

## Relationship of Patient's Characteristic Nutritional, Status and Physical Activity with Hypertension in Elderly at Puskesmas Sako Palembang

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### Abstrak

Hipertensi merupakan penyakit nomor 1 yang paling banyak dialami oleh para lansia dengan prevalensi 35,6% pada usia 45-54 tahun, 45,9% pada usia 55-64 tahun, 57,6% pada usia 65-74 tahun dan 63,8% pada usia 75 tahun ke atas. Hipertensi merupakan penyakit kedua tertinggi di Kota Palembang. Beberapa penelitian menunjukkan terdapat beberapa faktor risiko yang dapat menyebabkan terjadinya hipertensi seperti karakteristik pasien (usia, jenis kelamin, riwayat medis keluarga dan pendidikan), status gizi dan aktivitas fisik. Penelitian ini bertujuan untuk mengetahui hubungan karakteristik pasien, status gizi dan aktivitas fisik dengan hipertensi pada lansia. Penelitian ini merupakan studi analitik observasional dengan desain *cross sectional*. Teknik sampling yang digunakan adalah sampling insidental dengan jumlah sampel sebanyak 106 responden yang merupakan pasien lansia  $\geq 46$  tahun yang berobat di Puskesmas Sako Palembang. Uji statistik yang digunakan adalah *Chi-square* dan Regresi Logistik Biner. Hasil analisis menggunakan uji *Chi-square* menunjukkan bahwa terdapat hubungan yang signifikan antara usia ( $p=0,006$  dan  $0,000$  POR=7,25 dan 31,88), jenis kelamin ( $p=0,027$  POR=2,87), riwayat keluarga ( $p=0,000$  POR=11,3), pendidikan ( $p=0,000$  dan  $0,001$  POR=24,37 dan 9,37), status gizi ( $p=0,000$  POR= 11,43), aktivitas fisik ( $p=0,019$  dan  $0,002$  POR=4,01 dan 6,07) dan hipertensi. Setelah diuji dengan regresi logistik biner didapatkan hasil bahwa riwayat medis keluarga, pendidikan dan status gizi merupakan faktor yang paling mempengaruhi terjadinya hipertensi. Terdapat hubungan yang signifikan antara usia, jenis kelamin, riwayat medis keluarga, pendidikan, status gizi, aktivitas fisik dengan hipertensi. Faktor yang paling mempengaruhi hipertensi pada lansia adalah riwayat keluarga, pendidikan dan status gizi.

**Kata kunci:** Hipertensi, Karakteristik, Status Gizi, Aktivitas Fisik, Lansia

### Abstract

**Relationship of Patient's Characteristic Nutritional, Status and Physical Activity with Hypertension in Elderly at Puskesmas Sako Palembang.** Hypertension is the main disease that is affecting the elderly with the prevalence of 35,6% at 45-54 years old, 45,9% at 55-64 years old, 57,6% at 65-74 years old and 63,8% at more than 75 years old. In Palembang, it is the second most common disease. Many research shows many risk factors are related to hypertension, including patient's characteristics (age, sex, family medical record and education), nutritional status and physical activity. This study aims to determine the relationship of elderly patients' characteristics, nutritional status and physical activity with hypertension. Research is done by using observational analytical study with cross sectional design. Sampling method used in this research is incidental sampling and 106 elderly patients of Puskesmas Sako Palembang participated ( $\geq 46$  years old by the time this research is conducted). Statistical analysis is done using Chi-square and binary logistic regression. Chi-square analysis has shown that there are significant relationship between age ( $p=0,006$  and  $0,000$ ; POR=7,25 and 31,88), sex ( $p=0,027$ ; POR=2,87), family medical record ( $p=0,000$ ; POR=11,3), educational status ( $p=0,000$  and  $0,001$ ; POR=24,37 and 9,37), nutritional status ( $p=0,000$ ; POR=11,43), physical activity ( $p=0,019$  and  $0,002$ ; POR=4,01 dan 6,07) with hypertension. On the other hand, binary logistic regression analysis assumes that family medical record, educational status and nutritional status are the most influential factors that are affecting hypertension. Age, sex, family medical record, educational status, nutritional status and physical activity have significant relationship with the prevalence of hypertension. Family medical record, educational status and nutritional status are the most influential factors that are affecting the prevalence of hypertension.

