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Research Article

The Relationship Between Mild Cognitive Impairment and Daily Living Activities in the Elderly at the Dewi Sartika Cokrobedog Community Health Post

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Abstract: The increasing number of older adults and longer life expectancy have led to various health challenges, including cognitive decline. Mild Cognitive Impairment (MCI) is a condition that occurs in the transitional stage between normal aging and dementia. It is characterized by decreased memory, attention, language, visuospatial ability, and executive function, although it does not yet significantly disrupt basic daily activities. However, this condition can influence the independence of older adults in performing Activities of Daily Living (ADL), particularly instrumental activities that require higher cognitive abilities such as managing finances, shopping, preparing meals, and using transportation. If cognitive decline is not properly managed, it may increase dependency, raise the risk of injury, and reduce the quality of life of older adults. This study aimed to analyze the relationship between Mild Cognitive Impairment and Activities of Daily Living among older adults at Posyandu Dewi Sartika Cokrobedog. The research applied a quantitative cross-sectional design with a sample of 93 older adults selected using purposive sampling. Cognitive function was assessed using the Montreal Cognitive Assessment Indonesian version (MoCA-Ina), while daily functional ability was measured using the Lawton Instrumental Activities of Daily Living (IADL) scale. Data were analyzed using the Shapiro–Wilk normality test and Spearman Rank correlation. The results showed a significant relationship between Mild Cognitive Impairment and ADL independence ($p < 0.05$) with a moderate correlation, indicating that better cognitive function is associated with greater independence in daily activities.

Keywords: Cognitive Function; Lawton IADL; Mild Cognitive Impairment; MoCA-Ina; Older Adults.

1. Introduction

The world is currently facing a global aging population, marked by a significantly higher proportion of older adults than younger adults. Aging is a natural biological process characterized by a gradual decline in physiological functions, which increases the risk of chronic disease and disability in older adults. With age, physical abilities decline, followed by cognitive impairment, psychosocial changes, and balance problems, making older adults more vulnerable to difficulties in performing daily activities and becoming dependent on others (Izquierdo et al., 2021).

The global elderly population has shown significant growth in recent decades. The World Health Organization (WHO) (2022) noted that the number of older adults aged 60 and over, which was around 1 billion in 2020, is expected to increase to around 1.4 billion by 2030. Indonesia currently ranks fourth in the world with 20.24 million elderly, after China, India, and Japan, with a trend that continues to increase annually. Regionally, the WHO reports that Southeast Asia has an elderly population of approximately 142 million (Siregar et al., 2023). At the provincial level, the Special Region of Yogyakarta has the highest proportion of elderly people at 13.4%, followed by Central Java (11.8%), East Java (11.5%), Bali (10.3%), and North Sulawesi (9.7%). Conversely, the province with the lowest elderly population is Papua, at 2.8% (F. Akbar et al., 2021).

The continued increase in the elderly population makes cognitive decline an increasingly significant health challenge. This impairment arises not only from the aging process but is also triggered by various chronic diseases common in the elderly, such as hypertension, diabetes, heart disease, mild stroke, obesity, chronic kidney disease, depression, and sleep

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disorders. These conditions can disrupt cerebral blood flow, trigger inflammation, and damage nerve cells, increasing the risk of developing Mild Cognitive Impairment (Lei & Wang, 2024).

Globally, the prevalence of MCI in the elderly is approximately 23.7%, with a tendency to increase with age and a higher prevalence in women. The age group over 80 years shows the highest prevalence, indicating that increasing age is a major factor in cognitive decline. Variations between countries are influenced by assessment methods, criteria and cultural background, as well as health status (Salari et al., 2025). In Asia, the prevalence of MCI ranges from 20–25%, reflecting a higher burden of cognitive impairment compared to other regions. This region is experiencing rapid aging population growth, accompanied by an increase in chronic diseases such as hypertension and diabetes mellitus, which contribute to cognitive decline. In China, the prevalence is 7.7% in the elderly aged 65 years and older, or more than 38 million people affected, most of whom are at risk of developing dementia (Jiang et al., 2024). In Southeast Asia, including Indonesia, the prevalence of MCI is estimated at around 17.08%, indicating a relatively high incidence in the elderly population (Fitri et al., 2025).

Mild Cognitive Impairment (MCI) is a condition of cognitive decline that occurs in the early stages before dementia develops. MCI is characterized by impairments in memory, attention, and other thinking skills, but individuals with it are still able to carry out daily activities independently without significant social impairment. Although it may appear mild, MCI carries a high risk of progressing to dementia if not recognized early. Therefore, early detection and treatment are crucial to maintaining cognitive function in older adults, preventing more severe decline, and supporting their quality of life (Jia et al., 2021). Cognitive decline in older adults, including those at the MCI stage, directly impacts the ability to perform Activities of Daily Living (ADL). Elderly individuals with MCI often experience difficulty remembering steps, are slow in making decisions, and are less able to coordinate the sequence of tasks, thus impairing the independent performance of ADLs. This condition makes it more difficult for them to perform basic ADLs such as bathing, dressing, eating, using the toilet, and transferring positions (Zahroh et al., 2024). This suggests that cognitive impairment is associated with decreased independence in ADLs, with older adults with MCI requiring more assistance in performing daily activities. Early cognitive changes are sufficient to reduce an older adult's ability to maintain independence and quality of life. In addition to physical factors, cognitive function also influences postural control through the integration of sensory information from the vestibular, proprioceptive, and visual systems, processed by the central nervous system. Cognitive impairments in attention, executive function, memory, and reaction time can reduce the body's ability to adjust position, resulting in decreased stability. The hippocampus plays a crucial role in this mechanism, as a structure in the temporal lobe involved in memory formation, information processing, spatial orientation, and emotional regulation through its involvement with the limbic system. Hippocampal impairment can impede information processing and impact cognitive stability (Rao et al., 2022).

