THE RELATIONSHIP OF VISUS WITH THE RISK OF FALLING IN THE ELDERLY

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ABSTRACT
Elderly is someone who has entered the age of 60 years and over. Elderly is an age group in humans who have entered the final stages of their life phase. The problem that often occurs in the elderly is falling. The risk of falling consists of intrinsic and extrinsic factors. Vision (visual acuity) is part of the intrinsic risk factor for falling in the elderly. The purpose of this study is to analyze the relationship between visual acuity and the risk of falling in the elderly. This research method uses quantitative analysis with a cross sectional approach. Analytics is research that tries to explore how and why health phenomena occur. The sample selection used simple random sampling technique with a total sample of 50 respondents. Data analysis test using the Kendall Tau correlation test. The results of the study based on the results of univariate visual acuity analysis were carried out with 41 respondents (82%) and the risk of falling was 32 respondents (64%). Statistical Test of the Relationship of Vision with the Risk of Falling in the Elderly. Of the 50 respondents from the bivariate analysis, the statistical test results obtained were p-value = 0.004, which means that the p-value < 0.05. The conclusion in this study is that there is a relationship between visual acuity and the risk of falling in the elderly.

Keywords: Elderly, Visus, Risk of falling

INTRODUCTION

According to the World Health Organization (WHO) Elderly is someone who has entered the age of 60 years and over. Elderly is an age group in humans who have entered the final stages of their life phase. The group that is categorized as elderly will experience a process called the aging process.

According to WHO, Elderly (Elderly) is a group of people aged 60 years or more. Globally, in 2013 the proportion of the population aged over 60 years was 11.7% of the total world population and it is estimated that this number will continue to increase in line with increasing life expectancy. WHO data shows that in 2000 the life expectancy of people in the world was 66 years, in 2012 it rose to 70 years and in 2013 it became 71 years. The proportion of elderly people in Indonesia also increases every year. WHO data in 2009 showed that the elderly amounted to 7.49% of the total population, in 2011 it became 7.69% and in 2015 the proportion of elderly people was found to be 8.1% of the total population (WHO, 2015).

Indonesia is an old structured country with an elderly population of over 7%. The percentage of elderly in 2015 has reached 9.03%, namely 23.66 million people. This increased from the previous year which was only 8.1% of the total population. In West Java, the elderly population has increased from eighth with the largest number of elderly, the percentage of elderly (elderly) in West Java is increasing. Based on data released by the Central Statistics Agency (BPS) in 2015, the percentage of

elderly people in Indonesia is 8.5 percent of the total population (Ministry of Health RI, 2015). In Bogor City, the elderly population reaches 79,261 elderly people (Bogor City Statistics Agency, 2015).

With the increase in the number of elderly people in Indonesia, the problems that arise in the elderly will occur more and more, one of which is falling. Falling is a problem that often occurs in the elderly. Based on a survey conducted in Indonesia, around 30% of seniors aged over 65 years fall every year. Half of these numbers experience repeated falls. The incidence of falls in Indonesian people aged over 65 years is 1,800 events per year which causes death (Ashar, 2016).

A fall is an event that causes a conscious subject to land on the ground involuntarily, excluding falls resulting from a hard blow, loss of consciousness, or seizures. Falls often occur and are experienced by the elderly. Many factors play a role in it, both intrinsic factors and extrinsic factors (Tinetti, 2015).

According to the World Health Organization, the proportion of the population over 60 years in the world from 2000 to 2050 will double from about 11% to 22%, or in absolute terms increase from 605 million to 2 billion elderly. Nazam (2013) conducted a survey on the incidence of patient falls in the US, where the results of the survey showed 2.3-7% per 1000 elderly people fell out of bed every day and 29-48% of the elderly experienced minor injuries and 7.5% with minor injuries. serious wound. The XII PERSI Congress (2015) reported that the incidence of patient falls in Indonesia in January-September 2015 was 14%, this illustrates that the presentation of patient falls is included in the top five medical incidents other than medication errors (Komariah, 2015).

In Indonesia the prevalence of fall injuries in people over the age of 55 reaches 49.4%, ages over 65 years and over 67.1% (Ministry of Health, RI, 2015). The annual incidence of falls among the elderly living in the community increases from 25% at the age of 70 years to 35% after the age of over 75 years (Stanley & Beare, 2015). Falls are reported to occur in around 30% of seniors aged 65 years and over who live at home (community), half of these numbers experience recurrent falls. Elderly who live at home fall around 50% and require hospital care around 10-25%. (Darmojo & Martono, 2015). Data for 2015, the incidence rate of falls in the elderly in West Java is around 45-50%.

