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Original Article

Cognitive function and stress as determinants of independence among older adults in institutional care: A cross-sectional study

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Abstract

Background: The global increase in the older adult population is accompanied by complex health challenges, including cognitive decline, elevated stress levels, and decreased independence in activities of daily living. In Indonesia, approximately 12.7% of older adults experience dependency in basic activities, influenced by factors such as chronic disease, depression, low physical activity, limited social support, and cognitive impairment, which collectively accelerate functional decline.
Objective: This study aimed to examine the relationship between cognitive function and stress levels with independence among older adults residing at Griya Lansia Ciparay.
Methods: A quantitative study with a cross-sectional design was conducted involving 61 older adults selected through purposive sampling based on predefined inclusion criteria. Cognitive function was assessed using the Mini-Mental State Examination (MMSE), stress levels were measured with the Perceived Stress Scale (PSS-10), and independence was evaluated using the Barthel Index. Data were analyzed using univariate analysis to describe variable distributions and bivariate analysis employing the Spearman Rho correlation test.
Results: The findings revealed a statistically significant relationship between cognitive function and stress levels with independence among older adults (p = 0.001). Older adults with better cognitive function and lower stress levels demonstrated higher levels of independence in performing daily activities.
Conclusion: Cognitive function and stress levels are significantly associated with independence among older adults. Strategies aimed at preserving cognitive abilities and managing psychological stress are essential to maintain functional independence and improve quality of life in the elderly population, particularly in institutional care settings.

Background

Independence in older adults refers to their ability to meet daily activity needs without relying on others (Sihaloho, 2022) Age-related changes occur due to reduced cell numbers, decreased physical activity, inadequate nutrition, and exposure to pollution and free radicals, leading to physiological and structural changes including in the brain that influence functional ability (Martemucci et al., 2022)

Demographic projections reinforce the urgency of addressing independence in older populations. Globally, the number of older adults is expected to exceed 1.4 billion by 2030 ((WHO, 2021). In Indonesia, the older adult population has reached 11.8% or nearly 34 million in 2025 (Badan Pusat Statistik, 2025). About 12.7% of Indonesian older adults experience dependency in basic activities influenced by chronic illness, depression, low physical activity, limited social support, and cognitive impairment (Handajani et al., 2023)

West Java has the second-largest older adult population in Indonesia after East Java, with approximately 5.8 million individuals aged 60–75 years recorded in (Badan Pusat Statistik, 2025). Griya Lansia Ciparay is one of the social care institutions for older adults that accommodates the highest number of residents compared to other facilities, with a total of 155 older adults currently living in the institution.

Cognitive decline in older adults can hinder their ability to understand, plan, and perform daily activities independently because cognitive function involves essential mental processes such as memory, attention, decision-making, and planning (Raimo et al., 2024). Optimal cognitive function is characterized by balanced memory and intellectual abilities, supported by good physical condition, enabling older adults to perform daily activities independently without the need for assistance (Suryani et al., 2024).

Stress also affects independence. Older adults living in institutional care settings experience

higher levels of stress (de Medeiros et al., 2020), According to previous research, stress prevalence is substantially higher among older adults living in institutional care settings (30%) compared to those living with their families (8.34%) (Handajani et al., 2023). Chronic stress elevates cortisol secretion, accelerates degenerative processes, weakens physical resilience, and contributes to frailty (Herriot et al., 2018), while psychologically it diminishes motivation and self-confidence, increasing dependence on others (Imani & Godde, 2021)

The independence of older adults is influenced by physical and social factors (Haryati et al., 2022). Environmental conditions, including social support and psychological continuity, also shape their ability to function independently (Priyanto et al., 2022). Cognitive function plays a crucial role, as declining cognition increases dependency in meeting basic needs (Yuliana Sako et al., 2024). Additionally, changes in physical, mental, and cognitive conditions significantly contribute to reduced independence among older adults (Priyanto et al., 2022).

A study conducted at UPT Pelayanan Sosial Lanjut Usia Binjai similarly found that cognitive function plays a crucial role in determining independence in daily activities with p-value of 0,000 (Zega, 2021). Somehow, research by (Akhmad et al., 2019) reported no significant relationship between cognitive function and independence, with a p-value of 0.510 ($p > 0.05$). The authors explained that strong family support, active physical participation, and positive social interaction enabled older adults to remain independent despite mild cognitive impairment.

Meanwhile, research by (Solikhatun et al., 2022) demonstrated a significant relationship between stress levels and independence among older adults, supported by statistical testing results with $p = 0.000$ ($p < 0.05$), indicating that higher stress levels are associated with increased dependence. A previous study conducted in the working area of Antang Public Health Center in Makassar reported no significant relationship between stress levels and independence in daily activities among older adults. The results of the Fisher's Exact Test showed a p-value of 0.104 ($p > 0.05$), indicating that stress does not have a measurable influence on the independence of the elderly (Awaluddin, 2021).

