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History of Falls and The Use of Walking Aids on The Incidence of Depression in The Elderly in Indonesia

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Article Info

Abstract

Depression is a prevalent concern, especially among the elderly who are at risk of falling and rely on walking aids. This study examines the relationship between falls, walking aid usage, and depression in the elderly using data from the Indonesian Family Life Survey 5 (IFLS-5). Conducted as a cross-sectional study, it included respondents aged ≥ 60 years. Among the 2909 respondents, the majority of respondents were aged below 75 years (13.4%), women (51.6%), and lower level of education (84.1%) with a prevalence of depression of 24,1%. The research revealed that age, education, and a history of falls were significantly associated with the occurrence of depression (p<0.05). Age above 75 years old (OR: 0,653; 95% CI: 0,495-0,862) and higher education level (OR: 0,626; 95% CI: 0,483-0,811) was found to be a protective factor, while a history of falls was found to be a predictive factor to depression in elderly (OR: 1,996; 95%CI: 1,393-2,332). However, the use of walking aids showed no correlation with depression. These findings suggest that while age and education act as protective factors, a history of falls serves as a predictive factor for depression in the elderly.

Introduction

Currently, Indonesia has entered the era of an aging population, marked by an increasing number of elderly individuals (Badan Pusat Statistik, 2023). The rising number of elderly poses a particular challenge, especially in the healthcare sector. With advancing age, there is an increased risk of various degenerative issues, non-communicable diseases, and mental health problems, including the risk of depression (Fiske *et al.*, 2009; Weyerer *et al.*, 2013). Studies estimate that 7.2% of the elderly worldwide experience severe depression, and 17.1% experience depression at some point in their lives (Fiske *et al.*, 2009). Factors influencing depression include declining physical function and a history of falls. Declining physical function leading to activity limitations can further exacerbate the decline in muscle tissue function, increasing the risk of falls among the elderly (Iaboni and Flint, 2013; Salari *et al.*, 2022; Satria *et al.*, 2022).

Depression and a history of falls have a significant two-way relationship. Excessive fear of falling is often associated with depression. Fear and anxiety are significant cognitive-affective responses to falling events. Given the close relationship between depression and

anxiety in the elderly, excessive fear and anxiety of falling are closely related to depression (Iaboni and Flint, 2013; Salari *et al.*, 2022; Satria *et al.*, 2022). Besides balance training programs aimed at improving the balance of the elderly, the use of walking aids has become common among the elderly with motor function impairment or a history of falls (Widagdo *et al.*, 2024). These efforts are expected to reduce excessive fear of falling among the elderly. Modok *et al.'*s research indicates that the percentage of elderly individuals using walking aids reaches 13.5%. However, walking aids for the elderly often cause excessive fear, leading to depression (Modok and Wati, 2019; Anggarani and Djoar, 2020; Thies *et al.*, 2020). However, these studies are still controversial (Horowitz *et al.*, 2006; Kvæl *et al.*, 2017; Putu Martha and Kurniawan Djoar, 2020).

Previously, research on depression in the elderly using data from the Indonesian Family Life Survey-5 (IFLS-5) has been conducted (Handajani *et al.*, 2022; Madyaningrum *et al.*, 2019). The Indonesian Family Life Survey-5 is a health survey collected longitudinally with a representative sample from 13 provinces in Indonesia. These data include the health status of the elderly (Strauss *et al.*, 2016). However, to the best of the researchers' knowledge, research on the relationship between the history of falls and the use of walking aids with depression in the elderly using IFLS-5 data has never been conducted. This needs to be done considering previous studies indicating that a history of falls and the use of walking aids can lead to depression in the elderly (Salari *et al.*, 2022; Thies *et al.*, 2020). Therefore, this study focuses on analyzing the correlation between the history of falls and the use of walking aids with depression in the elderly in Indonesia. This research is expected to guide the elderly with a history of falls and the use of walking aids regarding the occurrence of depression.

Methods

This descriptive-analytic study with a cross-sectional approach utilized secondary data from the IFLS-5 (Indonesian Family Life Survey), a continuous community health survey in Indonesia conducted by RAND, Survey Meter, and the Center for Population and Policy Studies at Gadjah Mada University from September 2014 to March 2015 (Strauss *et al.*, 2016). The inclusion criteria comprised elderly individuals aged ≥ 60 years who completed questionnaires regarding their history of falls, use of walking aids, and depression (using the Center for Epidemiologic Studies Depression Scale: CESD-10). This questionnaire has been validated as a screening tool for depression risk in the elderly, with a sensitivity of 90% and specificity of 95% (Baron *et al.*, 2017; Fu *et al.*, 2022). The exclusion criteria for this study included incomplete data.