Atrophy of the hippocampus, as well as the middle and superior frontal lobes, further exacerbates this condition. Shrinkage of the hippocampus reduces the brain's ability to recognize direction, distance, and positional changes, resulting in less accurate spatial information. Meanwhile, decreased volume in the frontal lobe impacts movement planning, motor decision-making, and corrective responses when balance is disturbed. This combination of changes weakens the body's ability to maintain posture, stabilize position, and make automatic adjustments during movement. This condition makes older adults more susceptible to instability and increases the risk of falls (Cui et al., 2023).

In addition to affecting balance, cognitive decline also impacts physical activity in older adults, which plays a crucial role in maintaining cognitive function by stimulating brain remodeling through increased blood flow, neurogenesis, synaptic plasticity, reduced β-amyloid accumulation, inhibiting neuroinflammation, and mitigating cell damage caused by oxidative stress. Physical inactivity can diminish cognitive function, impacting independence, self-confidence, quality of life, and social interactions in older adults. Physical activity also increases the production of Brain-Derived Neurotrophic Factor (BDNF), which plays a role in maintaining and improving cognitive abilities, thus highlighting the importance of physical activity as a strategy for preventing cognitive decline in older adults (Zhang et al., 2025). This

suggests that maintaining regular and adequate physical activity is a crucial step in maintaining brain health and quality of life in older adults.

Cognitive impairment in the elderly can hinder the ability to live independently and reduce quality of life. Cognitive decline usually begins with complaints of forgetfulness, difficulty concentrating, and difficulty completing simple tasks. This can appear between the ages of 50 and 59 and is increasingly common in those over 80 (Pramadita et al., 2019). In the initial phase, the elderly are still able to carry out daily activities, but begin to experience difficulty remembering new information or organizing activities. If not detected early, this condition can progress to MCI and progress to dementia, resulting in losses such as increased dependence in ADLs, risk of injury, and a reduced quality of life.

The urgency of this research is heightened because understanding the relationship between MCI and ADL impairment is crucial for supporting early detection, planning appropriate physiotherapy interventions, and preventing the development of dementia. Several studies in recent years have also shown that MCI can affect the ability of older adults to perform ADLs, particularly activities involving executive function and long-term memory (Law et al., 2019). In Indonesia, studies assessing the relationship between MCI and ADL in older adults have shown mixed results due to differences in population characteristics and measurement methods used (Sunaringsih et al., 2024). Furthermore, most previous studies still rely on the Mini Mental State Examination (MMSE), which has limitations in detecting early changes in cognitive function. The use of the Indonesian version of the Montreal Cognitive Assessment (MoCA-Ina) in community-dwelling elderly, particularly those living independently and actively in Posyandu (Integrated Health Posts), is still relatively rare, so the picture of Mild Cognitive Impairment in this population has not been fully identified. Furthermore, assessment of elderly functional abilities in many studies still focuses on basic Activities of Daily Living, even though cognitive decline generally first affects the Indonesian version of the Lawton Instrumental Activities of Daily Living Scale (Lawton IADL-Ina), which demands executive and planning functions. This gap is the basis for the novelty of this study, namely evaluating the relationship between MCI and ADL abilities in community-dwelling elderly, considering the importance of the Lawton IADL-Ina as an early indicator of decreased independence and using a more sensitive instrument to identify early changes in cognitive function.

2. Preliminaries or Related Work or Literature Review

Elderly

Definition

Elderly age is the final stage in the human life cycle, after infancy, childhood, and adulthood. It is characterized by biological maturity and changes in organ function with age. During this period, individuals tend to experience a decline in physiological, cognitive, and social capacities, which impacts quality of life (Friska, 2020). According to the World Health Organization (WHO), elderly age is divided into several categories: 45–60 years is called middle age (middle age or A-teda madya), 60–75 years is called elderly (elderly age or wreda utama), 75–90 years is called old (tua or prawasana), and above 90 years is called very old (wreda wasana). Meanwhile, Government Regulation of the Republic of Indonesia Number 43 of 2004 stipulates that a person is considered elderly if they are 60 years of age or older. Understanding this classification is important for planning policies, health programs, and interventions that address the physical, cognitive, and social needs of the elderly.

Physiological Changes

The aging process affects nearly every system in the body, including the nervous, musculoskeletal, cardiovascular, and sensory systems, resulting in decreased muscle strength, joint flexibility, cardiovascular capacity, motor coordination, the ability to judge body position, and cognitive function. This condition makes older adults more susceptible to falls, with cognitive decline being a major risk factor. Falls in older adults are a significant cause of injury, making maintaining balance and cognitive function crucial for injury prevention (Made & Dewi, 2022). Furthermore, older adults are at higher risk for chronic degenerative diseases, particularly those affecting the vascular system, due to the gradual decline in cell, tissue, and organ function.

Mild Cognitive Impairment (MCI)

Definition of Mild Cognitive Impairment

Mild Cognitive Impairment (MCI) is a condition of mild cognitive impairment that is in the transitional stage between normal cognitive function and dementia. Clinically, MCI is characterized by objectively measurable declines in memory, attention, and executive function, but not to the point of disrupting daily activities. Unlike normal aging, which only shows a slowing of thought processes without significant functional decline, MCI presents with marked cognitive impairment.

