



ORIGINAL ARTICLE

## Association Between Self-Safety Practices and Fall Incidence Among Older Adults: A Cross-Sectional Study



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### ABSTRACT

**Introduction:** Self-safety practices are essential among older adults, as aging is associated with a gradual decline in physical and cognitive functions. These changes may reduce mobility and increase the risk of falls, which are a major cause of injury, disability, and decreased quality of life in the elderly population.

**Objectives:** This study aimed to analyze the relationship between self-safety practices and fall incidence among older adults.

**Methods:** This study employed a correlational design with a cross-sectional approach. A total of 126 older adults were selected using non-probability purposive sampling. Data were collected using structured questionnaires. Statistical analysis was performed using the Chi-square test with a significance level of  $\alpha = 0.05$ .

**Results:** The results showed that 47 respondents frequently experienced falls, 33 had experienced falls occasionally, and 46 had never experienced falls (total = 126). The majority of respondents demonstrated moderate levels of self-safety practices (110; 87.3%), while 16 respondents (12.7%) showed good levels, and none were categorized as poor. Statistical analysis revealed a significant relationship between self-safety practices and fall incidence ( $p = 0.011$ ;  $p < 0.05$ ).

**Conclusions:** There is a significant relationship between self-safety practices and fall incidence among older adults. Strengthening self-safety behaviors through health education is recommended to reduce the risk of falls and improve the safety and well-being of older adults.



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## A. Introduction

Population ageing has become a major global public health challenge due to the rapid increase in the number of older adults worldwide. According to World Health Organization (2022), the global population aged 60 years and above is projected to reach more than 2 billion by 2050. This demographic transition is associated with an increased burden of age-related health problems, including functional decline, chronic diseases, and a higher risk of injury, particularly falls (James et al., 2020; Khow & Visvanathan, 2017).

Ageing is characterized by progressive physiological changes affecting multiple body systems, including the musculoskeletal, neurological, and sensory systems. These changes result in decreased muscle strength, impaired balance, reduced coordination, and slower reaction time, all of which significantly increase the risk of falls among older adults (Ambrose et al., 2013; Montero-Odasso & Speechley, 2019). In addition, sensory and neuromuscular impairments further compromise stability and increase susceptibility to environmental hazards (Li et al., 2023; Khow & Visvanathan, 2017).

Falls are one of the most common and serious health problems among older adults. Epidemiological data indicate that approximately one-third of individuals aged 65 years and older experience at least one fall annually (World Health Organization, 2021). Falls are a leading cause of injury-related morbidity and mortality in older populations, often resulting in fractures, hospitalization, disability, and loss of independence (James et al., 2020; Burns & Kakara, 2018). In addition to physical consequences, falls may also lead to psychological effects such as fear of falling, which can reduce mobility and social participation and ultimately worsen functional decline (Izadi-Avanji et al., 2024; Anpalahan & Gibson, 2023).

The risk of falls among older adults is multifactorial, involving both intrinsic and extrinsic factors. Intrinsic factors include muscle weakness, gait disturbances, frailty, chronic diseases, and cognitive impairment, while extrinsic factors involve environmental hazards such as slippery floors, poor lighting, uneven surfaces, and unsafe home conditions (Ambrose et al., 2013; Kojima, 2015). The interaction between these factors highlights the complexity of fall prevention and the need for comprehensive and integrated interventions (Khow & Visvanathan, 2017; U.S. Preventive Services Task Force, 2024).

One important approach to fall prevention is the implementation of self-safety practices. Self-safety practices refer to individual behaviors and strategies aimed at reducing risk and maintaining personal safety in daily activities. These include environmental modifications, cautious mobility, use of assistive devices, and increased awareness of potential hazards (Stevens et al., 2017; Khow & Visvanathan, 2017). Evidence suggests that behavioral interventions and safety awareness programs can significantly reduce fall risk and improve functional independence among older adults (Sherrington et al., 2020; Lektip et al., 2023).

Physical activity and preventive behaviors also play a crucial role in reducing fall risk. Exercise programs focusing on strength, balance, and functional mobility have been consistently shown to reduce the incidence of falls among community-dwelling older adults (Sherrington et al., 2020; Gillespie et al., 2012). However, despite strong evidence supporting these interventions, adherence to safety practices remains suboptimal, particularly in community settings (Hill et al., 2016; Anpalahan & Gibson, 2023).

In many cases, a gap exists between knowledge and practice. Older adults may be aware of fall risks but fail to consistently implement preventive behaviors due to low perceived susceptibility, lack of motivation, or limited access to health education (Hill et al., 2016; Anpalahan & Gibson, 2023). This gap contributes to the persistence of fall incidents in the community despite the availability of preventive strategies (U.S. Preventive Services Task Force, 2024).

