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Profile of Elderly Patients with Cognitive Impairments in the Geriatric Outpatient Clinic Universitas Airlangga Hospital

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ABSTRACT

The elderly population in Indonesia continues to increase, accompanied by a rising prevalence of cognitive impairment influenced by factors such as age, sex, education, marital status, medical history, treatment, and substance use. This cross-sectional descriptive study aimed to identify the profile and risk factors of cognitive impairment among elderly patients at the geriatric clinic of Universitas Airlangga Hospital. Cognitive function was assessed using the Indonesian version of the Montreal Cognitive Assessment (MoCA-INA) during September–October 2025. Of 88 patients assessed, 82 (93.2%) scored below 26, indicating cognitive impairment, with most patients' assessment resulting in mild cognitive impairment (53%), which was most prevalent among individuals aged 60–69 years, women, retirees or unemployed individuals, and those with elementary-level education. Most patients were married, had comorbidities such as hypertension and diabetes mellitus, were undergoing treatment, and did not consume caffeine or cigarettes. These findings align with existing literature and highlight the high burden of cognitive impairment in this population, emphasizing the need for increased awareness and further research.

Keywords: cognitive impairment; elderly; geriatric; profile

INTRODUCTION

According to Indonesian Law No. 13 of 1998, older adults are individuals aged 60 years and above, classified as young-old (60–69 years), middle-old (70–79 years), and old-old (≥80 years). Since 2021, one in ten Indonesians has been an older adult, with approximately 30.9 million elderly individuals (11.75% of the population) [1]. Along with population aging, the prevalence of cognitive impairment among older adults has increased [2]. Studies in Asia report a median prevalence of cognitive impairment of 19.44%, while national data estimate cognitive impairment in up to 32.4% of Indonesian older adults [3]. Dementia cases in Indonesia are projected to rise substantially, reaching over 4 million affected individuals [4]. Cognitive decline is a common aspect of aging, involving multiple cognitive domains and ranging from mild cognitive impairment to dementia. Several risk factors, including age, education, sex, marital status, medical history, treatment, and substance use, are associated with cognitive impairment. However, data on cognitive impairment among older adults in Indonesia, particularly in Surabaya, remain limited, underscoring the need for accurate reporting to improve public awareness.

METHODS

This study used a cross-sectional design with descriptive analysis. Cognitive impairment was identified using the Indonesian version of the Montreal Cognitive Assessment (MoCA-INA) administered from September to October 2025 at the Geriatric outpatient clinic in Universitas Airlangga Hospital, Surabaya, Indonesia. Using the consecutive sampling technique, a total of 88 eligible patients were put through a brief interview and assessed using MoCA-INA during their visit to the doctor.

Through the interview, various variables (age, sex, education, marital status, medical history, treatment, and substance use) were retrieved and later studied. The Montreal Cognitive Assessment was chosen as a tool for its high specificity (90% in identifying mild cognitive impairment), and high specificity of 87%, as well as its brief execution, which takes around 10 minutes [5][6]. The Montreal Cognitive Assessment assesses numerous cognitive functions, such as short-term memory, visuospatial abilities, executive functions, attention, concentration, working memory, language, and orientation to time and place. MoCA has a total score of 30 points. The results are interpreted as normal ≥26, mild impairment (18-25), moderate impairment (10-17), and severe impairment (0-9).

RESULTS

Based on age groups, most respondents were classified as young-old adults, totaling 45 individuals (51.1%), followed by middle-old adults with 38 individuals (43.2%), and old-old adults with 5 individuals (5.7%). This indicates that the majority of respondents were in the early elderly age group. In terms of sex, female respondents predominated, with 54 individuals (61.4%), while males accounted for 34 individuals (38.6%).

Regarding occupation, most respondents were retirees (27 individuals; 30.6%), followed by those who were unemployed (26 individuals; 29.5%) and housewives (24 individuals; 27.2%). Meanwhile, self-employed respondents numbered 7 individuals (8%), and private-sector employees totaled 4 individuals (4.6%).

In terms of educational level, the majority had completed elementary school or equivalent and senior high school or equivalent, each comprising 28 individuals (31.8%). This was followed by tertiary education (bachelor's, master's, or doctoral degrees) in 18 individuals (20.4%), junior high school or equivalent in 11 individuals (12.5%), no formal education in 2 individuals (2.3%), and other educational backgrounds in 1 individual (1.1%). Based on marital status, most respondents were married (71 individuals; 80.6%), while 5 individuals (5.7%) were unmarried, 2 individuals (2.3%) were divorced, and 10 individuals (11.3%) were widowed.

In terms of comorbidities, hypertension was the most common condition, affecting 64 respondents (72.7%), followed by diabetes mellitus in 46 respondents (52.2%), a history of stroke in 8 respondents (9.1%), a history of heart disease in 7 respondents (7.9%), followed by diabetes mellitus in 46 respondents (52.2%), a history of stroke in 8 respondents (9.1%), a history of heart disease in 7 respondents (7.9%), and other conditions in 12 respondents (13.6%). Regarding medication history, the majority of respondents were currently receiving treatment (86 individuals; 97.7%), while only 2 individuals (2.3%) were not taking any medication. For substance use history, including caffeine consumption and smoking, 37 respondents (42.1%) were identified as substance users, whereas 51 respondents (57.9%) reported no substance use.

TABLE 1: Sociodemographic and Clinical Characteristics of Study Participants.