Statistical analysis in this study employed chi-square and multiple logistic regression using SPSS 26. The significance level for statistical tests was set at p<0.05. The chi-square method was used to analyze the relationship between two categorical variables. Multiple logistic regression was employed to evaluate the relationship between one or more dependent variables and independent variables. All independent variables were analyzed without considering the significance of bivariate statistical analysis results because these independent variables were theoretically related to depression. This analysis also calculated odds ratios (OR) and 95% confidence intervals to determine the risk of a variable for depression. If the OR value is greater than one, the independent variable is considered a predictive factor for the dependent variable. However, if the OR value is less than one, the independent variable becomes a protective factor against the dependent variable (Sopiyudin, 2014).

Result And Discussion

This research indicates that the majority of elderly respondents are under 75 years old (86.6%), female (51.6%), and have less than 12 years of education (84.1%), with a depression prevalence of 24.1%. Chi-square tests show that age, education level, and history of falls are significantly associated with depression occurrence in the elderly (p<0.05) (Table 1). Multiple logistic regression analysis reveals that variables predictive of depression occurrence include a history of falls, where the elderly with a history of falls are at a 1.996 times higher risk of experiencing depression (OR: 1.996; 95%CI: 1.393-2.332). Meanwhile, protective factors

Table 1. Bivariate Analysis of Independent Variables on the Occurrence of Depression among Research Respondents

Variable	Occurrence of Depression		Total	p
	Yes (%)	No (%)		
Age				
<75 years	628 (21,6)	1890 (65,0)	2518	0,005
≥75 years	72 (2,5)	319 (11,0)	391	
Gender				
Female	380 (13,1)	1120 (38,5)	1501	0,086
Male	319 (11,0)	1089 (37,4)	1408	
Education Level				
< 12 years	617 (21,2)	1830 (62,9)	2446	0,001
≥ 12 years	83 (2,9)	379 (13,0)	463	
History of Falls				
Yes	128 (4,4)	225 (7,7)	353	0,000
No	572 (19,7)	1984 (68,2)	2556	
Use of Walking Aids				
Yes	34 (1,2)	99 (3,4)	133	0,679
No	666 (22,9)	2110 (72,5)	2776	
Total			2909	

Source: IFLS 2014 Data

include age (OR: 0.653; 95% CI: 0.495-0.862) and education level (OR: 0.626; 95% CI: 0.483-0.811), where elderly individuals over 75 years old and those with higher education levels are at a lower risk of experiencing depression (Table 2).

The prevalence of depression in this study is 24.1%. This figure is similar to the findings of a study by Madyaningrum et al., which also used data from IFLS-5, at 24.9% (Madyaningrum et al., 2019). Meanwhile, another study by Pramesona et al. indicates that the prevalence of depression in the elderly ranges from 11% to 46.5% (Idris and Hasri, 2023; Pramesona and Taneepanichskul, 2018). This difference may be due to differences in respondent characteristics, where the studies by Idris et al. and Pramesona et al. used elderly respondents in urban areas and nursing homes, while this study used elderly respondents living in both urban and rural communities. Elderly individuals living in nursing homes tend to have more limitations in their daily lives, which can be one of the factors contributing to depression (Nugraha and Aprillia, 2020).

Table 2. Multivariate Analysis of Various Factors with the Occurrence of Depression among Research Respondents

Characteristic	P	Depression		
		OR	95% Confidence Interval	
			Lower	Upper
Age	0,003	0,653	0,495	0,862
Gender	0,291	1,098	0,923	1,307
Education Level	0,000	0,626	0,483	0,811
History of Falls	0,000	1,996	1,572	2,533
Use of Walking Aids	0,670	1,093	0,725	1,650

OR=Odds ratio, p<0,05

Regarding age factors, it was found that respondents aged ≥75 years are much smaller compared to the <75 years elderly group in Indonesia. This is in line with Indonesia's population census data for 2022, which shows that the elderly population in Indonesia reaches 9.28%, with the majority in the 65-75 age group (Badan Pusat Statistik, 2023). In this study, the demographic factor of age is significantly associated with depression occurrence. This finding aligns with WHO reports, where the highest prevalence of depression is in the age range of 60-64 years and starts to decrease at ages 65-69, becoming lowest at age >80 years (WHO, n.d.). Based on the results of multivariate analysis, it was found that age over 75 years is a protective factor against depression occurrence in the elderly. This is consistent with a meta-analysis study by Maier *et al.*, which states that older age is not a factor that independently increases the risk of depression, but rather age-related physical health decline and disability that lead to depression (Maier *et al.*, 2021). However, some studies found conflicting results (Conde-Sala *et al.*, 2019; Weyerer *et al.*, 2013). This may be due to other factors influencing depression, such as genetic factors, cultural and value differences, and social activities (Madyaningrum *et al.*, 2019; Maier *et al.*, 2021). A study by Susanti *et al.* (2018) suggests that older individuals who live longer may possess better-coping mechanisms and an enhanced ability to adapt to physical and psychological stress. With effective coping mechanisms, depression can potentially be avoided. According to the concept of psychoneuroimmunology, the acceleration of the aging process is closely linked to cellular damage within the body. Elevated stress levels and insufficient coping mechanisms may lead to increased cortisol hormone levels, contributing to cellular damage. Consequently, the incidence of depression tends to rise among individuals under the age of 75, due to the aging process experienced within this demographic (Lee *et al.*, 2019; Susanti *et al.*, 2018).

