Relationship between Social Participation and Cognitive Impairment in Low-Educated Older Adults Based on Indonesian Family Life Survey–5

Jayanto Nanda Putra¹, Yuda Turana²*, Yvonne Suzy Handajani³

¹School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
²Department of Neurology, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
³Department of Public Health and Nutrition, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

Background: The increasing older adult population requires attention in terms of education and health, as higher education levels contribute to cognitive reserve and may protect against age-related cognitive impairment. Cognitive reserve is an individual’s cognitive flexibility in using cognitive functions affected by brain aging, neurological diseases, and injury. Indonesia has a high prevalence of low-educated older adults, which strongly correlates with progressive cognitive impairment. Identifying risk factors for cognitive decline in this population is crucial. This study determines the factors affecting cognitive impairment in low-educated older adults using cross-sectional data from the Indonesian Family Life Survey–5.

Methods: This descriptive study analyzed 2,313 low-educated older adults ≥60 years old. Univariate and bivariate analyses were used to describe the sample and identify the relationships between categorical variables. Logistic regression identified the most significant factor affecting cognitive impairment.

Results: The prevalence of cognitive impairment in low-educated older adults is 22.6%. The chi-square test revealed significant relationships between those who are aged 75 years, a status other than married, female, living in rural areas, and not participating in social activities. Age is the most prominent factor affecting cognitive impairment in such adults (P<0.001; adjusted odds ratio, 3.232; 95% confidence interval, 2.500–4.180).

Conclusion: Cognitive impairment in the aforementioned adults is associated with being ≥75 years old, being a status other than married, being female, living in rural areas, and not participating in social activities. After controlling other variables, low-educated older adults who participated in at least ≥1 social activity in the last 12 months experienced cognitive impairment 0.64 times compared to those who did not participate in social activities.

Keywords: Cognitive Impairment; Cognitive Reserve; Older Adults
INTRODUCTION

The number of older adults worldwide will continue to increase over time.1) According to the Ministry of Health Republic of Indonesia (Kemenkes), the number of older adults in Indonesia will increase from 25.9 million (9.7%) in 2019 and reach 48.2 million (15.77%) in 2035.2) Accordingly, health institutions need to take this into consideration.

Aging, which causes molecular cell damage over time, leads to a gradual decrease in physical and mental capacity, increased risk of disease, decreased cognitive function, and ultimately death. Cognitive impairment is a condition in which sufferers experience cognitive impairments such as memory impairment or difficulty focusing.3-6) One of the causes is a neurodegenerative disease in which a person loses the structure or function of neuron cells, including the death of such cells.7) Alzheimer’s disease, one such disease, is estimated to cause at least 60% of dementia cases.8)

The increase in the older adult population worldwide has made dementia an actual public health problem.7) The prevalence of dementia in developing countries is around 1.5% at age 65 years, doubling every 4 years and reaching 30% at age 80 years.7) Low education, which is defined as education below 9 years (below senior high school [SHS]), increases the risk of decline in speed, memory, and general cognitive function when compared to high levels of education.9) Based on the National Socioeconomic Survey 2020 (SUSENAS), low-educated older adults dominate the proportion of older adults; 13.96% have never attended school, 32.48% did not finish elementary school, 31.78% graduated from elementary school/equivalent, and 8.01% graduated junior high school/equivalent (JHS).9)

Low education is a vital risk factor for cognitive impairment in older adults because people with low education are unaware of the importance of maintaining health.10) Highly educated people can obtain complex stimuli that enable them to absorb broader information about maintaining a healthy body and a better lifestyle.10) Given the high prevalence of low-educated older adults in Indonesia, and the fact that low education is a vital factor for the occurrence of more progressive cognitive disorders,10) research aimed at reducing the incidence of cognitive impairment in older adults with low education is important and urgent.

As cognitive function impacts the quality and well-being of a person’s life in old age, the quality of cognitive function in older adults is an important factor for attention. This statement is in line with Lenehan et al.,10) who stated that education is very beneficial because highly educated individuals can inhibit neurodegenerative pathology for a more extended period before functional or clinical impairment is reached. Sugiyono5) investigated the factors that affected the decline in cognitive function in 154 older adults with low education. However, the results can not be generalized to older adults in Indonesia. Few studies discuss factors among older adults with low education in Indonesia from a multivariate perspective. Therefore, the low number of such studies, the high number of low-educated older adults in Indonesia, and the lack of awareness of the importance of maintaining cognition in such adults motivate this study. Using secondary data based on the Indonesian Family Life Survey-5 (IFLS-5), this study determines the factors that affect cognitive impairment in older adults with low education. We hope that this study can serve as a reference to encourage/enable low-educated older adults to participate more in social activities to reduce and slow neurodegenerative pathology. In addition, this study can generally represent Indonesia’s low-educated older adult population and determine the most influential factor.