Variable	Number of Patients	%
Age (Years Old)		
Young-old (60 – 69 years)	45	51,1%
Middle-old (70 – 79 years)	38	43,2%
Old-old (≥80 years)	5	5,7%
Sex		
Male	34	38,6%
Female	54	61,4%
Occupation		
Private sector employee	4	4,6%
Self-employed	7	8%
Housewife	24	27,2%
Retired	27	30,6%
Unemployed	26	29,5%
Education		
No formal education	2	2,3%
Elementary school/equivalent	28	31,8%
Middle School/equivalent	11	12,5%
High School/equivalent	28	31,8%
Higher education	18	20,4%
Others	1	1,1%

Variable	Number of Patients	%
Marital Status		
Married	71	80,6%
Unmarried	5	5,7%
Divorced	2	2,3%
Widowed	10	11,3%
Comorbidities		
Hypertension	64	72.7%
Diabetes Mellitus	60	68,1%
History of heart disease	7	7,9%
History of stroke	8	9,1%
Others	12	13,6%
Medication History		
Currently taking medication	86	97,7%
Not taking medication	2	2,3%
History of Substance Use		
Smoking	4	4%
Caffeine consumption	36	40%
Alcohol consumption	0	0%
No substance use	51	56%

Demographic Characteristics of Participants

The sample distribution (Table 1) indicates that the study population was predominantly composed of young-old adults, women, individuals with basic to intermediate educational backgrounds, and a high prevalence of hypertension, with most respondents undergoing medical treatment.

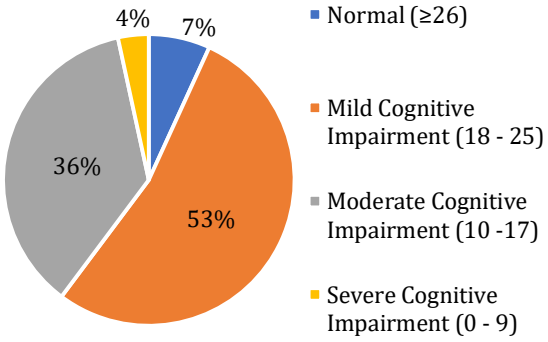

FIGURE 1: Distribution of Cognitive Function Levels According to MoCA-INA.

The distribution of respondents' cognitive function levels based on MoCA-INA scores showed that the majority of respondents were classified as having mild cognitive impairment, accounting for 53%. Furthermore, 36% of respondents were categorized as having moderate cognitive impairment. Respondents with normal cognitive function (score ≥26) comprised 7% of the sample, while those with severe cognitive impairment represented the smallest proportion at 4%. These findings indicate that most respondents in this study experienced cognitive impairment, predominantly at mild to moderate levels.

Cognitive Function Assessment Interpretation Classified by Age Groups in the Cognitive Impaired Population

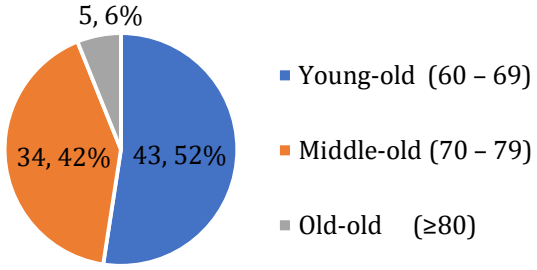

FIGURE 2: Age Classification of the Cognitive Impaired Population.

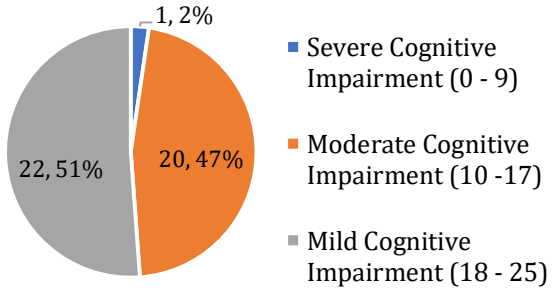

FIGURE 3: Cognitive Impairment Levels of the Young-old Population.

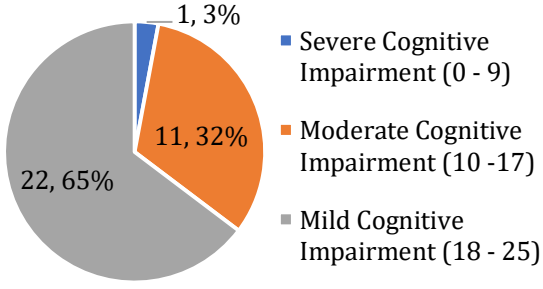

FIGURE 4: Cognitive Impairment Groups of the Middle-old Population.

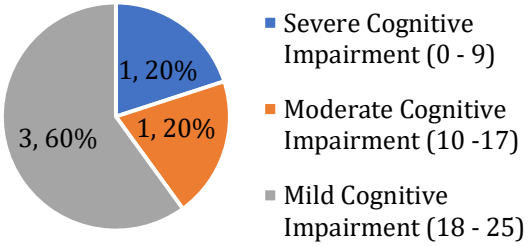

FIGURE 5: Cognitive Impairment Groups of the Old-old Population.

Cognitive Function Assessment Interpretation Classified by Sex in the Cognitive Impaired Population

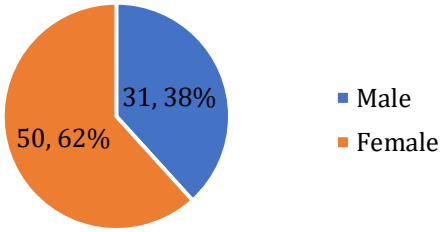

FIGURE 6: Sex Classification of the Cognitive Impaired Population.

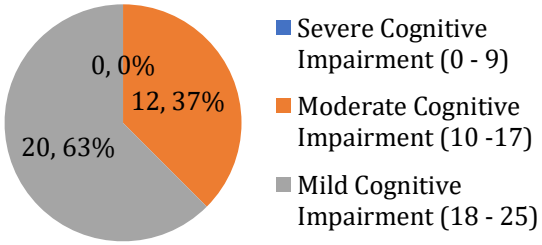

FIGURE 7: Cognitive Impairment Levels of the Male Population.

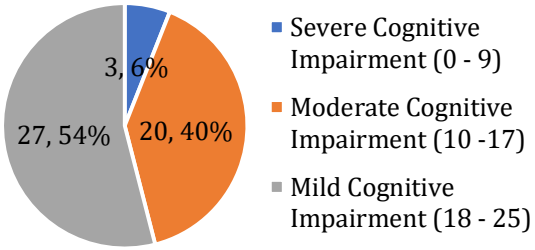

FIGURE 8: Cognitive Impairment Levels of the Female Population

Cognitive Function Assessment Interpretation Classified by Occupation in the Cognitive Impaired Population

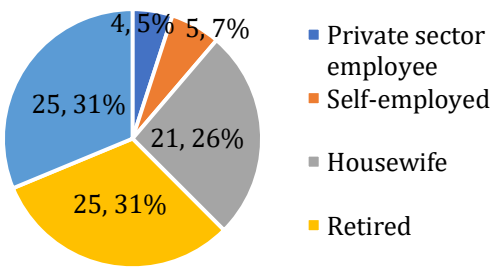

FIGURE 9: Occupation Classification of the Cognitive Impaired Population.