Risk Factors

a. Internal Factors

1) Age

Biological aging is the main internal factor that increases susceptibility to Mild Cognitive Impairment (MCI). With age, structural and functional changes occur in the brain, such as hippocampal atrophy, decreased synaptic plasticity, and weakening of neurotransmitter pathways, which then affect memory and executive function. A study by Gill Livingston and colleagues in the Lancet Commission report showed that aging and age-related risk factors are key determinants of cognitive decline and dementia (Livingston et al., 2020).

2) Gender

Gender differences are known to influence cognitive characteristics in older adults with MCI (Karstens et al., 2023), showing that men and women have different neuropsychological profiles when experiencing MCI, particularly in the domains of memory, executive function, and visuospatial abilities. The study found that women tended to show more pronounced impairments in verbal memory, while men experienced more frequent declines in visuospatial function. These findings confirm that gender is an internal factor that plays a role in the variation in symptoms and risk of MCI in the elderly.

3) Genetics

Genetic factors, particularly the presence of the Apolipoprotein E ε4 (APOE ε4) allele, play a significant role in increasing the risk of MCI. Individuals carrying this allele experience accelerated accumulation of pathological proteins such as beta-amyloid, decreased brain lipid metabolism, and increased cortical atrophy, which impacts memory and executive function impairments. Recent research has shown that APOE ε4 carriers are more likely to transition from MCI to dementia than non-carriers, making this allele considered a key genetic biomarker for cognitive decline (Studies, 2024).

4) Chronic Disease

Vascular diseases such as hypertension, diabetes, dyslipidemia, and chronic heart disease have been shown to contribute to the risk of MCI through mechanisms such as reduced cerebral perfusion and increased brain microvascular lesion burden. These conditions disrupt the supply of oxygen and nutrients to neural tissue, leading to declines in memory, attention, and executive function (Mahinrad et al., 2025).

5) Psychological

Psychological factors such as depression, anxiety, chronic stress, and sleep disturbances can impact cognitive function through increased stress hormones (cortisol), impaired nerve cell regeneration, and decreased sleep quality, which plays a crucial role in memory consolidation. Individuals with chronic depression are at higher risk of short-term memory decline and impaired executive function, making psychological conditions an internal factor contributing to MCI (Livingston et al., 2020).

6) Nutrition

Certain nutrient deficiencies, such as vitamin B12, folate, and vitamin D, have been shown to negatively impact nerve function and brain metabolism. These micronutrient deficiencies can lead to impaired myelination, increased inflammation, and neuronal damage associated with memory and attention deficits. Recent studies suggest that adequate nutrition may be a protective factor against the onset and progression of MCI (Nucci et al., 2024).

b. External Factors

1) Physical Activity
Low physical activity or a sedentary lifestyle is closely associated with an increased risk of MCI. Lack of activity leads to decreased cerebral perfusion, low levels of neurotrophic factor (BDNF), and increased systemic inflammation, all of which contribute to cognitive decline. An umbrella review shows that regular exercise can improve memory, attention, and executive function in older adults with MCI (Demurtas et al., 2020).

2) Education
Individuals with low levels of education or less involvement in cognitively stimulating activities such as reading, strategy games, or social interaction tend to have lower cognitive reserve. Low cognitive reserve makes the brain more vulnerable to structural changes that occur with aging. A Lancet study showed that regular mental stimulation can slow the onset of MCI symptoms (Livingston et al., 2020).

3) Unhealthy Diet
A diet high in saturated fat, sugar, and processed foods increases systemic inflammation and metabolic dysfunction, which impact brain health. Conversely, adherence to a Mediterranean diet rich in antioxidants and healthy fatty acids has been shown to reduce the risk of cognitive decline and MCI. A recent meta-analysis showed a significant association between a healthy diet and improved cognitive function (Nucci et al., 2024).

4) Smoking and Excessive Alcohol Consumption
Long-term nicotine exposure, as well as excessive alcohol consumption, can cause oxidative stress in neural tissue, disrupt synaptic transmission, and increase neuronal damage. Both factors have been shown to impair memory and executive function, thus being categorized as external factors that increase the risk of MCI (Livingston et al., 2020).

5) Social Isolation
Social isolation, lack of interaction, and low emotional support have the potential to increase the risk of MCI through both psychological (e.g., depression) and behavioral (decreased physical activity and cognitive stimulation) mechanisms. Older adults who rarely socialize tend to have a higher risk of memory decline and information processing speed (Livingston et al., 2020).

c. Pathophysiology

Pathophysiologically, Mild Cognitive Impairment (MCI) describes structural, functional, and biochemical changes in the central nervous system that lead to impaired cognitive abilities, particularly memory, attention, and thought processes. This functional decline begins with a reduction in the number of cholinergic neurons in the brain, which leads to decreased acetylcholine production. Acetylcholine plays a crucial role in the transmission of nerve impulses and memory formation, so its deficiency directly impacts memory and learning abilities (Pranata, 2020).

Activities of Daily Living in the Elderly

Definition of Activities of Daily Living

Activities of Daily Living (ADL) are a series of basic activities that reflect a person's ability to independently meet self-care needs, such as eating, bathing, dressing, using the toilet, and performing daily mobility activities. ADL is an important indicator for assessing the level of independence of older adults, as this ability is influenced by physical status, cognitive function, and psychological condition (Wang et al., 2025). Older adults with good physical and cognitive function are generally able to perform ADL independently, while decreased muscle strength, balance disorders, or cognitive decline can increase dependence in daily activities (Feng et al., 2025).

