integrated recording and reporting system of the puskesmas), posbindu, prolanis, and posyandu for the elderly at the Minasa Upa Health Center. The data collection instrument used in this study was a questionnaire consisting of several question items concerning individual characteristics data such as respondent identity, smoking, occupation, education, family history, obesity, knowledge, and stress.

Data analysis

Univariate analysis is an analysis carried out to obtain a description (description) of each variable, both independent and dependent variables and to describe the characteristics of respondents based on age, gender, education in the case and control groups. The data is presented in the form of a frequency distribution table.

Bivariate analysis was used to determine the effect of the independent variable (smoking), the control variable (occupation, education, family history, obesity, knowledge, stress) on the dependent variable (the incidence of hypertension). In this study, the resulting data are grouped so as to produce categorical data. In bivariate analysis, each independent variable was cross tabulated with the dependent variable. The statistical test used the Chi-square test to determine the significance of the relationship between the independent variable and the dependent variable statistically. If the P value <0.05, it means that there is a statistically significant relationship.

In addition, the cross tabulation will also look for the OR (Odds Ratio) value to determine whether there is a relationship between the independent variable and the dependent variable. The interpretation of the OR value is as follows: If OR >1 show that factor which researched is indeed a risk factor. If OR = 1 or or includes the number 1, it means that it is not a risk factor. If OR <1 means is a protective factor (Sastroasmoro & Ismael 2014). Multivariate analysis was used to see which independent variables had the most dominant effect on the

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dependent variable. This multivariate analysis was carried out using multiple logistic regression so that controlled ORs could be calculated, to estimate the risk of developing hypertension caused by risk factors. The methods used in the multiple logistic regression analysis are enter, farward, backward, and stepwise methods.

RESULTS

Table 1. Frequency of Research Variables in Control Group and Case Group

Variable		Hypertension Incidence					
		Case		Control		Total	%
		n	%	n	%		
Age	>/=50 years	38	86.4	27	61.4	65	73.9
	<50 years	6	13.6	17	38.6	23	26.1
	Total	44	100	44	100	88	100
Work	Doesn't work	23	52.3	33	75.0	56	63.6
	Working	21	47.7	11	25.0	32	36.4
	Total	44	100	44	100	88	100
Education	Primary School	1	2.3	1	2.3	2	2.3
	Junior High School	11	25.0	4	9.1	15	17.0
	Senior High School	13	29.5	19	43.2	32	36.4
	College	19	43.2	20	45.5	39	44.3
	Total	44	100	44	100	88	100
Family History	There is a history	25	56.8	16	36.4	41	46.6
	No history	19	43.2	28	63.6	47	53.4
	Total	44	100	44	100	88	100
Smoke	Smoke	29	65.9	16	36.4	45	51.1
	Do not smoke	15	34.1	28	63.6	43	48.9
	Total	44	100	44	100	88	100
Obesity	Obesity	26	59.1	18	40.9	44	50
	Not obese	18	40.9	26	59.1	44	50
	Total	44	100	44	100	88	100
Knowledge	Not enough	24	54.5	15	34.1	39	44.3
	Enough	20	45.5	29	65.9	49	55.7
	Total	44	100	44	100	88	100
Stress	Stress is very heavy	0	0.0	0	0.0	0	0.0
	Heavy stress	6	13.6	0	0.0	6	6.8
	Moderate stress	14	31.8	12	27.3	26	29.5
	Mild stress	15	34.1	15	34.1	30	34.1
	No stress	9	20.5	17	38.6	26	29.5
	Total	44	100	44	100	88	100

Table 1 shows that in the case group there were 38 people (86.4%) pre-elderly aged >=50 years, and 27 people (61.4%) aged <50 years. While in the control group there were 27 people (61.4%) pre-elderly aged >= 50 years, and 17 people (38.6%) aged <50 years.

For case group work, there were 23 people (52.3%) who did not work and 21 people (47.7%) pre-elderly who worked. While in the control group as many as 33 people (75.0%) pre-elderly who do not work. And 11 people (25.0%) are working.

Education in the case group was 1 person (2.3%) pre-elderly with elementary school education, 11 people (25.0%) junior high school, 13 people (29.5%) high school, 19 people (43.2%) college. While in the control group, 1 person (2.3%) pre-elderly with elementary school education, 4 people (9.1%) junior high school, 19 people (43.2%) high school, and 20 people (45.5%) colleges.