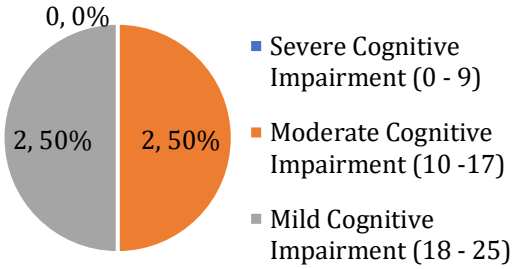

FIGURE 10: Cognitive Impairment Levels of Private Sector Employee Population.

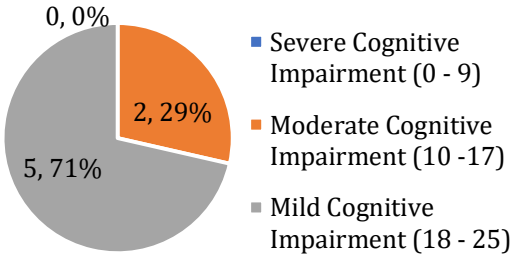

FIGURE 11: Cognitive Impairment Levels of the Self-employed Population.

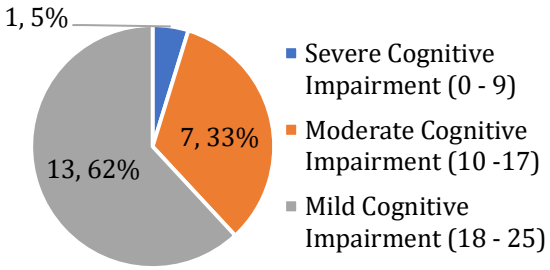

FIGURE 12: Cognitive Impairment Levels of Housewife Population.

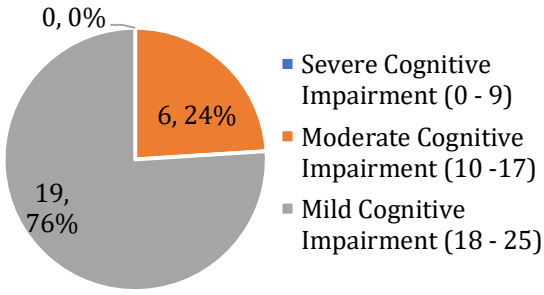

FIGURE 13: Cognitive Impairment Levels of the Retired Population.

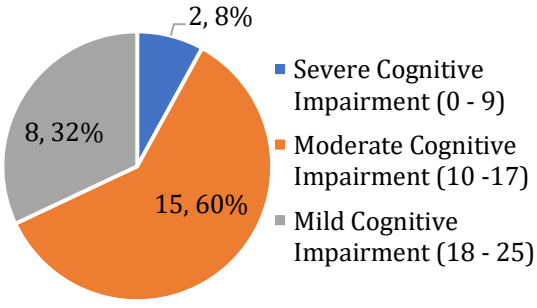

FIGURE 14: Cognitive Impairment Levels of the Unemployed Population.

Cognitive Function Assessment Interpretation Classified by Education Levels in the Cognitive Impaired Population

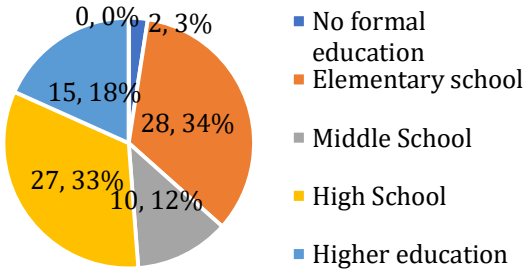

FIGURE 15: Education Levels Classification of Cognitive Impaired Population.

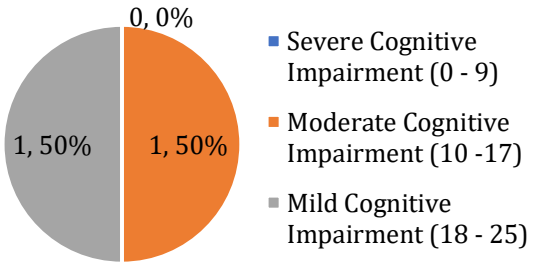

FIGURE 16: Cognitive Impairment Levels of the Population with No Formal Education.

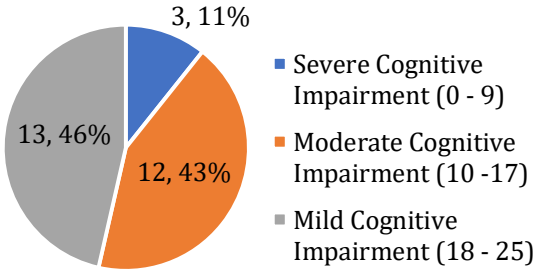

FIGURE 17: Cognitive Impairment Levels of Elementary School Graduates.

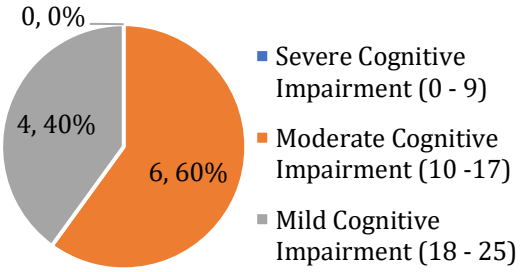

FIGURE 18: Cognitive Impairment Levels of Middle School Graduates.