Human Movement Activities of Daily Living

The ability of older adults to perform ADL is greatly influenced by the quality of their human movement, as activities such as standing, changing positions, walking, and maintaining balance are motor tasks that require muscle coordination, postural stability, joint mobility, and optimal motor control. The aging process causes various physiological and biomechanical

changes, including decreased muscle strength, slowed gait, and weakened postural control, resulting in less stable and efficient movement (Gwerder et al., 2025). These conditions make older adults more susceptible to falls, which can affect basic activities.

Balance in MCI

MCI not only affects memory and attention but also impacts body balance. Decreased executive function and attention make the brain less able to optimally process visual, vestibular, and somatosensory information necessary for maintaining posture. As a result, older adults with MCI are more prone to instability, characterized by shorter strides, less consistent gait patterns, and slower corrective responses when faced with balance disturbances. This condition is more apparent when individuals perform two tasks simultaneously, which require divided attention. These findings suggest that balance impairment in MCI does not stem solely from the aging process but is directly related to cognitive decline. Therefore, assessing balance and gait patterns is crucial for early detection of MCI and minimizing the risk of falls in older adults (Suzuki et al., 2023).

Physical Activity in MCI

Lack of physical activity contributes to an increased risk of MCI through several interconnected mechanisms. Low frequency of movement leads to decreased blood flow to the brain, resulting in suboptimal oxygen and nutrient supply, which ultimately impairs nerve cell function and the brain's ability to maintain connections between neurons. Low physical activity also reduces the stimulation of neuroplasticity, a crucial process in memory formation and information processing. Furthermore, inactivity impacts metabolic and vascular health, including increased blood pressure, insulin resistance, and fat accumulation, which can damage small blood vessels in the brain and slow cognitive function. Decreased cardiorespiratory fitness further reduces the efficiency of blood circulation to the brain. Over the long term, this combination of factors accelerates cognitive decline and increases the likelihood of developing MCI. Therefore, physical activity plays an important protective factor in maintaining brain health and preventing cognitive decline in the elderly (Firdausiah et al., 2025).

Measuring Mild Cognitive Impairment with Activities of Daily Living

Cognitive function in this study was measured using the Indonesian version of the Montreal Cognitive Assessment (MoCA-Ina) because this instrument has higher sensitivity in detecting MCI than other cognitive screening tools such as the MMSE. The MoCA is designed to more comprehensively assess various cognitive domains, including memory, attention, concentration, executive function, language, orientation, and visuospatial abilities. The assessment is conducted through simple tasks such as recalling words, copying geometric shapes, counting, and following verbal instructions. The maximum total score is 30, with a score <26 indicating indications of MCI (Pan et al., 2020). The selection of the MoCA in this study was based on evidence that the MoCA-Ina is more effective than the MMSE in identifying early-stage cognitive changes, especially because the MMSE is often insensitive to mild impairments that do not yet interfere with daily activities. Several studies, including findings (Pinto et al., 2019), indicate that the MoCA-Ina has higher sensitivity and specificity in detecting MCI, making it a more appropriate instrument for assessing cognitive function in older adults before analyzing its relationship to Activity of Daily Living abilities.

The Relationship between Mild Cognitive Impairment and Activities of Daily Living

Cognitive decline in older adults, including those with Mild Cognitive Impairment, often impacts their ability to perform daily activities. Impairments in memory, attention, and executive function make it difficult for older adults to organize activities, remember instructions, and complete tasks that require planning (Clemmensen et al., 2020). Cognitive decline, particularly in the domains of memory and executive function, is strongly associated with decreased ADL performance, even when older adults are still relatively well physically. Older adults with cognitive impairment tend to have lower levels of independence in ADLs, especially in activities that require pacemaking and problem-solving (Panghal et al., 2022).

3. Materials and Method

This study used a cross-sectional observational design, where data was collected once at the time of measurement. This design was chosen because it can provide an overview of the respondents' conditions at the time of the study, as explained (Sugiyono, 2017). Sampling was

carried out using purposive sampling, namely the selection of respondents based on considerations and criteria that have been determined by the researcher. The subjects of the study were elderly people who participated in activities at the Elderly Posyandu. After respondents who met the criteria were determined, cognitive function was measured using the Indonesian version of the Montreal Cognitive Assessment (MoCA-Ina) instrument and for Activity of Daily Living using the Indonesian version of the Lawton Instrumental Activity of Daily Living Scale (Lawton IADL-Ina).

The collected data was first reviewed before being processed. The processing process involved the following stages:

Editing

This stage was conducted to assess the completeness, consistency, and suitability of the data for the research needs. The researcher re-examined all data to prepare it for analysis.

Coding

At this stage, the collected data was assigned a code or symbol to facilitate grouping and analysis according to the research objectives.

Data Entry

The coded data was then entered into the computer using SPSS. In this study, the entry process was carried out using SPSS for Windows version 25.0.

Tabulating

The tabulation stage was carried out by grouping the data according to predetermined categories to obtain the frequency of each variable. This tabulation facilitated the analysis process and hypothesis testing.

4. Results and Discussion

Overview of the Research Location

This research was conducted at the Dewi Sartika Cokrobedog Elderly Community Health Post (Posyandu Lansia), a community-based health care facility for pre-elderly and elderly people in the Cokrobedog area of Godean, Sleman, Yogyakarta.

