

CORRELATION BETWEEN DEPRESSION AND BLOOD PRESSURE IN ELDERLY AT ST. YOSEF NURSING HOME SURABAYA

Ferry S Gozali¹⁾, Dyana Sarvasti²⁾, Endang Isbandiati³⁾

ABSTRACT

Introduction: Population of elderly in Indonesia is increasing every year, it's caused by success of development in many sectors, especially health sector. Elderly will undergo process of degeneration which affect their health. Many factors can affect their health, one is mental health. Depression is the most common mental health problem faced by the elderly. Elderly have a greater risk of depression than younger adults. In depressed patients there are changes in the levels of hormones and neurotransmitters in the body. It can cause changes in organ function one of which is the change in blood pressure.

Aim: The purpose of this study is to find the correlation between depression and blood pressure in the elderly in St. Yosef nursing home.

Methods: This study uses an analytic study with the cross-sectional design and then analyzed using the Spearman test. This research was conducted in St. Yosef nursing home Surabaya on June 16, 2016 until June 19, 2016. The population of this study is 140 people. 46 of the 140 respondents are respondents who comply the criteria.

Result: Thirty seven (37%) were diagnosed as mild depression, eighth point seven (8,7%) were diagnosed as severe depression, and twenty three point nine (23,9%) were diagnosed as hypotension. Respondent with depression (mild and severe) and hypotension is seventeen point four (17,4%). Statistical test using Spearman correlation test shows a significant result with $p=0,048$

Conclusion: The result showed significant, so it can be concluded there is a correlation between depression and blood pressure in the elderly.

Keywords: elderly, depression, blood pressure

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- 1) Student of Faculty of Medicine, Widya Mandala Catholic University of Surabaya, Jl. Kalisari Selatan No. 1 Surabaya. Email : ferrygo30@gmail.com
 - 2) Internal Medicine Department, Faculty of Medicine, Widya Mandala Catholic University of Surabaya, Jl. Kalisari Selatan No. 1 Surabaya
 - 3) Pharmacology and Therapy Department, Faculty of Medicine, Widya Mandala Catholic University of Surabaya, Jl. Kalisari Selatan No. 1 Surabaya

INTRODUCTION

The population of elderly people in Indonesia is increasing every year, because of the success of development in various fields, especially in health sector. According to Undang-Undang Republik Indonesia Number 13 of 1998 concerning elderly welfare, what is meant by Elderly (*lansia*) is someone who has reached the age of 60 years and over. ⁽¹⁾

Along with increasing age, the elderly will experience a degeneration process that can affect their health status. One of the factors that affect the health status of elderly is their mental health. Mental health problems are the most common problem faced by groups the elderly, the most common is depression. ⁽¹⁾ According to Hawari, depression is a disorder of the mood which is characterized by moodiness, deep and ongoing sadness that loses life excitement, apathy and pessimism can then be followed by behavioral disorders. Elderly people have a greater risk of depression than young adults. In old age, environmental stress often causes depression because adaptability has decreased. ⁽²⁾ Depression actually is not part of the physiological aging process. Meanwhile, people consider it as part of the physiological aging process. This assumption causes people to underestimate

the symptoms that arise which make depression is often undiagnosed and does not get the right treatment. ⁽³⁾

The prevalence of depression in the elderly in the world ranges from 8% -15% and the results of a meta-analysis reports from countries in the world get an average prevalence of depression in the elderly as much as 13.5%. ⁽⁴⁾ The average prevalence of depression in the elderly in Indonesia is 17.8%. ⁽²⁾ Some risk factors that can cause depression in the elderly include biological factors, marital status, and psychosocial factors. ^(5,6) Biological factors include genetic, age, sex, brain structural changes, and physical weakness. A number of psychosocial risk factors also involve elderly mental disorders. These risk factors include loss of social role, death of friends or relatives, increased isolation due to loss of social interaction, and financial limitations. ⁽⁶⁾ Biological and psychosocial factors are associated with changes in the levels of hormones and neurotransmitters in the body. Changes in hormone levels and neurotransmitters can cause changes in blood pressure.