In this study, the majority of respondents were female, which is consistent with data from BPS (Statistics Indonesia), indicating a female population of 15.4 million compared to 14.3 million males (Badan Pusat Statistik, 2022). However, gender was not found to be significantly associated with depression occurrence in the elderly in this study. These findings differ from those of Idris *et al.*, who showed that females have a higher risk of experiencing depressive symptoms (Idris and Hasri, 2023). Conversely, another study by Ozer *et al.* involving 641 elderly individuals showed a higher risk of depression among males, but a higher severity level was found among females. Female respondents are more at risk of experiencing more severe depression due to assumed higher vulnerability compared to males (Ozer, 2021). The differences in findings may also be attributed to differences in respondent characteristics, where Idris *et al.* studied respondents living in densely populated areas and Ozer *et al.* studied respondents in tertiary clinics (Ozer, 2021).

The majority of respondents in this study had low levels of education, below 12 years. This is consistent with Indonesia's population census data from BPS, indicating that the majority of the elderly in Indonesia have low educational statuses (Badan Pusat Statistik, 2023). This study indicates that education level significantly influences depression occurrence in the elderly. This aligns with studies by Xu *et al.* and Idris *et al.*, which reported that previously pursued education levels play a role in the onset and development of depression in the elderly. Respondents with higher education tend to have a lower risk of experiencing depression (Idris and Hasri, 2023; Xu *et al.*, 2023). Mumulati *et al.* in their study involving elderly individuals in one of Indonesia's nursing homes also reported similar findings (Mumulati *et al.*, 2020). Richardson *et al.* also reported that individuals with lower education levels tend to have relatively poor coping effects compared to individuals with higher education. The way individuals resolve various life problems is proven to be better in highly educated individuals compared to those with lower education. This study also shows that higher education (above 12 years) is a protective factor against depression in the elderly in this study (Richardson *et al.*, 2020).

A history of falls in the elderly is a sign that they have experienced a decline in motor function in terms of balance and muscle

strength. Additionally, the coordination system is also likely to experience dysfunction due to aging processes. This is undoubtedly related to the disabilities experienced by elderly individuals. This study indicates that a history of falls is significantly associated with depression occurrence in the elderly. This aligns with research by Choi *et al.*, which reported that elderly individuals with a history of frequent falls are prone to depression, often to a more severe degree than elderly individuals without a history of falls (Choi *et al.*, 2019). Based on multivariate analysis in this study, a history of falls is a predictive factor, which is consistent with research by Basharkhah *et al.*. The study showed that a history of falls accompanied by depressive symptoms experienced by subjects tends to increase their fear of falling in the future and demoralization effects, leading to subjects becoming more passive in their daily lives (Basharkhah *et al.*, 2020; Van Poelgeest *et al.*, 2021).

This study indicates that the use of walking aids is not significantly associated with depression occurrence. The use of walking aids is concrete evidence of disabilities experienced by the elderly population with advancing age. These disabilities may be related to depression occurrence in the elderly. The findings of this study differ from those of Horowitz *et al.*, who showed that the use of walking aids in elderly individuals with disabilities is significantly associated with depression occurrence (Horowitz *et al.*, 2006). Similarly, another study by Kvael *et al.* found that motor dysfunction, such as balance disturbances requiring the use of walking aids, is significantly associated with the development of depressive symptoms (Kvæl *et al.*, 2017). Mobility impairments requiring elderly individuals to use canes or other walking aids cause disruptions in daily activities or mobile social interactions. This undoubtedly leads to continuous emotional changes. The findings of this study are consistent with research by Anggraini *et al.*, which showed that an unsupportive environment and difficulties in using walking aids can lead to excessive fear of falling, which can then lead to depression. However, the study also states that the appropriate use of walking aids can assist in the mobilization of the elderly, reducing fear

and the risk of depression (Putu Martha and Kurniawan Djoar, 2020).

This study has strengths in utilizing representative data from 13 provinces in Indonesia. However, it also has limitations such as the use of secondary data. Additionally, there is a possibility that data collection was limited to respondents assessed to have relatively good health statuses.

Conclusion

The prevalence of depression among the majority of respondents aged under 75 years, female, and with low education levels is 24.1%. Age, education, and history of falls are significantly associated with depression occurrence, but not the use of walking aids. A history of falls is a predictive factor, while age over 75 years and higher education are protective factors against depression occurrence in the elderly in this study.

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