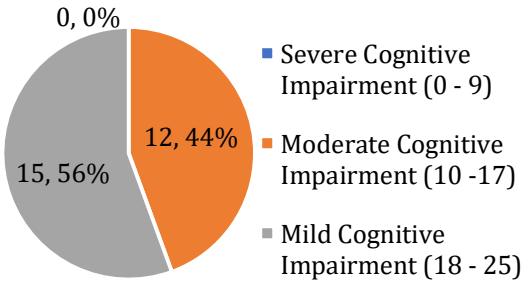

FIGURE 19: Cognitive Impairment Levels of High School Graduates.

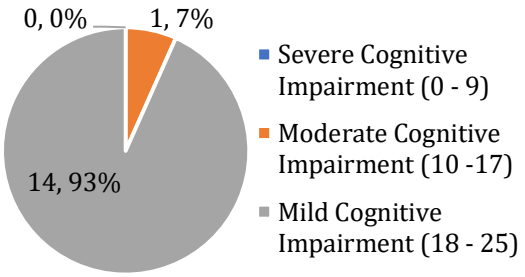

FIGURE 20: Cognitive Impairment Levels of Higher Education Graduates.

Cognitive Function Assessment Interpretation Classified by Marital Status in the Cognitive Impaired Population

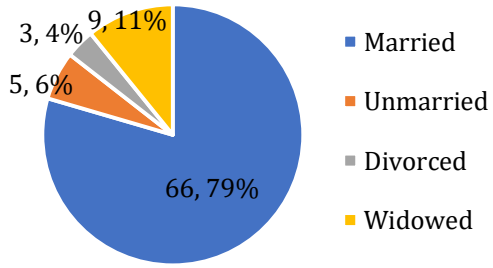

FIGURE 21: Marital Status Classification of Cognitive Impaired Population.

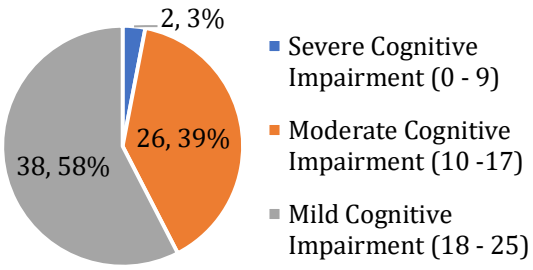

FIGURE 22: Cognitive Impairment Levels of Married Population.

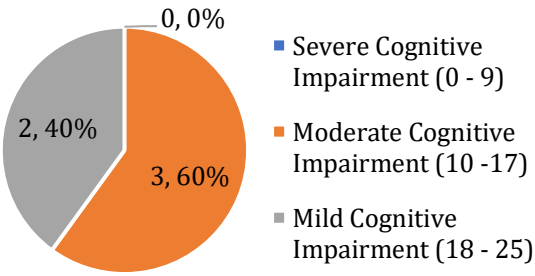

FIGURE 23: Cognitive Impairment Levels of Unmarried Population.

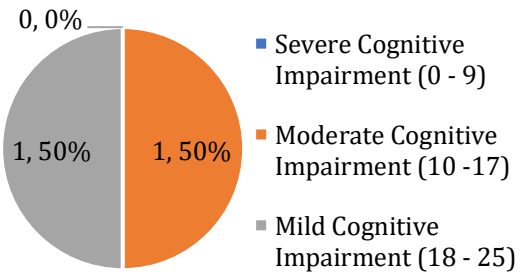

FIGURE 24: Cognitive Impairment Levels of Divorced Population.

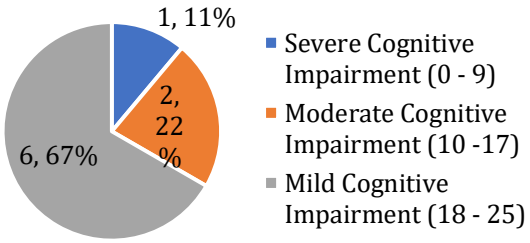

FIGURE 25: Cognitive Impairment Levels of the Widowed Population.

Cognitive Function Assessment Interpretation Classified by Comorbidities in the Cognitive Impaired Population

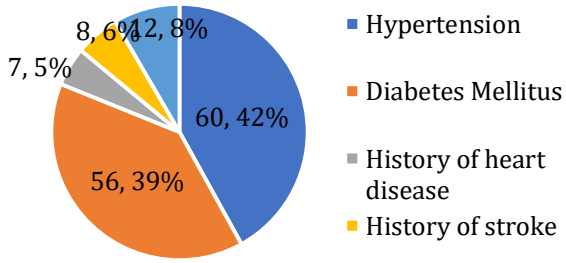

FIGURE 26: Comorbidities Classification of Cognitive Impaired Population.

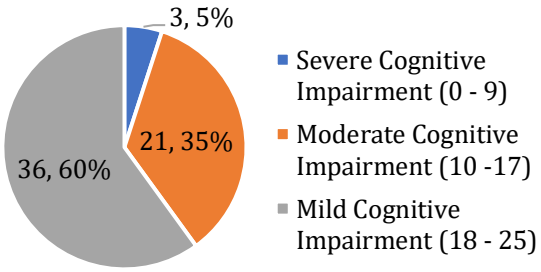

FIGURE 27: Cognitive Impairment Levels of the Hypertensive Population.

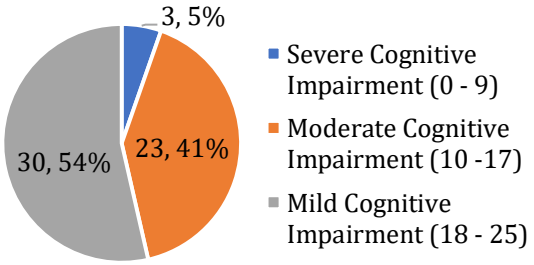

FIGURE 28: Cognitive Impairment Levels Population with Type 2 Diabetes Mellitus

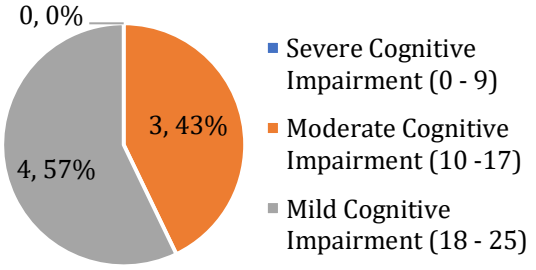

FIGURE 29: Cognitive Impairment Levels of the Population with a History of Heart Conditions.