This Posyandu plays an active role in promoting and preventing the health of the elderly through routine health checks, physical monitoring, and health education. A relatively large number of pre-elderly and elderly people registered and actively participating in activities at the Dewi Sartika Cokrobedog Elderly Community Health Post (Posyandu Lansia) are present. The majority of respondents were elementary school graduates with occupational backgrounds as housewives, laborers, and retired civil servants. These characteristics reflect the relatively modest social and educational background of the local community, yet they demonstrate a high level of participation in health care activities.

Descriptive Data

This study used an observational approach with a cross-sectional design, where variables were measured over a single time period. This design was chosen to describe the actual cognitive function and Activity of Daily Living abilities of the elderly and to analyze their relationship within the community context.

Respondent Characteristics

Age Distribution

Table 1. Distribution of Respondents by Age.

Age (Year)	Frequency	%
Pre-Elderly (45-59)	21	22,6
Elderly (60-75)	72	77,4
Total	93	100

Based on Table, the research respondents were divided into two age groups, namely pre-elderly (45–59 years) as many as 21 people (22.6%) and elderly (60–75 years) as many as 72 people (77.4%).

Gender Distribution

Table 2. Distribution of Respondents by Gender.

Gender	Frequency	%
Male	25	26,9
Female	68	73,1
Total	93	100

Based on Table, the distribution of respondents by gender shows that 25 respondents were male (26.9%), while 68 respondents were female (73.1%).

Distribution of Education Level

Table 3. Distribution of Respondents by Education.

Education Level	Frequency	%
Elementary School	45	48,4
Junior High School	20	21,5
High School	23	24,7
Diploma/Bachelor's Degree	5	5,4
Total	93	100

Based on Table, the distribution of respondents based on education level shows that respondents with elementary school education numbered 45 people (48.4%), junior high school education numbered 20 people (21.5%), high school education numbered 23 people (24.7%), and diploma/bachelor's degree education numbered 5 people (5.4%).

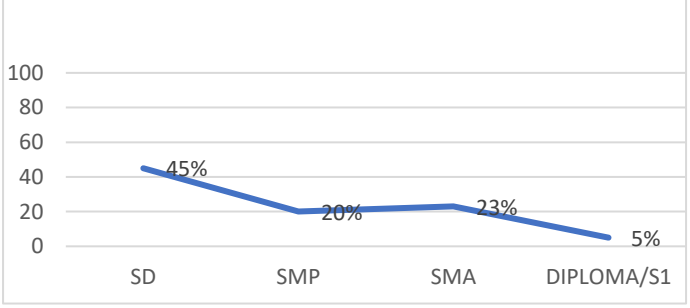

Figure 1. Education Level Graph.

Based on the respondent education level graph, the majority of elderly people have a primary school education. This indicates that the majority of respondents have a relatively low educational background, which can impact cognitive abilities and understanding in carrying out daily activities.

Overview of Research Variables

Distribution of MCI Categories

Table 4. Sample Distribution by MCI Category.

Category MCI	Total	%
Normal (≥26)	10	10,8
MCI (<26)	83	89,2
Total	93	100

Based on Table, the distribution of respondents by MCI category shows that 10 respondents (10.8%) had normal cognitive function, while 83 respondents (89.2%) had MCI.

Overview of Lawton IADL Scores

Table 5. Overview of Lawton IADL Scores.

Category ADL	Total	%
Fully Independent	18	19,4
Partially Independent	51	54,8
Dependent	24	25,8
Total	93	100

Based on Table, the analysis of the Lawton IADL scores by gender shows that female respondents had a higher average score than male respondents. The average score for men was 5.48 with a standard deviation of 1.960, while for women it was 5.97 with a standard deviation of 1.675. This indicates that women tend to have higher levels of independence in Activities of Daily Living than men. Furthermore, the higher standard deviation for men indicates that functional ability varies more widely among men than women.

Test Analysis Results

Normality Test

Table 6. Data Normality Test using Shapiro–Wilk.

Data Group	Result (*p*)
MoCA-Ina Score	0,056
Lawton IADL Score	0,001

Based on Table, the results of the normality test indicate that the MoCA-Ina score has a p-value of 0.056 ($p > 0.05$), indicating a normal distribution. Meanwhile, the Lawton IADL score has a p-value of 0.001 ($p < 0.05$), indicating a non-normal distribution. Because one of the study variables did not meet the assumption of normality, the overall data was considered non-normally distributed, and the correlation analysis was continued using non-parametric tests.

Hypothesis Testing

Table 7. Hypothesis Testing Data Using the Spearman Rank Correlation Test.

Variable	*p*-value
MoCA-Ina dan Lawton IADL	0,001

Based on Table 4.7, the analysis of the relationship between the MoCA-Ina total score and the Lawton IADL total score using the Spearman Rank correlation test yielded a p-value of 0.001. A p-value <0.05 indicates a statistically significant relationship between Mild Cognitive Impairment and Activity of Daily Living (ADL) abilities in the elderly.

Discussion

This study analyzed the relationship between Mild Cognitive Impairment (MCI) as the independent variable (X) and Activity of Daily Living (ADL) as the dependent variable (Y) in the elderly at the Dewi Sartika Cokrobedog Integrated Health Post (Posyandu). The results of the analysis are presented in the following section.

Sample Overview

This study is an observational cross-sectional study aimed at analyzing the relationship between Mild Cognitive Impairment and Activity of Daily Living (ADL) abilities in the elderly. This study involved 93 respondents.