Entering age will experience a condition of physical decline which is characterized by less clear hearing, worsening vision, decreased muscle strength (musculoskeletal disorders) which results in slow movements, and disproportionate body movements. As a result of the physical changes in the elderly, it results in impaired physical mobility which will limit the independence of the elderly in fulfilling their daily activities and cause the risk of falling in the elderly (Stanley & Beare, 2015).

Musculoskeletal disorders are a cause of disturbances in walking and balance which can result in slowness of movement, feet tend to wobble easily, as well as decreased ability to anticipate slips, trips, and slow responses that facilitate falls in the elderly. These musculoskeletal factors play a major role in the risk of falling in the elderly (Sunaryo et al, 2016).

In 2015, Brundle, et al. studied 54 visually impaired men and women aged ≥65 years in Greater Manchester, UK. The research design used in this study was a qualitative design by holding focus group discussions and interviews. Brundle, et al. managed to identify that the elderly with visual

impairments are at high risk of falling. The results of his research show that there are 5 types of factors that are identified as causes of falls in the elderly, namely: health conditions and changes in balance, cognitive impairment and habitual factors, the impact of visual impairments if they are around the house, the impact of visual impairments if adapting to the environment outside the residence, and other causes of unexplained falls. Changes in the visual system will result in a decrease in dark adaptation and a decrease in field of view (Artinzwati 2015). These changes will cause the elderly to have a high risk of falling, especially when the elderly are active and mobilizing.

The eye is the sense of sight which functions to perceive the shape, size, color, and position of an object. The function of the eye is very important for human life, but lack of attention to eye health has the potential to cause disturbances, one of which is impaired visual acuity. Visual acuity or vius is an eye ability or eye refraction to see an object. Eye injuries and diseases can affect vision. The clarity of vision can be called visual acuity, which ranges from full vision to visible vision. If sharpness decreases, vision becomes blurred (Ilyas, 2015).

The results of the preliminary study showed that the results of interviews with 10 elderly people showed that 5 elderly people said they had fallen due to visual impairment, 3 elderly people said they had fallen due to an unsafe environment and 2 elderly said they had never fallen.

Based on the description of the background above, the researcher is interested in conducting research on "The Relationship between Vision and the Risk of Falling in the Elderly." In this study there were two independent variables, namely visual acuity and one dependent variable, namely risk of falling. independent variables are variables that cause the emergence or change of the dependent variable. The dependent variable is the variable that is affected or is the result, because of the independent variables.

RESEARCH METHODS

This type of research uses quantitative analysis. Quantitative analysis is research that tries to explore how and why health phenomena occur. analytical research can be done quantitatively so that statistical analysis can be carried out. The design of this study used a cross-sectional design, cross-sectional is a study that simultaneously determines the exposure (exposure) and outcome (disease outcome) for each research subject. Another definition of a cross-sectional study is a study designed to collect data at one point in time: the phenomenon being studied is during one data collection period. cross sectional study is appropriate to use to explain the status of a phenomenon at one point in time.

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The research hypothesis is a temporary answer to the formulation of the research problem. The hypothesis in this study is the Alternative Hypothesis (Ha) meaning there is a relationship, p value 0.05. The Alternative Hypothesis (Ha) states that there is a relationship between two or more variables, it can also state that there are differences in certain respects in different groups.

The location of this research was carried out in Puskesmas Bogor Utara , Bogor Regency. When this research was carried out in September 2022. The population in this study was the elderly of 100 people.

The sampling technique in this study using simple random sampling technique is a random samplesimple. states the definition of a simple random sample is a way of taking samples by selecting directly from the population and the probability of each member of the population to become a sample is very large. How to determine the sample with:

The slovin formula: n = N/N(e2) + 1

N = Total Population

n = Number of Samples

e = Significance Level

In the slovin formula there are several provisions, namely:

The value of e = 0.1 for a large population

The value of e = 0.2 for a small population

Thus, the researcher took a sample from the entire population of 50

The data collection tool uses a questionnaire. The questionnaire is an information gathering technique that allows analysis to determine the relationship between visual acuity and the risk of falling in the elderly in Puskesmas Bogor Utara , Bogor Regency. Data processing and data analysis were computerized using the SPSS for Windows series 21 program. The analysis consisted of univariate and bivariate analysis. Bivariate analysis used Kendall's tau test where bivariate analysis analyzed the relationship between visual acuity and risk of falling in the elderly.

