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MENTAL STATUS, ABILITIES MOBILIZATION AND THE RISK OF FALLS IN THE ELDERLY WITH HYPERTENSION: A CORRELATIVE STUDY

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Abstract

Entering old age, there will be changes both physically and psychologically in a person, so that the elderly are at risk of developing hypertension. The risk of falling can have a significant impact on elderly hypertensive patients, in this condition it can cause disturbances in mental function and mobility ability. This study aimed to analyze the relationship between mental status and mobility ability with the risk of falling in elderly hypertensive patients. The research design uses correlation with a cross - sectional approach. The independent variables are mental status and mobility ability, the dependent variable is the risk of falling into the elderly. The study was conducted in November 2024 in village A in Kudus district. A sample of 64 respondents was selected through Random Sampling. The fall risk questionnaire used the Mini Mental State Exam (MMSE), mobility ability used the Elderly Mobility Scale (EMS) and fall risk used the Berg Balance Scale (BBS) which is valid and reliable. Data analysis used the Spearman Rank test. There is a relationship between mental status (p=0.001) and mobilization ability (0.001) with the risk of falling elderly people with hypertension. Intervention is needed to prevent the risk of falling by improving mental health and mobilization ability, for example elderly gymnastics.

I. INTRODUCTION

High blood pressure is a global public health problem and a leading cause of premature death worldwide. High blood pressure is called the “silent killer” because most people with hypertension are not aware of it because it usually does not show signs or symptoms (WHO, 2021 & Mills et al., 2020).

According to data from the National Health and Nutrition Examination Survey in 2017-2018, the prevalence of high blood pressure in the United States in adults is 45.4%. High blood pressure increases with age, namely 22.4% (ages 18-39 years), 54.5% (ages 40-59 years) and 74.5% (60 years and over). The prevalence of high blood pressure in Southeast Asia is around more than 30% of adults experience increased blood pressure, where almost 1.5 million deaths or 9.4% of total deaths are caused by hypertension each year (Delavera et al, 2021 & Castillo, 2019).

The risk of falling can be a significant impact on the elderly with hypertension, the elderly become more susceptible to injuries such as fractures or wounds in this condition can cause disorders in mental function and mobility abilities. Mental status is also an impact of hypertension, as a result the elderly can experience decreased cognitive function such as confusion, memory disorders. Decreased mobility ability is the impact of hypertension which causes damage to blood vessels to the muscles and nervous system which results in decreased muscle strength and body balance. The impact of mental status and mobility ability if not treated can

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increase the decline in quality of life such as decreased activity can trigger decreased physical fitness and psychological disorders that cause the risk of falls.

Based on an initial survey on August 5, 2024 conducted by researchers with the head of the Village A Posbindu working group, data was obtained on 120 elderly hypertensive patients. From 10 respondents regarding mental status and mobility ability with the risk of falling in elderly hypertensive patients aged 60-75 years, blood pressure was checked, with an average respondent blood pressure of 145/95 mmHg. Based on the results of interviews with 10 respondents by asking questions about mental status, mobility ability and risk of falling, On the risk of falling using the Berg Balance Scale (BBS) guidelines, the results showed that 2 elderly people had a high risk of falling, 4 people had a moderate risk of falling and 4 people had a low risk of falling. On mental status using MMSE measurements with the results of 8 normal people and 2 people probable cognitive disorders. On the measurement of mobility ability using the elderly mobility scale with the results of 6 independent people, 3 people experiencing limitations, and 1 person experiencing dependence.

This research differs from previous research in several important aspects. The research conductedpada penelitian Fauzul Farda et al (2021) focus on the risk of falling in the elderly. While this study explores mental status and mobility ability with the risk of falling in the elderly which provides a more comprehensive understanding of the factors that influence the risk of falling in the elderly with hypertension. In addition, the setting of the research location in Tanjungrejo village has never been done. The purpose of this research is to study in depth the relationship between mental status and ability. Mobilization with the risk of falling in elderly hypertensive patients in 2024.

II. RESEARCH METHODS

This type of research is quantitative research. where data collection is carried out using instruments, statistical data analysis with a cross-sectional approach (Sugiyono, 2019). The dependent variable of this study is the risk of falling and the independent variable is the mental status and mobilization ability and population used in this study were all elderly hypertensives who were members of the Posbindu Village A where the total population was 120 elderly . The number of samples taken in this study was 64 respondents calculated using the Isaac and Michael formula . The sampling technique used is random sampling, which is by taking a simple random sampling that can be done if the list of population names already exists using excel. Data collection for the study began in November 2024 in village A, Kudus district.