Lack of independence in elderly people has substantial clinical and functional consequences. A decline in independence accelerates the deterioration of physiological functions and increases the risk of complications associated with chronic diseases (Weng et al., 2024). Reduced functional ability also contributes to difficulties in maintaining balance and performing daily activities, which in turn heightens the incidence of falls and prolonged immobility. These conditions have been strongly associated with a higher likelihood of premature mortality among older adults (Goodarzi et al., 2024).

A preliminary observation conducted at a social care institution in Ciparay involving seven older adults revealed that five residents were dependent and only two were independent. Emotional assessment indicated frequent feelings of sadness, helplessness, and anxiety, alongside interpersonal conflicts that increased irritability, suggesting elevated stress levels. During the observation period, four older adults also experienced a decline from partial to total dependence, reflecting not only deterioration in physical and cognitive function but also the vulnerability of older adults to psychological and environmental factors that may accelerate the loss of independence.

Therefore, this study aims to examine the relationship between cognitive function and stress levels with the level of independence among older adults living in a social care institution in Ciparay.

Methods

Study Design

This study employed a quantitative analytical observational design using a cross-sectional approach. The design enabled the assessment of cognitive function, stress levels, and independence among older adults at a single point in time, allowing the researcher to examine correlations between the independent variables and the dependent outcome. A cross-sectional survey was considered appropriate because it captures prevalence and associations without requiring long-term follow-up. The

study was conducted at UPTD Griya Lansia Ciparay, Bandung Regency.

Sampling

The study population consisted of all older adults residing at UPTD Griya Lansia Ciparay, Bandung Regency. The researcher applied a purposive sampling technique.to select respondents who in accordance with the criteria. Eligible participants were older adults residing at UPTD Griya Lansia Ciparay who were able to communicate verbally and had lived in the institution for at least three months. The sample size was determined using Slovin's formula with a 10% margin of error based on a population of 155 residents, resulting in a required sample of 61 respondents.

Inclusion criteria included adults aged ≥60 years and the ability to communicate verbally. Exclusion criteria involved acute medical conditions or unconsciousness at the time of data collection.

Instruments

Data were collected using a structured questionnaire administered through direct interviews. Three standardized instruments were applied. Cognitive function was assessed using the Mini-Mental State Examination (MMSE), which evaluates orientation, memory, attention, recall, and language, with scores categorized as normal (24–30), moderate impairment (17–23), and severe impairment (0–16) (Leal et al., 2024). Stress levels were measured using the Perceived Stress Scale (PSS), a 10-item tool rating perceptions of unpredictability, lack of control, and pressure on a five-point Likert scale; total scores were classified as mild, moderate, or severe stress. Independence in daily activities was evaluated using the Barthel Index, which assesses functional abilities such as feeding, bathing, mobility, toileting, and stair use. Scores were categorized into total, severe, moderate, or mild dependence, or full independence (Idaiani & Indrawati, 2021). All instruments were selected for their validity, ease of use, and suitability for older adult populations.

Data Collection

Data collection was collected September from 5 to 26 September 2025 through face-to-face interviews using a structured questionnaire. Before each interview, participants were provided with a clear explanation of the study's purpose, procedures, and their rights as respondents. All data were collected individually to maintain confidentiality and ensure that each participant felt comfortable throughout the process. The researcher read each question aloud and recorded the participants' responses to accommodate varying levels of literacy and cognitive ability.

Data Analysis

Data analysis was performed using Jeffreys's Amazing Statistics Program (JASP) and using Kolmogorov–Smirnov to test data normality and Spearman Rho correlation test to analyze the relationship between cognitive function, stress levels, and independence among older adults. Data processing began with editing to check completeness and consistency of responses, followed by coding to convert qualitative responses into numerical values. The coded data were entered into statistical software for analysis. Data cleaning was performed to identify errors, missing values, or outliers.

Ethical Consideration

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Faculty of Health Science and Technology (FITKes), Universitas Jenderal Achmad Yani, under approval number 06/KEPK/FITKes-Unjani/X/2025. Based on the committee's assessment, the study was declared ethically feasible and approved, and therefore permitted to proceed in accordance with the approved research protocol. Confidentiality of data and respondent identity was strictly maintained. Ethical principles of beneficence, non-maleficence, autonomy, and justice were upheld throughout the study. Interviews were conducted respectfully to prevent psychological discomfort, and participants could withdraw at any time without penalty. Selection of respondents was based solely on inclusion

criteria to ensure fairness and equal opportunity for participation.