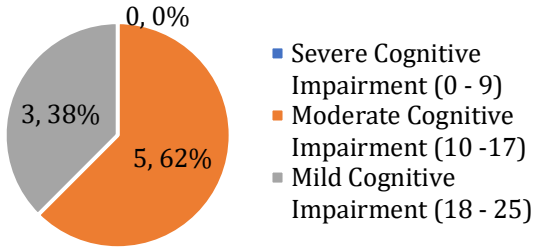

FIGURE 30: Cognitive Impairment Levels of the Population with a History of Stroke.

Cognitive Function Assessment Interpretation Classified by Use of Medication in the Cognitive Impaired Population

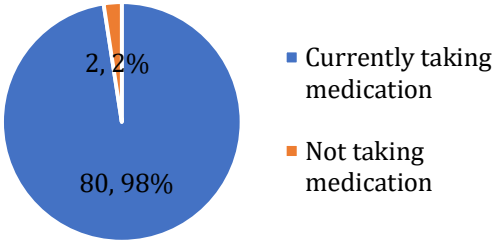

FIGURE 31: Medication History Classification of the Cognitive Impaired Population.

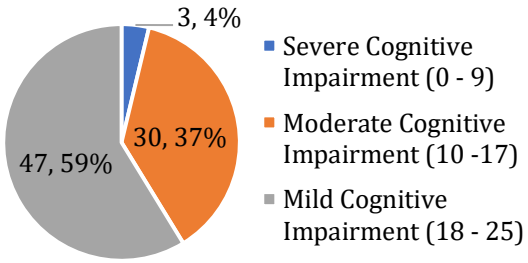

FIGURE 32: Cognitive Impairment Levels of Medicated Population.

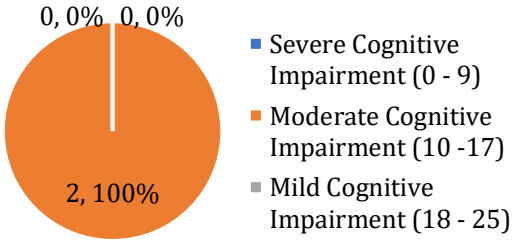

FIGURE 33: Cognitive Impairment Levels of Unmedicated Population.

Cognitive Function Assessment Interpretation Classified by Substance Use in the Cognitive Impaired Population

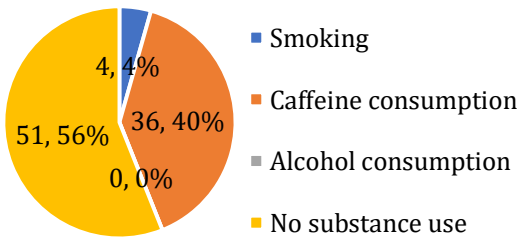

FIGURE 34: Substance Use Classification of the Cognitive Impaired Population.

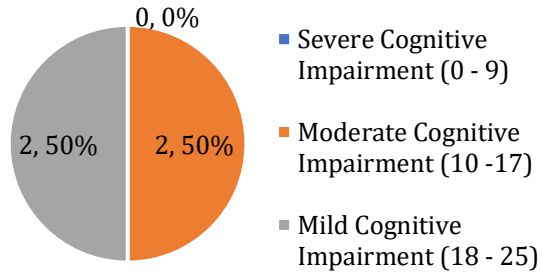

FIGURE 35: Cognitive Impairment Levels of Smokers Population.

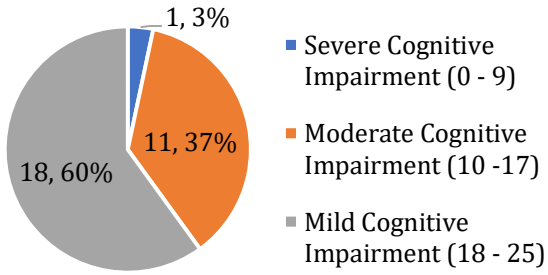

FIGURE 36: Cognitive Impairment Levels of Caffeinated Population.

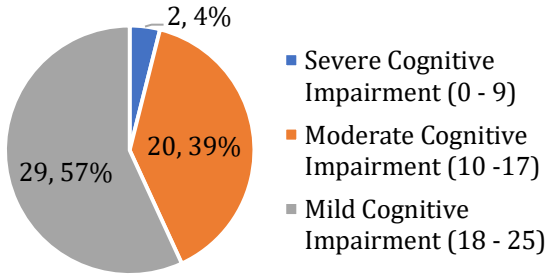

FIGURE 37: Cognitive Impairment Levels of the Population with No Substance Use.

DISCUSSION

Age Characteristics of Cognitive Impaired Study Participants

Based on the subject data, the largest age group consisted of young-old adults (60–69 years), totaling 45 individuals (51.1%), followed by middle-old adults with 38 individuals (43.2%). Among the six patients who achieved MoCA-INA scores ≥26, two were classified as young-old and four as middle-old. Of the 82 patients with scores below 26, 43 were young-old, 37 were middle-old, and 5 were old-old adults.

Analysis of the distribution of cognitive impairment severity across the three elderly age groups demonstrated varying patterns of cognitive decline with advancing age. The three pie charts illustrate the distribution of mild, moderate, and severe cognitive impairment among young-old (60–69 years), middle-old (70–79 years), and old-old (≥80 years) adults.

In the young-old group (60–69 years), most respondents were classified as having mild cognitive impairment (51%), followed by moderate impairment (47%), with only 2% experiencing severe impairment. These findings suggest that in the early stages of old age, cognitive decline generally remains at mild to moderate levels. This pattern may be associated with physiological aging processes that begin to affect memory, attention, and processing speed without yet resulting in severe cognitive dysfunction [7][8].

In the middle-old group (70–79 years), the proportion of mild cognitive impairment increased to 65%, while moderate impairment decreased to 32%, and severe impairment remained low at 3%. The increased proportion of mild impairment in this group may indicate that most individuals are still in the early stages of cognitive decline.