Respondent Characteristics

a. Age Distribution

Based on Table, the age distribution of respondents shows that the majority of participants were in the elderly group aged 60–75 years (72 individuals) (77.4%), while the pre-elderly group aged 45–59 years (21 individuals) (22.6%). The dominance of this elderly age group indicates that the majority of study respondents have entered the advanced aging phase, which is characterized by various biological, psychological, and functional changes. Age is a major factor associated with cognitive decline. With age, structural and functional changes occur in the brain, such as hippocampal atrophy, decreased synaptic plasticity, and impaired cerebral perfusion, which impact memory and executive function, increasing the risk of Mild Cognitive Impairment in the elderly (Livingston et al., 2020). Several studies also show that the prevalence of Mild Cognitive Impairment increases significantly in those over 60 years of age.

According to (Salari et al., 2025) the elderly group has a higher incidence of MCI compared to the younger age group, mainly due to the accumulation of degenerative processes and chronic diseases that often accompany the aging process. This is in line with the results of this study, where most respondents are included in the age group that is vulnerable to cognitive decline. In addition to impacting cognitive aspects, increasing age also affects the ability of Activity of Daily Living. Elderly aged 60–75 years tend to experience decreased muscle strength, balance, and speed of movement which can limit the ability to carry out daily activities independently. Elderly elderly have a higher risk of experiencing limitations in ADL, especially in instrumental activities that require cognitive function, planning, and decision-making. In addition to impacting cognitive function, increasing age also affects the ability of Activity of Daily Living. Elderly aged 60–75 years tend to experience decreased muscle strength, balance, and speed of movement which can limit the ability to carry out daily activities independently.

Older adults are at higher risk of experiencing limitations in ADLs, particularly in instrumental activities requiring cognitive function, planning, and decision-making. The age distribution of respondents in this study also demonstrates that the sample is representative of the population primarily targeted for cognitive decline studies. The larger proportion of older adults reflects increasing life expectancy, leading to a corresponding increase in the number of older adults with various health consequences. This situation strengthens the research's relevance because the elderly group presents more complex health care needs, both physically and mentally. Neurophysiologically, the aging process causes a decrease in the speed of nerve impulse transmission and a decrease in the effectiveness of neurotransmitters that play a role in memory and attention.

These changes result in slowed information processing and decreased executive abilities, ultimately contributing to the emergence of mild cognitive impairment in the elderly. This condition further reinforces the notion that older age is a significant risk factor for cognitive decline. The predominance of 60–75 year olds in this study also has implications for functional aspects. During this age range, physical capacities such as muscular endurance, flexibility, and balance begin to decline. This decline does not always result in total dependence, but it does significantly impact efficiency in performing daily activities, particularly those that require simultaneous physical and cognitive coordination, such as managing finances, using transportation, and preparing daily necessities.

Meanwhile, the pre-elderly group continues to play a crucial role as a transitional phase toward aging. Early cognitive changes often go unnoticed between ages 45 and 59, but they have the potential to progress to Mild Cognitive Impairment if not detected and prevented early (Pramadita et al., 2019). The presence of this group in the study suggests that promotive and preventive interventions need to begin in middle age to slow the degenerative process. Furthermore, the age distribution of respondents also influenced the variation in levels of independence found in the study.

Seniors aged 60–75 are in the early stages of aging, still possessing considerable potential for independence but beginning to show limitations in more complex activities. This explains why some respondents are still able to perform basic activities but begin to experience difficulties with instrumental activities that require higher cognitive functions. Psychologically, aging is also associated with changes in motivation, self-confidence, and the ability to adapt to the environment. Elderly people with cognitive decline often exhibit reduced initiative in activities, which can ultimately accelerate dependency if not supported by their social and family environment.

Thus, it can be concluded that the dominance of the elderly age group in this study indicates that most respondents are in the advanced aging phase, vulnerable to degenerative changes, both cognitively and physically. Increasing age is associated with an increased risk of Mild Cognitive Impairment due to changes in brain structure and function, which impacts the decline in Activities of Daily Living (ADL) abilities. Meanwhile, the pre-elderly group is in a transitional phase that begins to experience initial cognitive changes, although they do not yet cause significant impairment. This age distribution of respondents confirms that age plays a significant role in the risk of Mild Cognitive Impairment and decreased ADL abilities in the elderly, as evidenced by the research findings.

b. Gender Distribution

Based on Table, the distribution of respondents by gender shows that there were more female respondents than male respondents. This indicates that women's participation in elderly health services tends to be higher than that of men. This is in line with the societal phenomenon that women have better health awareness and a higher life expectancy, resulting in more frequent involvement in community health services, such as elderly community health posts (Posyandu) and routine health check-ups.

This study found that the proportion of female respondents was significantly higher than that of male respondents, at 73.1%. This finding indicates that elderly women are the group most involved in health services at the study site. This also indicates that women have a higher level of participation in health monitoring, making them more easily accessible as research respondents. Gender is an important demographic characteristic in health research because biological and psychosocial differences between men and women can influence health conditions, including cognitive function and the ability to perform daily activities. Differences in social roles, activity patterns, and life experiences also influence the level of independence of older adults in carrying out Activities of Daily Living.

According to (Purnanto, 2020), gender is often analyzed alongside age and education to provide a snapshot of respondent characteristics, although this does not always show a significant relationship with Activity Daily Living independence. This suggests that gender serves more as a descriptive variable to strengthen the interpretation of research data, rather than as a primary factor in determining the level of independence of older adults. (Z. A. Akbar & Dainy, 2023) state that women tend to have a higher risk of cognitive decline in old age, which is associated with hormonal

changes, longer life expectancy, and psychosocial factors. The decline in estrogen after menopause is known to affect the brain's neuroprotective function, thus contributing to memory and executive function decline.