Results

This section presents the univariate analysis results, which describe the characteristics of respondents based on the three main variables in the study: cognitive function, stress levels, and independence level. The detailed frequency distribution for each variable is summarized in Table 1.

Table 1. Frequency Distribution of respondents based on cognitive function, stress levels, and independence level

Variables	Frequency (n)	Percentage (%)
Cognitive Function		
Normal	30	49,2
Moderate Cognitive Impairment	18	29,5
Severe Cognitive Impairment	13	21,3
Stress Level		
Mild Stress	17	27,9
Moderate Stress	36	59,0
Severe Stress	8	13,1
Independence Level		
Independent	27	44,3
Mild Dependence	21	34,3
Moderate Dependence	3	4,9
Severe Dependence	7	11,5
Total Dependence	3	4,9

Table 1 presents the frequency distribution of respondents based on cognitive function, stress level, and independence. Of the 61 respondents, nearly half demonstrated normal cognitive function (49.2%), while 29.5% showed moderate cognitive impairment, and 21.3% experienced severe impairment. In terms of stress level, most respondents reported moderate stress (59.0%), followed by mild stress (27.9%), and only 13.1% experienced severe stress. Regarding independence, 44.3% of respondents were classified as independent, 34.3% had mild dependence, 4.9% had moderate dependence, 11.5% had severe dependence, and 4.9% were categorized as totally dependent.

Table 2. The association between cognitive function, stress levels, with independence level

Variables	Independence Level										Total	
	Independent		Mild Dependence		Moderate Dependence		Severe Dependence		Total Dependence			
	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%
Cognitive Function												
Normal	20	74,1	8	38,1	2	66,7	0	0,0	0	0,0	30	49,2
Moderate	4	14,8	9	42,9	0	0,0	3	42,9	2	66,7	18	29,5
Severe	3	11,1	4	19,0	1	33,3	4	57,1	1	33,3	13	21,3
Spearman's Rho statistical test value 0,001 r = 512												
Stress Level												
Mild Stress	13	48,1	3	14,3	0	0,0	1	14,3	0	0,0	17	27,9
Moderate Stress	14	51,9	16	76,2	2	66,7	4	57,1	0	0,0	36	59,0
Severe Stress	0	0,0	2	9,5	1	33,3	2	28,6	3	100	8	13,1
Spearman's Rho statistical test value 0,001 r = -615												

Table 2 demonstrates a statistically significant association between cognitive function and independence among respondents. Older adults with normal cognitive function showed the highest proportion of independence, with 74.1% classified as independent and only 11.1%

falling into the moderate or severe dependence categories. In contrast, respondents with moderate cognitive impairment exhibited greater levels of dependence, including 42.9% with mild dependence and 66.7% with total dependence. Those with severe cognitive impairment showed even stronger patterns of dependency, with 57.1% experiencing severe dependence and 33.3% classified as totally dependent. The Spearman's Rho test yielded a p-value of 0.001 and a correlation coefficient of r = 0.512, indicating a statistically significant association between cognitive function and independence.

A similar pattern was observed for stress level. Respondents with mild stress demonstrated higher independence, with 48.1% being independent and only 14.3% experiencing severe dependence. Conversely, those with moderate stress showed increased levels of dependence, including 76.2% with mild dependence and 66.7% with moderate dependence. Older adults with severe stress demonstrated the highest dependency, with 100% classified as totally dependent. The Spearman's Rho test produced a p-value of 0.001 and a correlation coefficient of r = –0.615, confirming a statistically significant negative association between stress level and independence ($p < 0.05$).

Discussion

The findings of this study demonstrate a significant association between cognitive function and the level of independence among older adults living in an institutional setting. Respondents with normal cognitive function exhibited the highest level of independence, whereas those with moderate and severe cognitive impairment showed markedly increased levels of dependence. These results align with previous research suggesting that cognitive decline interferes with memory, planning, attention, and decision-making abilities, all of which are essential for performing daily activities independently (Yuliana Sako et al., 2024). Similarly, other studies have reported that diminished cognitive capacity leads to functional limitations and greater dependency in activities of daily living among the elderly (Zega, 2021).

The study also revealed a significant negative association between stress levels and independence. Older adults who experienced mild stress were more likely to maintain independence, while those with moderate or severe stress demonstrated higher dependency. This finding supports earlier evidence that elevated stress contributes to both psychological and physiological deterioration, thereby reducing functional ability and increasing dependency (Handajani et al., 2023). Stress has also been shown to impair mood, motivation, and cognitive performance, resulting in reduced engagement in daily activities and heightened vulnerability to dependence (Özdemir & Telli, 2024).