In the elderly there will be structural and functional changes in the heart and blood vessels. This causes changes in blood pressure in the elderly. The normal limit of elderly blood pressure is different from young adults. Many risk factors can cause changes in blood pressure in the

elderly, one of them is depression. The research results by Rahayujati, Lewa and Pramantara (2010) in Yogyakarta, stated that there was a significant correlation between depression and elderly blood pressure. ⁽⁷⁾ Research on the correlation of depression levels and blood pressure in the elderly in Indonesia is still limited. This is why researchers conducting a research on the correlation of depression level with blood pressure in the elderly at the St. Yosef House for Elderly.

METHODS

An analytical research using cross-sectional study was conducted. This study was to determine the correlation between depression level and blood pressure in the elderly.

The sample of this study was all elderly in the St. Yosef Surabaya House that met the criteria during June 2016, comprises of 46 respondents from 140 total populations. The inclusion criteria were the elderly (age \geq 60 years) and respondents were still cooperative. The exclusion criteria of this study were respondents with a history of both controlled and uncontrolled hypertension and respondents suffering from cognitive impairments (MMSE $<$ 17). The sampling technique used in this study was purposive sampling.

The research begins by determining the study population, calculating the sample size, and collecting data. Before collecting data, researchers must know the age of the respondent from the medical record, know the history of hypertension, and measure cognitive function using a Mini Mental State Examination (MMSE) questionnaire. These three things are useful so that the research subjects meet the inclusion and exclusion criteria. Then the researchers collected data by measuring the level of depression in the elderly using a Geriatric Depression Scale questionnaire (GDS), measuring blood pressure in elderly people suffering from depression using a mercury sphygmomanometer and classifying the blood pressure. Then the collected data was entered into the SPSS and tested for correlation using Spearman correlation test.

RESULT

Based on distribution of respondents by gender, the number of female respondents (65.2%) was more than the number of male respondents (34.8%).

Table 1. Distribution of respondents based on gender

Gender	Frequency (n)	Percentage
Male	16	34,80%
Female	30	65,20%
Total	46	100%

Based on Table 2, the 75-90 year old group has a percentage of 50%, representing the highest percentage of age group. The age group >90 years (Very Old) is the age group with the lowest percentage of 2.2%.

Table 2. Distribution of respondents based on age

Age	Frequency (n)	Percentage (%)
60-74 years old (<i>Elderly</i>)	22	47,8%
75-90 years old(<i>Old</i>)	23	50%
>90 years old (<i>Very Old</i>)	1	2,2%
Total	46	100%

Based on Table 3, the respondents included in prehypertension category had the highest percentage of 41.30%, while the respondents included in the

hypertension category had the lowest percentage of 15.2%.

Table 3. Distribution of respondents based on blood pressure

Category	Frequency (n)	Percentage
Hypotension	11	23,90%
Normal	9	19,60%
Pre- hypertension	19	41,30%
Hypertension	7	15,2%
Total	46	100%

Based on Table 4, the elderly who did not experience depression at the St. Yosef House Surabaya had the highest percentage of 54.2%, while the elderly who experienced major depression had the lowest percentage of 8.7%.

Table 4. Distribution of respondents based on depression level

Category	Frequency (n)	Percentage
Normal	25	54,2%
Mild Depression	17	37%
Severe Depression	4	8,7%
Total	46	100%

Based on Table 5, it was found that the highest percentage was in age group

60-74 and 75-90 years old while the classification of prehypertension blood pressure was 23.8% and 17.1%. The age group 60-74 years old has the lowest percentage in the hypertension case of 2.2%, while the age group 75-90 years old

has the lowest percentage in the normal blood pressure classification of 6.5%. The percentage of the age group >90 years has a normal blood pressure classification of 2.2%.

Table 5. Distribution of respondents based on age and blood pressure

Gender	Blood Pressure								Total	
	Hypotension		Normal		Prehypertension		Hypertension			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
60-74 years olds (<i>Elderly</i>)	5	10,9%	5	10,9%	11	23,8%	1	2,2%	22	47,8%
75-90 years old(<i>Old</i>)	6	13%	3	6,5%	8	17,4%	6	13,1%	23	50%
>90 years old (<i>Very Old</i>)	0	0%	1	2,2%	0	0%	0	0%	1	2,2%
Total	11	23,9%	9	19,%	19	41,3%	7	15,2%	46	100%

Based on Table 6, it was found that the highest percentage in the age group 60-74 and >90 years old was normal depression level of 30.4% and 2.2%

respectively. The percentage in the 75-90 year old group between mild and normal depression was the same at 21.7

