Analysis of Characteristics of Health Status Based on Assessment of Cognitive Function in the Elderly in Indonesia

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KEYWORDS

Characteristics of the Elderly, Health Status, Cognitive Function.

ABSTRACT

Introduction: Various challenges will arise due to the increase in elderly people yearly. In Indonesia, the effect of the demographic transition can be seen in the low birth and death rates, and the rise in life expectancy is indirectly the way to increase the number of the elderly; from sharing the problems that arise among the elderly, one of the things that need to be concerned is how to maintain cognitive function so that the elderly can maintain their health status. Objectives: to determine the relationship between characteristics and the health status of the elderly based on the results of cognitive function assessment. Methods: This study is a type of observational analytical research using a cross-sectional study design and was carried out in Gowa Regency, South Sulawesi Province, Indonesia, from August to December 2023, involving 64 older adults with the criteria of elderly people who are 60-75 years old, do not have mental disorders and can read and write. Cognitive function uses the Montreal Cognitive Assessment Indonesia version (MoCA-Ina) and is a variable to be analyzed. Results: There was a significant relationship between sex $p<0.030$, age $p<0.027$, education level $p<0.001$, occupation $p<0.045$, prayer activity $p<0.001$ with cognitive function, while marital status was not related to cognitive function $p>0.193$. Conclusion: The characteristics of the elderly in this study are related to health status based on the value of cognitive function in the elderly.

1. Introduction

Various challenges will arise due to the increase in elderly people yearly. In Indonesia, the effects of the demographic transition can be seen in the low birth and death rates, and the rise in life expectancy indirectly increases the number of elderly people. There is an increase in the prevalence of cognitive impairment as we age. Namely, *Mild Cognitive Impairment* (MCI) at the age of over 60 years is estimated to be around 42% worldwide (1). The incidence of cognitive impairment in patients aged 75-79 years is 22.5 per 1000 population; the prevalence of Mild Cognitive Impairment in Asian countries reaches 17.1%, and in developing countries, it is predicted to increase to 100% between 2001 and 2040 (2). Cognitive function has several aspects, namely aspects of memory, language, attention, perception, executive, and thinking strategies; when individuals enter old age, the brain nerves begin to decline in the form of an inability to process new information and retrieve information from memory (3). Therefore, the decline in cognitive function causes several problems in the elderly, such as decreased language and speech skills, difficulty in imagination, and Alzheimer's and Dementia disorders (4).

The risk factors for cognitive decline in individuals include physiological factors (age, chronic diseases, and blood glucose levels), genetic factors, and lifestyle factors (activity, consumption of food, alcohol, and drugs) so that the decline in cognitive function that occurs in individuals is average when a person enters old age (5).Problems in the cognitive function of the elderly are often considered commonplace, so people rarely care about the condition of the elderly, even though in Indonesia based on data obtained by Alzheimer's Indonesia in 2016, it is estimated that around 1.2 million people in Indonesia have cognitive function disorders, namely dementia and this number is expected to continue to increase in 2030 to 2 million people and in 2050 to 4 million people (6). Based on the results of the prevalence of dementia in the elderly, the Indonesia government needs to take a stance regarding this elderly problem, one of which is already running is the elderly posyandu (7), The activities carried out at the Posyandu for the Elderly are related to routine health checks, routine medication for the elderly who are sick, elderly gymnastics, and socialization about diseases (8). The activities at the posyandu are certainly not enough to optimize the cognitive function of the

elderly. In addition to pharmacological treatment, other activities with a non-pharmacological approach are needed.

Objective

Based on the factors mentioned above, this study aims to determine the relationship between characteristics and the health status of the elderly based on the assessment of cognitive function. This study also provides valuable insights as a basis for efforts to prevent and improve cognitive function by paying attention to the characteristics of the elderly before providing interventions both through pharmacological and non-pharmacological approaches.

