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The Relationship Between Cognitive Function and Quality of Life Among Elderly Patients in the Prolanis Program at Sleman Primary Health Center, Yogyakarta

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Abstract: Increasing age leads to physical, psychological, and social changes that affect the quality of life of the elderly, especially those suffering from chronic diseases such as Diabetes Mellitus (DM). The elderly are prone to cognitive function impairment, including decline in memory, concentration, and problem-solving abilities. Data from BPS (2023) show an increase in the elderly population, with the Special Region of Yogyakarta being the province with the highest proportion. A preliminary study at Sleman Primary Health Center indicated that 40% of the elderly experience mild to severe cognitive function impairment. To determine the relationship between cognitive function and quality of life among elderly patients in the Prolanis program at Sleman Primary Health Center, Yogyakarta. This study employed a quantitative research design using a cross-sectional approach. The total population was 476 respondents, with a sample of 83 respondents selected through purposive sampling. The study was conducted at Sleman Primary Health Center, Yogyakarta. The research instruments used were the MMSE questionnaire and the WHOQOL-BREF questionnaire. Bivariate analysis was performed using Kendall's Tau test.
The majority of the elderly were aged 60–74 years (69.9%), female (75.9%), unemployed (49.4%), and had had DM for more than 5 years (44.6%). A total of 48.2% had moderate cognitive function, and 62.7% had moderate quality of life. The Kendall's Tau test showed a positive and significant relationship between cognitive function and quality of life ($r = 0.301$; $p = 0.002$). There is a positive and significant relationship between cognitive function and quality of life among the elderly. The better the cognitive ability of the elderly, the higher their perceived quality of life.

Keywords: Cognitive function, Elderly, Quality of Life

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Introduction

Aging or the aging process is a stage in which the ability of tissues to repair, replace, and maintain their normal function gradually diminishes (Siregar, 2023). Elderly is a natural and unavoidable process because it is part of the human life cycle (Luhung & Anugrahati, 2020). The final stage of life where the function of vital organs declines is also known as old age (Harri Yondro et al., 2019). The elderly are those who have reached the age of 60 years or more. The elderly are an age group that has entered the final stage of their lives. In general, the elderly experience various changes. These changes include the death of a spouse, dysfunction or chronic disease, negative attitudes toward aging, retirement, death of family and friends, and negative perceptions

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outside the family. These changes affect all aspects of life, including health (Raudhoh & Pramudiani, 2021).

According to the World Health Organization (WHO) in 2024, most people can expect to live to age 60 and beyond. Currently, the population of elderly aged 60 years and over is estimated to increase from 1 billion to 1.4 billion in 2020. By 2050, the world's population of people aged 60 years and over will double (2.1 billion). The number of people aged 80 years or older is expected to triple between 2020 and 2050, reaching 426 million (Organization, 2024). Statistics Indonesia (BPS) generally reports that the elderly dependency ratio increases along with the rising percentage of the elderly. The percentage of Indonesia's elderly population increased by at least 4 percent over more than one period (2010–2022), reaching 11.75 percent. All provinces in Indonesia in 2023 had an elderly population percentage above 6 percent (Statistik, 2023). Diabetes Mellitus is a major challenge in improving the quality of life of the elderly (Sutomo, 2023). Diabetes Mellitus is a global health problem, including in Indonesia, with the number of cases continuing to increase each year. This metabolic disease is characterized by chronic hyperglycemia due to damage or lack of insulin secretion, as well as impaired body response to the insulin hormone (Joni Yoga Pratama, Daru Estiningsih, Raden Jaka Sarwadhamana, Ari Susiana Wulandari, 2022).

At the end of 2021, the International Diabetes Federation (IDF) confirmed in the 10th edition of the Atlas that diabetes is one of the fastest-growing global diseases in the 21st century, with more than 500 million sufferers. This number is expected to increase to 643 million by 2030 and reach 783 million by 2045 (Federation, 2021).

The elderly are vulnerable to maintaining a good quality of life due to the decline in physical, biological, and psychological functions caused by the aging process, one of which is the decline in cognitive function (Putri, 2021). The decline in cognitive function in the elderly occurs due to the aging process that affects brain structure and function. Several factors contributing to this process include a reduction in the number of brain cells, exposure to toxic substances such as free radicals and pollution, lack of nutritional intake, and decreased physical and mental activity (Raudhoh & Pramudiani, 2021).

One of the efforts made by the Government of the Republic of Indonesia to control Diabetes Mellitus is through the Prolanis program (Chronic Disease Management Program). The goal of Prolanis is to encourage participants with chronic diseases to achieve optimal quality of life, with the indicator that 75% of registered participants visiting primary health facilities show good results on specific examinations for Diabetes Mellitus, thereby preventing disease complications (Putra, 2023).