Family history in the case group was 25 people (56.8%) pre-elderly who had a family history of hypertension, and 19 people (43.2%) who did not have a family history of hypertension. While in the control group, there were 16 people (36.4%) pre-elderly who had a family history of hypertension, and 28 people (63.6%) who did not have a family history of hypertension.

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Smoking status in the case group was 29 people (65.9%) pre-elderly who smoked, and 16 people (36.4%) who did not smoke. Meanwhile, in the control group, 16 people (36.4%) pre-elderly smoked, and 28 people (63.6%) did not smoke.

Obesity status in the case group was 26 people (59.1%) pre-elderly who were obese, and 18 people (40.9%) were not obese. Meanwhile, in the control group, 18 people (40.9%) were obese, and 26 people (59.1%) were not obese.

Knowledge in the case group was 24 people (54.5%) pre-elderly who had less knowledge, and 20 people (45.5%) who had sufficient knowledge. Stress status in the case group, there were no pre-elderly who experienced very heavy stress, as many as 6 people (13.6%) experienced severe stress, 14 people (31.8%) moderate stress, 15 people (34.1%) mild stress, and 9 people (20.5%) were not stressed. While in the control group there were no pre-elderly who experienced very heavy stress and severe stress, as many as 12 people (27.3%) were under moderate stress, 15 people (34.1%) had mild stress, and 17 people (38.6%) did not. stress.

Table 2. Risk Factors for Smoking, Occupation, Education, Family History, Knowledge, Obesity and Stress on Hypertension Incidence in Pre-Elderly in the Working Area of the Minasa Upa Health Center

Variable		Hypertension Incidence					*p value*	OR 95% CI
		Case		Control		Total		
		n	%	n	%			
Smoke	Smoke	29	65.9	16	36.4	45		3.383
	Not Smoke	15	34.1	28	63.6	43	0.006	(1,410-8,117)
	Total	44	100	44	100	88		
Work	Working	21	47.7	11	25.0	32		2,739
	Not work	23	52.3	33	75.0	56	0.027	(1,110-6,758)
	Total	44	100	44	100	88		
Education	Low	12	27.3	5	11.4	17		2,925
	Tall	32	72.7	39	88.6	71	0.059	(0.932-9.175)
	Total	44	100	44	100	88		
Family History	There is a history	25	56.8	16	36.4	41		2,303
	No history	19	43.2	28	63.6	47	0.054	(0.978-5.421)
	Total	44	100	44	100	88		
Obesity	Obesity	26	59.1	18	40.9	44		2,086
	Not obese	18	40.9	26	59.1	44	0.088	(0.892-4.881)
	Total	44	100	44	100	88		
Knowledge	Not enough	24	54.5	15	34.1	39		2.32
	Enough	20	45.5	29	65.9	49	0.053	(0.981-5.486)
	Total	44	100	44	100	88		
Stress	Stress	35	79.5	25	56.8	60		2,956
	No stress	9	20.5	19	43.2	28	0.022	(1,149-7,602)
	Total	44	100	44	100	88		

Table 2 shows that in the case group there were 29 people (65.9%) pre-elderly who smoked, and 16 people (36.4%) who did not smoke. Meanwhile, in the control group, 16 people (36.4%) pre-elderly smoked, and 28 people (63.6%) did not smoke. Based on the results of statistical tests using the chi-square test, the value of p = 0.006 (p <0.05). This means that there is an effect of smoking on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 3.383 with an analysis of the lower limit value of 1.410 and upper limit of 8.117 meaning the OR value is at the Confidence interval (Cl) exceeding the value 1, so smoking is a risk factor for the incidence of hypertension and pre-elderly smoking is at risk of 3.