2. Methods

This study is a type of observational analytical research using a cross-sectional study design and was conducted in Gowa Regency, South Sulawesi Province, Indonesia, from August to December 2023, involving 64 elderly people with the criteria of elderly people who are 60-75 years old, do not have mental disorders and can read and write.Two instruments were used to collect data: the sociodemographic questionnaire and the Indonesian version of the Montreal Cognitive Assessment Instrument (MoCA-Ina). The sociodemographic questionnaire includes age, gender, marital status, education level, occupation, and prayer activities.

Cognitive function was assessed with MoCA-Ina. The instrument has eight dimensions with varying points: executive visuospatial examination (5 points), object naming (3 points), memory (0 points), attention (6 points), language ability (3 points), abstraction (2), and procrastination. Memory (5 points), and orientation (6 points). The maximum value is 30. A total score of > 25 is categorized as normal cognitive function. The result was a CVI of 0.82 and Cronbach's alpha of 0.963 for reliability (9). The research began after receiving ethical approval from the Health Research Ethics Commission, Faculty of Medicine, Hasanuddin University, with Letter No. 141/UN4.6.4.5.31/PP36/2023 and protocol number UH23020070. The study's results were analyzed using SPSS 24.0. The data is presented in a cross-tabulation table.

3. Results and Discussion

Table 1. Characteristics of the Elderly by Gender, Age, Marital Status, Education, Occupation, and Prayer Activities (n=64)

Characteristic	N	%
Gender		
Man	17	28.1
Woman	46	73.0
Age (Years)		
60-65	32	50.8
66-70	26	41.3
>71	5	7.9
Marital status		
Marry	60	93.8
Unmarried	4	6.3
Education		
Elementary School	24	38.1
Junior High School	25	39.7
Senior High School	6	10.9
Diploma	6	9.5
Bachelor's Degree	2	3.2
Job		
Housewife	35	55.5
Farmer	17	28.3
Self-Employed	8	12.7
Retiree	3	4.8
Prayer Activities		
Mosque	27	42.2
House	37	57.8
MoCa-Ina Score (mean ± SD)	**25.4 ± 2.06**	

Table 1 shows the characteristics of respondents with female gender as many as 46 people (73.0%) and male as many as 17 people (28.1), the age range of 60-65 years as many as 32 people (50.8%), age 66-70 years as many as 26 people (41.3%), married respondents as many as 60 people (93.8%), respondent education level with elementary level is 24 people (38.1%), junior high school as many as 25 people (39.7%), respondents with work as housewives as many as 35 people (55.5%), as farmers as many as 17 people (28.3%), then the respondents' prayer activities were carried out in mosques as many as 29 people (45.3%) and those carried out at home as many as 35 people (54.7%) than the average MoCA-Ina score of respondents was 25.4 $\pm$ 2.06

Table 2. Relationship of Characteristics with Cognitive Function of the Elderly

Characteristic	Cognitive Function		Amount (%)	p-value
	Annoyed (%)	Normal (%)		
Gender				
Man	4 (6.3)	14 (21.9)	17 (28.1)	0.030*
Woman	24 (38.1)	22 (34.9)	46 (73.0)	
Age (Years)				
60-65	9 (14.3)	23 (36.5)	32 (50.8)	0.027*
66-70	17 (27.0)	10 (15.6)	26 (41.3)	
>71	2 (3.2)	3 (4.7)	5 (7.9)	
Marital status				
Marry	25 (39.1)	35 (54.7)	60(93.8)	0.193*
Unmarried	3 (4.7)	1 (1.6)	4 (6.3)	
Education				
Elementary School	19 (30.2)	5 (7.9)	24 (38.1)	
Junior High School	7 (11.1)	18 (28.6)	25 (39.7)	0.001*
Senior High School	1 (1.6)	6 (9.3)	6 (10.9)	
Diploma	1 (1.6)	5 (7.9)	6 (9.5)	
Bachelor's Degree	0 (0.0)	2 (3.2)	2 (3.2)	
Job				
Housewife	20 (31.7)	15 (23.8)	35 (55.5)	
Farmer	7 (11.1)	11 (17.2)	17 (28.3)	0.045*
Self-Employed	1 (1.6)	7 (11.1)	8 (12.7)	
Retiree	0 (0.0)	3 (4.8)	3 (4.8)	
Prayer Activities				
Mosque	6 (9.4)	21 (32.8)	27 (42.2)	0.001*
House	27 (42.2)	10 (15.6)	37 (57.8)	

