

The Factors Affecting the Risk of Falls Among Elderly in the Working Area of Motoboi Kecil Public Health Center

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Abstrak

Dalam perjalanan hidupnya, lansia akan mengalami segala keterbatasan yang berhubungan dengan masalah kesehatan. Secara biologis, daya tahan fisik penduduk lansia semakin melemah. Hal ini dapat disebabkan oleh penurunan struktur dan fungsi sel, jaringan, serta sistem organ tubuh lansia. Dapat dibuktikan bahwa kelompok lansia lebih banyak menderita penyakit yang menyebabkan penurunan kemampuan dalam melakukan aktivitas dibandingkan dengan orang yang masih mudah. Penyakit dan masalah yang sering dihadapi lansia adalah mudah jatuh. Jatuh merupakan suatu kondisi di mana seseorang terjatuh dengan atau tanpa disaksikan orang lain, secara tidak sengaja atau direncanakan, dengan arah jatuh ke lantai, dengan atau tanpa mencederai dirinya sendiri. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi risiko jatuh pada lansia di UPTD Puskesmas Motoboi Kecil. Penelitian ini menggunakan desain cross sectional. Jumlah sampel dalam penelitian ini sebanyak 35 responden. Analisis data menggunakan Uji Chi-Square. 1. Hasil penelitian menunjukkan bahwa terdapat hubungan antara faktor gangguan penglihatan dan penggunaan alat bantu jalan dengan risiko jatuh pada lansia di UPTD Puskesmas Motoboi Kecil dengan nilai $P = 0,000$ atau $<P = 0,05$. 2. Hasil penelitian menunjukkan bahwa terdapat hubungan antara faktor gangguan penglihatan dan lingkungan dengan risiko jatuh pada lansia di UPTD Puskesmas Motoboi Kecil dengan nilai $P = 0,019$ atau $<P = 0,05$. 3. Setelah dilakukan uji Chi-Square, didapatkan bahwa terdapat hubungan antara faktor alat bantu jalan dengan faktor lingkungan dengan risiko jatuh pada lansia di UPTD Puskesmas Motoboi Kecil dengan nilai $P = 0,002$ atau $<P = 0,05$.

Kata kunci: gangguan penglihatan; alat bantu jalan; lingkungan; lansia; risiko jatuh

Abstract

In the course of their lives, the elderly will experience all the limitations associated to health problems. Biologically, the physical endurance of the elderly population is weakening. This can be caused by a decrease in the structure and function of cells, tissues, and organ systems of the elderly body. It can be proven that the elderly group suffers more from diseases that cause a decrease in the ability to carry out activities compared to people who are still easy. Diseases and problems that are often faced by the elderly are easy to fall. Falling is a condition in which a person falls with or without being witnessed by others, accidentally or planned, with the direction of falling to the floor, with or without injuring himself. This study aims to determine factors affecting the risk of falling in the elderly at UPTD Puskesmas Motoboi Kecil. This study used a cross sectional design. The number of samples in this study were 35 respondents. Data analysis using the Chi-Square Test. 1. result showed that there was a correlation between the factor of visual impairment and the use of walking aids and the risk of falling on the elderly at the UPTD Puskesmas Motoboi Kecil with a P Value = 0.000 or $<P = 0.05$. 2. result showed that there was a correlation between visual impairment and environmental factors and the risk of falling on the elderly at the UPTD Puskesmas Motoboi Kecil with a P value = 0.019 or $<P = 0.05$.

After the Chi- Square test was carried out, it was found that there was a correlation between the walking aid factor and the environmental factors at risk of falling on the elderly at the UPTD Puskesmas Motoboi Kecil with a P value = 0.002 or $<P = 0.05$.

Keywords: vision impairment; walking aids; environment; elderly; risk of fall

INTRODUCTION

According to the World Health Organization, an elderly person is someone who has entered the age of 60 years and above. The elderly is an age group who have entered the final stage of their life phase. Elderly will go through a process called the aging process. According to the World Health Organization, especially in the Southeast Asia region, the elderly population is 8% or around 142 million people. By 2050 it is estimated that the elderly population will increase 3 times from the previous year. In 2000 the number of elderlies was around 7.4% of the total population, while in 2010 the number of elderlies was 9.7% of the total population, and in 2020 it is estimated that the number of elderlies will reach 11.34% of the total population (WHO, 2018).