**Keywords:** Hypertension, Characteristic, Nutritional Status, Physical Activity, Elderly

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## **1. Introduction**

Half of elderly population are around four hundred millions living in Asia region.<sup>1</sup> Indonesia, as one of the developing countries, will also experience the rise of elderly population. Life expectancy of the population in South Sumatera has also increased in 2017 from 69,19 years old to 69,18 years old.<sup>2</sup> The rise in life expectancy is a challenge for Indonesia to maintain the elderly population welfare.

The results of the Riset Kesehatan Dasar shows that hypertension is the main disease which affects the elderly.<sup>3</sup> Hypertension is a condition where systolic and diastolic blood pressure is above the normal number of 130/80 mmHg.<sup>4</sup> According to the study of Rikesdas (2013), the prevalence of women with hypertension in Indonesia is bigger (28,8%) than men (only 22,8%).<sup>3</sup> The result of Riset Kesehatan Dasar in 2013 states that the prevalence of hypertension tends to be higher to the people with lower educational background.<sup>3</sup> Research conducted on elderly population at Puskesmas Simpang Tiga Pekanbaru shows that in a group of participants consisting 87 patients with hypertension, there are 79 patients (90,8%) who have a family medical record of hypertension.<sup>5</sup> The result of the study shows that out of the 26 people who suffer from hypertension in RSUD Tugurejo Semarang, there are 12 people (46,2%) overweight and obese.<sup>6</sup> The result of study on elderly population who suffer from hypertension in Posyandu Mekar Sari Yogyakarta got 27 people (62,8) with less physical activities.<sup>7</sup>

The results of a preliminary survey conducted at Puskesmas Sako and cited from the data of patients' visit who are treated in July 2018, found that 174 of 361 patients have hypertension. Prevention and control of the risk of hypertension need to be done at Puskesmas Sako. This study aims to determine the relationship between patient's characteristics, nutritional status and physical

activity with hypertension in the elderly at Puskesmas Sako Palembang.

## **2. Method**

This study was an observational analytical study with a cross sectional design. The observation was conducted at Puskesmas Sako Palembang from November to December 2018.

The sample of study was elderly patients aged  $\geq 46$  years old and treated at the Puskesmas Sako Palembang that met the determined criteria which were elderly with the age of  $\geq 46$  years old and administered as a patient of Puskesmas Sako Palembang. The excluded criteria were the patients with disabilities and refused to become respondents. The sampling method used in this observation was incidental sampling.

The data on patient's characteristics (age, sex, family medical record, education) and physical activity were obtained from interviews and questionnaires. Nutritional status data were obtained from measurements of height and weight then calculated for body mass index (BMI). The patients' blood pressure was obtained from the patients' medical record to determine whether patients suffer from hypertension or not. The data that had been obtained, later on, processed and analyzed by using Chi-square test and Binary Logistic Regression.

## **3. Results**

This study was conducted on patients who were treated at Puskesmas Sako Palembang for 1 month with a total of 106 respondents. Table 1 shows that early elderly patients (43,4%) are more than seniors (16,0%) and late elderly (40,6%). Female patients (67,9%) are more than male patients (32,1%). Most patients have a family medical record of hypertension which is equal to 61,3%, while those patients without a family medical record of hypertension is equal to 31,1%.

Most of the patients' educational records are elementary education which is as much as 42,5%, while middle education is 39,6% and higher education is 17,9%. Overweight patients are more (50,9%) than patients who are not overweight (49,1%). Patients who have heavy physical activity are more (40,6%) than those who have less physical activity (27,4%) and moderate physical activity (32,4%). Most patients who suffered from hypertension which is equal to 68,9%, while those who do not, equal to 31, 1%.

