Jurnal Indonesian Journal of Empirical Nursing Science

CORRELATION BETWEEN THE RISK OF FALL WITH INCIDENT OF HYPERTENSION IN THE ELDERY

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ABSTRACT

The health of the elderly has a significant impact on a number of diseases. Hypertension is one of the illnesses that is frequently observed in the elderly. Blood flow to the heart muscles will become restricted if the heart's blood arteries are damaged. This may contribute to heart attacks, which raises the risk of falls in older people with a history of high blood pressure. The aim of this study are correlation between the risk of fall with incident of hypertension in the eldery.

The design of this study used cross- sectional study. The population of study are elderly with hypertension in Lumbangsari Village, Bululawang District, Malang Regency, Indonesia. The sample of this study 58 respondent and used total sampling. Instrument of this variable used questionnaire. An overview of the degree of fall risk in older adults with hypertension is the variable under study. Analysis of this study used spearmank rank.

The result of this study show that of the level of risk of fall in elderly hypertensi. Eldery who have high risk of fall (48.3%), moderate risk of fall (27.6%) and small risk of fall (24.1%). Level of hypertension are hypertension grade 2nd (48%), hypertension grade 1st (34%) and prehypertension (18%). There is positive correlation between level of risk and incident of hypertension with R=0.67 and p- value= 0.02. These results are influenced by several factors, namely age, gender, education, occupation, income, disease, smoking, excessive salt consumption.

Based on this research, it can motivate elderly, to better maintain their diet and always maintain safety and health. Risk of fall eldery with hypertension can be decreased with preventive measures that can be given to the eldery.

Keywords: *hypertension, eldery, risk of fall*

ARTICLE INFO

Article history:
Submitted: December 9th 2023
Accepted:February 17th 2024
Available Online: March 26th 2024

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INTRODUCTION

Background

An elderly person is someone who has reached the age of 60 years and above. The success of development in various fields, especially the health sector, has led to an increase in the life expectancy of the world's population, including Indonesia. However, behind the success of increasing the birth rate and the burden of disease (infectious and non-communicable), it will also increase the number of dependents of the population in the productive age group on the unproductive age group (Ministry of Health, 2016). The condition of the elderly has a lot of influence on various diseases because the human body experiences the aging process. One of the diseases commonly found in the elderly is hypertension, consuming excess salt, low fiber diet, obesity, lack of physical activity, stress, smoking and alcohol consumption (Ministry of Health, 2020). Hypertension is caused by decreased elasticity of the arteries so that blood pressure tends to increase. Hypertension is a condition where there is an abnormal and continuous increase in blood pressure on several blood pressure checks caused by one or several risk factors that do not work properly in maintaining normal blood pressure, where the systolic blood pressure is as high as 165 mmHg or more while diastole reaches 95 mmHg or more (WHO, 2016).

According to WHO data, around 972 million people or 26.4% of people worldwide suffer from hypertension, this figure is likely to increase to 29.2% in 2025. Of the 972 million people with hypertension, 333 million are in developed countries and The remaining 639 are in developing countries, including Indonesia (Yonata, 2016). WHO (2013) states that one in three adults worldwide has high blood pressure and this increases with age, namely one in ten people in their 20s and 30s to five in ten people in their 50s. The most common disease in the elderly based on Basic Health Research in 2013 is hypertension. With a prevalence of 45.9% at age 55-64 years, 57.6% at age 65 years, 74% and 63.8% at age ≥ 75 years (RI Ministry of Health Information, 2016).

From the results of a preliminary study on residents of Lumbangsari Village RT 06 RW 02, Bululawang District, Malang Regency in September 2021, there were 35 elderly people and 29 elderly people at the Posyandu who had a history of hypertension, based on interviews with 29 elderly people with hypertension, 14 elderly people had grade 2 hypertension, where systolic blood pressure is ≥ 160 mmHg and diastole reaches ≥ 100 mmHg,

and 10 elderly people have grade 1 hypertension, with systolic blood pressure of 140–159 mmHg and diastole of 90–99 mmHg, and 5 other elderly people have prehypertension, where systolic blood pressure is 120 –139 mmHg and diastole 80–89 mmHg. There were 13 elderly who admitted to having fallen, 9 elderly with grade 2 hypertension, and 4 elderly with grade 1 hypertension. 5 elderly who admitted to having fallen using walking aids such as sticks, 4 elderly with grade 2 hypertension and 1 elderly with grade 1 hypertension.