Table 6. Distribution of respondents based on age and depression level

Age	Depression Level						Total	
	Normal		Mild Depression		Severe Depression			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
60-74 years old (<i>Elderly</i>)	14	30,4%	7	15,3%	1	2,2%	22	47,8%
75-90 years old (<i>Old</i>)	10	21,7%	10	21,7%	3	6,5%	23	50%
>90 years old (<i>Very Old</i>)	1	2.2%	0	0%	0	0%	1	2,2%
Total	25	54,2%	17	37%	4	8,7%	46	100%

The lowest percentage of age group 60-74 (Elderly) was severe depression at 2.2%. The lowest percentage of age group 75-90 was severe depression at 6.5%,

while in the age group >90 years (Very Old) there were no people who experienced mild depression and severe depression.

Table 7. Distribution of respondents based on gender and blood pressure

Gender	Blood Pressure								Total	
	Hypotension		Normal		Prehypertension		Hypertension			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Male	4	8,7%	5	10,9%	6	13%	1	2,2%	16	34,8%
Female	7	15,2%	4	8,7%	13	28,3%	6	13%	30	65,2%
Total	11	23,9%	9	19,6%	19	41,3%	7	15,2%	46	100%

Based on Table 7, it was found that the highest percentage within male respondents was prehypertension at 13%. The highest percentage within female respondents was prehypertension at 28.3%. The lowest percentage within male

respondents was hypertension at 2.2%, while the lowest percentage within female respondents with normal blood pressure at 8.7%.

Table 8. Distribution of respondents based on gender and depression level

Gender	Depression Level						Total	
	Normal		Mild Depression		Severe Depression			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Male	8	17,4%	8	17,4%	0	0%	16	34,8%
Female	17	36,9%	9	19,6%	4	8,7%	30	65,2%
Total	25	54,3%	17	37%	4	8,7%	46	100%

Based on Table 8, the percentage of male respondents who experienced mild depression and did not experience depression was the same at 17.4%. The highest percentage of female respondents

who did not experience depression at 36.9%, while the lowest percentage of female respondents was with severe depression at 8.7%.

Table 9. Distribution of respondents based on depression level and blood pressure

Blood Pressure	Depression Level						Total	
	Normal		Mild Depression		Severe Depression			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Hypotension	3	6,5%	5	10,9%	3	6,5%	11	23,9%
Normal	5	10,9%	4	8,7%	0	0%	9	19,6%
Prehypertension	13	28,2%	5	10,9%	1	2,2%	19	41,3%
Hypertension	4	8,7%	3	6,5%	0	0%	7	15,2%
Total	25	54,3%	17	37%	4	8,7%	46	100%

Based on Table 9, the highest percentage of respondents who were not depressed was found to be 13% pre hypertensive. The highest percentage of respondents who experienced mild depression was found in the classification of hypotension and prehypertension by 10.9%, and the highest percentage of respondents who experienced severe depression was found in the classification of hypotensive of 6.5%. The lowest percentage of respondents who did not experience depression was found in the classification of hypotensive of 6.5%, meanwhile the lowest percentage of respondents with mild depression was found in hypertension of 6.5%. There were no respondents who experienced severe depression with the classification of normal blood pressure and hypertension. Statistical test using Spearmen corellation test shows a significant result with $p=0,048$

DISCUSSION

In this study, the number of female respondents was higher than male at 65.2% and 34.8% respectively. This statement is supported by a study conducted by Monika in 2015, which states that older women who live in nursing homes are more numerous than elderly men. This is presumably because the life expectancy of women is higher than that of men.⁽⁸⁾

In this study, it was found that female respondents had higher blood pressure than male. This statement is supported by studies that have been carried out, according to Ninios et al in 2008 stating that elderly women have higher blood pressure than men. This is because the level of the hormone estrogen in the body decreases after menopause. Endogenous estrogen hormones function as vasodilators, increase levels of nitric oxide (NO), and

maintain sodium balance in the blood through the RAA system. ^(9,10)

The same data was also shown in the study by Pinto E in 2007, that the prevalence of hypertension in the elderly female (60.1%) was more than the elderly male (39.9%). ⁽¹¹⁾

In this study, it was found that the female respondents (19.6%) experienced mild depression more than male (17.4%). The female respondents who were severely depressed were 8.7% and none of the male respondents who had severe depression were found.

