

The Relationship Between Visual Acuity and the Risk of Falls Among the Elderly at The Tresna Werdha Social Services Unit in Jember, 2026

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ABSTRACT

Introduction: The aging process is characterized by a decline in the body's physiological functions, one of them are decreased visual acuity. In older adults, decreased visual acuity affects the vestibular system, leading to impaired balance and reduced ability to maintain postural stability, which increases the risk of falls. This study was conducted to determine the relationship between visual acuity and the risk of falls among older adults at the UPT PSTW Jember.

Method: This study employed a correlational design with a cross-sectional approach. The study population consisted of 100 participants, with a sample of 80 older adults selected using simple random sampling. Data were collected through visual acuity testing using the E Chart and fall risk assessment using the Morse Fall Scale (MFS), which were analyzed using Spearman's Rho correlation test.

Result: The results of the study indicate that the majority of participants had low vision (82.5%) and that the majority were classified as being at high risk of falling (53.8%). The Spearman Rho correlation analysis yielded a p-value of 0.000 ($p < 0.05$) with a correlation coefficient of $r = 0.729$, indicating a significant association between visual acuity and the risk of falling, reflecting a strong correlation and a positive relationship.

Conclusion: The correlation results indicate that as visual acuity declines, the risk of falling increases. Declining vision impairs the ability to perceive the environment, judge distances, detect obstacles, and maintain balance, highlighting the need for interventions to improve the safety of older adults.

Keywords: *Older Adults; Visual Acuity; Risk of Falling*

Introduction

Old age is the final stage of human development, following childhood, adulthood, and middle age, during which individuals undergo the aging process (Destriande et al., 2021). The aging process is a progressive change in the body that occurs over time.

leading to a decline in physiological function and ultimately resulting in the death of the organism; it affects various aspects of life including physical, mental, biological, and socioeconomic aspects which play a crucial role in determining the quality of life in older adults (Elmaghfuroh dkk., 2023). The aging process is also associated with changes in health status and a decline in the body's ability to perform daily functions, which can affect the well-being of older adults and increase the risk of chronic noncommunicable diseases (Destriande et al., 2021). A decline in physiological function can lead to health problems in older adults, causing them to face difficulties in meeting their needs (López-Otín et al., 2023).

The aging process leads to physiological changes characterized by a decline in organ function, such as weakened muscle strength, deterioration of the cardiovascular and respiratory systems, and a decline in sensory functions such as vision and hearing (Dewi dkk., 2022); (Goyani et al., 2024). One of the geriatric conditions commonly found in older adults is declining vision, which can impair their ability to adapt to their surroundings and maintain their balance (Völter et al., 2021). This condition is characterized by reduced visual acuity, a narrowed field of vision, decreased contrast sensitivity, and difficulty adapting to changes in lighting, which ultimately affect spatial perception, the ability to judge distance, and postural stability (Eswanti & Sunarno, 2022). Visual acuity is the eye's ability to recognize objects at a distance in detail. A decline in visual acuity also affects spatial perception, balance, and the ability to judge distance and movement (WHO, 2023).

According to data from the Central Statistics Agency (BPS) in its 2024 Elderly Population Statistics publication, the proportion of the elderly population in Indonesia stands at 12% of the total population, or approximately 33.5 million people out of a total population of 279 million. The proportion of the elderly in East Java is 16.02% of its total population of approximately 40.5 million, meaning the number of elderly people in this province is estimated to reach 6.48 million (BPS, 2024). Meanwhile, the elderly population in Jember Regency is approximately 415,437 people (BPS Jember, 2024). Findings from the March 2024 National Socioeconomic Survey (Susenas) indicate that approximately 42.81% of older adults in Indonesia experience health complaints, with vision problems being among the most common. More than 14 million older adults in

Indonesia suffer from declining vision, which can reduce their quality of life and increase their risk of becoming dependent on others for daily activities (BPS, 2024).