Based on the background description above, the researcher is interested in conducting a study entitled "The Relationship Between Cognitive Function and Quality of Life Among Elderly Prolanis Participants at Sleman Primary Health Center, Yogyakarta."

Method

This study employed a quantitative approach with a cross-sectional design to analyze the relationship between cognitive function and quality of life among elderly patients with Diabetes Mellitus participating in the Prolanis Program at Sleman Primary Health Center, Yogyakarta. This approach was chosen because it allows data collection at a single point in time, making it relevant for describing the actual cognitive condition and well-being of the elderly.

The research sample consisted of 83 elderly individuals selected purposively, considering inclusion criteria such as age ≥ 60 years, ability to communicate, and willingness to undergo testing and complete questionnaires. The sample size was calculated using the Slovin formula with a 10% margin of error, from a total population of 476 elderly Prolanis participants. Data collection was conducted through direct interviews using two instruments: the MMSE (Mini Mental State Examination) to assess cognitive function and the WHOQOL-BREF to assess overall quality of life.

The MMSE measures aspects of orientation, attention, memory, language, and visual-spatial construction, while the WHOQOL-BREF assesses four main domains of quality of life: physical, psychological, social, and environmental. The data obtained were analyzed using the Kendall's Tau statistical test to examine the correlation between variables.

Result and Discussion

Table 1. Distribution of Elderly Characteristics at Sleman Primary Health Center, Yogyakarta

Characteristic	Frequency	Percentage (%)
Age		
60–74 years	58	69.9
75–90 years	25	30.1
Total	83	100.0
Sex		
Male	20	24.1
Female	63	75.9
Total	83	100.0
Education Level		
No schooling	11	13.3
Elementary school	16	19.3
Junior high school	14	16.9
Senior high school	30	36.1

University	12	14.5
Total	83	100.0
Marital Status		
Married	46	55.4
Divorced (living)	4	4.8
Widowed	33	39.8
Total	83	100.0
Occupation		
Not working	41	49.4
Retired	10	12.0
Laborer	9	10.8
Farmer	5	6.0
Self-employed	17	20.5
Other	1	1.2
Total	83	100.0
Duration of DM		
< 1 year	18	21.7
1–5 years	28	33.7
> 5 years	37	44.6
Total	83	100.0
Duration of DM		

Based on Table 1, the characteristics show that the majority of respondents were aged 60–74 years, with 58 respondents (69.9%), while some respondents were aged 75–90 years, 25 respondents (30.1%). Regarding sex, most respondents were female, 63 respondents (75.9%), compared to male respondents, 20 respondents (24.1%). Based on education level, most respondents had senior high school education, 30 respondents (36.1%), and a few had no formal schooling, 11 respondents (13.3%). Based on marital status, most respondents were married, 46 respondents (55.4%), while those divorced (living) numbered 4 (4.8%). Based on occupation, most respondents were not working, 41 respondents (49.4%), with 1 respondent (1.2%) in the "other" category. According to the results, it was found that most respondents had suffered from Diabetes Mellitus for more than 5 years, namely 37 respondents (44.6%). Meanwhile, some respondents had been diagnosed with DM for less than 1 year, totalling 18 (21.7%). This indicates that most elderly in this study have lived with DM for a fairly long period. The duration of DM can affect overall health conditions, including cognitive function and quality of life, because the longer a person suffers from DM, the greater the risk of chronic complications and decline in body functions.

2. Distribution of Elderly Cognitive Function

Table 2. Frequency Distribution of Respondents' Cognitive Function at Sleman Primary Health Center, Yogyakarta

Variable	Frequency	Percentage (%)
Cognitive Function		
Normal	14	16.9
Mild impairment	19	22.9
Moderate impairment	40	48.2
Severe impairment	10	12.0
Total	83	100.0

Based on Table 2, it is known that out of 83 respondents, most elderly had cognitive function in the moderate category, with 40 respondents (48.2%). Furthermore, 19 respondents (22.9%) had mild cognitive impairment, 14 respondents (16.9%) had normal cognitive function, and 10 respondents (12.0%) were in the severe category.

3. Distribution of Elderly Quality of Life

Table 3. Frequency Distribution of Respondents' Quality of Life at Sleman Primary Health Center, Yogyakarta

Variable	Frequency	Percentage (%)
Quality of Life		
Low	10	12.0
Moderate	52	62.7
High	21	25.3
Total	83	100.0

Based on Table 3, it is known that most respondents had moderate quality of life, with 52 respondents (62.7%). Meanwhile, 21 respondents (25.3%) had high quality of life, and only 10 respondents (12.0%) were in the low category.

