

Cognitive Function, Neuroticism, and Depression Among Nursing Home Older Adults in Indonesia

A Cross-Sectional Study

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ABSTRACT

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Depression is a serious mental health problem among older adults, especially in social care facilities. This study examines the hypothesis that cognitive function and neuroticism personality are associated with depression among older adults residing in a nursing home, a relationship that remains rarely investigated within the Indonesian institutional context. A quantitative cross-sectional study was conducted among 38 older adults aged 60 to 85 years, selected from an initial population of 373 residents through a total sampling approach after applying inclusion and exclusion criteria. Depression was measured using the GDS-15. Cognitive function was measured using the MoCA-Ina. Neuroticism personality was measured using the BFI-2. Bivariate associations were assessed using Pearson's correlation test. This study found that the majority of respondents did not experience depression (65.8%), although the mean cognitive function score was below the normal threshold (18.58 ± 6.77). There was no significant relationship between cognitive function and depression levels ($r = -0.038$; 95% CI -0.353 to 0.285; $p = 0.821$). There was a significant positive correlation between neuroticism personality and depression levels ($r = 0.524$; 95% CI 0.246 to 0.723; $p < 0.001$). In summary, neuroticism personality was significantly associated with depression level among institutionalized older adults, whereas cognitive function was not. Neuroticism may therefore be a more relevant psychological marker of depression risk than cognitive status in this population; further studies directly measuring psychosocial and spiritual variables are needed to clarify the mechanisms underlying the non-significant cognitive-depression association.

Keywords

Cognitive Function
Depression
Neuroticism
Nursing Home
Older Adults

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Introduction

The global increase in the elderly population has become a significant demographic phenomenon in recent decades [1]. This demographic transition has complex implications for health systems. Older adults are susceptible to degenerative diseases such as osteoporosis, which place a significant burden on healthcare systems [2], [3]. These physical ailments often lead to significant functional impairment and a deterioration in quality of life [4], [5]. Another challenge is the treatment of mental disorders in older people. With the increasing number of older people, the prevalence of mental disorders is also increasing, with depression accounting for the largest proportion, at 22.9% of all cases of mental disorders in this age group [6]. Depression in older adults cannot be viewed solely as a clinical problem, but rather as a public health issue that impairs quality of life and increases the risk of suicide. It is influenced by multifactorial interactions between biological changes due to the aging process and psychosocial stress throughout life [7]-[9].

Current research findings reveal a complex dynamic relationship between cognitive functions and depressive symptoms in older adults. Some findings suggest that an increase in the severity of depressive symptoms is associated with faster memory loss, while cognitive decline can also trigger or exacerbate depression [10]. In addition to cognitive factors, personality aspects also play a role in determining a person's susceptibility to depression [11]. Neuroticism, characterized by a tendency toward intense and persistent negative emotions, has been identified as a psychological factor that increases a person's susceptibility to psychosocial stress and impairs their ability to use adaptive coping strategies [12].

The contextualization of life in care facilities complicates the understanding of the phenomenon of depression in older adults. Older adults living in social care facilities face additional challenges in the form of social isolation and feelings of loneliness, both of which are strong predictors of the development of depressive disorder [13], [14]. Although the relationship between cognitive function, neuroticism personality, and depression has been extensively studied, most previous studies have focused either on the bivariate relationship between two variables or on older adults with specific conditions [12]. Studies specifically addressing the relationship between cognitive factors and personality in older adults living in social care facilities in Indonesia are still relatively rare.

This difference is quite significant given the psychosocial characteristics and spiritual coping mechanisms of older people in Indonesia, which differ from those of older people in other countries. In this context, this study aims to examine the relationship between cognitive functions and neuroticism personality traits with the occurrence of depression in older adults living in the Tresna Wreda Budi Mulia 3 social care facility in South Jakarta. The study aims to make an empirical contribution to a better understanding of the determinants of depression in older adults in the context of Indonesian institutions and culture.