In contrast, in the old-old group (≥80 years), although mild cognitive impairment remained predominant (60%), there was a more pronounced increase in moderate and severe cognitive impairment, each accounting for 20%. This pattern suggests that in advanced old age, the risk of more severe cognitive impairment tends to increase.

Overall, these results indicate that mild cognitive impairment is the most prevalent condition across all elderly age groups; however, there is a clear trend toward increasing severity of cognitive impairment with advancing age. This finding supports previous studies, such as that by Bai et al. (2022), which reported that the prevalence of cognitive impairment increases with age [9].

Sex Characteristics of Cognitive Impaired Study Participants

The cognitive assessment results of elderly patients at the geriatric clinic of Universitas Airlangga Hospital based on sex showed that 32 of 34 male patients (94.1%) and 50 of 54 female patients (92.6%) were indicated to have cognitive impairment.

Analysis of the distribution of cognitive impairment severity by sex revealed differences in the patterns of cognitive impairment between male and female respondents. The pie charts in Figures 7 and 8 illustrate the proportions of mild, moderate, and severe cognitive impairment in each group.

Among male respondents, the majority experienced mild cognitive impairment (63%), while 37% were classified as having moderate cognitive impairment, and no cases of severe cognitive impairment were observed (0%). These findings suggest that most male respondents were still in the early stages of cognitive decline. The absence of severe cognitive impairment in this group may be influenced by sample size, respondent characteristics, or the possibility of greater cognitive reserve among some male individuals.

In contrast, the distribution of cognitive impairment severity among female respondents showed greater variability. Most female respondents were classified as having mild cognitive impairment (54%), followed

by moderate cognitive impairment (40%) and severe cognitive impairment (6%). These findings indicate that although mild cognitive impairment remained predominant, the proportion of moderate to severe cognitive impairment was relatively higher among women compared with men, consistent with previous studies.

This difference in distribution suggests that women tend to have a higher risk of more severe cognitive impairment than men. According to a study by Livingston et al. (2020), older women have a higher risk of developing dementia than older men [10]. This may be related to several factors, including longer life expectancy among women, postmenopausal hormonal changes, and social and psychosocial factors.

Overall, the results of this study demonstrate that mild cognitive impairment was the most dominant condition in both men and women; however, women exhibited a higher proportion of moderate to severe cognitive impairment.

Occupation Characteristics of Cognitive Impaired Study Participants

Based on the distribution of cognitive impairment severity according to occupational status, revealed differences in cognitive impairment patterns across occupational groups. This finding suggests that occupational status may be associated with variations in cognitive function among older adults, either directly or indirectly through mental activity, social engagement, and daily routines.

Overall, as shown in Figure 9, the occupational groups most frequently observed among subjects with cognitive impairment were retirees and unemployed individuals, each accounting for 31%, followed by housewives at 26%, self-employed individuals at 7%, and private-sector employees at 5%. This distribution indicates that most subjects with cognitive impairment belonged to groups that were no longer actively working or did not have formal employment.

Among private-sector employees (Figure 10), all respondents were classified as having mild or moderate cognitive impairment, each accounting for 50%, with no cases of severe cognitive impairment observed. This may indicate that formal employment, which demands cognitive function, social interaction, and structured daily routines, potentially exerts a protective effect against severe cognitive decline.

The self-employed group (Figure 11) demonstrated a predominance of mild cognitive impairment (71%), with the remaining respondents experiencing moderate cognitive impairment (29%), and no cases of severe impairment. Self-employment, which is typically flexible yet still involves decision-making and mental engagement, may contribute to the preservation of cognitive function in some individuals.

Among housewives (Figure 12), most respondents experienced mild cognitive impairment (62%), followed by moderate impairment (33%), with a small proportion exhibiting severe cognitive impairment (5%).

The retiree group (Figure 13) was dominated by mild cognitive impairment (76%), while 24% experienced moderate impairment, and no severe impairment was observed. This pattern may reflect differences in post-retirement adaptation, in which some older adults remain socially and mentally active, thereby maintaining relatively preserved cognitive function.

In contrast, among unemployed subjects (Figure 14), a different pattern was observed, with moderate cognitive impairment being the most prevalent category (60%), accompanied by mild impairment (32%) and severe impairment (8%). This group exhibited relatively more severe cognitive impairment compared with other occupational groups.

Overall, the findings of this study indicate that engagement in work-related or productive activities is generally associated with milder levels of cognitive impairment, whereas the absence of work or cessation of productive activities without compensatory engagement may increase the risk of more severe cognitive impairment. These results are consistent with previous studies.

For example, research by Sindi et al. (2022) reported that passive occupations are associated with an increased risk of cognitive impairment, whereas active occupations exert a protective effect. Passive occupations are defined as those involving low demands and low control, such as security guards and cleaning staff, while active occupations involve high demands and high control, such as physicians, architects, and teachers. Low-control occupations are typically monotonous and require minimal skills, whereas high-control occupations are non-repetitive and require more than four years of training [11].

Furthermore, then et al. (2013) reported that higher occupational complexity, particularly work involving data and interpersonal interaction, is associated with a reduced risk of cognitive impairment, likely due to the cognitively stimulating nature of such occupations [12].

Educational Level Characteristics of Cognitive Impaired Study Participants

Based on the data collected by the researchers, patients with cognitive impairment were predominantly elementary school/equivalent graduates, totaling 28 individuals, followed by senior high school or equivalent graduates with 27 individuals. Analysis of the distribution of subjects with cognitive impairment according to highest educational attainment revealed differences in the patterns of cognitive impairment across educational groups.

These findings suggest that educational level may be associated with variations in cognitive function among older adults, which can be explained by the concept of cognitive reserve.

Overall, as shown in Figure 15, subjects with cognitive impairment were most frequently drawn from the elementary school/equivalent (34%) and senior high school/equivalent (33%) education groups, followed by those with tertiary education (bachelor's/master's/doctoral degrees) at 18%, junior high school/equivalent at 12%, and no formal education at 3%. This distribution indicates that the majority of subjects with cognitive impairment had low to intermediate educational backgrounds.