The preliminary study conducted by the researcher found that the elderly population at the UPT PSTW Jember consisted of 140 elderly individuals, divided into 43 independent elderly, 57 semi-dependent elderly, and 40 fully dependent elderly. A preliminary study conducted on 10 elderly individuals found that 8 out of 10 experienced a decline in visual acuity, and 3 of them had a history of falling within the past 6 months. This indicates that the elderly at the UPT PSTW Jember are at risk of falling.

Declining visual acuity has a negative impact on the lives of older adults, including reduced mobility, difficulty performing daily activities, an increased risk of depression due to social isolation, and a decline in quality of life. Common consequences include balance issues, decreased muscle strength, cognitive decline, and an increased risk of falls (Konitatillah dkk., 2021). Older adults with vision impairments are twice as likely to experience a fall compared to older adults with normal vision (WHO, 2021). A decline in visual acuity makes it difficult for older adults to recognize their surroundings, thereby increasing the risk of missteps and loss of balance (Mehta et al., 2022).

Research findings Gupta et al., (2023) states that older adults with bilateral vision problems are more likely to experience repeated falls than individuals with normal vision. This indicates that vision problems in both eyes significantly affect older adults' ability to maintain balance and perceive their surroundings. Consistent with the findings of a study from (Singh & Maurya, 2022) states that vision problems have a direct impact on the daily activities of older adults, such as walking, changing positions, and recognizing objects in their surroundings, making them more prone to losing their balance and ultimately falling.

The risk of falls among older adults refers to a situation in which older adults have a high likelihood of falling due to internal and external factors. Internal factors include decreased visual acuity, hearing loss, muscle weakness, balance disorders, and the use of certain medications. Meanwhile, external factors such as slippery floors, poor lighting, and unsafe room layouts also increase the risk. Falls among the elderly can

result in serious injuries, fractures, reduced independence, and even death (Gupta et al., 2023). Based on the background and phenomena described above, the researcher is interested in conducting a study on the Relationship Between Visual Acuity and the Risk of Falls Among the Elderly at the Tresna Werdha Social Services Unit in Jember.

Method

This study employed a correlational design with a cross-sectional approach. The study population consisted of 100 older adults from independent living and semi-care facilities, with a sample of 80 older adults determined using the Slovin formula and selected through simple random sampling. Data were collected through visual acuity testing using the E Chart and a fall risk observation sheet using the Morse Fall Scale (MFS), which were analyzed using Spearman's rho correlation test.

Results

Table 1. Frequency Distribution of Respondents by Age Group

Age Group	Frequency (f)	Percentage (%)
60-74 years	53	66,3
75-84 years	27	33,8
>90 years	0	0
Total	80	100

Source: Data Primary, 2026

Based on Table 1, which presents the results of the frequency distribution analysis by age category, data was collected from 80 respondents, with the majority falling into the elderly category, totaling 53 respondents (66.3%).

Table 2. Frequency Distribution of Respondents by Gender

Gender	Frequency (f)	Percentage (%)
Male	36	45
Female	44	55
Total	80	100

Source: Data Primary, 2026

Based on Table 2, which presents the results of the frequency distribution analysis by gender, data was collected from 80 respondents, with the majority being female, totaling 44 respondents (55%).

Table 3. Frequency Distribution of Respondents Based on History of Falls

History of Falls	Frequency (f)	Percentage (%)
Never Fallen	28	35
Have Fallen	52	65
Total	80	100

Source: Data Primary, 2026

Based on Table 3, which presents the results of the frequency distribution analysis of fall history, data was collected from 80 respondents, with the majority 52 respondents (65%) having experienced a fall.

Table 4. Frequency Distribution of Respondents by Visual Aid

Assistive Devices	Frequency (f)	Percentage (%)
Glasses	9	11,3
Do Not Use	71	88,8
Total	80	100

Source: Data Primary, 2026

Based on Table 4, which presents the results of the frequency distribution analysis of visual aids, data was collected from 80 respondents, the majority of whom 71 respondents (88.8%) did not use visual aids.