Material and Methods

This study uses a quantitative approach with a cross-sectional design to analyze the correlation between cognitive functions, neuroticism personality, and the frequency of depression in older adults. This design was chosen because it allows for the simultaneous measurement of all independent and dependent variables at a specific point in time and is therefore efficient in identifying correlations between the variables. The dependent variable in this study was the level of depression, while the independent variables included cognitive function and neuroticism personality. The study was conducted at the Budi Mulia 3 Social Welfare Institution for the Elderly in South Jakarta from December 2025 to January 2026. The research subjects were elderly people aged 60-85 years who met the inclusion criteria of being able to communicate clearly, willingness to participate by signing informed consent, and having a minimum formal education history of elementary school. Exclusion criteria included elderly individuals with communication disorders, basic literacy limitations or extreme physical limitations of the upper extremities that hindered the completion of the instrument, terminal illness or advanced stage malignancy, a history of severe psychiatric disorders or acute neurological diseases, severe sleep disorders with a Pittsburgh Sleep Quality Index score of more than 15, and severe mobility disorders with a Functional Ambulation Categories score of 0 or 1.

The sampling technique used total sampling, in which all 373 residents registered at the institution were initially considered. Of these, a number of residents were excluded because they resided in non-independent or non-potential wards, or did not meet the study's inclusion and exclusion criteria during screening, leaving a final sample of 38 participants who completed all study instruments. As total sampling was applied to the entire eligible population rather than a calculated subsample, no separate power analysis was performed to determine sample size; the final *n* of 38 reflects the number of eligible residents who met inclusion criteria and consented to participate. First, the Geriatric Depression Scale-15 (GDS-15) is a screening instrument for depression in the elderly with 15 dichotomous questions that assess aspects of interest in activities, feelings of sadness, loneliness, and boredom, with a

sensitivity of 92% and specificity of 89%, and internal reliability with Cronbach's alpha of 0.755 in the Indonesian version [15].

Second, the Montreal Cognitive Assessment Indonesian version (MoCA-INA) is a cognitive function screening instrument with 30 points that assesses the domains of attention, concentration, executive function, memory, language, visuo-constructive skills, conceptual thinking, calculation, and orientation, with a reliability of 0.963 and a total kappa validity of 0.82 in the Indonesian elderly population [16], [17]. Third, the Big Five Inventory-2 (BFI-2) measures the dimension of negative emotionality or neuroticism through 12 statements with a 5-point Likert scale covering the facets of anxiety, depression, and emotional instability, showing a Cronbach's alpha reliability of 0.88 and internal structure validity with Confirmatory Factor Analysis CFI of 0.936 in the Indonesian version [18], [19].

The research procedure began with the submission of an ethics approval application to the Research Ethics Committee (Komisi Etik Penelitian) of Universitas Pembangunan Nasional 'Veteran' Jakarta (Approval No: 6/I/2026/KEP, approved 14 January 2026), and a permit application to the management of the Budi Mulia 3 Social Welfare Institution. Written informed consent was obtained from all participants prior to data collection, after the study procedures, potential risks, and benefits were explained. Data collection was then carried out by distributing demographic data forms, followed by the completion of the GDS-15, MoCA-INA, and BFI-2 questionnaires with the assistance of researchers to ensure that respondents understood the instructions. Data analysis used univariate analysis to describe the characteristics of each variable, and bivariate analysis used Pearson's correlation test for normally distributed data or Spearman's correlation test for non-normally distributed data to identify the relationship between cognitive function and depression, as well as neuroticism personality and depression in the elderly.

Results

This study was conducted at the Tresna Wreda Budi Mulia 3 Social Welfare Institution in South Jakarta, a Technical Implementation Unit under the DKI Jakarta Provincial Social Service that provides social rehabilitation and comprehensive care services for neglected elderly people. This institutional environment is designed to meet the basic needs and support the physical and mental well-being of its residents.

Functionally, the residential area of the home is divided into independent and potentially independent residences for elderly people who are still able to carry out daily activities, as well as non-independent residences for elderly people with physical limitations or cognitive impairments who require intensive supervision. This environmental structure supports the implementation of structured physical and mental-spiritual guidance.

This study uses an analytical observational design with a cross-sectional approach. The study population consisted of all older adults registered in a nursing home, with sample selection conducted through a screening process based on inclusion and exclusion criteria, resulting in 38 respondents.

The collected data were analyzed univariately to describe the characteristics of the respondents and bivariate to identify the relationships between the independent and dependent variables.

A. Univariate Analysis

Table 1 presents the demographic characteristics of the 77 respondents, including maternal age, occupational status, and gestational age. Most participants were aged 20–35 years, were housewives, and had not yet reached term pregnancy. These distributions provide an overview of the sample profile used for subsequent preeclampsia analyses.