Hypertension that lasts for a long period of time when left untreated can cause damage to the blood vessels in the heart. Damage to the blood vessels in the heart will result in blood flow to the heart muscles being obstructed. This can cause a heart attack, which will increase the risk of falls (WHO, 2018).

Elderly people who have a history of hypertension when doing dangerous activities such as climbing stairs or strenuous exercise may be at greater risk of falling. Falling incidents in the elderly can cause soft tissue injuries and fractures of the thigh, wrist and can even cause death.

The risk of falls can also cause various health problems such as pain, physical discomfort, limited mobility, and a slow healing process which will have an impact on the condition of the elderly, where they will experience dependency problems to carry out daily activities. The incidence of falls in the elderly continues to increase along with the increase in risk factors for falls, namely age, physical condition, psychological condition and environmental factors (Ministry of Health, 2018).

The older you get, the higher the risk of developing hypertension. Especially in elderly people who rarely do physical activities such as sports, elderly people tend to have a higher heart rate. Lack of physical activity can cause obesity which can increase blood pressure. Risk factors for hypertension include age, gender, family history and genetics which cannot be changed or controlled. If not treated immediately, hypertension can trigger strokes, blood vessel damage, attacks or heart failure, which can cause falls in the elderly (WHO, 2013).

Efforts to reduce the risk of falls are through good, correct, measured and regular physical exercise (BBTT) as well as exercises that are appropriate to each individual's health level, physical activity level and fitness level, which can reduce the risk of bone abnormalities which cause the risk of falls in the elderly. One of the good and correct physical exercises is balance training. Balance exercises are shown to help increase muscle strength on the lower limbs (legs) and to improve vestibular / body balance. Balance training is very

important for the elderly because this exercise really helps to keep the body stable so as to prevent falls which often occur in the elderly (Nurkuncoro, 2015).

METHOD

Community based case- control study was conducted among mothers who have eldery people who have hypertension in Public Health Center Malang Regency, East Java, Indonesia. The population of study are elderly with hypertension in Lumbangsari Village, Bululawang District, Malang Regency, Indonesia. The sample of this study 58 respondent and used total sampling. Instrument of this variable used questionnaire. An overview of the degree of fall risk in older adults with hypertension is the variable under study. The independent variable in this study was the risk of fall in eldery. The dependent variable are level of hypertension.

This study used a questionnaire as its data research instrument, which was examined for validity and reliability utilizing data analysis methods spearman rank using SPSS 16.0 statistical software. Instrument data used a questionnaire taken from MFS *(Morse Fall Scale)* and instrument to measure blood pressure and classification into level of hypertension. Respondent were given informed consent by signing a consent letter as research subject for interviews and filling out the questionnaires, discussions and observations. Researchers delivered informed consent and explain the research objective, voluntary and the ability to understand information. Analysis of this study used spearmank rank.

The research implemented in Juni 2022- Desember 2022 in Malang Regency, East Java, Indonesia. This study was approved by the Health Research Ethic Committee, Health Polytechnic of Malang with number 2574/KEPK/2022.

RESULT

This research was carried out in Lumbangsari Village RT 02 RW 06, Bululawang District, Malang Regency, East Java, Indonesia Lumbangsari Village is a village in Bululawang District, Malang Regency. Lumbangsari Village is directly adjacent to Gading and Sukonolo Villages to the south. Wandanpuro Village to the north, Krebet and Krebet Senggrong Villages to the east and Wonokerso Village to the west, Malang Regency, Indonesia.

Table 1. Characteristic Respondent

Indicator	f	%
Age		
55- 65 years old	24	41.4
66- 74 years old	34	58.6
Gender		
Men	14	24.1
Women	44	75.9
Educational Level		
Elementary school	32	55.2
Junior high school	18	31
Senior high school	8	13.8
Occupation		
Farmer	26	44.8
Factory workers	8	13.8
None	24	41.4

Indicator	f	%
Income		
Under 3 million IDR	28	48.3
Over 3 million IDR	30	51.7
Smoke		
Yes	18	69
No	40	31
Excess salt consumption		
Yes	0	0
No	58	100
Visual Impairment		
Yes	38	65.5
No	20	34.5
Alcohol Consumption		
Yes	0	0
No	58	100
Drug hypertension Consumption		
Yes	58	100
No	0	0
Slippery floor		
Yes	30	51.7
No	28	48.3
Lighting disorder		
Yes	42	72.4
No	16	27.6
Risk Fall		
Yes	26	44.8
No	32	55.2
Walking Aid		
Without tools	34	58.6
Stick	10	17.2
Hold on to object around you	14	24.1
Used of iv drug/ heparin		
Yes	0	0
No	58	100
Gait		
Normal	40	69
Weak	10	17.2
Limping	8	13.8
Mental status		
Disturbance	20	24.5
Normal	38	65.5
Degree of Hypertension		
Prehypertension	11	18
Hypertension grade 1st	19	34
Hypertension grade 2nd	28	48