The predominance of female respondents in this study also has implications for Activity Daily Living capabilities. Elderly women, who have a longer life expectancy, tend to be more exposed to degenerative processes, both physically and cognitively. Decreased muscle strength, the risk of frailty, and chronic diseases, which are more common in women, can impact the level of independence in performing daily activities, particularly instrumental activities that require the integration of physical and cognitive abilities. Furthermore, the predominance of women in this study suggests that the analysis of the relationship between Mild Cognitive Impairment and Activities of Daily Living (ADL) is more representative of the condition of elderly women.

This is important to understand because differences in biological and psychosocial characteristics between men and women can influence variations in cognitive function and levels of independence in daily activities. Based on this discussion, it can be concluded that the predominance of female respondents in this study reflects the characteristics of the elderly population in the community and indicates the high level of female participation in healthcare activities. Biological, hormonal, and psychosocial factors contribute to differences in health conditions between men and women, including the risk of declining cognitive function and ADL abilities in older age. However, the gender distribution in this study does not directly impact the primary research objective but rather serves as a demographic overview that strengthens the context for analyzing the relationship between Mild Cognitive Impairment and Activities of Daily Living in the elderly.

c. Education Distribution

Based on Table, the distribution of respondents by education level shows that the majority of respondents had a low level of education, meaning they did not complete elementary or junior high school, while respondents with secondary and higher education were relatively few. The results of this study illustrate that the elderly in the study location were dominated by individuals with a basic education background. This condition reflects the characteristics of the older generation, who in their youth had limited access to formal education, due to economic, social, and environmental factors at the time.

Education level is an important demographic characteristic because it influences an individual's ability to process information, adapt, and complete daily activities. This study found that the predominance of low education suggests that respondents' cognitive reserve capacity tends to be more limited. Higher education is associated with greater cognitive reserve, enabling older adults to maintain cognitive functions such as memory, planning, and problem-solving despite the aging process. Conversely, low education can increase vulnerability to cognitive decline, ultimately impacting the ability to carry out daily activities independently (Zhu et al., 2016).

Elderly people with higher education have better cognitive function scores than those with lower education, especially when engaging in cognitively stimulating activities. Engaging in these activities plays a role in maintaining memory and executive function, thereby slowing the process of cognitive decline. Furthermore, education level also influences the ability to perform daily activities. Elderly people with higher education tend to be better able to understand instructions, plan, and complete ADL and IADL tasks independently compared to those with lower education. In other words, low education levels can be a factor that weakens the ability of older adults to perform daily activities due to reduced cognitive skills needed to organize, remember, and complete tasks (Zhu et al., 2019).

This situation indicates that education not only plays a role during productive years but also has a long-term impact on quality of life in old age. The distribution of education in this study also illustrates the variation in respondents' abilities. The group with secondary education showed better levels of adaptation and independence than those with primary education, although not as optimal as those with higher education. Meanwhile, the relatively small number of respondents with higher education reflects that elderly people with academic backgrounds are still limited in the primary healthcare population.

Based on the discussion above, it can be concluded that the predominance of respondents with low levels of education reflects the characteristics of older adults in communities with limited access to education during their youth. Educational attainment plays a crucial role in developing cognitive reserve, which influences the ability to maintain cognitive function and independence in performing Activities of Daily Living. Older adults with low levels of education tend to be more susceptible to cognitive decline, which can lead to limitations in performing daily activities.

Mild Cognitive Impairment in the Elderly

Based on Table, the distribution of respondents by Mild Cognitive Impairment category shows that the majority of respondents were in the MCI category, amounting to 83 (89.2%), while 10 (10.8%) had normal cognitive function. The results of this study illustrate that the majority of elderly people in the study community experienced mild cognitive impairment based on screening results using the MoCA-Ina instrument.

This study found that almost all respondents had MoCA-Ina scores below the normal cutoff of <26. This indicates that mild cognitive impairment is a predominant condition among elderly people in the study area. This high proportion suggests that cognitive impairment has occurred widely in the elderly population, although most are still at a mild stage. The MoCA-Ina is a cognitive screening instrument designed to sensitively detect mild cognitive impairment, particularly in the elderly population. This instrument assesses various cognitive domains, including attention, memory, executive function, language, visuo-spatial function, and orientation, thus identifying subtle cognitive changes often missed by other screening tools such as the Mini Mental State Examination.

Previous research has shown that the MoCA-Ina is more effective in detecting MCI due to its better discriminatory ability and less prone to maximum scores, allowing for more visible variations in the level of cognitive function in older adults (Jia et al., 2021). The high proportion of respondents identified with MCI in this study also suggests that cognitive screening using the MoCA-Ina is capable of detecting early-stage cognitive decline in the community. This suggests that a significant proportion of older adults already experience impairments in specific cognitive domains, such as memory, attention, and executive function, which play a role in daily activities. Clinically, the results of this study have important implications for the quality of life of older adults. Mild cognitive impairment can affect memory, problem-solving, and decision-making, all of which play a role in carrying out daily activities. The impact can be seen in difficulties managing medications, orienting time, and planning routine activities (Panghal et al., 2022).

This suggests that, even though it is considered mild, cognitive decline can still gradually impact the independence of older adults. In addition to biological factors resulting from the aging process, the high MCI rates found in this study may also be related to psychosocial factors. Older adults who experience social isolation and participate less in community activities and mental stimulation tend to experience faster cognitive decline than socially active older adults (Ishikawa et al., 2022). This situation is relevant to the characteristics of older adults in communities where most activities are confined to the home environment.