Overall, these results emphasize that both cognitive function and stress level play a substantial role in shaping the independence of institutionalized older adults. The findings reinforce the theoretical framework that cognitive and psychological factors interact to influence functional outcomes in aging populations. This highlights the importance of interventions targeting cognitive stimulation, stress reduction, and supportive environmental conditions to maintain independence among older adults (Haryati et al., 2022).

Despite the robust statistical associations, this study contains limitations that may affect the generalizability of the findings. The use of purposive sampling within a single institutional setting limits external validity, as environmental factors, staff support, and institutional routines may differ across facilities. Additionally, the cross-sectional design restricts the ability to infer causality, meaning that it cannot be determined whether stress and cognitive decline directly caused the decrease in independence or occurred concurrently due to other underlying factors. Response bias may also have occurred, as self-reported stress levels may not fully capture the complexity of psychological experiences among older adults.

Some studies have reported different findings regarding the relationship between cognitive function, stress levels, and independence in

older adults. Research by (Akhmad et al., 2019) found no significant association between cognitive function and independence, which was attributed to protective factors such as strong family support, active physical engagement, and positive social interaction. These conditions enabled older adults to remain independent despite experiencing mild cognitive impairment, resulting in outcomes that differ from the majority of previous studies.

Similarly, (McQuaid et al., 2022) reported no significant relationship between stress and independence, which may be explained by methodological differences and the characteristics of the study population. Participants in their study were generally healthy older adults living in community settings, enabling them to carry out daily activities despite experiencing stress. In addition, protective factors such as strong social and family support and regular physical activity may buffer the effects of stress on independence by maintaining functional stability. These inconsistencies across studies may be influenced by variations in sample characteristics, measurement instruments, and cultural or environmental contexts.

In conclusion, the independence of older adults is shaped by a complex interaction of cognitive function, psychological well-being, environmental conditions, and institutional support systems. Fragmented or single-focus interventions are unlikely to produce meaningful improvements without being integrated into broader, multisectoral strategies. Therefore, efforts to enhance functional independence among institutionalized older adults must incorporate cognitive stimulation programs, stress-management interventions, supportive social environments, and tailored caregiving approaches (Özdemir & Telli, 2024). This study reinforces the pivotal role of cognitive health and psychological stability as foundational components for maintaining independence in aging populations.

Based on the explanation above, the researchers assume that the decline in independence among older adults at Griya Lansia Ciparay is influenced by both cognitive deterioration and elevated stress levels. Cognitive decline, which is associated with physiological changes in brain structure due to aging, leads to deficits in fulfilling self-care needs. In accordance with Orem's Self-Care Deficit Nursing Theory, older adults with intact cognitive function tend to be more independent, whereas decreasing cognitive ability is directly proportional to increased dependency, highlighting the importance of thinking, memory, and decision-making skills in maintaining independence. At the same time, older adults experiencing high levels of stress are assumed to have lower independence, particularly due to difficulties in adapting to institutional environments, loss of financial autonomy, and feelings of abandonment by family, which contribute to psychological pressure and increased vulnerability to stress. Therefore, efforts to preserve cognitive function and manage stressthrough supportive-educative nursing interventions, coping enhancement, and psychosocial support are essential to maintain and improve independence among older adults.

Conclusion and Recommendation

This study highlights the significant influence of cognitive function and stress levels on the independence of older adults residing in an institutional setting. Older adults with normal cognitive function demonstrated a greater capacity to maintain independence, while those with moderate or severe cognitive impairment exhibited higher levels of dependency. Similarly, respondents experiencing mild stress tended to remain independent, whereas moderate and severe stress were associated with increasing dependency. These findings emphasize that the interaction between cognitive health and psychological well-being plays a critical role in determining functional outcomes in the elderly. The results reinforce the need for holistic approaches in geriatric care that consider cognitive, emotional, and environmental factors in order to preserve independence and improve quality of life.

Based on the findings of this study, several implications for practice and future research can be identified. For practice, institutions

caring for older adults should implement structured cognitive stimulation activities, stress reduction programs, and individualized support tailored to residents' functional levels. Integrating mental health services, stress management intervention such as engaging in structured recreational activities can help reduce stress while simultaneously training and enhancing cognitive abilities and creating a socially supportive environment may help improve both cognitive function and emotional resilience, thereby promoting greater independence.

For future research, longitudinal studies are recommended to examine the causal pathways between cognitive decline, stress, and loss of independence over time. Investigations involving multiple institutions would also improve generalizability and allow comparisons across different care settings. Further studies exploring additional psychological, social, and environmental variables may provide a more comprehensive understanding of the determinants of independence in older adults. Such research would support the development of more targeted and effective interventions for this vulnerable population.

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Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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