A study by Schoever et al (2009) found that prevalence of depression in male was 6.9% and 16.5% in female. The study found that diseases that cause functional disabilities such as stroke, parkinsonism and Alzheimer's are more common in women than men. Functional disability is one of the risk factors for depression. ⁽¹²⁾

The data obtained in this study are not in accordance with research by Vafaie A et al in 2016, which states that older male are more at risk of suffering from depression than female, because male are more introverted and associated with loss of strength and control (lost power and control), while women are always open with people around, which means always discussing their feelings

with others and receiving support from others. ⁽¹²⁾

In this study it was found that the number of study respondents with age group of 75-90 years (Old) who had hypertension was 13.1%, representing the age group with the highest number of people who had hypertension compared to the 60-74 years old group.

According to Mateos-Caceres PJ et al in 2011, the risk of hypertension continues to increase with age. This is caused by an increase in Reactive Oxygen Species (ROS). One result of an increase in ROS is the inactivation of NO which can cause a decrease in vascular vasodilation. ⁽¹³⁾

According to Logan AG (2011), the elderly will experience an increase in systolic blood pressure. The aging process causes a decrease in elastin, sclerosis of the smooth muscle in the blood vessels, decreased ability of the kidneys to excrete salt, increased glucose tolerance which can cause endothelial damage blood vessels, and decreased baroreceptor function. ⁽¹⁴⁾

This study also found that the number of study respondents with age group of 75-90 years old had mild depression (21.7%) and more severe depression (6.5%) than the age group 60-74 years old.

According to Mojtabai R in 2014, as people ageing, the risk of depression will double. This is caused by changes in both physical, psychological, economic, social and spiritual changes that affect the quality of life in the elderly. Age is one of the risk factors for depression.⁽¹⁵⁾

According to Susan S in 2012, elderly people have a high risk of depression, caused by disease induced disability, a decrease in the function of each organ system that interferes with daily functioning, decreased nutrient intake, especially folic acid, are thought causing depression and dementia, and financial limitations that make the elderly feel depressed.⁽¹⁶⁾

In this study it was found that the highest percentage of respondents who did not experience depression were found in prehypertension (13%). Mild depression of 10.9% found in elderly with hypotension and prehypertension, while severe depression of 6.5% was found in elderly with hypotensive blood pressure. The lowest percentage of respondents who did not experience depression was found in the classification of hypotensive blood pressure (6.5%), while the lowest percentage of respondents who experienced mild depression was found in the hypertension (6.5%). There were no respondents who experienced severe

depression with normal blood pressure and hypertension.

In a study by Artinian NT et al in 2006, there were 43.7% of depressed patients with hypotension, 38.5% with normal blood pressure, and 17.8% with hypertension.⁽¹⁷⁾ According to Hildrum B in 2007, there was a significant relationship between depression and a decrease in blood pressure (hypotension) in Norwegian. In patients with depression, there is a decrease in the sympathetic nervous system neurotransmitters, especially epinephrine and dopamine. Decreased levels of epinephrine and dopamine can cause a decrease in cardiac output and peripheral resistance, so that blood pressure drops.⁽¹⁸⁾

According to Carmilla MM in 2009, there was a relationship between depression and a decrease in blood pressure. Decreased blood pressure due to depression is caused by a decrease in neuropeptide-y levels. Neuropeptide-y is a central and autonomic nervous system neurotransmitter produced by the nucleus arcuatus in the hypothalamus. Neuropeptide-y functions as a strong vasoconstrictor.⁽¹⁹⁾

The results of this study are different from data from the American Heart Association (AHA) in 2015, that someone who is depressed can increase

the risk of hypertension and heart attack. Depression can cause an increase in cortisol levels in the body, it is thought to increase blood pressure in patients with disorders of depression, anxiety, and stress. ⁽²⁰⁾ A study by Rubio-Guerra AF et al in 2013 showed that depression can cause an increase in blood pressure. This is because in the early phase of depression is often accompanied by anxiety disorders. Anxiety disorders increase the work of the sympathetic nervous system which can cause an increase in blood pressure and heart rate. ⁽²¹⁾

CONCLUSION

Based on this study we can conclude that:

1. There was correlation between depression level and blood pressure in the elderly
2. The prevalence of mild and severe depression was found higher in elderly female than male
3. Prehypertension was the most common blood pressure classification found in St. Yosef House
4. Most elderly who experienced depression also has hypotension

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