This research finding is also supported by another community study that reported that screening using the MoCA-Ina was able to identify a greater number of mild cognitive impairments than other screening instruments. This indicates that the MoCA-Ina has good sensitivity in detecting cognitive decline in older adults, making it effective for describing cognitive conditions in the community and playing a crucial role in early detection of cognitive impairment (Mg et al., 2023). Therefore, based on the research results obtained, it can be concluded that the majority of respondents were identified as having Mild Cognitive Impairment based on the MoCA-Ina screening. This finding confirms that mild cognitive impairment is a fairly prominent condition in the elderly at the Dewi Sartika Cokrobedog integrated health post.

Activities of Daily Living in the Elderly

According to Table 4.5, the Lawton IADL is a functional measure that encompasses the complex activities required for independent living by the elderly, such as managing finances, shopping, cooking, and using the telephone or transportation. A high score on the Lawton IADL indicates greater independence, while a low score indicates limitations or dependence on assistance from others. This instrument is frequently used in gerontology research to assess functional differences based on demographic characteristics, including gender, age, and health conditions of the elderly (Ilmiah et al., 2025).

Based on the results of this study, the level of independence of the elderly shows that most respondents are in the partially independent category, while the remainder are divided into the fully independent and dependent categories. This finding confirms that although the elderly are still capable of performing some instrumental activities, many begin to experience difficulty with more complex activities, particularly those requiring cognitive function, mobility, and coordination. This condition reflects a gradual decline in functional capacity that occurs with aging. When examined by gender, the difference in mean Lawton IADL scores in this study indicates variations in functional ability between men and women.

These differences may be influenced by social and cultural factors in daily activities. Women tend to score higher because, from their productive years, they are more frequently involved in domestic activities such as cooking, shopping, and managing the household, which are included in the IADL assessment components. Conversely, in men, these activities are not always the primary role, which can influence the independence score obtained (Dufournet et al., 2021). In addition to role factors, the greater variation in scores among men in this study also indicates the diversity of functional abilities in older adults, which can be influenced by health conditions, employment history, and daily activity levels.

Overall, the combination of this research data and existing theory suggests that older adults' Activity of Daily Living (ADL) abilities are influenced not only by the aging process but also by lifelong activity experiences, social roles, and concomitant health factors. Therefore, this study confirms that the majority of older adults are at a level of partial independence, with differences in abilities based on gender. Therefore, efforts to maintain independent functioning are needed through interventions that consider the physical, cognitive, and social aspects of older adults.

Relationship between Mild Cognitive Impairment and Activities of Daily Living

The results of this study indicate a significant relationship between Mild Cognitive Impairment and Activities of Daily Living in the elderly. The Spearman Rank correlation test yielded a correlation coefficient of $r = 0.498$ with a p-value of 0.001, indicating a positive relationship with moderate strength. This means that the better the elderly's cognitive function, as measured by the MoCA-Ina, the better their ability to perform activities of daily living, as measured by the Lawton IADL.

Based on the results of this study, elderly with low MoCA-Ina scores, which indicate MCI, tend to have lower levels of independence in ADLs. Conversely, elderly with better cognitive function demonstrated greater independence in performing instrumental activities of daily living. This confirms that the cognitive decline that occurs during the MCI phase has a significant impact on the functional abilities of the elderly in the study community. MCI not only impacts cognitive aspects but also affects the elderly's functional independence, particularly in instrumental ADL activities. Activities such as managing finances, shopping, using communication tools, managing medication, and utilizing transportation require strong cognitive abilities, particularly in the domains of memory, attention, and executive function.

Decreases in these domains, as detected by the MoCA-Ina score, will directly impact the Lawton IADL-Ina score (Iliah et al., 2025). The MoCA-Ina score has a significant relationship with ADL ability, particularly IADL, because the MoCA-Ina measures various cognitive domains that play a crucial role in planning and executing daily activities (Durant et al., 2016). Therefore, using the MoCA-Ina as a measure of cognitive function and the Lawton IADL as a measure of ADL ability in this study is appropriate and complementary in describing the relationship between cognitive condition and functional independence in the elderly. Based on the results of this study, the moderate strength of the relationship indicates that cognitive function is an important factor influencing independence in the elderly, although not the sole factor. This means that in addition to cognitive function, other factors such as physical condition, chronic illness, family support, and the social environment can also influence ADL ability in the elderly.

Clinically, the results of this study confirm that Mild Cognitive Impairment is a condition that requires serious attention because it impacts the elderly's Activities of Daily Living (ADL) abilities. Early detection of cognitive impairment is crucial so that interventions can be initiated early to maintain the elderly's independence. Based on the overall results and discussion, it can be concluded that there is a significant relationship between Mild Cognitive Impairment and ADL abilities in the elderly. This moderate relationship indicates that cognitive function plays a significant role in the level of functional independence, particularly in instrumental activities. Therefore, cognitive decline detected during the MCI phase requires attention because it has the potential to impact the elderly's ability to perform daily activities independently.

5. Conclusion

Based on the research results and discussion in this thesis, it can be concluded that there is a significant relationship between Mild Cognitive Impairment (MCI) and Activity Daily Living (ADL) in the elderly at the Dewi Sartika Cokrobedog Integrated Health Post (Posyandu). This indicates that cognitive function is related to the elderly's ability to carry out daily activities, where a decline in cognitive function tends to be followed by a decrease in the level of independence in these activities.

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