Table 3. Frequency Distribution of Respondents by Walking

Assistive Devices	Frequency (f)	Percentage (%)
Cane	26	32,5
Walker	3	3,8
None	51	63,7
Total	80	100

Source: Data Primary, 2026

Based on Table 5, which presents the results of the frequency distribution analysis of walking aids, data was collected from 80 respondents, with the majority 46 respondents (57.5%) not using walking aids.

Table 6. Frequency Distribution of Respondents by Health Issue

Health Issue	Frequency (f)	Percentage (%)
Coronary Herth Disease	10	12,5
<i>Gout</i>	26	32,5
Cataracts	5	6,3
Hipertension	36	45
Glaucoma	3	3,8
Total	80	100

Source: Data Secondary, 2026

Based on Table 6, which presents the results of the frequency distribution analysis of health problems, data was collected from 80 respondents, with the majority 36 respondents (45%) reporting hypertension as their health problem.

Table 7. Frequency Distribution of Respondents by Visual Acuity

Visual Acuity	Frequency (f)	Percentage (%)
Normal	14	17,5
<i>Low Vision</i>	66	82,5
Total	80	100

Source: Data Primary, 2026

According to Table 7, data was collected from 80 respondents; the majority of respondents 66 in total (82.5%) had low vision.

Table 8. Frequency Distribution of Respondents by Risk of Falling

Risk of Falling	Frequency (f)	Percentage (%)
No Risk	14	17,5
Low Risk	23	28,7
High Risk	43	53,8
Total	80	100

Source: Data Primary, 2026

According to Table 8, data was collected from 80 respondents; the majority of respondents 43 respondents (53.8%) were at high risk of falling.

Table 9. Relationship Between Visual Acuity and Risk of Falling

Visual Acuity	Risk of Falling								<i>P Value</i>	<i>r</i>
	No Risk		Low Risk		High Risk		Total			
	f	%	f	%	f	%	f	%		
Normal	14	17,5%	0	0,0%	0	0,0%	14	17,5%	0,000	0,729
<i>Low Vission</i>	0	0,0%	23	28,7%	43	53,8%	66	82,5%		

Source: Data Primary, 2026

The results of the statistical analysis using Spearman's rho test yielded a p-value of < 0.001 , indicating that $p < \alpha$, which means there is a significant association between visual acuity and the risk of falling among the elderly at the Tresna Werdha Social Services Unit in Jember.

Discussion

The results of a study conducted on 80 elderly individuals residing at the Tresna Werdha Social Services Center in Jember indicate that the majority of respondents in this study experienced a decline in visual acuity (low vision), with a rate of 82.5%. During visual acuity testing, elderly individuals who wear glasses are advised to remove them. Visual acuity is generally affected by the aging process, which causes degenerative changes in the eye's structures. Researchers suggest that the high prevalence of low vision is due to factors that affect visual acuity in older adults, namely age, gender, the use of visual aids, and health issues.

In line with the high prevalence of vision loss among the elderly, the results of this study also indicate that the majority of respondents are at high risk of falling. The results of a study conducted on 80 older adults residing at the Tresna Werdha Social Services Unit in Jember indicate that the highest fall risk category in this study was the high-risk category, comprising 43 respondents (53.8%). This is consistent with the findings of Bahtiar dkk., (2024) at the Tresna Werdha Nirwana Puri Social Welfare Home in Samarinda, East Kalimantan, researchers found that 63 respondents (64%) were at high risk of falling. The risk of falling can be influenced by intrinsic and extrinsic factors. A high risk of falling among the elderly generally indicates a significant decline in physiological function, such as balance disorders, decreased muscle strength, and limited mobility. This condition is often exacerbated by comorbidities that can affect bodily stability. In addition to individual factors, the high risk of falling also reflects the influence of environmental factors, particularly those experienced by the elderly living in nursing homes, such as slippery floors, inadequate lighting, and a lack of mobility aids. Differences in the risk of falls among older adults can be influenced by a number of factors, including age, gender, history of falls, use of walking aids, health issues, and visual acuity.