RESEARCH RESULT

The researcher came and introduced himself and conveyed the aims and objectives, then the researcher gave an informed consent sheet to be signed by the respondent if he agreed to help fill out the questionnaire given without any coercion. The number of respondents was 50 respondents.

The results obtained in a study entitled the relationship between visual acuity and the risk of falling in the elderly in Puskesmas Bogor Utara, Bogor Regency in 2022 are as follows:

Table 1. Frequency distribution of the characteristics of the respondents based on the age of the respondents

No	Age	Frequency	Percentage %
1	60-80 years	37	74
2	< 60 years	13	26
	Total	50	100

Based on table 1 frequency distributionAge in Puskesmas Bogor Utara , Bogor Regency, 2022.of the 50 respondents, most were aged 60-80 years, namely 37 respondents (74%).

Table 2. Distribution of the frequency of visual acuity in the elderly

No	Vision	Frequency	Percentage %
1	normal		}
2	abnormal	l	?
	Total	)	100

Based on table 2 the results of the frequency distributionVisus (Visual Sharpness) in Puskesmas Bogor Utara , Bogor Regency in 2022out of 50 respondents, most of the vision was not normal, namely 41 elderly people (82%).

Table 3. Frequency distribution of the risk of falling in the elderly

No	Resiko Jatuh	Frekuensi	Presentase %
1	Tidak Beresiko	2	4
2	Beresiko Sedang	16	32
3	Beresiko Tinggi	32	64
Total		50	100

Based on table 3 resultsfrequency distribution of Fall Risk in the Elderly,of the 50 respondents showed that most were at high risk of falling, namely as many as 32 elderly (64%).

Table 4. The relationship between visual acuity and the risk of falling in the elderly in Puskesmas Bogor Utara , Bogor Regency

Visus	Resiko Jatuh						Total		P Value
	Tidak Beresiko		*Beresiko Sedang*		*Beresiko Tinggi*				
	N	%	N	%	N	%	N	%	
Normal	1	2	6	12	2	4	9	18	0,004
Tidak Normal	1	2	10	20	30	60	4	82	
Total	2	4	16	32	32	64	5	100	

Based on table 4 above, it is known that 50 respondents, 30 of them are known to have abnormal vision with a high risk of falling. statistical test resultsThe Relationship between Vision and the Risk of Falling in the Elderly in Puskesmas Bogor Utara, Bogor Regency in 2022.From 50

respondents, the statistical test results obtained were p-value = 0.004, which means that the p-value <0.05 so that there is a relationship betweenVision with the Risk of Falling in the Elderly.

DISCUSSION

a. Visus (Visual Sharpness)

Based on the results of the frequency distributionVisus (Visual Sharpness) inOf the 50 respondents who had right and left vision, most of the vision was abnormal, namely 41 elderly people (82%).

The results of this study were compared with research conducted byAmadea Maria yanti 2018 with the title Relationship of Vision with the Risk of Falling in the Elderly Bacirokota Village, Yogyakarta.The results showed that there were 97 elderly respondents with the results of bivariate analysis with the Spearman correlation test showing that there was no relationship between the best eye vision and the risk of falling in the elderly (FES-I) (p=0.063 and r=0.190) but in the worst eye vision group the results showed that there was a relationship between the worst eye vision and the risk of falling in the elderly (p=0.018 and r=0.240). And it can be concluded that there is a relationship between the worst vision and the risk of falling in the elderly.

Abnormal vision is vision less than 5/20 in the best eye or field of vision less than 20 meters. After treatment or refractive correction (with glasses), vision does not return to normal. Vision remains impaired, a person who is less alert can use existing vision to study the world and to plan and perform tasks that require sight.

Based on the theory and results of the research that the researchers did with a total of 50 respondents, that the majority of respondents had abnormal vision 41 (82%). This was reinforced by the results of the examination using the Snellen chart that the researchers gave to the respondents.

According to the analysis of researchers concludedthat vision (visual acuity) isa component of vision and important for maintaining the balance of the body.

b. Risk of falling

Based on the resultsFrequency Distribution of Fall Risk in the Elderly in Puskesmas Bogor Utara, Bogor Regency in 2022.of the 50 respondents showed that most were at high risk of falling, namely as many as 41 elderly (64%).