Mini Mental Status Exam (MMSE) mental status questionnaire was first developed by Marsal Folstein in 1975. MMSE is a standard questionnaire that has been tested for validity and reliability consisting of 11 aspects of questions consisting of 5 dimensions, namely, orientation, registration, attention and calculation, recall, and language. The results of the questionnaire are categorized into 3, namely: 1) Normal, total score 24-30. 2) Mild cognitive impairment, total score 17-23. 3) Severe cognitive impairment, total score 0-16. MMSE values range from 0-30, the higher the MMSE value, the better the cognitive function, conversely the smaller the MMSE value, the worse the cognitive function. The MMSE standard questionnaire that has been tested for validity using *Person Product Moment* obtained a calculated r of 0.357 and a table r value of 0.355 and reliability using the *Cronbach's Alpha formula* with a value of 0.765.

The Ederly Mobility Scale (EMS) mobilization ability questionnaire was developed by Smith in 1994. EMS is a standard questionnaire that has been tested for validity and reliability consisting of 7 aspects of questions. The results of the questionnaire are categorized into 3, namely: 1) Immobilization, score below 10. 2) Partial mobilization, score between 10-13. 3) Full mobilization, score more than 14. The higher the EMS value, the better the mobility, the

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smaller the EMS value, the worse the mobility. The validity test measured by *concurrent validity* shows p value = 0.948 and reliability shows p value = 0.75.

Berg Balance Scale (BBS) fall risk questionnaire , developed by Katherine Berg in 1989. BBS is a test tool with high validity and reliability used to measure balance consisting of 14 items of question aspects. The results of the questionnaire are categorized into 3, namely: 1) High fall risk with a score of 0-20. 2) Moderate fall risk with a score of 21-40. 3) Low fall risk with a score of 41-56. Higher scores indicate better ability to balance and vice versa. The validity test is measured by *Cronbach's alpha* of 0.948 and reliability is declared reliable if the alpha value is at least 0.60. This questionnaire is standard so its reliability is not tested (Sholekah et al., n.d.2022)

The analysis in this study is to determine the relationship between independent variables and dependent variables that are processed statistically using a computer program with statistical tests. In this study, *the Spearman rank test was used* and assisted by a computer with a significance of p <0.05. This research has been declared to have passed ethical review from the Health Research Ethics Commission (KEPK) Muhammadiyah University of Kudus with Number: 62/Z-7/KEPK/UMKU/XI/2024 on November 13, 2024. This research ethics also regulates how researchers behave during report preparation and research implementation.

III. RESULTS AND DISCUSSION

Respondent Characteristics

Characteristics	f	%
Age		
Elderly	60	93,8
Advanced old age	3	4,7
Very old age	1	1,6
Gender		
Man	9	14,1
Woman	55	85,9
Education		
No school	41	64,1
Elementary school	20	31,1
Junior High School	3	4,7
Job Category		
Farm workers	30	46,9
Self-employed	2	3,1
Housewife	21	32,8
Other	11	17,2
Category Duration of Illness		
3-8 months	8	9,4
1-2 years	45	70,1
2.5-3.5 years	9	14,1
4-5 years	4	6,3
Total	**64**	**100**

Based on Table above, it can be seen that the majority of respondents are in the age category Elderly 60 respondents (93,8%). Based on majority of respondents by gender category were female, as many as 55 respondents (85.9 %). Based on majority of respondents in the education level category were those who did not attend school, namely 41 respondents (64.1 %). above, it can be seen that the majority of respondents work as farm laborers, namely 30 respondents (46.9 %). Based on majority of respondents with the original category of illness for 1-2 years were 45 respondents (70.1 %).

Frequency Distribution Based on Fall Risk Questionnaire

Table 6 Frequency Distribution Based on Fall Risk Questionnaire

Fall Category	f	%
Tall	12	1 8.8
Currently	37	57 .8
Low	15	23.4
Total	**6 4**	**100**

(Source: Primary Data Processing Results, 2024)

Based on Table 4.6 above, it can be seen that the majority of respondents were in the moderate fall risk category, namely 37 respondents (57.8 %).