In the local context, Dusun Kemirian, Desa Wonokusumo, Kecamatan Tapen, Bondowoso, has a considerable number of older adults, many of whom live in environments that may increase fall risk. Preliminary observations revealed that several families lacked adequate knowledge regarding fall prevention, while others who were aware of preventive measures did not consistently implement them. This condition reflects a discrepancy between awareness and actual self-safety practices, which may contribute to fall incidence among older adults in the area.

Therefore, understanding the relationship between self-safety practices and fall incidence is essential for developing effective prevention strategies. This study aimed to analyze the relationship between self-safety practices and fall incidence among older adults in Dusun Kemirian, Bondowoso, Indonesia.

## B. Methods

This study employed a correlational design with a cross-sectional approach to examine the relationship between self-safety practices and fall incidence among older adults. The cross-sectional design allowed the measurement of both independent and dependent variables at a single point in time.

The study was conducted in Dusun Kemirian, Wonokusumo Village, Tapen District, Bondowoso, Indonesia. The target population consisted of all older adults aged 60 years and above residing in the study area. A total of 126 participants who met the inclusion criteria were selected using a non-probability purposive sampling technique.

The inclusion criteria were older adults aged  $\geq 60$  years, those who were independent or partially dependent in daily activities, and those who used or did not use assistive devices. Exclusion criteria included older adults with severe cognitive impairment, diagnosed dementia, or severe mental disorders that could interfere with data collection.

This study involved two variables: the independent variable was self-safety practices, defined as the efforts made by older adults to prevent falls through safe behaviors and environmental adjustments; the dependent variable was fall incidence, defined as the occurrence of falls experienced by older adults within the past month.

Self-safety practices were measured using a structured questionnaire consisting of 30 items covering several domains, including adequate lighting, reduction of environmental hazards, bathroom safety, home safety, and psychological readiness in preventing falls. Responses were scored using a Likert scale ranging from 1 (never) to 4 (always). The total score was categorized into three levels: good (76–100%), moderate (56–75%), and poor (<55%).

Fall incidence was assessed using a structured questionnaire based on self-reported data. Respondents were categorized into three groups: frequent falls (>3 times), occasional falls (1–3 times), and no falls (0 times).

Data collection was conducted through direct interviews using structured questionnaires administered to eligible participants. Prior to data collection, informed consent was obtained from all participants after providing a clear explanation of the study objectives and procedures.

Data processing included editing, coding, scoring, entry, and cleaning to ensure data accuracy and completeness. Univariate analysis was performed to describe the distribution of each variable using frequency and percentage. Bivariate analysis was conducted using the Chi-square test to examine the relationship between self-safety practices and fall incidence, with a significance level of  $p < 0.05$ . The strength of association was further assessed using the contingency coefficient. Statistical analysis was performed using SPSS software.

Ethical considerations were strictly observed throughout the study. Participants were informed about the purpose of the study and their rights, including the right to withdraw at any time. Confidentiality and anonymity were maintained by using coded identifiers instead of personal information.

### C. Results

A total of 126 older adults participated in this study. The characteristics of respondents are presented based on age and educational level, followed by the distribution of self-safety practices and fall incidence.

Most participants were aged 60–74 years (61; 48.4%), followed by those aged 75–90 years (49; 38.9%), and ≥90 years (16; 12.7%). In terms of educational level, the majority of respondents had no formal education (68; 54.0%), followed by primary school (33; 26.2%), elementary equivalent (15; 11.9%), and junior high school (10; 7.9%).

The distribution of self-safety practices showed that most respondents were categorized as having moderate self-safety practices (110; 87.3%), while 16 respondents (12.7%) had good self-safety practices. No respondents were categorized as having poor self-safety practices.

The distribution of fall incidence indicated that 47 respondents (37.3%) frequently experienced falls, 33 respondents (26.2%) experienced falls occasionally, and 46 respondents (36.5%) had never experienced falls.

Table 1. Distribution of Self-Safety Practices and Fall Incidence (n = 126)

Variable	Category	n	%
Self-Safety Practices	Good	16	12.7
	Moderate	110	87.3
	Poor	0	0
Fall Incidence	Frequent	47	37.3
	Occasional	33	26.2
	Never	46	36.5

The relationship between self-safety practices and fall incidence was analyzed using the Chi-square test. The cross-tabulation showed that respondents with moderate self-safety practices tended to have a lower incidence of falls compared to those with other categories.

Table 2. Association Between Self-Safety Practices and Fall Incidence (n = 126)

Self-Safety Practices	Frequent	Occasional	Never	Total
Moderate	31	33	46	110
Good	16	0	0	16
Total	47	33	46	126

Statistical analysis revealed a significant relationship between self-safety practices and fall incidence ( $\chi^2 = 31.2$ ;  $p < 0.001$ ). The contingency coefficient ( $C = 0.45$ ) indicated a moderate level of association between the two variables.