**Table 1. The Characteristic of Elderly at Puskesmas Sako Palembang**

Characteristic	N	%
<b>Age</b>		
Senior	17	16,0
Late Elderly	43	40,6
Early Elderly	46	43,4
<b>Sex</b>		
Female	72	67,9
Male	34	32,1
<b>Family Medical record</b>		
Yes	65	61,3
None	41	38,7
<b>Education</b>		
Elementary	45	42,5
Middle	42	39,6
High	19	17,9
<b>Nutritional Status</b>		
Overweight	54	50,9
Not overweight	52	49,1
<b>Physical Activity</b>		
Less physical activity	29	27,4
Moderate physical activity	34	32,1
Heavy physical activity	43	40,6
<b>Hypertension</b>		
Yes	73	68,9
No	33	31,1

The result of the study in Table 2 shows that the majority of patients with hypertension are late elderly, as many as 41 people (95,3%). The Chi-Square test obtained a value of  $p = 0,006$  and  $0,000$  ( $p < 0.05$ ) which means that there is a significant relationship between age and the occurrence of hypertension. Statistical test obtained Prevalence Odds Ratio (POR) = 7,25 and 31,88 which means patients aged  $> 65$  tended to have hypertension 7,25 times more risky compared

to those aged 46-55 years old, while patients aged 56-65 years old are at risk of 31,88 times suffering from hypertension compared to those aged 46-55 years old.

The result of the study in Table 2 shows that the majority of patients with hypertension are women as many as 55 people (76.4%). The Chi-Square test obtained  $p$  value = 0.027 ( $p < 0.05$ ), which means that there is a significant relationship between sex and the occurrence of hypertension. The statistical test obtained the value of Prevalence Odds Ratio (POR) = 2.87, which means that women are at risk of 2.87 times bigger to have hypertension compared to men.

The result of the study in Table 2 shows that most patients with hypertension have a family medical record of hypertension as many as 57 patients (87.7%). The Chi-Square test obtained a value of  $p = 0,000$  ( $p < 0.05$ ) meaning that there is a significant relationship between family medical record of hypertension and the occurrence of hypertension. The statistical test obtained the value of Prevalence Odds Ratio (POR) = 11,13 which means that patients who have a family medical record are at risk of 11.13 times higher to have hypertension compared to those who do not.

The result of the study in Table 2 shows that the majority of hypertensive patients' education are elementary education as many as 39 people (86.7). Chi-Square test  $p$  value = 0.000 ( $p < 0.05$ ) which means that there is a significant relationship between education and occurrence. Statistical test obtained Prevalence Odds Ratio (POR) = 24.37 and 9.37, which means patients graduated from elementary education are at risk of 24.37 times higher to suffer from hypertension compared to those with higher education while patients who have middle education are at risk of 9.37 times suffering from hypertension compared to those with higher education.

The result of the study in Table 2 shows that most hypertensive patients that have excess weight (overweight) as many as 49

people (90.7). Chi-Square test p value = 0.000 ( $p < 0.05$ ) which means that there is a significant relationship between nutritional status and the occurrence of hypertension. The statistical test obtained the value of Prevalence Odds Ratio (POR) = 11.43 which means the overweight patients are at risk of 11.43 times higher to suffer from hypertension compared to those who are not overweight.

The result of the study in Table 2 shows that most of patients with hypertension have moderate physical activity as many as 29 people (85.3%), while those with less physical activity are 23 people (79.3%) and

those who have heavy physical activity are 21 people (48.8%). The Chi-Square test obtained  $p = 0.019$  and  $0.002$  ( $p < 0.05$ ), which means there is a significant relationship between physical activity and the occurrence of hypertension. Statistical test obtained Prevalence Odds Ratio (POR) = 4.01 and 6.07 which means that patients who have less activity with a risk of 4.01 times higher to have hypertension compared to those who have heavy physical activity while patients who have moderate physical activity are at risk 6.07 times bigger to suffer from hypertension compared to those who have heavy physical activity.