Table 1. Frequency Distribution of Respondents Based on Demographic Characteristics

Characteristics	Frequency	Percentage (%)
Age		
Young Old (60-69 years old)	18	47.4
Old (70-79 years old)	15	39.5
Old Old (≥80 years old)	5	13.2
Gender		
Female	27	71.1
Male	11	28.9
Religion		
Islam	28	73.3
Christianity	7	18.4
Catholicism	1	2.6
Buddhism	2	5.3
Level of Education		
Elementary School	13	34.2
Junior High School	6	15.8
Senior High School	15	39.5
Higher Education/ University	4	10.5
Marital Status		
Married	14	36.8
Widowed	16	42.1
Single	8	21.1
Previous Employment		
Formal Sector	13	34.2
Informal Sector	14	36.8
Small Business Owner/ Self-Employed	4	10.5
Not Working	7	18.4

Source: Research data, processed

Based on Table 1, the majority of respondents were young elderly people (47.4%) and female (71.1%). Most respondents were Muslim (73.3%). The highest level of education was senior high school (39.5%), with the most common marital status being widowed or divorced

(42.1%). Most respondents' previous employment history was in the informal sector (36.8%).

Table 2 summarizes the distribution of respondents according to depression level. The table presents the number and percentage of participants in each depression category, providing an overview of the psychological status of the study population. These data serve as the basis for subsequent analyses examining factors associated with depression severity.

Table 2. Distribution of Respondents' Depression Levels

Depression Level	Frequency	Percentage (%)
No Depression (0-4)	25	65.8
Mild Depression (5-8)	9	23.7
Moderate Depression (9-11)	3	7.9
Severe Depression (12-15)	1	2.6

Source: Research data, processed

The results of depression level measurements using the Geriatric Depression Scale-15 showed a normal data distribution with a p-value >0.05 . The average depression score of respondents was 4.32 ± 3.05 , which generally indicated a non-depressed category, although there was variation in scores ranging from 0 to 12. Based on the categorization in Table 2, most respondents did not experience depression (65.8%).

The results of cognitive function measurements using the Indonesian version of the Montreal Cognitive Assessment show that the data is normally distributed with a mean score of 18.58 ± 6.77 . This mean score is below the normal threshold value of 26 points, with a minimum score range of 5 and a maximum score range of 29.

The assessment of neuroticism personality using the Big Five Inventory-2 revealed a normal data distribution with an average value of 26.66 ± 8.42 . The values obtained ranged from a minimum of 12 to a maximum of 44.

B. Bivariate Analysis

A bivariate analysis was performed on 38 respondents using Pearson's correlation test to assess the relationship between cognitive function and the degree of depression, as well as between neuroticism personality and the degree of depression. Examination of the data distribution using a scatter plot showed that the relationship between cognitive function and the degree of depression did not exhibit a clear linear pattern. In contrast, the relationship between neuroticism personality and the degree of depression showed a tendency toward a positive linear relationship.

The results of the correlation test showed that cognitive functions did not have a significant relationship with the degree of depression ($p = 0.821$). In contrast, neuroticism personality showed a significant correlation with the degree of depression ($p < 0.001$) with a correlation coefficient of $r = 0.524$, indicating a positive and moderate correlation. These results suggest that the degree of depression in older adults is more related to neuroticism personality traits than to cognitive function.

Table 3 presents the bivariate associations between cognitive function, neuroticism personality, and depression level. The analysis reports correlation coefficients, 95% confidence intervals, p-values, and sample sizes, allowing assessment of the direction, strength, and statistical significance of the relationships between each predictor and depression level.

Table 3. Bivariate Analysis of Cognitive Function and Neuroticism Personality with Depression Level

Variables Compared	r	95% CI	p-value	n
Cognitive function vs. Depression level	-0.038	-0.353 to 0.285	0.821	38
Neuroticism personality vs. Depression level	0.524	0.246 to 0.723	<0.001	38

Source: Research data, processed. CI = confidence interval.

Discussion

A. Demographic Data on Elderly Residents at the Budi Mulia 3 Social Welfare Institution

The demographic characteristics of the respondents in this study show a predominance of young older people, reflecting the composition of the population in the early stages of old age at the Budi Mulia 3 social care home. These findings are consistent with the studies by Fradila et al. and Setiyowati et al., which report a predominance of young older adults in the population of nursing homes [20], [21]. The low proportion of older people corresponds to Indonesia's national demographic profile, which shows that the majority of older people belong to the young senior group, while those over 80 years of age make up only a small proportion of the total population [22].