In the group with no formal education (Figure 16), subjects were equally divided between mild and moderate cognitive impairment, each accounting for 50%, with no cases of severe cognitive impairment observed. Although the number of subjects in this group was relatively small, this pattern suggests that individuals without formal education may experience cognitive decline beginning at the moderate level.

The elementary school/equivalent education group (Figure 17) demonstrated a more varied distribution of cognitive impairment, with mild impairment as the most common category (46%), followed by moderate impairment (43%) and severe impairment (11%). The presence of severe cognitive impairment in this group indicates that basic education alone may not provide optimal protection against cognitive decline in later life.

In the junior high school/equivalent group (Figure 18), most subjects were classified as having moderate cognitive impairment (60%), while the remainder experienced mild impairment (40%), with no severe impairment observed. This pattern suggests that at the lower secondary education level, cognitive impairment tends to occur predominantly at a moderate severity.

In contrast, in the senior high school/equivalent group (Figure 5.19), most subjects experienced mild cognitive impairment (56%), with the remainder classified as having moderate impairment (44%), and no cases of severe impairment were identified. This finding indicates a trend toward better cognitive function with increasing educational attainment. In the tertiary education group (bachelor's /master's/doctoral degrees; Figure 20), nearly all subjects were classified as having mild cognitive impairment (93%), with only a small proportion experiencing moderate impairment (7%), and no cases of severe cognitive impairment were observed.

Overall, the results of this study indicate that higher levels of educational attainment are associated with milder degrees of cognitive impairment. This finding is consistent with the cognitive reserve theory, which proposes that higher education enhances the brain's ability to compensate for structural and functional changes associated with aging. Longer durations of formal education provide more sustained and intensive cognitive stimulation, potentially delaying or attenuating the manifestation of more severe cognitive impairment. This observation aligns with the hypothesis proposed by Livingston et al. (2020), which suggests that lower educational attainment adversely affects cognitive reserve [10].

Marital Status Characteristics of Cognitive Impaired Study Participants

A study by Sommerlad et al. (2017) concluded that being married is associated with a reduced risk of dementia compared with individuals who are divorced, widowed, or never married. This finding is consistent with the results of the patient profile data collected at the geriatric clinic of Universitas Airlangga Hospital [13].

Analysis of the distribution of cognitive impairment according to marital status in this study revealed differences in the patterns of cognitive impairment across marital status groups. This suggests that marital status may play a role in cognitive function among older adults, particularly through social, emotional, and psychological support mechanisms.

Overall, as shown in Figure 21, most subjects with cognitive impairment were married (79%), followed by widowed individuals (11%), unmarried individuals (6%), and divorced individuals (4%). Among married subjects (Figure 22), the majority experienced mild cognitive impairment (58%), followed by moderate impairment (39%), with only a small proportion experiencing severe cognitive impairment (3%). This pattern indicates that married subjects tend to experience cognitive impairment at milder levels.

In contrast, among unmarried subjects (Figure 23), moderate cognitive impairment was the most dominant category (60%), while the remainder experienced mild impairment (40%), with no cases of severe cognitive impairment observed. This suggests that unmarried individuals may experience more severe cognitive impairment compared with married individuals, although the sample size in this group was relatively small.

In the divorced group (Figure 24), the distribution of cognitive impairment was evenly divided between mild and moderate impairment (50% each), with no cases of severe impairment identified. Meanwhile, in the widowed group (Figure 25), most subjects experienced mild cognitive impairment (67%); however, moderate (22%) and severe cognitive impairment (11%) were also observed. The loss of a spouse is known to significantly affect psychological well-being, including increased stress, loneliness, and depression, which over time may contribute to cognitive decline. Overall, the results of this study indicate that married subjects tend to have milder levels of cognitive impairment compared with unmarried, divorced, or widowed subjects.

These findings support the concept that stable social and emotional support, such as that obtained through marriage, plays an important role in maintaining cognitive function in older adults. Nevertheless, the relatively small number of subjects in certain marital status groups should be considered when interpreting these results.

Comorbidities in Cognitive Impaired Study Participants

Based on the collected data, the majority of patients with cognitive impairment had the following comorbid conditions: hypertension accounted for 42% (60 subjects), followed by diabetes mellitus at 39% (56 subjects). Other comorbidities included conditions such as chronic obstructive pulmonary disease, allergies, and low back pain at 8% (12 subjects), a history of stroke at 6% (8 subjects), and a history of heart disease at 5% (7 subjects).

Among subjects with diabetes mellitus (Figure 28), the distribution of cognitive impairment showed that mild cognitive impairment was the most common category (54%), followed by moderate impairment (41%) and severe impairment (5%). Diabetes mellitus is associated with chronic hyperglycemia, insulin resistance, and oxidative stress, all of which may affect neuronal function and increase the risk of cognitive impairment. The relatively high proportion of moderate cognitive impairment suggests that diabetes mellitus may accelerate the progression of cognitive decline.

These findings are consistent with previous meta-analyses reporting a significant association between diabetes and an increased risk of dementia. In particular, a diabetes duration of less than five years has been associated with a higher risk of dementia [14]. Among subjects with hypertension (Figure 27), the majority experienced mild cognitive impairment (60%), followed by moderate impairment (35%), with a small proportion experiencing severe impairment (5%). Chronic hypertension can lead to impaired cerebral perfusion and structural changes in cerebral blood vessels, which over time contribute to cognitive decline. However, the predominance of mild cognitive impairment in this group may indicate that many subjects were still in the early stages of cognitive deterioration.

A study by McGrath et al. (2017) examined the relationship between blood pressure and the incidence of dementia, reporting that systolic hypertension from midlife (40–64 years) to older age (≥65 years) was associated with dementia. Furthermore, among individuals with low-to-normal blood pressure (≤140/90 mmHg) in midlife, a sharp decline in systolic blood pressure was associated with a twofold increase in dementia risk [15].

In subjects with a history of heart disease (Figure 29), most were classified as having mild cognitive impairment (57%), while the remainder experienced moderate impairment (43%), with no cases of severe cognitive impairment observed. Heart disease may impair cardiac output and cerebral perfusion; however, the variability in cognitive impairment severity in this group may be influenced by disease duration, medical control, and other protective factors such as physical and social activity.