Frequency Distribution Based on Mental Status

Table 7 Frequency Distribution Based on Mental Status Questionnaire

Fall Category	f	%
Definite	28	43.8
Probable	29	45 . 3
Normal	7	10.9
Total	**64**	**100**

(Source: Primary Data Processing Results, 2024)

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Based on Table 4.7 above, it can be seen that the majority of respondents in the probable cognitive disorder category were 29 respondents (45.3 %).

Mobilization Ability

Table 8 Frequency Distribution Based on Mobilization Ability Questionnaire

Fall Category	Frequency (n)	Percentage (%)
Immobilization	12	1 8.8
Mobilization	15	23.4
Independent	37	57.8
Total	**6 4**	**100**

(Source: Primary Data Processing Results, 2024)

Based on Table 4.8 above, it can be seen that the majority of respondents are in the independent category, namely 37 respondents (57.8 %).

The relationship between mental status and risk of falls in the elderly with hypertension

Table 9. Frequency distribution between mental status and risk of falling

Mental Status	(n)	(%)	P. Value	Correlation value
definite	28	100		
Probable	29	100	0.001	0.461
Normal	7	100		
Total	**6 4**	**100**		

(Source: Primary Data Processing Results, 2024)

Based on Table 4.9 above, it can be seen that the p-value is 0.001 < 0.05 and the correlation value is 0.461.

The relationship between mobilization ability and the risk of falling in the elderly with hypertension

Table 10. Frequency distribution between mobilization ability and risk of falling

Category Fall	n	(%)	P. Value	Correlation value
Immobilization	12	100		
Mobilization	15	100	0.001	0.578
Independent	37	100		
Total	**6 4**	**100**		

(Source: Primary Data Processing Results, 2024)

Based on Table 4.10 above, it can be seen that the p-value is 0.001 < 0.05 and the correlation value is 0.578.

Discussion

Respondent Characteristics

Based on the research results obtained, it shows that of the 64 respondents with hypertension, the majority were female, as many as 55 respondents (85.9 %). This can happen because women experience menopause which results in a decrease in the production of estrogen hormones which gradually decreases naturally and tends to have more hypertension after the age of 45 years. The results of this study are in line with research conducted by Cahyani n.d.(2019)that women have the highest proportion of hypertension with a total of 62 people.

The majority of respondents were in the age range of 60-75 years as many as 60 respondents (93.8%). This is because entering the final elderly period can cause a decrease in the immune system and a lack of body response in preventing disease, stress in facing retirement which can increase blood pressure. In addition, this stress will cause people to consume excessive food, especially fatty foods, which ultimately triggers an increase in blood pressure. The results of this study are in line with research Lestari (2019)that age has a significant relationship with the incidence of hypertension.

The results of the study showed that the majority did not go to school, amounting to 41 respondents (64.1%). The level of education also indirectly affects blood pressure. The level of education affects lifestyle, namely smoking habits, drinking habits, and habits of doing physical activities such as sports. The high risk of developing hypertension in low education is likely due to the lack of knowledge in someone with low education about health. Research by Purwo Setyo (2019)states that there is a relationship between education level and hypertension

Based on the type of work, the majority of farm laborers are 30 respondents (46.9%). The impact of working long hours results in prolonged stress, many people prioritize

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work over physical health status. This study is in line with the Dachi et al., n.d. (2021)fact that the majority of people with hypertension are farm laborers. Based on the results of the study, the majority of respondents experienced hypertension within 1-2 years, 45 respondents (70.3%). Elderly people with long-term chronic diseases will increase the risk of falling. This study is supported by Puji Yuliati et al., n.d.(2021) the relationship between the length of suffering and the risk of falling in the elderly who are diagnosed with hypertension.

Mental Status

The majority of elderly hypertensive patients in Tanjungrejo Village have a mental status of probable cognitive disorders, namely 29 respondents (45.3%) . This finding is in line with research by Handayani (2023)that most elderly people are in normal status in MMSE assessment as much as 73% or 27 elderly people. While 14% others have Definite Cognitive Disorder status and 13% others have Probable Cognitive Disorder status

This can be influenced by the age factor of the elderly . As we age, there is a decline in brain function, such as decreased blood flow to the brain, changes in neuron structure, and decreased neurotransmitters . The results of the study are supported by research Lestari (2019)that shows that age has a significant relationship with the incidence of hypertension. Other research by Muna et al., (2020) states that factors that affect mental status include age, psychological factors and the endocrine system. An elderly person will experience some decline in body function. One of the changes is a psychological change that will affect mental health. Declines in various aspects cause various problems that can lead to stress. The disorder is characterized by elderly people who are reluctant to interact with others and the inability to care for themselves. If not handled properly, it can result in the risk of falling (Muna et al., 2020).