**Chi-Square Test*

Table 2 shows that the results of the statistical test between the relationship between sex and cognitive function were obtained with a value of p<0.030 where the elderly with the female sex who had more cognitive function impairments based on the MoCA-INA score were 24 people (38.1%) compared to 4 men (6.3%). The analysis of the relationship between age and cognitive function obtained a value of p<0.027, where in the age range of 66-70 years, the most experienced cognitive function disorders were as many as 17 people (27.0%) compared to other age ranges. The analysis of marital status with cognitive function obtained a value of p>0.193 with the married category of 25 people (39.7%) who experienced cognitive dysfunction. The relationship between education level and cognitive function was analyzed with a value of p<0.001, where the elderly with elementary education level experienced the most cognitive function disorders, namely 19 people (30.2%). The results of the analysis of the relationship between work and cognitive function were obtained with a value of p<0.045, where the elderly who worked as IRTs experienced the most cognitive function impairments in as many as 20 people (31.7%), then the results of the analysis of the relationship between prayer activities and cognitive function were obtained a value of p<0.001 where the elderly who carried out prayers at home were more likely to experience cognitive function impairment as many as 27 people (42.2%) compared to the elderly who performed prayers in Mosque.

Discussion

The aging process is a process that results in changes, including physical, psychological, social, and

spiritual changes. Physiological changes in the elderly cause a decrease in the immune system in the face of disturbances from inside and outside the body. The psychosocial changes that occur during the aging process will involve the process of life transition and loss. Quality healthy elderly are elderly who go through the aging process while remaining physically and mentally healthy (10).Physiologically, with increasing age, it will be followed by changes and decreases in anatomical functions, such as the shrinking of the brain, and biochemical changes in the central nervous system so that it can automatically cause a decline in cognitive function (11).

Various homeostatic reserves in the elderly begin to decrease. Therefore, there is a decrease in the supply of glucose and oxygen, which is the primary source of nutrients for brain metabolism; this is what disrupts the brain's metabolic pathways, which has an impact on cognitive function disorders (12). When a person enters old age, many problems must be faced related to the development of the life of the elderly both physically, mentally, and psychosocially; the older a person is, the more his physical ability will decrease so that it can result in regression and changes that occur in the elderly (13). In eight provinces in Indonesia that have entered the structure of the elderly population, it was found that based on gender data, the female elderly are more than the male elderly, which is 52.82% compared to 47.72%, where women are more at risk of cognitive decline due to the role of endogenous sex hormone levels in changes in mental function (14). Estrogen receptors have been found in areas of the brain that play a role in learning and memory functions, such as the hippocampus. Low levels of estradiol in the body have been linked to a decline in general cognitive function and verbal memory; extra diol is thought to be neuroprotective and may limit damage from oxidative stress, as well as being seen as a neuronal protector against amyloid toxicity in Alzheimer's patients (15). Based on the statistical results, it was found that there was a relationship between age and cognitive function, where in the age range of 66-70 years, the most experienced cognitive function disorders. The speed of the process of decreasing nerve centers along with age these changes are experienced by almost all people who reach the age of 70 years and above; at the age of 65-75 years, there are symptoms of regression in several abilities that vary in each individual (16). The degenerative decline in function is a physical change in the form of a decrease in the structure of organ cells, for example, brain cells; along with increasing age, the weight of the brain decreases or experiences a shrinkage (atrophy) of 10-20%, atrophy in brain cells can cause brain work to decrease due to a decrease in nerve function in the brain so that it can result in intellectual decline in the elderly (17).