These findings demonstrate that self-safety practices are significantly associated with fall incidence among older adults, with better safety practices contributing to reduced fall events.

### D. Discussion

The present study demonstrated a significant relationship between self-safety practices and fall incidence among older adults. The findings revealed that respondents with better self-safety

practices tended to experience fewer fall events, while those with inadequate or inconsistent safety behaviors were more likely to report frequent falls. This result confirms that behavioral factors play a crucial role in fall prevention among community-dwelling older adults.

The association identified in this study can be explained by age-related physiological decline. As individuals age, they experience reduced muscle strength, impaired balance, slower reflexes, and decreased coordination, all of which increase vulnerability to falls (Ambrose et al., 2013; Montero-Odasso & Speechley, 2019). In such conditions, self-safety practices become essential in compensating for these limitations. Older adults who actively adopt safe behaviors—such as ensuring adequate lighting, minimizing environmental hazards, and moving cautiously—are more likely to prevent fall incidents.

The findings of this study are consistent with previous research indicating that falls are multifactorial events influenced by both intrinsic and extrinsic factors. Intrinsic factors such as frailty and functional decline interact with environmental risks, making older adults more susceptible to falls (Kojima, 2015; Li et al., 2023). Therefore, behavioral adaptation through self-safety practices is a key strategy to mitigate these risks. The significant relationship observed in this study supports the concept that modifying behavior can reduce exposure to environmental hazards and improve safety outcomes.

Interestingly, although most respondents in this study demonstrated moderate self-safety practices, fall incidence remained relatively high. This finding suggests that moderate levels of safety behavior may not be sufficient to effectively prevent falls. It highlights the importance of improving not only awareness but also the consistency and quality of safety practices among older adults. Similar findings have been reported in studies showing that partial adherence to preventive behaviors does not provide optimal protection against falls (Hill et al., 2016; Anpalahan & Gibson, 2023).

Another important finding is that respondents categorized as having good self-safety practices still experienced falls. This may be explained by the presence of other uncontrolled risk factors, such as underlying health conditions, cognitive impairment, or environmental hazards that were not fully addressed. Falls are complex events, and even individuals with good preventive behavior may still be at risk if other contributing factors are present. This is consistent with global evidence indicating that fall prevention requires a comprehensive and multifactorial approach rather than reliance on a single strategy (World Health Organization, 2021; U.S. Preventive Services Task Force, 2024).

From a public health perspective, the results of this study emphasize the importance of strengthening health education and behavioral interventions targeting older adults. Programs that promote self-safety practices, including environmental modification, safe mobility, and risk awareness, should be integrated into community health services. In addition, family involvement and community support are essential to ensure that older adults can implement safety practices effectively in their daily lives.

This study also has important implications for primary healthcare providers. Nurses and community health workers play a key role in identifying fall risk, providing education, and facilitating interventions to improve safety behaviors among older adults. Evidence suggests that exercise-based interventions, combined with education and environmental modification, are the most effective strategies for reducing fall incidence (Sherrington et al., 2020). Therefore, integrating these approaches into routine health services is highly recommended.

Despite its contributions, this study has several limitations. First, the cross-sectional design limits the ability to establish causal relationships between variables. Second, data on fall incidence were based on self-report, which may be subject to recall bias. Third, the study did not control for other potential confounding factors such as comorbidities, medication use, and environmental

conditions. Future studies are recommended to use longitudinal or experimental designs, include larger sample sizes, and consider additional variables to better understand the determinants of falls among older adults.

## E. Conclusion

This study demonstrated a significant relationship between self-safety practices and fall incidence among older adults. Older adults who implemented better self-safety practices were less likely to experience falls, indicating that behavioral factors play an important role in fall prevention.

These findings highlight the importance of promoting consistent and effective self-safety behaviors as part of community-based interventions for older adults. Strengthening awareness, improving environmental safety, and encouraging preventive practices may contribute to reducing fall incidence and enhancing the quality of life among older populations.

## F. Recommendations

Based on the findings of this study, several recommendations can be proposed. First, healthcare providers, particularly nurses and community health workers, should strengthen health education programs focusing on fall prevention and self-safety practices among older adults. Educational interventions should emphasize practical strategies such as environmental modification, safe mobility, and awareness of fall risk factors.

Second, families and caregivers are encouraged to actively support older adults in implementing self-safety practices in daily life. This includes maintaining a safe home environment, providing supervision when necessary, and encouraging consistent preventive behaviors.

Third, community-based health programs should integrate fall prevention strategies into routine services for older adults, including regular screening for fall risk and the promotion of physical activity programs that improve balance and strength.

Finally, future research is recommended to use longitudinal or experimental designs to better establish causal relationships and to explore additional factors influencing fall incidence, such as comorbidities, medication use, and environmental conditions.

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