According to survey data in Indonesia, the incidence of falls in the elderly aged 65 years is around 30% and the incidence of falls at the age of >80 years is around 50%, and the incidence of falls in nursing homes is around 43.47% each year. This figure is expected to continue to increase (BKKBN, 2020).

Elderly will go through a process called the aging process that usually limit their ability to move or to do certain activities. Biologically, the physical endurance of the elderly population is weakening. This can be caused by a decrease in the structure and function of tissue cells, as well as the organ systems of the elderly body. It can be proven that the elderly group suffers more from diseases that cause a decrease in the ability to carry out activities and make them at high risk of falling.

Falling is a condition where a person falls with or without being witnessed by others, accidentally or planned, with the direction of falling to the floor, with or without injuring himself. The causes of falls in the elderly include accidents such as slipping, sudden loss of consciousness, vertigo, and so on. Factors that influence the incidence of falls in the elderly can be both intrinsic factors and extrinsic factors. Intrinsic factors could include factors that exist in patients such as joint stiffness, muscle weakness, hearing loss, vision, balance disorders, hypertension, diabetes, and so on. While, the extrinsic factors are factors found in the environment such as inappropriate footwear, slippery floors, uneven roads, lack of lighting, tripping, and others (Sardjito, 2019).

In the province of North Sulawesi in 2018, out of 2.5 million people, there were 267 thousand elderly people aged 60 years and over. This number is estimated to increase 13.5% in 2025. While, the prevalence of injuries due to falls at the age of 65-74 years is around 8.1%, and at the age of more than 74 years, the prevalence is around 9.2% (RISKESDAS, 2018).

The results of research conducted by Utami (2017) on the correlation between family support and the risk of falling in the elderly in Yogyakarta, showed the results of sufficient family support as many as 19 people (48, 7%) and less support as many as 8 elderly (20.5%), the risk of falling in the elderly showed 16 elderly (41%) experienced a moderate risk of falling and 8 elderly (20.5%) experienced a low risk of falling. The Kendall Tau test results obtained a p-value of $0.029 < 0.05$, with a correlation coefficient of 0.329 (Utami, 2017).

The results of research conducted by Hidayat, et.al (2018) on the correlation between knowledge and family behavior in preventing fall risk in the elderly in Tebas Sungai village, showed that half of families had sufficient knowledge in preventing the risk of falling in the elderly and almost half (46.7%) of families provided good behavior in preventing the risk of falling in the elderly. Another research conducted by Hastari and Ariani, (2018) on the fall risk and family support in the elderly in Kelurahan Pasir Jaya, showed that more 71% respondents had a low risk of falling and 52% of the respondents provided good family support to the elderly.

The results of research conducted by Rudy and Setyanto, (2019) on the factors affecting the risk of falling in the elderly showed that there is a significant correlation between impaired limb system, visual impairment, and home environment with the risk of falling in the elderly. The results of research conducted by Saputra and Syah (2018) on the correlation between family support and the risk of falls in the elderly in Kayen Sendangsari Pajangan Bantul showed high family support as many as 42 elderly (82.4%), moderate family support as many as 4 elderly (7.8%), low support as many as 5 elderly (9.8%). The risk of falling in the elderly shows 32 elderly (62.7%) have a low risk of falling and 19 elderly (37.3%) have a moderate risk of falling.

METHODS

The study used descriptive analytic method using cross sectional approach. This research was conducted in May - June 2022 at UPTD Puskesmas Motoboi Kecil. The population in this study were all elderly in the working area of UPTD Puskesmas Motoboi Kecil (291 elderly in total). The sample was 35 elderly chosen using simple random technique. ~~The sampling technique using the slovin formula amounted to 35 elderly.~~ Data collection was carried out using questionnaire. Data collected was about intrinsic factors, including visual impairment and extrinsic factors, including walking aids and the environment. Data analysis using univariate analysis used to analyze the data about samples' characteristics. Bivariate analysis is used to analyze the correlation between the intrinsic factor and the risk of falling and the correlation between the extrinsic factor and the risk of falling. The analysis used was Chi Square statistical test. The independent variable of this study was visual impairment, and the dependent variables was walking aids and the environment.