The results of the bivariate analysis using Spearman's Rho statistical test with a significance level of < 0.05 yielded a p-value of 0.000. A p-value of < 0.05 with a table r of 0.729 indicates a strong correlation. The direction of the correlation in this study is positive (+). This means that the hypothesis is accepted and there is a significant relationship between visual acuity and the risk of falling among the elderly

at the Tresna Werdha Social Service Unit in Jember. Visual acuity enables individuals to clearly distinguish the shapes and details of objects, which can be influenced by the physiological function of the eye and the aging process. According to the study by Silaen dkk., (2023) which states that vision impairment in the elderly is the result of the body's degenerative processes, which can affect an individual's ability to perform daily activities.

Research conducted at the UPT PSTW Jember revealed that 66 respondents (82.5%) were older adults with reduced visual acuity (low vision) and a high risk of falling. The researchers hypothesized that the decline in visual acuity and high risk of falling among the elderly were caused by impairments in receiving and processing visual information from the environment, thereby reducing their ability to maintain balance, recognize obstacles, and estimate distances. This condition is exacerbated by the aging process, which leads to a decline in sensory and neuromuscular function, making the elderly more prone to postural instability and an increased risk of falling.

Failure to wear glasses among older adults with vision impairments can worsen visual perception, thereby increasing the risk of tripping or slipping. This study is supported by the opinion that Ouyang et al., (2022) which states that older adults with impaired vision and balance and gait disorders who do not use glasses or canes are at high risk of falling. Impaired vision affects vestibular function, but the use of corrective eyewear does not significantly improve impaired vision.

Declining visual acuity is linked to the role of the vestibulocochlear system in maintaining the body's balance. The human balance system is the result of the integration of three components: the visual, vestibular, and proprioceptive systems. When visual acuity declines, the visual information that should help orient the body's position relative to the environment becomes suboptimal. This condition leads to greater reliance on the vestibular system in the inner ear (vestibulocochlear system); however, in older adults, the function of this system has also declined due to degenerative processes. Consequently, the integration of information between the visual and vestibular systems is disrupted, thereby reducing the body's ability to maintain postural balance. The resulting impacts include impaired stability while standing or walking, an increased risk of losing balance, and delayed responses to

changes in body position or the surrounding environment. This condition ultimately increases the likelihood of falls among the elderly, particularly when moving about in unsafe environments or in areas with limited lighting (Politi et al., 2022). In addition, declining physical health, the presence of comorbidities, and balance disorders further impair older adults' ability to adapt to visual impairments (Yulianti dkk., 2022).

Meanwhile, older adults with declining visual acuity but a low risk of falling exhibit adaptive behaviors, such as being more cautious when walking, recognizing their limitations, and receiving support from their surroundings whether in the form of assistance with mobility or a safer environment. In addition, relatively good physical condition, such as maintained balance and muscle strength, also plays a role in reducing the risk of falling despite visual impairment. These findings are consistent with research conducted Mehta et al., (2022) which states that the risk of falls among older adults is not solely influenced by visual impairments, but also by other factors such as physical activity, health status, and environmental factors; thus, the presence of these factors can reduce the likelihood of falls among older adults with visual impairments.

Declining visual acuity (low vision) in older adults is closely linked to an increased risk of falling. Older adults with visual impairments tend to have difficulty recognizing their surroundings such as obstacles, changes in floor surfaces, or suboptimal lighting and are therefore unable to anticipate potential hazards on their own. Researchers also assume that reduced visual acuity affects older adults' responses and behaviors during daily activities such as walking, moving from one place to another, and maintaining balance making them more vulnerable to mobility impairments and loss of stability, which ultimately increases the likelihood of falls.

Conclusion

Based on the study conducted at the Tresna Werdha Social Services Unit in Jember from March 9, 2026, to April 7, 2026, it can be concluded that the visual acuity of the elderly is predominantly classified as low vision, while their risk of falling is predominantly in the high-risk category. Furthermore, there is a statistically significant

correlation between visual acuity and the risk of falling among the elderly at the Tresna Werdha Social Services Unit in Jember.

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