Mobilization Ability

Elderly people with hypertension in Village A found that most respondents had independent mobilization capabilities. namely 37 respondents (57.8%). This can be influenced by age factors and affect the elderly's ability to mobilize because as age increases, there is a decrease in various physical aspects of the body that affect movement and independence . As age increases, a person experiences a decrease in muscle strength, the neuromuscular system that affects mobilization is the muscle, skeletal, tendon ligament, cartilage and nerve systems. Skeletal muscles regulate bone movement because of the ability of muscles to contract and relax which works as a muscle strength lever system. This is in accordance with research Donna D Ignatavicius (2019)that factors that affect mobilization ability are age, lifestyle, disability, energy level and neuromuscular system.

Based on the research that has been done, Putu et al., n.d. (2019) it shows that mobility risk factors have a relationship with the risk of falling and Mobility is a strong predictor of the risk of falling. Mobility is the independent variable that most strongly explains the dependent variable. Decreased mobility ability can be seen from balance disorders, muscle weakness and inability to move properly.

Decreased mobility is accompanied by rapid fatigue and inability to maintain a stable posture. In addition, the elderly tend to have slow reflexes and lack of motor coordination. This can increase the risk of falls. Interventions that can reduce this risk are muscle strengthening exercise programs, as well as an environment that supports patient safety (Abdullah & Nur'amalia, 2022).

Risk of Falling

Based on the results of research in Tanjungrejo Village, Jekulo District, Kudus Regency, elderly with hypertension found that most respondents had a moderate risk of falling, amounting to 37 respondents (57.8%). This shows that decreased cognitive function in the elderly can affect body balance and

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coordination, thereby increasing the risk of falling. Risk factors for falls are divided into intrinsic and extrinsic factors: intrinsic factors are sensory system disorders, cardiovascular system disorders, and gait disorders or using walking aids (for example, patients depend on the use of canes, walkers, or do not use walkers). Extrinsic factors such as poor lighting, slippery floors, uneven floor conditions, and inadequate facilities.(Rudi & Setyanto, 2019).

The most common risk factors for falls in the elderly are due to disorders in themselves such as sensory motor disorders, cognitive disorders, central nervous system disorders, resulting in decreased balance, decreased muscle strength, and cognitive decline. In addition, it can also be caused by the dangerous state of the home environment (slippery, uneven floors, etc.). So the elderly are prone to falls or balance disorders According to (Bachtiar et al., 2020).

The relationship between mental status and the risk of falling in elderly people with hypertension in Village A, Kudus Regency

The results of the study showed that there was a relationship between mental status and the risk of falling in the elderly with hypertension in Village A , Kudus Regency. The results of the statistical test using the Spearman rho test obtained a p-value of 0.000 < (a = 0.05) so Ho was rejected, which means there is a relationship between mental status and the risk of falling in the elderly with hypertension in Tanjungrejo Village, Jekulo District, Kudus Regency.

Based on the distribution in table 9, the elderly who have definite cognitive impairment are mostly at moderate risk of falling, while the elderly who have probable cognitive impairment are also at moderate risk of falling and the elderly who are normal are mostly at moderate risk of falling. The results of the Spearman rank distribution obtained a p-value of 0.000 < (a = 0.05) and the correlation coefficient value (0.461) is in the range of 0.400-0.599 and has a positive relationship direction, meaning that the higher the mental status disorder, the higher the risk of falling, and vice versa.

Elderly people tend to experience decreased mental status and limited mobility. Elderly people who experience decreased mental status will also experience confusion and panic which ultimately affects the risk of falling. Then, limited mobility can increase the risk of falling. Elderly people with limited mobility tend to walk slower and less stably which can cause them to fall. Decreased mobility is caused by decreased muscle mass and balance due to increasing age of the elderly.

Exercises to improve balance include yoga, to help reduce the risk of falls in the elderly. Several studies have shown that regular exercise can improve stability and prevent the risk of falls.(Freiberger et al., 2020).