In contrast to other comorbidities, among subjects with a history of stroke (Figure 30), the majority experienced moderate cognitive impairment (62%), while the remainder had mild impairment (38%), with no cases of severe impairment observed. Stroke directly causes brain tissue damage, making it expected that subjects with a history of stroke would exhibit more severe cognitive impairment compared with those with hypertension, diabetes mellitus, or heart disease.

Overall, the results of this study indicate that vascular and metabolic comorbidities are associated with the severity of cognitive impairment, with a tendency toward more severe impairment among subjects with a history of stroke compared with those with hypertension, diabetes mellitus, or heart disease.

Medication in Cognitive Impaired Study Participants

Based on the findings of this study, all samples with normal MoCA-INA scores and the majority of samples with cognitive impairment (80 out of 82) were recorded as currently taking medication. Subjects who were taking medication were patients undergoing treatment with drugs prescribed according to their comorbid conditions. Most patients were receiving antihypertensive medications, followed by medications for diabetes mellitus.

Analysis of the distribution of cognitive impairment according to medication history showed that medication use and the presence of a treatment history were associated with variations in the severity of cognitive impairment among subjects. A history of medication use generally reflects the presence of chronic diseases requiring long-term therapy, which may indirectly affect cognitive function through the underlying disease mechanisms as well as the effects of the medications themselves.

Overall, as shown in Figure 31, the vast majority of subjects with cognitive impairment were taking medication (98%), while only 2% were not. This finding indicates that most subjects in this study had health conditions requiring pharmacological treatment, which is commonly observed in elderly populations with chronic diseases.

Among subjects with a history of medication use (Figure 32), most experienced mild cognitive impairment (59%), followed by moderate impairment (37%), with only a small proportion experiencing severe impairment (4%). The predominance of mild cognitive impairment in this group may suggest that ongoing treatment helps maintain overall health stability, thereby keeping cognitive decline at mild to moderate levels.

In contrast, among subjects without a history of medication use (Figure 33), all subjects experienced moderate cognitive impairment (100%), with no cases of mild or severe impairment observed. Although the number of subjects in this group was very small, this pattern suggests that the absence of a medication history is not necessarily associated with better cognitive status. This may be because these subjects had not yet been diagnosed or had not received adequate medical management for underlying conditions contributing to cognitive impairment.

Overall, the results of this study indicate that subjects with a history of medication use tend to have milder levels of cognitive impairment compared with those without a medication history. However, the limited number of subjects without a medication history should be considered when interpreting these findings. Proper management of chronic diseases through regular medication use may help control risk factors that contribute to cognitive decline, including vascular, metabolic, and inflammatory disturbances.

Previous research by Tully et al. (2016) found that diuretic use was associated with a reduced risk of dementia and Alzheimer's disease [16]. This is supported by a 2019 meta-analysis examining five classes of antihypertensive medications angiotensin-converting enzyme inhibitors (ACE inhibitors), angiotensin II receptor blockers (ARBs), beta blockers, calcium channel blockers (CCBs), and diuretics which concluded that individuals with hypertension who used antihypertensive medications had a lower risk of developing dementia and Alzheimer's disease compared with those who did not use such medications. The study also reported no significant differences in dementia risk among the different classes of antihypertensive drugs [17].

Substance Use in Cognitive Impaired Study Participants

Based on data collected from the study sample, most subjects with cognitive impairment did not consume any substances (56%), followed by those who consumed caffeine (40%) and those who smoked cigarettes (4%); no subjects were found to consume alcohol. This distribution indicates that the majority of subjects in this study did not have a history of addictive substance use, particularly alcohol and tobacco, which may influence the interpretation of the relationship between substance use and cognitive impairment.

Among cigarette smokers (Figure 35), the severity of cognitive impairment was evenly distributed between mild (50%) and moderate (50%) impairment, with no cases of severe cognitive impairment observed. Although the number of patients in this group was relatively small, these findings suggest that smokers had already experienced cognitive decline up to a moderate level.

Studies examining the correlation between smoking and cognitive function in the United States have reported a negative association between smoking habits and processing speed [18]. This is consistent with earlier findings by Anstey et al. (2007), which showed that active smokers experienced greater cognitive decline compared with former smokers [19]. In addition, a study conducted in Germany by Mons et al. (2013) demonstrated that smokers have an increased risk of cognitive impairment in later life, with the risk increasing with the duration and intensity of smoking and decreasing over time after smoking cessation [20].

Among patients who consumed caffeine (Figure 36), most were classified as having mild cognitive impairment (60%), followed by moderate impairment (37%) and a small proportion with severe impairment (3%). This pattern suggests that, in most patients, caffeine consumption was not associated with severe cognitive impairment.

A study by Li et al. (2025) demonstrated a significant positive correlation between caffeine consumption and cognitive performance, with alkaline phosphatase identified as a mediating factor. Higher levels of coffee and caffeine intake were associated with improved cognitive abilities, particularly in the domains of memory and processing speed [21].

Meanwhile, among patients who did not consume any substances (Figure 37), the majority were classified as having mild cognitive impairment (57%), followed by moderate impairment (39%) and severe impairment (4%). This distribution indicates that even in the absence of substance use, individuals may still experience cognitive impairment, which is likely influenced by other factors such as age, educational level, comorbidities, and chronic health conditions.

CONCLUSIONS

MoCA-INA assessment of 88 geriatric patients showed that 93.2% had cognitive impairment, predominantly at mild to moderate levels. Most affected patients were aged 60–69 years, with mild cognitive impairment being the most common across all age groups and increasing in severity with advancing age. Women comprised the majority of patients with cognitive impairment and exhibited higher proportions of moderate to severe impairment than men. Patients were predominantly retirees or unemployed, had low to intermediate educational backgrounds, and were mostly married. Hypertension and diabetes mellitus were the most common comorbidities, with most hypertensive patients showing mild cognitive impairment. The majority of patients were undergoing medical treatment, and most did not use substances such as caffeine or cigarettes, suggesting that cognitive impairment in this population is largely influenced by demographic and clinical factors rather than substance use.

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