4. Analysis of Differences Between Variables (Bivariate Analysis)

The results of the statistical test for the relationship between cognitive function and quality of life among the elderly, using the Kendall's Tau test to determine whether there is a relationship between cognitive function and quality of life of the elderly at Sleman Primary Health Center, Yogyakarta, are as follows:

Table 4 Relationship Between Cognitive Function and Quality of Life of Elderly Prolanis Participants at Sleman Primary Health Center, Yogyakarta

Cognitive	Low (n)	Low (%)	Moderate	Moderate	High (n)	High (%)	Total (n)	Total (%)	r	p-value
Normal	1	1.2	6	7.2	7	8.4	14	16.8	0.301	0.002
Mild	2	2.4	19	22.8	7	8.4	28	33.7		

Moderate	4	4.8	25	30.1	7	8.4	36	43.3
Severe	3	3.8	2	2.4	0	0.0	5	6.0
Total	10	12.0	52	62.5	21	25.2	83	100.0

Based on Table 4, there is a significant relationship between cognitive function and quality of life of the elderly at Sleman Primary Health Center, Yogyakarta. The Kendall's Tau test results show a correlation coefficient (r) of 0.301 and a p-value of 0.002, which means this relationship is positive and statistically significant ($p < 0.05$). In general, the better the cognitive function of the elderly, the better their quality of life. In the group with normal cognitive function, the majority had high quality of life (7 respondents or 8.4%) and moderate quality of life (6 respondents or 7.2%), while only 1 person (1.2%) had low quality of life. Meanwhile, elderly with mild cognitive impairment mostly had moderate quality of life (19 people or 22.8%) and only a few had high quality of life (7 people or 8.4%). In the moderate cognitive function group, the majority also had moderate quality of life (25 respondents or 30.1%), and 4 people (4.8%) had low quality of life. Elderly with severe cognitive impairment tended to have low quality of life, with 3 people (3.8%) in the low category, and none had high quality of life. These results indicate that declining cognitive function is associated with a decrease in quality of life among the elderly. Therefore, efforts to maintain and improve the cognitive function of the elderly, such as through social activities, light exercise, and mental stimulation, are important to keep their quality of life good.

This study aimed to determine the relationship between cognitive function and quality of life among elderly participants of the Prolanis program at Sleman Primary Health Center, Yogyakarta. The Kendall's Tau test results showed $r = 0.301$ with p-value = 0.002 ($p < 0.05$), which means there is a positive and significant relationship between cognitive function and quality of life of the elderly. The better the cognitive function possessed by the elderly, the better their perceived quality of life.

The majority of elderly in this study experienced a decline in cognitive function in the moderate category (48.2%). The decline in cognitive function in the elderly is a natural consequence of the aging process that affects the central nervous system, including neuronal degeneration, resulting in reduced ability to think, remember, and understand information. This condition is exacerbated by chronic diseases such as Diabetes Mellitus experienced by all respondents in this study, because long-term hyperglycemia can damage small blood vessels in the brain and accelerate cognitive decline.

In terms of quality of life, most elderly were in the moderate category (62.7%). This indicates that although respondents are still able to perform daily activities such as eating, bathing, and social interaction, they face various mild obstacles such as fatigue and sleep disturbances. Elderly with better cognitive function tend to be more socially active, able to manage their health conditions independently, and have a higher level of life satisfaction. Conversely, cognitive decline impacts physical, psychological, and social aspects, including the risk of depression, loneliness, and dependence on others.

These findings are consistent with research by Putri (2021) which states that there is a significant relationship between cognitive function and quality of life in the elderly. Research by Subekti & Dewi (2022) also shows that elderly individuals with good family support tend to have better preserved cognitive function and higher quality of life. Thus, efforts to maintain cognitive function through mental stimulation, social activities, and light exercise become important strategies in improving the quality of life of elderly patients with Diabetes Mellitus.

Conclusion

This study shows that there is a relationship between cognitive function and quality of life among elderly participants of the Prolanis program. The statistical analysis results indicate that the significance value (p value) is < 0.05, thus the alternative hypothesis (Ha) is accepted, and the null hypothesis (H0) is rejected. The direction of the correlation shows that the better the cognitive function of the elderly, the better their quality of life. Conversely, a decline in cognitive function is associated with a decrease in quality of life in the elderly.

These findings confirm the importance of early detection efforts and interventions to maintain cognitive function in the elderly in order to improve and preserve their quality of life. Future research is expected to explore other factors affecting the quality of life of the elderly and to develop more comprehensive community-based interventions to support elderly health.

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Author Contributions

MCP: conceptualized and designed the study, conducted data collection and data analysis, and drafted the manuscript. BIY: contributed to the study design and performed critical revision of the manuscript. M: provided methodological guidance, assisted in data interpretation, and reviewed and approved the final version of the manuscript. All authors have read and approved the final version of the article.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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