The predominance of female respondents in this study reflects the global phenomenon of gender inequality in terms of life expectancy. Forecast data from Statistics Indonesia for 2025 show that life expectancy for women will reach 76.2 years, compared to only 70.9 years for men. These findings are consistent with the study by Tanaka et al., which reports a predominance of older women in nursing homes [23]. The study by Dya & Oktora explains that older men tend to still be married, while women are more likely to be widowed, leading to a lack of social and economic support that increases vulnerability to loneliness and social isolation [22].

Religious distribution is dominated by Islam, reflecting the demographics of DKI Jakarta and consistent with the findings Vitayala et al., which reported that 76.2% of elderly people in nursing homes are Muslim [24]. The educational profile shows that the majority of respondents only received primary to secondary education, consistent with Susenas 2019 data which recorded that 79.5% of Indonesian elderly people have low education levels [25]. The educational limitations of this generation are due to the lack of access to educational facilities in the past and gender inequality, which contributed to educational disparities [26].

Marital status is dominated by widows or widowers, which is in line with the findings Setyo et al., reporting that 97.5% of respondents in nursing homes are widows or widowers [27]. This bereavement condition is a factor that triggers the loss of social support, forcing the elderly to undergo institutionalization and correlating with deep loneliness and a decline in psychological well-being.

The majority of elderly people in social institutions previously worked in the informal sector, had low incomes, no social security protection, limited education, and were mostly female, in line with data from SMERU (2022) and the Ministry of Manpower [28]. However, elderly former formal sector workers are also present in social institutions due to non-economic factors, such as limited family support after retirement, widowhood, or the need for a more structured and supportive environment [29]. These findings indicate that living in a social institution does not solely reflect economic vulnerability, but is also a manifestation of social, psychosocial, and family dynamics in old age.

B. Depression Levels

The results of the study show that 65.8% of elderly people do not experience depression, in line with Dewi's findings, who reported a similar proportion. It was noted that 64.29% of respondents did not experience depression, with a predominance of high self-efficacy in this group [30]. Although not directly measured in this study, the low prevalence of depression may plausibly be related to protective factors reported in the broader literature on nursing home environments, such as religiosity, spiritual practices, and collective social activities that involve regular interaction among residents. Support and constructive social interaction are important protective factors against depression in the elderly in social institutions. A supportive collective environment and shared religious practices provide emotional reinforcement and a sense of togetherness that reduces the prevalence of depression in this population [31].

C. Cognitive Function

The findings of a decline in cognitive function among elderly people in social institutions are consistent with previous studies reporting that 87.3% of elderly people in nursing homes experience a decline in cognitive function [32]. A study by Setyani & Iskandar confirmed that elderly people living in nursing homes have a more significant tendency toward cognitive decline than those living in the community, due to a lack of cognitive stimulation in the institutional environment [33].

The nursing home environment, which is synonymous with social isolation, is consistently associated with cognitive decline in older adults. Older adults who live in communities generally have higher cognitive scores due to a more cognitively and socially stimulating environment, independence in daily activities, and active involvement in social activities. In contrast, elderly people in nursing homes experience functional dependence, limited social

roles, and monotonous daily routines, which cumulatively accelerate cognitive decline [33], [34]. Cognitive decline is also influenced by multidimensional factors such as advanced age and low educational attainment, which are strong determinants of low cognitive scores. Education functions as a protective factor through the mechanism of cognitive reserve, whereby older adults with lower formal education have limited neurocognitive adaptive capacity and are therefore more vulnerable to cognitive decline with age [35].

C. Neuroticism Personality

The findings of this study indicate that older adults generally have low to moderate levels of neuroticism, with substantial individual variation. These findings are in line with research by Achmadan et al. and Ahya & Siaputra, which state that the distribution of neuroticism scores in adult and elderly populations tends to be asymmetrical with wide individual variation, especially in the dimension of negative emotionality. Although there is a decrease in the average level of neuroticism with age, the variability of scores remains high in the elderly group, especially those who experience environmental and social changes in later life [18], [19].

The context of social institutions contributes to the heterogeneity of neuroticism levels in the elderly due to their complex and diverse life experiences. Experiences such as the loss of family members or loved ones are significant changes that can reinforce differences in psychological characteristics between individuals in institutional settings [36].

D. The Relationship Between Cognitive Function and Depression Levels

Theoretically, the neurobiological model explains that chronic depression can impair cognitive functions through disturbances in the regulation of the hypothalamic-pituitary-adrenal axis, an increase in inflammatory mediators, and changes in the neurotransmitters responsible for memory and executive functions [37]. Conversely, a decline in cognitive function can increase susceptibility to depression, as cognitive impairments lead to frustration in coping with everyday tasks and weaken an individual's coping mechanisms. However, a consistent relationship between cognitive function and depression is not evident in all contexts [38].