RESULTS

1. Description of Respondent Characteristics

Table 1. Respondent Characteristics by Age and Gender

Characteristic	Frequency	Percentage
Age		
60-70	32	91.4%
71-80	3	8.6%
Total	35	100%
Gender		
Male	11	31.4%
Female	24	68.6%
Total	35	100%

Based on the table above, it can be seen that the characteristics of respondents based on age are mostly elderly aged 60-70 years, namely 32 respondents (91.4%) and the least elderly aged 71-80 years, namely 3 respondents (8.6). the characteristics of respondents based on gender, most of the elderly are female, namely 24 respondents (68.6%) and the fewest Jansia are male, namely 11 respondents (31.4%).

2. Univariate Analysis

Table 2. Frequency Distribution of Visual Impairment

Vision Impairment	Frequency	Percentage
No interference	15	42.9%
There is interference	20	57.1%
Total	35	100%

Based on the table above, it can be seen that most of the elderly have visual impairment, namely 20respondents (57.1%) and the least elderly who do not have visual impairment, namely 15 respondents (42.9%).

Table 3. Frequency Distribution of Walking Aids

Walking aids	Frequency	Percentage
Not at risk	15	42.9%
At Risk	20	57.1%
Total	35	100%

Based on the table above, it can be seen that most of the elderly are at risk of falling, namely 20 respondents (57.1%) and the least elderly who are not at risk of falling, namely 15 respondents (42.9%).

Table 4. Frequency Distribution of Environment

Environment	Frequency	Percentage
Not at risk	9	25.7%
At Risk	26	74.3%
Total	35	100%

Based on the table above, it can be seen that most of the elderly are at risk of falling, namely 26 respondents (74.3%) and the fewest elderly who are not at risk of falling are 9 respondents (25.7%).

3. Bivariate Analysis

Table 5. Correlation between visual impairment and walking aids at UPTD Puskesmas Motoboi Kecil

Visual impairment	Walking aids			P Value
	Not at risk	At Risk	Total	
No interference	4 (11.4%)	11 (31.4%)	15 (42.8%)	0.000
There is interference	11 (31.4%)	9 (25.7%)	20 (57.1%)	
Total	15 (42.9%)	20 (57.1%)	35 (100%)	

Based on the table above, it can be seen that the elderly who do not have visual impairment and walking aids used are not at risk of falling there are 4 respondents (11.4%), elderly who do not have visual impairment and walking aids used are at risk of falling there are 11 respondents (31.4%) while elderly who have visual impairment and walking aids used are not at risk of falling there are 11 respondents (31.4%), elderly who have visual impairment and walking aids used are at risk of falling there are 9 respondents (25.7%).

The results of the Chi-Square statistical test obtained P value = 0.000 < α = 0.05. This means that there is a correlation between the factor of visual impairment and the factor of walking aids at the risk of falling at the UPTD Puskesmas Motoboi Kecil or the alternative hypothesis (Ha) is accepted and the null hypothesis (HO) is rejected.

Table 6. The correlation between visual impairment and the environment at UPTD Puskesmas Motoboi Kecil

Visual impairment	Environment			P Value
	Not at risk	At Risk	Total	
No interference	7 (20%)	8 (22.9%)	15 (42.9%)	0.019
There is interference	2 (5.7%)	18 (51.4%)	20 (57.1%)	
Total	9 (25.7%)	26 (74.3%)	35 (100%)	

Based on the table above, it can be seen that elderly people who do not have visual impairment and their environment are not at risk of falling are 7 respondents (20.0%), elderly people who do not have visual impairment and their environment is at risk of falling are 8 respondents (22.9%), while elderly people who have visual impairment and their environment is not at risk of falling are 2 respondents (5.7%), elderly people who have visual impairment and their environment is at risk of falling are 18 respondents (51.4%).

The results of the Chi-Square statistical test obtained a P value = 0.019 or < α = 0.05. This means that there is a correlation between visual impairment factors and environmental factors at risk of falling at the UPTD Puskesmas Motoboi Kecil or the alternative hypothesis (Ha) is accepted and the null hypothesis (HO) is rejected.