**Table 2. Bivariate Analysis of Factors that Related to Hypertension**

Variable	Hypertension				Total		p_value	POR (CI 95%)
	Yes		No		N	%		
	n	%	n	%				
<b>Age</b>								
Senior	14	82,4	3	17,6	17	100	0,006	7,25 (1,82-28,86)
Late Elderly	41	95,3	2	4,7	43	100	0,000	31,88 (6,85-148,43)
Early Elderly	18	39,1	28	60,9	46	100		
<b>Sex</b>								
Female	55	76,4	17	23,6	72	100	0,027	2,87 (1,210-6,834)
Male	18	52,9	16	47,1	34	100		
<b>Family Medical record</b>								
Yes	57	87,7	8	12,3	65	100	0,000	11,13 (4,21-29,37)
None	16	39,0	25	61,0	41	100		
<b>Education</b>								
Elementary	39	86,7	6	13,3	45	100	0,000	24,37 (6,02-98,67)
Middle	30	71,4	12	28,6	42	100	0,001	9,37 (2,58-34,06)
High	4	21,1	15	78,9	19	100		
<b>Nutritional Status</b>								
Overweight	49	90,7	5	9,3	54	100	0,000	11,43 (3,923-33,318)
Not overweight	24	46,2	28	53,8	52	100		
<b>Physical Activities</b>								
Less physical activity	23	79,3	6	20,7	29	100	0,019	4,01 (1,36-11,81)
Moderate physical activity	29	85,3	5	14,7	34	100	0,002	6,07 (1,979-18,655)
Heavy physical activity	21	48,8	22	51,2	43	100		

The result of the analysis in Table 3 shows that family medical record, education and nutritional status are the most influential factors in hypertension ( $p < 0.05$ ).

**Table 3. Multivariate Analysis With Enter Method**

Variabel	B	P_value	Exp (B)
Family Medical record	-2,173	0,001	0,114
Education		0,001	
Education(1)	3,433	0,000	30,974
Education(2)	1,655	0,045	5,232
Nutritional Status	-2,302	0,001	0,100
Constants	5,807	0,000	332,549

Based on the results of the analysis of binary logistic regression, we conclude 2 probabilities. Patient who has a family medical record of hypertension, elementary education and overweight has a probability of suffering from hypertension up to 99.15% while patients who have a family medical record of hypertension, middle education and overweight has a probability of suffering from hypertension up to 95,19%.

#### 4. Discussion

This study shows a significant relationship between age and hypertension ( $p = 0,000$ ). The results of this study are in line with the research conducted by Gerungan, Kalaskan and Akili (2016) which shows a significant relationship between age and hypertension ( $p = 0,000$ ).<sup>8</sup> Physiological changes that occur in aging period, such as the decrease of stroke volume and the increase of peripheral resistance also rise the risk of suffering from hypertension.<sup>9</sup> Research conducted by Novitaningtyas (2014) shows different results, that there is no significant relationship between age and hypertension.<sup>10</sup> The difference in the results of this study is due to the lack of samples, which is only 40 samples.

This study shows a significant relationship between sex and hypertension ( $p < 0.05$ ). The results of this study are in line with the research conducted by Ramdhani, Respati and

Irasanti (2013) which shows a relationship between sex and hypertension ( $p = 0.007$ ).<sup>11</sup> When entering menopause, women are more risky to suffer from hypertension due to decreasing in estrogen production after menopause period. Estrogen hormones play a role in vasodilation by increasing the production of nitric oxide (NO) in arterioles.<sup>12</sup> Therefore, in menopausal women, the ability of blood vessels for vasodilation is decreasing, so that the blood pressure will rise and hypertension occurs. In contrast to the research conducted by Agustina, Sari and Savita (2014) shows that there is no significant relationship between sex and hypertension ( $p = 0.497$ ).<sup>5</sup> Different results are caused by the respondents' bad lifestyles in the study. The elderly who are sampled in that study have smoking habits and high stress level which are risk factors for hypertension.<sup>13</sup>

This study shows a significant relationship between age and hypertension ( $p < 0.05$ ). The results of this study are in line with the research conducted by Agustina, Sari and Savita (2014) which shows that there is a significant relationship between family medical record and hypertension ( $p = 0.008$ ).<sup>5</sup> Both parents who have a medical record of hypertension can increase the possibility of getting essential hypertension. Hypertension is often found in monozygotic twins (one egg) (Harahap et al., 2008).<sup>14</sup>