Table 2 shows that in the case group there were 21 people (47.7%) pre-elderly who worked, and 23 people (52.3%) who did not work. While in the control group there were 11 people (25.0%) pre-elderly who worked, and 33 people (75.0%) who did not work. Based on the results of statistical tests using the chi-square test, the value of p = 0.027 (p <0.05). This means that there is an effect of work on the incidence of hypertension in pre-

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elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.739 with a lower limit value of 1.110 and an upper limit of 6.758 meaning the OR value is at the Confidence interval (Cl) exceeding a value of 1, so work is a risk factor for the incidence of hypertension and pre-elderly not working is at risk of 2,

Table 2 shows that in the case group as many as 12 people (27.3%) pre-elderly had low education, and 32 people (72.7%) had high education. Meanwhile, in the control group, 5 people (11.4%) had low education, and 39 people (88.6%) had high education. Based on the results of statistical tests using the chi-square test, the value of p = 0.059 (p>0.05). This means that there is no influence of education on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.925 with the lower limit value of 0.932 and the upper limit of 9.175 being in the Confidence interval (Cl) range below the value of 1 so that education is not a risk factor for hypertension.

Table 2 shows that in the case group there were 25 people (56.8%) pre-elderly who had a family history of hypertension, and 19 people (43.2%) who did not have a family history of hypertension. While in the control group, there were 16 (36.4%) pre-elderly who had a family history of hypertension, and 28 people (63.6%) who did not have a family history of hypertension. = 0.054 (p>0.05). This means that there is no influence of family history on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.303 with a lower limit value of 0.978 and an upper limit of 5,

Table 2 shows that in the case group there were 26 people (59.1%) pre-elderly who were obese, and 18 people (40.9%) who were not obese. Meanwhile, in the control group, 18 people (40.9%) were obese, and 26 people (59.1%) were not obese. Based on the results of statistical tests using the chi-square test, the value of p = 0.088 (p>0.05). This means that there is no influence of obesity on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.086 with the lower limit value of 0.892 and upper limit of 4.881 being in the Confidence interval (Cl) range below the value of 1 so that obesity is not a risk factor for hypertension.

Table 2 shows that in the case group there were 24 people (54.5%) pre-elderly who had less knowledge, and 20 people (45.5%) who had sufficient knowledge. While in the control group as many as 15 people (34.1%) pre-elderly have less knowledge, and 29 people (65.9%) who have sufficient knowledge. Based on the results of statistical tests using the chi-square test, the value of p = 0.053 (p>0.05). This means that there is no influence of knowledge on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.320 with the lower limit value of 0.981 and the upper limit of 5.486 being in the Confidence interval (Cl) range below the value of 1 so that knowledge is not a risk factor for hypertension.

Table 2 shows that in the case group there were 35 people (79.5%) pre-elderly who were stressed, and 9 people (20.5%) were not stressed. Meanwhile, in the control group, 25 people (56.8%) were stressed, and 19 people (43.2) were not stressed

Based on the results of statistical tests using the chi-square test, the value of p = 0.022 (p <0.05). This means that there is an effect of stress on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. The results of the analysis also show the Odds Ratio (OR) value of 2.956 with a lower limit value of 1.149 and an upper limit of 7.602, meaning that the OR value is at the Confidence interval (Cl) exceeding the value 1, so stress is a risk factor for hypertension and pre-elderly who are stressed are at risk of suffering from 2.956 times. hypertension compared to non-stressed pre-elderly.

Table 3. Results of Bivariate Simple Logistic Regression Analysis Against Independent Variables (Initial Step)

Independent variable	B	Sig	Exp(B)	95% CI for EXP(B)	
Smoke	.834	.085	2,302	.891	**5.952**
Work	.725	.142	2,065	.784	**5.437**
Stress	.806	.119	2.238	.813	**6.160**
Smoke	**1,219**	**.006**	**3.383**	**1,410**	**8.117**

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Table 3 shows the initial step of the results of the bivariate simple logistic regression analysis on the independent variables. The most dominant variable at risk for the incidence of hypertension in pre-elderly is smoking. The results of the analysis obtained the value of Exp(B) 3,383 with a lower value of 1,410 and an upper value of 8,117.

DISCUSSION

Risk factors for smoking on the incidence of hypertension

Smoking can cause hypertension due to the chemicals contained in tobacco, especially nicotine which can stimulate the sympathetic nerves and trigger the heart to work faster so that blood circulation flows faster and blood vessels constrict, as well as the role of carbon monoxide which can replace oxygen in the blood and force the heart to meet the body's oxygen needs (Sukmana 2009).