Several previous studies have reported that several factors that can affect cognitive memory include gender, age, regular physical exercise and memory, stress, physical conditions, and environmental conditions (18,19). Furthermore, statistically, the results showed no relationship between marital status and cognitive function, but when viewed descriptively in this study, married people generally did not experience cognitive function disorders. A married person tends to have better mental and physical health than someone who has never been married, divorced, or widowed. (20,21). Married people often experience more social interaction, which can stimulate their cognitive function and protect against cognitive decline (22).Education is a process of life experience and intellectual stimulation that will affect a person's cognition. A low level of education means that mental experiences and the environment also have less impact on intellectual stimulation. It can result in a person's cognition being bad (23)The study's results showed that education affects cognitive function. The elderly who do not go to school tend to experience cognitive function problems compared to the elderly who are highly educated.Housewives dominate the employment status in this study; among people living in rural areas, there is recognition that women are considered not to have a high work culture compared to men. Conditions like this are due to the prevailing customs and culture, where cultural values place women in domestic affairs in the household so they cannot develop their potential. In addition to the prevailing cultural values, this condition is also caused by an educational pattern that does not lead them to become trained personnel (24).

The results of this study are in accordance with the research, which shows that most of the elderly

respondents working as housewives have a lower cognitive category than the elderly who have retired.Implementing elderly worship, namely 5-time prayers, is carried out both at the mosque and at home. The mandatory prayer of five times daily is one of the leading and required practices of Islamic religious beliefs. Mandatory prayer is a unique and distinctive form of worship of Islam in form and spirit. Obligatory prayer is an obedience to Allah SWT the Creator and is manifested in a unique and appropriate physical act that manifests in the spirit.

All Muslims are ordered to perform the obligatory prayer daily as an obligation and the second pillar of faith. Before performing the mandatory prayer, Muslims need to perform ablution by washing their hands, face, and feet in a particular order. Ablution is an act of maintaining a high level of cleanliness and spiritual purity to ensure that obligatory prayers can be performed with a clean body and a clear intention of the worshipper to enter the right state of mind to communicate with Allah (25). There is a significant relationship between the implementation of religious activities and the improvement of cognitive function in the elderly (26,27). These findings are in line with the findings of a recent systemic review in which the authors found that religious/spiritual engagement is essential in protecting middle-aged and older adults from cognitive decline (28). This can be explained by the existence of various aspects of religious activities that involve continuous brain stimulation, such as reciting and reading verses of the Quran, focusing when performing prayers, and motor functions with a series of activities that are repeated every day. For example, daily prayer has been proven to be able to improve cognitive function in the elderly, considering that prayer requires concentration and combines elements of physical exercise (29,30). Furthermore, careful attention in listening to and reciting the verses of the Qur'an stimulates the area of the brain in the *temporal lobe,* which is the center of memory consolidation (31).

4. Conclusions

Based on the results of the research that has been carried out, it can be concluded that there is a meaningful relationship between gender and cognitive function, where the elderly of the female sex experience more cognitive function impairment based on the MoCA-Ina score compared to men. There is a relationship between age and cognitive function, where the elderly in the age range of 66-70 years are the most experienced in cognitive function disorders compared to other age ranges. There is a relationship between the level of education and cognitive function where the elderly with the level of elementary school education experience the most cognitive function disorders. There is also a relationship between work and cognitive function where the elderly who work as housewives experience the most cognitive function disorders. Then, the analysis of the relationship between prayer activities and cognitive function shows that the elderly who carry out prayer at home are more likely to experience disorders of cognitive function compared to the elderly who perform prayers in the mosque. While there was no statistically significant relationship between marital status and the cognitive function of the elderly, descriptively, the elderly with married status were more likely to have no cognitive function impairment than those who had impairment.

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Conflict of interest

All authors declared that there are no conflicts of interest.

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