METHODS

We conducted a descriptive-analytic study with a cross-sectional research design. The data are derived from IFLS-5, which was conducted in 13 provinces in Indonesia in 2014–2015. After considering inclusion and exclusion criteria, a total of 2,313 older adults with low education were included in the analysis. The inclusion criteria were older adults who were aged ≥60 years, had participated in the IFLS-5 survey, had low education (<SHS), and had filled out the Telephone Survey of Cognitive Status (TICS) questionnaire. The exclusion criteria were low-educated older adults with missing data.

For data analysis, univariate analysis using descriptive analysis was conducted to derive an overview of the distribution and frequency of population characteristics such as age, sex, marital status, area of residence, the quantity of social participation, and cognitive impairment. Bivariate analysis used the chi-square test with P<0.05 to determine the relationship between the two variables studied. Multivariate analysis used multiple logistic regression with P<0.05 to establish which factors influenced cognitive impairment most in older adults with low education.

Data listed in IFLS-5 were obtained from several questionnaires. Cognitive function was measured using items from the TICS.10) The TICS included questions about today’s date and how well the respondent remembered, with perfect, very good, good, moderate, and poor response options. Respondents were asked to subtract 100 from 7 sequentially, followed by an immediate and delayed word recall for 10 nouns. Next, respondents were asked to name as many animals as possible in 60 seconds. Respondents were then asked to describe “overlapping pentagons.” The total score was between 0 and 34, with suspected dementia having a score of 0–8; suspected dementia is classified as cognitively impaired.50)

Questions about sociodemographic factors included age, gender, and area of residence.11) Marital status was divided into married, single, separated, divorced, and widowed.11) Social participation was examined via “yes” and “no” questions covering participation in community meetings, cooperation, routine collaborative work, youth group activities, religious activity, night patrols, and the system for managing solid waste (household waste) in the last 12 months.11) Then, they are categorized as either “not participating” or “participating ≥1 activity.”

Analysis was performed with the STATA MP ver. 14.1 program (Stata Corp., College Station, TX, USA). Univariate analysis was used to de-
termine the characteristics of the respondents. The bivariate analysis used the chi-square test to see the relationship between the two categorical variables. Results reported using P-values, with P<0.05 considered significant, as well as odds ratios using 95% confidence intervals (CI). Multivariate analysis with logistic regression was used to examine factors that have a significant relationship with overall cognitive impairment and the most prominent factors of cognitive impairment in older adults with low education. Variables with P<0.20 in bivariate analysis were further analyzed using multivariate analysis. Results reported using a P-value of <0.05 were considered significant, and adjusted odds ratio (AOR) using 95% CI.

Permission to use IFLS-5 secondary data was obtained from RAND Corp. (Santa Monica, CA, USA) via electronic mail. The requirement for informed consent from individual patients was omitted because of the retrospective design of this study. Ethical approval was obtained from the Research Ethics Commission of the Faculty of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia (reference: 22/10/KEP-FKIKUAJ/2022), and the study was conducted between March and November 2022.

RESULTS

Table 1 shows the basic characteristics of respondents obtained from univariate analysis. Table 1 also compares cognitive impairment prevalence according to independent variables. The prevalence of cognitive impairment in low-educated older adults is 22.6%. The majority of low-educated older adults are <75 years old (86%), female (57.9%), married (62.6%), living in a rural area (50.2%), participating ≥1 social participation, and have normal cognitive function (77.4%).

In the bivariate analyses using the chi-square test, increased risk of cognitive impairment among low-educated older adults is related to the absence of social participation (P=0.002), age ≥75 years old (P<0.001), female (P<0.001), unmarried/divorced/widowed (P<0.001), and rural living area (P<0.001) (Table 1).