The risk of falling is an increase in the possibility of falling which can cause physical injury, the risk of falling in the elderly is generally caused by environmental and physiological factors that can result in injury.

The cause of the risk of falling is usually caused by intrinsic factors in the form of a history of previous falls, decreased visual acuity, in terms of extrinsic factors can be in the form of bathrooms, floor surface conditions, lack of lighting.

Factors that affect the risk of falling fall risk is influenced by intrinsic factors and extrinsic factors. Intrinsic factors are factors that come from within a person: 1) Age is Age affects a person's

risk of falling, where age or age is closely related to the growth process and the aging process. In the elderly who have experienced the aging process, there is a physiological decline in their body, and the aging process takes place continuously. 2) Decreased visual acuity Decreased visual acuity is an abnormality of light refraction by the visual media consisting of the cornea, eye fluid, lens, glass body or the length of the eyeball so that the image of the object is refracted incorrectly in the macula lutea area without accommodation assistance. 3) Muscle strength is the strength of a muscle or muscle group produced to be able to fight resistance with maximum effort. Muscle strength is needed when doing activities. 4) Balance is the body's ability to control the center of gravity (center of gravity) or the center of mass of the body (base of support). The center of gravity is the point where the mass of an object is concentrated by virtue of its gravitational pull. in normal humans, the center of gravity is located in the lower abdomen and slightly in front of the knee joint. 5) Body mass index (BMI). 4) Balance is the body's ability to control the center of gravity (center of gravity) or the center of mass of the body (base of support). The center of gravity is the point where the mass of an object is concentrated by virtue of its gravitational pull. in normal humans, the center of gravity is located in the lower abdomen and slightly in front of the knee joint. 5) Body mass index (BMI). 4) Balance is the body's ability to control the center of gravity (center of gravity) or the center of mass of the body (base of support). The center of gravity is the point where the mass of an object is concentrated by virtue of its gravitational pull. in normal humans, the center of gravity is located in the lower abdomen and slightly in front of the knee joint. 5) Body mass index (BMI).

With increasing age, body weight increases due to the accumulation of fat in the muscles while the muscle cells themselves decrease in number and volume, so there is a tendency to reduce physical activity due to obesity. while extrinsic factors are factors that come from outside the person, for example from the surrounding environment 1) Environment. unstable tools or equipment. 2) Exercise or Physical Activity One of the interventions that can be used to improve the physiological factors that cause falls is a physical exercise program. Physical exercise can be defined as a type of activity that is planned,

The results of this study are compared with research that has been conducted by Nita Suratini (2018) entitled The Relationship between Family Support and the Risk of Falling in the Elderly in Krasakan Lumbung Rejo Tempel Village, Sleman.The results showed that 16 elderly (41%) had a high risk of falling and 8 elderly had moderate falls (20.5%).

Based on the theory and results of the research that the researchers have done, the majority of elderly respondents who are at high risk are 41 (64%). This was reinforced by the results of the questionnaire items that the researchers gave to the respondents.

According to the analysis of researchers concludedthat it is necessary to take action to prevent the risk of falling in the elderly to reduce the high risk of falling in the elderly.

c. Relationship of Vision with the Risk of Falling in the Elderly

Bivariate analysis results obtained from 50 respondents, there were 41 (82%) respondents who had the worst vision with a p value of 0.004 <0.05. Which means there is a relationship between vision and the risk of falling in the elderly.

The results of this study are comparable to Amadea Maria Yanti's 2018 study entitled The Relationship between Visus and the Risk of Falling in the Elderly in Bacirokota Village, Yogyakarta. The results showed that there were 97 elderly respondents with the results of bivariate analysis with the Spearman correlation test showing that there was no relationship between the best eye vision and the risk of falling in the elderly (FES-I) (p=0.063 and r=0.190) but in the worst eye vision group the results showed that there was a relationship between the worst eye vision and the risk of falling in the elderly (p=0.018 and r=0.240). And it can be concluded that there is a relationship between the worst vision and the risk of falling in the elderly.

Based on the results of the research and theory above, the researchers concluded that there was harmony between theory and research results, namely that abnormal vision affects the risk of falling. This is proven from the results of the research that the researchers conducted that 41 respondents (82%) had abnormal vision which caused the risk of falling.

According to the researcher's analysis, it was concluded that the elderly who have abnormal vision will cause the risk of falling in the elderly.