Table 7. Correlation between walking aids and the environment at UPTD Puskesmas Motoboi Kecil

Walking aids	Environment		Total	P Value
	Not at risk	At Risk		
Not at risk	3 (8.6%)	12 (34.3%)	15 (42.9%)	0.002
At Risk	6 (17.1%)	14 (40%)	20 (57.1%)	
Total	9 (25.7%)	26 (74.3%)	35 (100%)	

Based on the table above, it can be seen that the elderly with walking aids used are not at risk and the environment is not at risk of falling there are 3 respondents (8.6%), elderly with walking aids used are not at risk and the environment is at risk of falling there are 12 respondents (34.3%) while the elderly with walking aids used are at risk and the environment is not at risk of falling there are 6 respondents (17.1%), elderly with walking aids used are at risk and the environment is also at risk of falling there are 14 respondents (40.0%).

The results of the Chi-Square statistical test obtained a P value = 0.002 or $\alpha = 0.05$. This means that there is a correlation between the factor of walking aids and environmental factors of fall risk at the UPTD Puskesmas Motoboi Kecil or the alternative hypothesis (H_a) is accepted and the null hypothesis (H_0) is rejected.

DISCUSSION

1. Respondent Characteristics

a. Age

Based on the results of the study, it can be seen that the elderly aged 60-70 years were 32 respondents (91.4%) and the elderly aged 71-80 years were 3 respondents (8.6). According to Smith et al (2017) the age of the elderly does not affect the risk of falling but the risk of falling is more prevalent in those with visual impairment, the environment, hypertension. As people get older, people often accept that falls are unavoidable; however this is not the case (Reis Da Silva, 2023). Individuals can still be at a high risk of falling despite screening assessment and management, thus, at home, the emphasis should be on anticipating and preventing falls (Reis Da Silva, 2023).

b. Gender

Based on the results of the study, it can be seen that the elderly are female, namely 24 respondents (68.6%) and the elderly are male, namely 11 respondents (31.4%). Clinically, women are more at risk of falling than men, this is due to a lack of estrogen in elderly women which causes osteoclast genesis to decrease and loss of bone mass can cause changes in posture that affect the risk of falling (Patton, Vincenzo & Lefler, 2022). In women, falls were significantly associated with poor nutritional status and instrumental ADL dependence; and in both genders, falls were significantly associated with greater depression, ADL dependence, and the presence of more chronic diseases and negatively associated with physical performance (Minhee et.al., 2023). Previous study showed that improving nutritional status and strengthening physical ability is the most effective strategy for reducing fall risk in older elderly women. (Minhee et.al., 2023).

2. Univariate Analysis

a. Visual impairment

The results of the study can be seen that most of the elderly have visual impairment, namely as many as 20 respondents. An opaque lens certainly makes it difficult to pass light to the retina, as a result the image on the retina becomes blurred so that vision becomes unclear which has the potential to cause falls in old age (Hashemi et.al., 2022). When the elderly have difficulty seeing around them, two things will happen that cause the elderly to fall, namely not seeing objects when walking which makes them stumble, and the elderly will definitely hesitate in walking or stepping.

b. Walking aids

The results of the study can be seen that most of the elderly are at risk of falling, namely as many as 20 respondents. According to Maresova et.al (2023) the elderly need ease of movement and do various activities independently, so that they do not feel troublesome for their families. Declining physical abilities make it difficult for the elderly to achieve independence, which is why they need various assistive devices to facilitate their movement.

c. Environment

The study found that most of the elderly were at risk of falling, namely 26 respondents. According to Dady (2020) the environment is a situation or condition that is either supportive or dangerous that can affect falls in the elderly. About 70% of falls in the elderly occur at home, 10% occur on the stairs, with the incidence of falling when going down the stairs more than when going up, the others occur due to tripping over household items

lying below, slippery or uneven floors, carpets that are not held properly, poor lighting (less bright or blinding) (Alabdullgader & Rabbani, 2021).