Table 2 shows multivariate analysis results using multiple logistic regression method. Factors that decrease the risk of cognitive impairment in low-educated older adults are participating in ≥1 social activity, social participation is the easiest way to inhibit cognitive impairment in low-educated older adults.
DISCUSSION

Our study found that low-educated older adults who participated in at least ≥1 social activity in the last 12 months experienced cognitive impairment 0.64 times compared to those who did not participate in social activities during the previous 12 months after controlled social demography. The results of this study are in line with Henderson et al.,22) Hwang et al.,19) Choi,10) Zhou et al.,15) Fu et al.,16) and Smith et al.,17) who state that if the individual participates more in social activities in society can have a positive impact on cognitive function and can inhibit cognitive impairment related to aging. Increasing positive social interaction in various social activities will increase cognitive activity, which can also develop cognitive reserves that slow down the manifestations of cognitive impairment related to aging.15) Increasing social support in social activities by interacting with one another is an activity that can help reduce stress and depression levels in subjects that can impact cognitive function.13,15) Like one of the social activities, namely religious activities. By participating in religious activities, the subject understands how to deal with stress and life problems, which are also considered crucial in reducing anxiety and depression responses.12,14) In addition, the more individual participation in social activities, the higher the cognitive function, and vice versa.12,15) Therefore, researchers consider that routinely participating in religious activities in older adults with low education who have low cognitive reserves will have a good tendency not to experience a decline in cognitive function related to aging.

On the factor of those aged ≥75 years, low-educated older adults had an increased risk of cognitive impairment by 3.23 times compared to those aged <75 years. These results are supported by several similar studies, such as Murmari19) and Zahodne et al.,26) who reported that individuals with increasing age would experience an increased risk of cognitive decline due to the aging process, and individuals with higher levels of education would have higher cognitive reserves that could compensate for cognitive impairment due to aging. Individuals with low education have low cognitive reserves, so increasing age will increase the progression of cognitive disorders.15) However, individuals with higher levels of education will have a higher cognitive reserve, thus enabling the brain to cope with age-related brain changes more effectively.23)

Sex is also a factor that affects cognitive impairment in older adults with low education. Female older adults experience cognitive impairment 1.74 times compared to male older adults. The results are supported by research by Subramanian et al.,22) Lyu and Kim,23) and Levine et al.,24) who established that female individuals have a significantly higher tendency for cognitive impairment compared to male individuals. This is associated with a genetic predisposition, namely the presence of the apolipoprotein E4 allele, the allele of brain-derived neurotrophic factor 66, and estrogen, which causes female individuals to be at risk of cognitive impairment, especially at an advanced age.23) Lyu and Kim23) indicated that this could happen because older adults who are experiencing menopause will lose the hormone estrogen, which is associated with an increase in blood pressure, which is a risk factor for cognitive disorders.

Marital status is also a factor that influences cognitive impairment in low-educated older adults. Low-educated older adults who are married experienced cognitive impairment 0.74 times compared to single, separated, divorced, and widowed. This result suggests that marriage is a factor that decreases the risk of cognitive impairment in older adults with low education. These results align with Feng et al.,25) and MacKinnon-Lee et al.,26) who established that individuals who are not married or divorced experience an increased risk of cognitive impairment. This can occur because those who are not married or divorced experience a decrease in attractiveness in life and a reduction in social interaction that can maintain cognitive function, especially in old age.25-27) Multivariate studies reveal that the significance between marital status and cognitive impairment indicates that holistically, marital status is a factor that needs to be considered with the cognitive function of older adults.

Regarding the area of residence factor, low-educated older adults who live in rural areas have a 1.91 times greater risk of experiencing cognitive impairment compared to those living in urban areas. Our results align with research conducted by Ng et al.,28) Baernholdt et al.,29) and Vogelsang,30) who established that older adults living in rural areas have a significantly higher tendency for cognitive impairment than those living in urban areas. Living in rural areas is associated with difficulty accessing education and health compared to living in urban areas.30) Additionally, older adults who live in rural areas tend to be socially isolated compared to those in urban areas.29) Therefore, researchers argue that the risk of experiencing physical and mental health problems will increase.24,29) Hence, social support and social participation is crucial to prevent this from happening.

This study provides an overview of the factors influencing cognitive impairment in low-educated older adults. However, a similar analysis should be conducted to further examine the factors that may influence cognitive impairment in other older adults not discussed in this study due to limited data. Future research can compare the cognitive functions of groups with high and low education. Further, this study was a cross-sectional study; therefore, in the future, a similar study with a longitudinal design could be conducted to determine more about the causal relationships that exist.

In conclusion, according to IFLS-5 data, 22.6% of low-educated older adults in Indonesia experience cognitive impairment. Factors influencing the increased risk of cognitive impairment in such adults are being ≥75 years, being female, living in rural areas, being single, separated, divorced and not participating in social activities. Government policies should target low-educated older adults to join social participation to slow cognitive impairment.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.
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ORCID

Jayanto Nanda Putra: https://orcid.org/0009-0000-0100-1687
Yuda Turana: https://orcid.org/0000-0003-4527-0285
Yvonne Suzy Handajani: https://orcid.org/0000-0002-8245-9354

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