Based on table 1 above, the results of research on age data showed that almost half of the respondents aged 66-74 years, 31% were at moderate risk of falling. In the type data, almost half of the female gender is 41% who are at moderate risk of falling. In educational data, a small number of people with at least elementary school education 24%, are at moderate risk of falling. Based on data almost half of them don't work, 9 people (31%) are at moderate risk of falling. In smoking data, almost half do not smoke, 11 people (38%) are at moderate risk of falling. In the data on excessive salt consumption, the majority of respondents consumed excess salt, 15 people (52%) were at moderate risk of falling.

Table 2. Correlation between risk fall and hypertension level

Variable	R	p- value
Risk fall and hypertension level	0.67	0.02

Based on table above correlation between risk fall and hypertension have positive correlation with r 0.67 and p- value 0.02

DISCUSS

Based on the research results above, it shows that the level of risk of falls in the elderly is almost half, 14 respondents (48.3%) have a high risk of falling, a small number of 8 respondents (27.6%) have a moderate risk of falling and a small number of 7 respondents (24.1%) is not at risk of falling. These results are influenced by several factors, namely age, gender, education, employment, income, history of illness, smoking, excessive salt consumption, visual impairment, alcohol

consumption, drug consumption, slippery floors and lighting problems.

In the data on the use of walking aids, almost half of the 15 respondents (51.7%) do not use walking aids and a small number of 5 respondents (17.2%) use sticks to walk. According to Kiik, et al (2018) elderly people who use walking aids have limb disorders or difficulty walking so that assistive devices are needed to help with daily activities and to support body weight where the legs are no longer strong enough to support them, the use of walking aids is used. to balance your body if you don't use a walking aid.

In the gait data, most of the 20 respondents (69%) were normal in walking and a small number of 4 respondents (6.9%) had a limp in their gait. This can disrupt a person's productivity and allow changes in normal gait to become abnormal. Abnormal gait changes can increase the risk of falls (Morse, 2017). Decreased physical capabilities are caused by the loss of the network's ability to repair itself and maintain its normal function so that it cannot withstand damage. This decrease in physical ability will affect locomotor function (to initiate and maintain a rhythmic gait), balance, postural reflexes, sensory function and sensorimotor integration, motor control, the musculoskeletal system and cardiopulmonary function (Pirker & Katzenschlager, 2017).

In the mental status data, most of the 19 respondents (65.5%) were aware of their condition and a small number of 10 respondents (34.5%) experienced memory limitations. According to Shin et al. (2021) in their research also said that elderly people with disturbed cognitive status and balance problems are at greater risk of falling compared to elderly people with normal cognitive status and balance.

From the research results on age data, the majority of 14 respondents (48.3%) aged 66-74 years and a small number of 7 respondents (24.1%) aged 55-65 years were not at risk of falling. According to Yaokaka (2017), as people age, they will experience a process of degeneration and a decline in their ability to carry out daily life activities, so that their flexibility will decrease and cause a greater risk of falls. According to Kiik, et al (2018) increasing age often causes various diseases, declining body function and balance and the risk of falls.

In gender data, almost half of the 10 respondents (34.5%) who are female have a high risk of falling, while a small number of 4 respondents (13.8%) who are male have a high risk of falling. Woman clinically more at risk of falling than men, this is because elderly women lack estrogen causing decreased osteoclastogenesis and loss of

bone mass, which will have an impact on changes in body posture which results in an increased risk of falls (Susilo et al., 2017). Based on theory (Nugroho, 2015); (Wahyuni & Fitrah, 2010) women fall more often than men. This is because women at an advanced age will experience menopause.

In terms of educational data, almost half of the 7 respondents (24.1%) with primary school education have a high risk of falling, while a small number of 3 respondents (10.3%) also have elementary school education and have a high risk of falling. According to WHO (2007), one of the causes of falls is low education. The respondent's education level shows that there is an influence in obtaining information about health. Low education causes elderly people to have a low level of knowledge and little knowledge about the risks of falls such as preventing or dealing with them. It can be concluded that the higher the level of education, the better the health status. On the other hand, the lower a person's education level, the worse their health status.