3. Bivariate Analysis

a. Correlation between visual impairment and walking aids at UPTD Puskesmas Motoboi Kecil

Based on the results of the Chi-Square statistical test, the P value = 0.000 was obtained, which means it is smaller than the value $\alpha = 0.05$. This means that there is a correlation between the factor of visual impairment and the factor of walking aids at the risk of falling at the UPTD Puskesmas Motoboi Kecil. When the elderly have difficulty seeing around them, there will be two things that cause the elderly to fall, namely not seeing objects when walking which makes them stumble, and the elderly will definitely hesitate in walking or stepping. The results of this study are in line with Hasinudin & Abdillah (2025) where there is a significant correlation between visual impairment factors and the risk of falls in the elderly.

Based on the results of the Chi Square statistical test, the P value = 0.019 was obtained, which means that it is smaller than the value $\alpha = 0,05$. This means that there is a correlation between visual impairment factors and environmental factors at risk of falling at the UPTD Puskesmas Motoboi Kecil. When the elderly have difficulty seeing their surroundings, there will be two things that cause the elderly to fall, namely not seeing objects at work] which makes them stumble, and the elderly will definitely hesitate to walk or step (Ouyang, et.al., 2022).

b. The correlation between walking aids and the environment at UPTD Puskesmas Motoboi Kecil

Based on the results of the Chi Square statistical test, the P value = 0.002 was obtained, which means it is smaller than the value $\alpha = 0.05$. This means that there is a correlation between the factor of walking aids and environmental factors at risk of falling at the UPTD Puskesmas Motoboi Kecil. Elderly people who use walking aids have impaired limbs or difficulty in walking so that the need for walking aids to support body weight where the legs are no longer strong enough to support. The results of this study are in line with Ravika (2018) where there is a significant correlation between the factor of walking aids and the risk of falls in the elderly at BPPLU Bengkulu City. An unsafe environment can cause the risk of falls in the elderly, because the environment can affect when humans are in a place that causes such as slippery or uneven floors, poor lighting (less bright or blinding) (Alabdullgader & Rabbani, 2021).

CONCLUSIONS

Based on the results and discussion, it can be concluded that:

1. Most of the elderly at UPTD Puskesmas Motoboi Kecil have visual impairment as one of the risk factors of falling.
2. Most of the elderly at the small UPTD Puskesmas Motoboi using walking aid, and this is one of the risk factors of falling.
3. Most of the elderly at UPTD Puskesmas Motoboi Kecil have “at risk” environment that become one of the risk factors of falling.
4. There is a correlation between the use of walking aids and environmental factors with the risk of falling on the elderly at UPTD Puskesmas Motoboi Kecil.
5. There is a correlation between visual impairment factors and environmental factors with the risk of falling in the elderly at the UPTD Puskesmas Motoboi Kecil.

REFERENCE

- Alabdulgader, A., & Rabbani, U. (2021). Prevalence and risk factors of falls among the elderly in Unaizah City, Saudi Arabia. *Sultan Qaboos University Medical Journal*, 21(1), e86.
- Central Bureau of Statistics. (2019). Statistics of the Elderly Population 2019. Jakarta: Central Bureau of Statistics.
- Dady, F., Memah, H. P., & Kolompoy, J. A. (2020). Correlation between Environmental Hazards and Fall Risk of the Elderly at BPLU Senja CeraH Manado.
- Deniro, A. J. N., Sulistiawati, N. N., & Widjajanti, N. (2017). The Correlation between Age and Activity of Daily Living with Fall Risk in Geriatric Outpatient Installation Patients. 4(4), 199-203.
- Donsu J D T. (2017). Methodology, Nursing Research. Yogyakarta.
- Dunsky, A., Zeev, A., & Netz, Y. (2017). Balance performance is task specific in older adults. *BioMed research international*, 2017(1), 6987017.
- Dady, F., Memah, H. P., & Kolompoy, J. A. (2020). Hubungan Bahaya Lingkungan dengan Risiko Jatuh Lanjut Usia di BPLU Senja CeraH Manado. *Jurnal Persatuan Perawat Nasional Indonesia (JPPNI)*, 3(3), 149-156.
- Gamage, N., Rathnayake, N., & Alwis, G. (2019). Prevalence and Associated Risk Factors of Falls