Research conducted by Mahmudah et al (2015) shows the opposite results. It states that there is no significant relationship between family medical record and hypertension ( $p = 0.068$ ).<sup>15</sup> This different results is caused by the healthy lifestyle of respondents participated in the study, such as low stress levels and non-excess sodium and fat intake due to stress levels, sodium intake and fat are risky factors for suffering from hypertension.<sup>13</sup>

This study shows a significant relationship between age and hypertension ( $p < 0.05$ ). The results of this study are in line with the research conducted by Kharisyanti and Farapti (2017) which shows that there is a

significant relationship between education and hypertension ( $p = 0.005$ ).<sup>16</sup> Education aims to fight ignorance that will affect the improvement of business skills or work. Furthermore, it will avoid poverty and increase the ability to prevent diseases, maintain and improve their health.<sup>17</sup>

In contrast to that, a research conducted by Purnama and Prihartono (2013) in Posyandu Lansia Johar Baru, Central Jakarta shows that education do not have a significant relationship with hypertension ( $p = 0.399$ ).<sup>18</sup> This different results are caused by several other factors which affecting the hypertension to occur, such as unhealthy lifestyle. There are still many respondents in the study who have smoking habits and very high stress levels. These two factors can affect the occurrence of hypertension.<sup>13</sup>

This study shows a significant relationship between nutritional status and hypertension ( $p = 0,000$ ). The results of this study are in line with the research conducted by Pakarti (2017) which shows that there is a significant relationship between nutritional status and hypertension with a value of  $p = 0,000$ .<sup>19</sup> The relationship between nutritional status and hypertension is in line with the theory which states overweight will cause the heart to work harder in meeting the needs of blood for the body which will have an impact in increasing blood pressure.<sup>20</sup>

Contrary to that, the results of a study conducted by Kristiandi (2017) shows that there is no relationship between nutritional status and hypertension ( $p = 0.659$ ).<sup>21</sup> This different results are caused by the lack of samples in the study, which only 42 people, and most of the samples does not have smoking habit, because smoking is one of the risk factors for hypertension.<sup>13</sup>

This study shows a significant relationship between physical activity and hypertension ( $p < 0.05$ ). The results of this study are in line as the research conducted by Mahmudah et al (2015) which found that there is a significant relationship between physical activity and hypertension ( $p = 0.024$ ).<sup>15</sup> The elderly who

are treated at PuskesmasSako spent more time sitting. They can spend 2-6 hours of time sitting while taking care of grandchildren and watching.

In contrast to that, the research conducted by Purnama and Prihartono (2013) found that there is no significant relationship between physical activity and hypertension ( $p = 1,000$  and  $0.802$ ).<sup>18</sup> It because the respondents' nutritional status is mostly normal and sodium and fat intake is less. Good control of risk factors, such as healthy lifestyle, can reduce the suffering from hypertension.<sup>13</sup>

## 5. Conclusion

The conclusions from the results of this research are as follows.

1. The subjects in this study are mostly 46-55 years old (43.4%), female (67.9%), have a family medical record of hypertension (1.3%), elementary education graduates (42.5%), overweight (50.9%) and have moderate physical activity (32.1%).
2. There is a relationship between age and hypertension ( $p = 0.006$  and  $0,000$ ) in the elderly at Puskesmas Sako Palembang.
3. There is a relationship between sex and hypertension ( $p = 0.027$ ) in the elderly at Puskesmas Sako Palembang.
4. There is a relationship between family medical record of hypertension ( $p = 0,000$ ) in the elderly at Puskesmas Sako Palembang
5. There is a relationship between education and hypertension ( $p = 0,000$  and  $0,001$ ) in the elderly at Puskesmas Sako Palembang.
6. There is a relationship between nutritional status and hypertension ( $p = 0,000$ ) in the elderly at Puskesmas Sako Palembang.
7. There is a relationship between physical activity and hypertension ( $p = 0.019$  and  $0.002$ ) in the elderly at Puskesmas Sako Palembang
8. The factors that most affect the most to the cause of occurrence of hypertension are family medical record of hypertension, education and nutritional status.

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