The results of this study are in line with research conducted by Aryantiningsih & Silaen (2018) at the Harapan Raya Health Center Pekanbaru which showed that there was an effect of smoking on the incidence of hypertension (OR = 7.28). Research by (Elvivin, Lestari & Ibrahim 2016) also concluded that smoking is a risk factor for hypertension (OR = 6.75).

Based on the results of interviews at the research site, most of the respondents smoked >12 cigarettes/day. Smokers can be classified according to the number of cigarettes smoked per day. Bustan, 2007 divided them into 3 groups, which said light smokers were smokers who smoked 1-10 cigarettes a day, moderate smokers, 11-20 cigarettes a day, and heavy smokers more than 20 cigarettes a day. The results also showed that most of the respondents smoked with filter cigarettes/cigarettes with cork at the base (51%). Research by Kurniati, Udiyono & Saraswati (2012) also found that the number of filter smokers was much higher, namely 97.22% compared to non-filter smokers. The price of filter cigarettes in the market is relatively cheaper and is widely available in stalls in the surrounding area.

In addition to the type of cigarette, most of the respondents smoked for more than 15 years. Research conducted by Linda & Kirnantoro (2010) showed that there was a relationship between length of smoking and the incidence of hypertension (p = 0.006). This means that the longer the respondent smokes, the higher the level of hypertension. The longer a person smokes a cigarette, it will have a major influence on increasing blood pressure or hypertension. This can be caused because the CO gas produced by cigarette smoke can have a major effect on increasing blood pressure. If consumed continuously it will accumulate in the walls of blood vessels and cause blood vessels to "cramp" so that blood pressure rises, this increase occurs because nicotine constricts blood vessels, forcing the heart to work hard.

Occupational risk factors for hypertension

Based on the results of research on occupational risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City, it was found that in the case group most of the respondents did not work, namely 23 people (52.3%) and in the control group, most of the respondents did not work, namely as many as 33 people (75%).

The results of this study are in line with research conducted by Maulidina (2019) which showed a significant relationship between work and the incidence of hypertension (OR = 1.83). respondents who do not work have a 1.83 times chance of experiencing hypertension than respondents who work.

Based on the results of interviews with respondents, most of the respondents are no longer working and have entered their retirement period. According to(Anggara & Prayitno 2013), people who do not work are at risk of suffering from hypertension 8.95 times compared to people who work. Moreira's research (2013) in Brazil shows that people who work can avoid hypertension by 0.73-0.88 times in urban areas and 0.79-0.81 times in rural areas compared to those who do not work (Moreira, Moraes & Luiz 2013). Meanwhile, in Indonesia, people who do not work have a 1.42 times risk of developing hypertension (Rahajeng & Tuminah 2019).

The type of work affects the pattern of physical activity, where work that does not rely on physical activity has an effect on blood pressure. Office workers such as bank employees, drivers, security officers and jobs that rely on automatic machines and sit more than 5 hours a day make workers less physically active so they are at risk of hypertension (Bosu 2015).

Lack of physical activity causes blood flow in the body does not flow normally. Routine physical

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activity can reduce saturated fat, increase sodium elimination that occurs due to changes in kidney function, repeat plasma renin and catecholamines activity that can prevent an increase in blood pressure (Hayati 2019). Research by Paruntu & Rumangit (2015) proves that the lower the physical activity, the higher the blood pressure. WHO (2011) recommends for ages 16-64 years to do 300 minutes of physical activity per week (at least 5 days) or as much as 60 minutes in 1 day to reduce the risk of non-communicable diseases including hypertension.

The results of this study are not in line with the research conducted by Sinulingga & Samingan (2019) which showed there was no relationship between work and the incidence of hypertension (p = 0.51).

Educational risk factors for hypertension

Education is an indicator of the level of human ability to understand access to information obtained from the outside, in this case it is related to health information related to awareness to want to check themselves and know the advanced complications of hypertension including recognizing the early symptoms of hypertension.

Based on the results of monitoring at the research site, most of the respondents are highly educated. The results of this study are in line with research conducted by Aditomo (2014) which showed that there was no relationship between education level and the incidence of hypertension (p = 0.80) with an OR = 0.873 (0.299-2.544) where more respondents had higher education than respondents with low education. .