- among Rural Community-Dwelling Older People: A Cross-Sectional Study from Southern Sri Lanka. *Current gerontology and geriatrics research*, 2019(1), 2370796.
- Hashemi, H., Asharlous, A., Yekta, A., Aghamirsalim, M., Nabovati, P., Sadoughi, M. M., & Khabazkhoob, M. (2022). Astigmatism profile in the elderly population: Tehran Geriatric Eye Study. *Japanese journal of ophthalmology*, 66(5), 461-473.
- Hasinuddin, M., & Abdillah, A. (2025). Analysis of Intrinsic and Extrinsic Factors with the Risk of Falls in the Elderly at the Elderly Posyandu. *Jurnal Kesehatan dr. Soebandi*, 13(1).
- Hastari, Ghina, & Ariani, N. P. (2018). Gambaran Resiko Jatuh Dan Dukungan Keluarga Pada Lansia Di RW 08 Kelurahan Pasir Jaya Kecamatan Bogor Barat Tahun 2018.
- Herman, T. H & Kamitsuru. 2018. NANDA-I Nursing Diagnosis.
- Hidayat, N., Wahyuni, T. D., & Sulasmini, S. (2018). Hubungan Antara Pengetahuan Dengan Perilaku Keluarga Dalam Pencegahan Risiko Jatuh Pada Lansia di Desa Tebas Sungai Kecamatan Tebas Kabupaten Sambas Provinsi Kalimantan Barat. *Nursing News: Jurnal Ilmiah Keperawatan*, 3(3).
- Magfiroh, N. F. (2025). Analisis Faktor Resiko Terjatuh pada Lansia di Posyandu Yudistira RW 02 Puskesmas Pandanwangi Kota Malang. *Jurnal Penelitian Multidisiplin Bangsa*, 1(11), 2036-2040.
- Maresova, P., Krejcar, O., Maskuriy, R., Bakar, N. A. A., Selamat, A., Truhlarova, Z., & Vítkova, L. (2023). Challenges and opportunity in mobility among older adults; key determinant identification. *BMC geriatrics*, 23(1), 447.
- Minhee, S. U. H., Kim, D. H., Insook, C. H. O., & Ham, O. K. (2023). Age and gender differences in fall-related factors affecting community-dwelling older adults. *Journal of Nursing Research*, 31(2), e270.
- Ouyang, S., Zheng, C., Lin, Z., Zhang, X., Li, H., Fang, Y., & Wu, G. (2022). Risk factors of falls in elderly patients with visual impairment. *Frontiers in public health*, 10, 984199.
- Patton, S., Vincenzo, J., & Lefler, L. (2022). Gender differences in older adults' perceptions of falls and fall prevention. *Health promotion practice*, 23(5), 785-792.
- Ravika, Ramlis. (2018). Faktor-faktor yang berhubungan dengan resiko Jatuh pada lansia di BPPLU Kota Bengkulu Tahun 2017. *Journal of Nursing and Public Health*, 6(1).

- Reis da Silva, T. H. (2023). Falls assessment and prevention in the nursing home and community. *British journal of community nursing*, 28(2), 68-72.
- Rudi, A., & Setyanto, R. B. (2019). Analisis faktor yang mempengaruhi risiko jatuh pada lansia. *Jurnal Ilmiah Ilmu Kesehatan: Wawasan Kesehatan*, 5(2), 162-166.
- Rosidawati. (2018). Knowing the Elderly and their care. Jakarta. Salemba Medika
- Saputra, I., & Syah, Rahadian Syah. (2021). Hubungan Dukungan Keluarga Dengan Risiko Jatuh Pada Lansia Di Dusun Kayen Sendangsari Pajangan Bantul. *Media Ilmu Kesehat*, 9(2), 156-163.
- Smith AD, Silva A, Rodrigues S, Moreira M, Nogueira J, Tura L, et al. Assessment of Risk of Falls in Elderly living at Home. Brazil. *Rev. Latino-Am. Enfermagem* 2017;25:e2754.
- Utami, N., & Suratini, S. (2017). The Correlation between Family Support and the Risk of Falling in the Elderly in Krasakan Village Lumbungrejo Tempel Sleman Yogyakarta. Undergraduate Thesis. Yogyakarta: Faculty of Health Sciences, Aisyiyah University.
- Widyanto, F. (2017). Community Nursing with a Practical Approach. Yogyakarta: Nuha Medika