This study is supported by research Cui et al., (2023)obtained Spearman correlation results showing SAS and SDS scores have a weak negative correlation. This study is also supported by research conducted (Dwi Wardianti, 2019)with the results of the Chi Square test obtained a p-value of 0.0001, it can be concluded that there is a significant relationship between cognitive function and the risk of falling in the elderly. Another study by Aprilia, Lestari & Rachmawati (2019) found that there is a relationship between cognitive function and the risk of falling in the elderly at the Tresna Werdha Budi Sejahtera Banjarbaru Social Home .

The relationship between mobilization ability and the risk of falling in elderly people with hypertension in Tanjungrejo Village, Jekulo District, Kudus Regency

The results of the study showed that there was a relationship between mobilization ability and the risk of falling in the elderly with hypertension in Tanjungrejo Village, Jekulo District, Kudus Regency. Based on the distribution in table 4.10, the elderly who had immobilization were at high risk of falling, while the elderly with partial mobilization were at moderate risk of falling and the majority of independent elderly were

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at moderate risk of falling as well . The results of the Spearman rank distribution obtained a p-value of 0.000 < (a = 0.05) and the correlation coefficient value (0.578) was in the range of 0.400-0.599 and had a positive relationship direction, meaning that the higher the immobilization, the higher the risk of falling, and vice versa.

Elderly people tend to experience decreased mental status and limited mobility. Elderly people who experience decreased mental status will also experience confusion and panic which ultimately affects the risk of falling. Then, limited mobility can increase the risk of falling. Elderly people with limited mobility tend to walk slower and less stable which can cause them to fall. Decreased mobility is caused by decreased muscle mass and balance due to aging. One of the exercises to improve balance is yoga, to help reduce the risk of falling in the elderly. Several studies have shown that regular exercise can increase stability and prevent the risk of falling.(Freiberger et al., 2020).

A strong relationship between good mobilization ability or can be said to be independent elderly can keep the elderly away from the risk of falling, and vice versa if the elderly's mobilization ability decreases or even the elderly are unable to mobilize without the help of others, it will increase the risk of falling that they may experience. The elderly need to be considered regarding physical exercise, especially balance training in order to maintain optimal mobilization ability.

This study shows the results of the elderly's abilities in mobilizing such as the ability of the elderly to lie down, sit, stand, walk and reach for an object. The average elderly's mobilization ability is independent. The intensity of the elderly's physical activity decreases with the aging they experience. Decreased physical activity and immobilization can cause the elderly to experience decreased muscle strength. Mobilization ability is associated with the physical activity carried out by the elderly. The elderly sit still and lie down more often than doing physical activity, this is possible due to the lack of knowledge and interest of the elderly in physical exercise. The elderly should do physical activity for at least 30 minutes every day of the week (Abdullah & Nur'amalia, 2022).

The elderly in this study had a low risk of falling and most were able to carry out their daily activities independently. Therefore, the elderly are able to do physical activities to maintain their health in old age. Physical activity is defined as all forms of activity or body movement that cause energy expenditure, such as doing housework, shopping, gardening, or exercising.

Every physical activity requires balance, with a balance physical training program or sports that contain elements of balance such as swimming, gymnastics, Taichi etc., can reduce the risk of elderly people falling, so that the possibility of injury, fracture or even death can be minimized, and the life expectancy or health or fitness of the elderly is maintained (Supriyono, 2019).

This study is supported by (Kholifah Mar'ah Konitatillah et al., 2021)the majority of independent mobilization (49.8%) and most elderly people in UPT PSTW Bondowoso have a low risk of falling (46.8%). The results of statistical tests indicate that there is a relationship between mobilization ability and the risk of falling in elderly hypertensive patients in UPT PSTW Bondowoso (p value = 0.001). Therefore, it is very important for elderly people with hypertension to do physical activities to improve body balance so that they can mobilize independently and reduce the possibility of falling.

IV. RESEARCH LIMITATIONS

The research conducted still has many shortcomings and limitations, where the design used is cross-sectional, the results of which may not describe trends or changes in the long term, the number of samples is still limited, and the factors studied are limited to mental status and mobilization ability.

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V. CONCLUSION

This study shows a significant relationship between mental status, mobility ability and the risk of falling in elderly with hypertension. Further researchers are expected to explore this topic with a cohort design, a larger sample size and measure other factors that may affect the risk of falling in elderly with hypertension.

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