A low level of education has an impact on low knowledge and this affects behavior. Adequate education cannot guarantee the creation of good behavior, because according to Lehendroff and Tracy's theory, behavior is not only influenced by ability but also willingness (Sudarma 2008). Information received by the community outside of their education also plays an important role in increasing knowledge (Suhardi 2014). The results of research conducted by Zhang et al (2013) in China showed that the lower a person's education level, the higher the risk of experiencing hypertension. In Brazil, people who have studied for 15 years can be protected from the risk of hypertension by 0.69 times in urban areas and 0.75 times in rural areas (Moreira, Moraes & Luiz 2013).

However, the results of this study contradict the research conducted by (Waas, Ratag & Umboh 2014) at the Ratahan Health Center, Minahasa Regency which showed a relationship between education and the incidence of hypertension (p = 0.010) with an OR value of 2.867 (1,272-6.462) where respondents with low education had a higher risk. 2.86 times suffer from hypertension compared to respondents with higher education.

Risk factors for family history of hypertension

Assessment of family history suffering from hypertension was carried out based on the respondent's acknowledgment that there were family members namely father, mother, grandfather and grandmother who suffered from hypertension. Based on the results of the research on family history risk factors for the incidence of hypertension in the pre-elderly in the working area of the Minasa Upa Health Center Makassar City, it was found that in the case group most of the respondents had a family history of hypertension as many as 25 people (56.8%) and in the control group most of the respondents do not have a family history of hypertension as many as 28 people (63.6%)

This is in line with research conducted by Aryantiningsih & Silaen (2018)which showed there was no relationship between family history and the incidence of hypertension (p = 0.160) with an OR value of 1.921 (0.861-4.283). In contrast to research conducted by Solehaini, 2018 which showed that family history was associated with the incidence of hypertension (p = 0.000; POR = 7.106; and 95% CI = 3.759-13.436), meaning that someone with a family history of hypertension had a 7.106 times greater risk of developing hypertension. when compared with someone with no family history of hypertension. From the results of this study, it is known that the family history of hypertension is mostly obtained from biological mothers (59.4%).

The role of genetic factors in the incidence of hypertension is proven by the finding that hypertension is more common in monozygotic twins (one egg cell) than heterozygous twins (different eggs). However, not every person with hypertension can be from a lineage, but someone has the potential to get hypertension if their parents are hypertensive patients. Heredity or genetics is also one of the risk factors for hypertension that cannot be changed. Genetic factors cannot be controlled. The presence of genetic factors in certain families will cause that family to have a risk of suffering from hypertension (Isnaini & Lestari 2018).

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Risk factors of obesity on the incidence of hypertension

The results of this study are in line with research conducted by Ulfa & Wahyuni (2017) which showed there was no relationship between obesity and the incidence of hypertension (p = 0.408). The absence of a relationship is probably due to an increase in the sympathetic system. The increase in the sympathetic system is in line with the results of the cross tabulation between obesity and the incidence of stress, which is known that the incidence of stress is more common in the elderly who are not obese. This means that the sympathetic nerves that regulate nerve and hormone function can cause an increase in heart rate, narrowing of the arteries and an increase in water and sodium retention (Ulfa & Wahyuni 2017).

However, the results of this study are not in line with the research conducted by (Kartika & Purwaningsih 2020) which showed a significant relationship between obesity and the incidence of hypertension in pre-elderly in Senen District, Central Jakarta (OR=2.53). Body weight and BMI are directly correlated with blood pressure, especially systolic blood pressure. The relative risk for suffering from hypertension in obese people is 5 times higher than in normal people. Meanwhile, in patients with hypertension, 20-33% were found to be overweight (Indonesian Ministry of Health 2006).

Knowledge risk factors for the incidence of hypertension

Knowledge is a very important component for the formation of one's actions, where before an action occurs within the individual there is a sequential process such as awareness of an object, feeling interested, weighing, starting to try new behaviors, and finally behaving according to the knowledge they have (Notoatmodjo 2003)

Based on the results of the research on knowledge risk factors for the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City, it was found that in the case group most of the respondents had less knowledge, namely 24 people (52.3%) and in the control group, most of the respondents had sufficient knowledge, namely as many as 29 people (65.9%)

The results of statistical tests using the chi-square test obtained a value of p = 0.053 (p>0.05). This means that there is no influence of knowledge risk factors on the incidence of hypertension in pre-elderly. The results of the analysis also show the Odds Ratio (OR) value of 2.320 with the lower limit value of 0.981 and the upper limit of 5.486 being in the Confidence interval (Cl) range below the value of 1 so that knowledge is not a risk factor for hypertension.