There is no statistically significant correlation between the two variables [39]. From a biopsychosocial perspective, protective environmental factors and strong social support can modify or mitigate the direct link between cognitive decline and depression in older adults. In the context of the Budi Mulia 3 social home, older adults participate in regular support and prevention activities, including social interaction facilitated by volunteers, as well as spiritual activities such as reading the Koran and communal prayer. Although social support and spirituality were not directly measured as variables in this study, prior literature suggests that such activities may function as adaptive coping mechanisms that strengthen psychological resilience and reduce the impact of psychosocial stressors [40]. It is therefore plausible, though

speculative and not directly tested in this study, that similar unmeasured protective factors partly explain the non-significant association observed here between cognitive function and depression; future studies should measure these variables directly to evaluate this hypothesis.

E. The Relationship Between Neuroticism Personality and Depression Levels

In personality psychology, neuroticism as a dimension of the Big Five shows emotional instability and sensitivity to stress, so that older adults with high levels of neuroticism are more prone to feelings of sadness or excessive anxiety [41]. Declining physical condition, functional limitations, and social isolation reinforce this vulnerability. A study by Li and Zhang found that aspects of neuroticism such as worry and anxiety mediate the relationship between personality and depressive symptoms [42]. Zhu et al. reported that older adults with high neuroticism have a 6.13-fold higher hazard ratio for depression due to intense emotional reactivity and weak emotional regulation [43]. Analysis of the Indonesian Family Life Survey shows that older adults with negative affect have a 1.12 times higher risk of depression [44].

Clinically, the combination of neurotic traits and chronic stress reduces the brain's response to pleasure, weakens mental defenses, and increases the risk of depression after facing difficult life events [45]. Psychologically, neuroticism encourages a focus on negative thoughts, rumination, low self-efficacy, and negative perceptions of aging, thereby facilitating the onset of depression [46]. Although spirituality was not directly measured in this study, spiritual activities and regular worship at the Budi Mulia 3 Social Welfare Home for the Elderly may plausibly contribute to lower neuroticism levels, consistent with the findings of Ghiggia et al., who reported a negative correlation between neuroticism and spirituality [47].

Conclusion

The study shows that the demographic characteristics of the respondents are predominantly young seniors, women, Muslims, people with secondary education, widows or widowers, and people with a professional background in the informal sector. The majority of respondents did not suffer from depression, although average cognitive function scores were below normal, indicating a decline in cognitive function in this population. The degree of neuroticism showed considerable variation, with a low to moderate distribution. The bivariate analysis revealed no significant association between cognitive function and depression level, which may be due to protective factors such as strong social support and regular spiritual activities in the nursing home as adaptive coping mechanisms. In contrast, there was a significant positive correlation between neuroticism personality and depression level, with an increase in neuroticism score correlating with an increase in depression level.

These findings contribute to the understanding that neuroticism personality traits are significantly associated with depressive symptoms in older adults in institutional settings, while the non-significant relationship between cognitive function and depression may

potentially be influenced by unmeasured environmental and spiritual factors that warrant direct investigation in future research.

Limitations of this study include its cross-sectional design, which does not allow for causal conclusions, as well as limited variable measurements that do not quantitatively consider additional factors such as sleep quality, medical comorbidities, and social support.

Limitation and Suggestions

This study has limitations in the scope of variables observed, where the focus of analysis is only on the bivariate association of cognitive function and neuroticism personality with depression. Geriatric depression is a clinical phenomenon with a multidimensional etiology that involves other determinants such as social support from family and fellow residents, degree of functional independence or Activities of Daily Living, sleep quality, and a history of chronic medical comorbidities and polypharmacy that are not accommodated in the analysis model.

The limitations of cross-sectional research designs mean that the data only describe conditions at a specific point in time, making it impossible to determine cause-and-effect relationships or causality. Self-report instruments are prone to subjectivity and social desirability bias, whereby respondents may answer in a way that makes them look good in order to conceal their actual psychological condition. The physical condition of older adults, who are prone to fatigue, and their reduced attention span when completing long questionnaires may also affect the accuracy of their responses.

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Conflict of Interest

The authors declare that they have no competing financial interests or personal relationships that could influence the objectivity of the research reported in this manuscript.

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