CONCLUSION

Based on the discussion as previously described, it can be concluded from this study as follows:

1. Known resultsfrequency distributionVisus (Visual Sharpness)Of the 50 respondents who had the right and left eye sight, most of them had the worst eyes, namely 41 elderly people (82%).
2. Known resultsFrequency distribution of Fall Risk in the Elderlyof the 50 respondents showed that most were at high risk of falling, namely as many as 32 elderly (64%).
3. Known statistical test resultsThe Relationship between Vision and the Risk of Falling in the Elderlyfrom 50 respondents obtained statistical test results p-value = 0.004, which means p-value <0.05 so there is a relationship betweenVision with the Risk of Falling in the Elderly.

SUGGESTION

1. For educational institutions

   It is hoped that it can provide reference materials and reading materials for gerontics courses and knowledge about visual acuity as well as a reference in carrying out further research on the risk of falling in the elderly.

2. For the elderly
   It is hoped that it can be used as a reference for the elderly to increase their awareness of the risk of falling which has decreased vision
3. For further researchers
   It is hoped that this can be used as basic data for further researchers to strengthen the research that will be carried out by researchers regarding visual acuity and the risk of falling
4. For professions
   It is hoped that it can increase knowledge about the relationship between visual acuity and the risk of falling in the elderly.

BIBLIOGRAPHY

1. Rigenastiti, Amadea et al. 2018. "Relationship of Vision with the Risk of Falling in the Elderly The Correlation of Visual Acuity and The Risk of Falls Of."
2. Dwi wardianti. 2018. The Relationship Between Cognition and the Risk of Falling in the Elderly at the Dharma Bhakti Surakarta Nursing Home
3. Hutomo, et al. 2015. The Relationship between Home Environment Management and the Risk of Falling in the Elderly in the Village of Karangwuni Wates Kulon Progo
4. Diah ernita. 2015. Images of Chemotherapy Responses in Elderly Patients with Acute Leukemia. Padang : Andalas University (thesis)
5. Gina Hastari. 2015. Overview of fall risk and family support for the elderly, Bandung: Bandung Health Polytechnic (thesis)
6. Asher, PH. 2016. Description of the Perception of Risk Factors for Falling in the Elderly at Tresna Werdha Budi Mulia 4 Margaguna Social Institution, South Jakarta. (Thesis). Jakarta: UIN Syarif Hidayatullah.
7. Tinetta, ME. 2015. Preventing Falls In Elderly Person. N Engl J Med 348;1:42-49.
8. Dwi Agnes, et al. 2016. Analysis of Factors Associated with the Risk of Falling in the Elderly Living at Home
9. Rigenastiti, Amadea et al. 2018. "Relationship of Visual Acuity with the Risk of Falling in the Elderly The Correlation of Visual Acuity and The Risk of Falls Of."
10. Ilyas HS, Yulianti SR. Ophthalmology. 5th ed. Jakarta: Faculty of Indonesia
11. Law number 13 of 1998 concerning elderly welfare
12. Lilik Ma'rifatul Azizah. 2011. Elderly nursing book, Yogyakarta: Graha Science
13. Dede Nasrallah. 2016. Textbook of Gerontic Nursing. New York: ECG.
14. AM Sugeng Budiono. 2011. Textbook of visual acuity. Semarang: university publishing body in penogoro, semarang
15. Guyton. 2010. Human Physiology and Basic Mechanisms of Disease. Ed.3 jakarta: EGC medical book publisher
16. Ilyas Sidarta. 2010. Guide to eye disease. Jakarta: FKUI publishing house.

17. Darmojo. 2015. https://studylibid.com/doc/637325/bab-ii-tinjauan-pustaka-2.1-risiko-fall-2.1.1-pengertian.
18. Nugroho, W. 2010 gerontic and geatrical nursing., Jakarta. EGC.
19. Dewwi : dewi, sr 2015. textbook of gerontic nursing. Yogyakarta: deepublish
20. Notoadmojo, S., 2010, Health Behavior Science, Rineka Cipta, Jakarta
21. Arikunto, Suharsimi, Research Procedures: A Practice Approach, Revised Edition VI, Jakarta: PT Rineka Cipta, 2010.
22. Herman, Adang. 2012. Learning Methodology book. Attack: LP3G
23. Sugiyono. 2014. Educational Research Methods Quantitative Qualitative Approach and R&D. Bandung: Alphabet.