Stress risk factors for the incidence of hypertension

Stress is a condition caused by the interaction between individuals and their environment that encourages a person to perceive a difference between the demands of the situation and resources (biological, psychological, and social) that exist in a person and an increase in blood pressure will be more prominent in individuals who have high blood pressure. tendency of high emotional stress (Indonesian Ministry of Health 2013).

The results of this study are in line with research conducted by (Marsita, Nurmawan & Indriastuti 2020), at the Abeli Health Center in Kendari City which showed the influence of stress on the incidence of hypertension with an OR = 4.336 (95% CI = 2.156-10.725) meaning that people with stress are at risk of 4.3 times suffering from hypertension. hypertension compared to people who are not stressed.

Based on the results of monitoring at the research site, most of the respondents experienced mild stress (34.1%). This is because stress can trigger an increase in blood pressure. The results of this study are in line with the theory that stress will trigger an increase in blood pressure with a mechanism that triggers an increase in adrenaline levels. Stress will stimulate the sympathetic nerves will appear an increase in blood pressure and increased cardiac output. Stress will increase if peripheral vascular resistance and cardiac output increase which stimulates the sympathetic nerves. So that stress will react to the body which includes increased muscle tension, increased heart rate and increased blood pressure. This reaction occurs when the body reacts quickly when it is not used.

The Most Dominant Risk Factor for Hypertension Incidence

From the results of multivariate analysis, the most dominant variable at risk for the incidence of hypertension is smoking. The results of the analysis obtained the value of Exp(B) 3,383 with a lower value of 1,410 and an upper value of 8,117. This means that pre-elderly who smoke are at risk of suffering from

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hypertension 3 times compared to pre-elderly who do not smoke.

Smoking habits seen from various points of view are indeed very detrimental, both for themselves and those around them. In terms of health, the influence of chemicals contained in cigarettes such as nicotine, CO (carbon monoxide) and tar will stimulate the work of the central nervous system and sympathetic nervous system, resulting in increased blood pressure and faster heart rate, stimulating cancer and various other diseases.

Smoking habits greatly affect the increase in blood pressure. The more cigarettes smoked and the longer a person smokes, the greater the risk of developing blood pressure. Not all people with hypertension are aware of their illness. This is what makes hypertension often referred to as the "Silent Killer" or "silent killer". So that the patient then finds himself having complications or complications from hypertension such as stroke, coronary heart disease, and kidney failure. So it is necessary to prevent and control hypertension risk factors to make people aware of smoking habits and their bad impact on health.

CONCLUSION

Based on the research results obtained, the analysis and discussion can be concluded as follows: 1). There is an influence of smoking risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 2). There is an influence of occupational risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 3). There is an influence of stress risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 4). There is no influence of educational risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 5). There is no influence of family history risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 6). There is no influence of obesity risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 7). There is no influence of knowledge risk factors on the incidence of hypertension in pre-elderly in the working area of the Minasa Upa Health Center Makassar City. 8). The results of the logistic regression analysis showed that the smoking variable was the most dominant variable at risk for the incidence of hypertension in the working area of the Minasa Upa Health Center Makassar City.

SUGGESTION

Some suggestions from researchers; 1). For the Puskesmas, it is hoped that the results of this study can be input for managers of disease prevention and control programs, especially as a consideration in determining strategies for preventing and controlling hypertension. Creating a smoke-free area in the community, in order to reduce the risk factors for hypertension. 2). For the community to control stress levels well, such as routinely participating in puskesmas activities such as elderly gymnastics and elderly posyandu held by the puskesmas every week. 3). For further researchers, this research can be used as additional information about hypertension, and is expected to be able to develop this research by examining other risk factors related to hypertension.

Declaration of Conflicting Interest

All authors state that there is no potential Conflict of Interest in this research and article.

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