In the disease data, almost all of them had a history of hypertension, 12 respondents (41.3%) had a high risk of falling. Falls are one of the main health problems for the elderly, especially elderly people with comorbidities such as hypertension, diabetes, heart disease and others, elderly people who undergo treatment for hypertension is known to risk falls and injury, Orthostatic hypotension (OH) is a common clinical problem associated with hypertension. Falls can cause physical injuries such as osteoporotic fractures and head injuries (Abubakar et al., 2021).

In the fall history data (in the last 3 months), the majority did not have a history of falls, 16 respondents (55.2%) and almost half of the 13 respondents (54.8%) had a risk of falling. The results of Ashar's research (2016) explained that the causes of falls in the elderly include limb disorders, nerve disorders, vision problems, hearing problems, use of walking aids and a history of previous falls. The Fall Prevention Guideline For Older Adults states factors causing falls include epidemiological factors, health status factors, pharmacological factors, environmental factors and ergonomic factors (Lyons 2012).

In the data on comorbidities (Secondary Diagnosis), all 29 respondents (100%) did not have comorbidities. According to Black (2014) Hypertension will cause problems in the elderly. Increasing blood pressure will affect the ability of perfusion to body tissues including the brain as the center for regulating consciousness and body balance.

In the smoking data, a small number of 6 respondents (20.7%) who smoke have a high risk of falling, while a small number of 2 respondents (6.8%) have a moderate risk of falling. According to Black & Hawks (2005) which states that cigarettes contain nicotine which can cause an increase in heart rate and cause peripheral vasoconstriction which will increase peripheral blood pressure in the short term, during and after smoking. Roslina's research results (2007) stated that there was a relationship between smoking habits and the incidence of hypertension. Suryati's research (2015) states that there is a significant relationship between smoking and hypertension.

In the data on excessive salt consumption, a small number of 8 respondents (27.6%) were at high risk of falling. The results of this research are in line with the statement (Dirsken Dik, 2010) stating that sodium consumption will activate the vasopressor mechanism in the central nervous system and stimulate water retention which results in an increase in blood pressure. The results of previous research also prove that there is a relationship between consumption of salty food and the incidence of hypertension, namely the results of Sugiharto's (2007) research which states that someone who is used to consuming salty food will be 3.95 times at risk compared to people who are not used to consuming salty food.

In the visual impairment data, almost half of the 9 respondents (31%) experienced visual impairment which resulted in a high risk of falls. Changes in visualization ability can be seen from visual acuity, visual acuity is a measure of spatial resolution, usually at high contrast, and is described in minimum angle resolvable, changes that occur can affect the elderly when visualizing objects in three dimensions and measuring the distance of the object (Darowski , 2008). When a person has difficulty seeing objects and the environment, two things will happen that cause falls, firstly, the elderly do not see objects in the area where they are walking so they will bump into and trip, secondly, the elderly will be hesitant in walking and taking steps, this will make it difficult when they are in new environments and unsafe environments.

In the drug consumption data, almost half of the respondents consumed drugs, 10 respondents (34.5%) were at moderate risk of falling. Based on the results of Kuswardhani's research (2018), anti-hypertension drugs are a risk factor for falls. However, the association between antihypertensive drugs and falls was not significant. This is because one risk factor cannot cause a fall. Compared with other

risk factors, taking more than four types of medication had a significant association with falls.

In the slippery floor data, almost half of the respondents had slippery floors in their homes, 8 people (28%) were at moderate risk of falling, and in the lighting data, almost half of the respondents had no lighting problems in their homes, 11 people (38%) were at moderate risk of falling. Environment

The house can cause falls because many parts of the house are not modified to help the elderly carry out daily activities. The elderly are a group that has experienced a decline in the function of various systems in their bodies making it difficult for them to carry out activities like adults, the condition of the house is such as slippery floors, uneven yards, places to rest that are difficult to reach, stairs that are too high, items or property that are badly placed. untidy, and insufficient lighting in the house will increase the risk of falls (Darowski, 2008). An uneven yard is at risk of causing falls in the elderly, places that do not have maximum lighting, especially at night, will make it difficult for the elderly to see so that the elderly tend to trip, bump and fall.

SUMMARY

Based on the results of research that has been carried out regarding the level of risk of falls in the elderly, it was found that the self-concept of families who had experienced loss was that the majority of 15 respondents (52%) were at moderate risk of falling, almost half were 10 respondents (34%), and a small number were 4 respondents. (14%) are not at risk of falling. These results are influenced by several factors, namely age, gender, education, employment, income, suffering from illness, smoking, excessive salt consumption.

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