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Fungsi Kognitif Lansia di Panti Sosial Tresna Werdha Islamic Village, Tangerang

Elderly Cognitive Functions at Tresna Werdha Islamic Village Nursing Home, Tangerang

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ABSTRACT

***Background**: According to aging Index data in 2035, it is projected that there will be 73 elderly people per 100 population increasing every year. The implication of increasing the number of elderly is an increase in cognitive function degradation that affects the old age ratio dependency in carrying out normal daily activities. **Objective**: The purpose of this study was to determine the elderly cognitive functions at the Islamic Village Nursing Home. **Methods**: This study used a cross-sectional study design with the sampling technique using a total population of 48 elderly woman respondents. The location of the research was carried out at the Islamic Village Nursing Home, Tangerang. Data collection was carried out in March to April 2020. Data was collected using a standard questionnaire for cognitive function measured using the standard Mini-Mental State Exam (MMSE) questionnaire and the level of independence measured using the standard Barthel Index checklist. Other respondent characteristic data were collected through interviews and observations. **Results**: Cognitive function has a significant relationship with the level of independence of elderly women with values (OR = 5.402; P value = 0.013; CI = 95% 1.430 - 20.426). Elderly women with impaired cognitive function (MMSE score> 23) are at risk of experiencing a dependency level of 4.5 times in fulfilling daily activities compared to elderly women whose cognitive function is normal. **Conclusion**: The decline in cognitive function in the elderly is the biggest cause of the inability to carry out normal daily activities and also the most common reason for being dependent on others to take care of themselves. It is hoped that services at the nursing home, especially caregivers, can improve the quality of services for the elderly by increasing overall attention both by providing a holistic, comprehensive diagnostic effort, by paying attention to the role of the elderly so that the quality of life of the elderly can be improved.*

***Keywords**: Cognitive function, Elderly Women, Level of Independence*

ABSTRAK

***Latar Belakang**: Data Aging Index, pada tahun 2035 diproyeksikan terdapat 73 orang lanjut usia per 100 penduduk meningkat setiap tahunya. Implikasi peningkatan jumlah lanjut usia (lansia) adalah peningkatan penurunan fungsi kognitif yang mempengaruhi rasio ketergantungan usia lanjut (old age ratio dependency) dalam melakukan aktifitas normal sehari-hari. **Tujuan**: Tujuan penelitian ini untuk mengetahui fungsi kognitif lansia di Panti Sosial Tresna Werdha Islamic Village Tangerang. **Metode**: Penelitian ini menggunakan rancangan studi cross-sectional dengan teknik pengambilan sampel menggunakan total populasi yakni sebanyak 48 responden wanita lansia. Lokasi penelitian dilaksanakan di Panti Werdha Islamic Village Tangerang. Pengumpulan data dilakukan pada bulan Maret-April 2020. Pengambilan data untuk mengukur fungsi kognitif dilakukan menggunakan kuesioner baku Mini Mental State Exam (MMSE) dan tingkat kemandirian diukur menggunakan checklist baku Indeks Barthel. Data karakteristik responden lainnya dikumpulkan melalui interview dan observasi. **Hasil**: Fungsi Kognitif mempunyai hubungan yang signifikan dengan tingkat kemandirian wanita lansia dengan nilai (OR = 5,402; P Value = 0,013; CI = 95% 1,430-20,426). Bahwa wanita lansia yang fungsi kognitifnya mengalami gangguan (hasil score MMSE > 23) berisiko mengalami tingkat ketergantungan 5,4 kali dalam pemenuhan aktifitas*

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sehari-hari dibandingkan dengan wanita lansia yang fungsi kognitifnya normal. ***Kesimpulan****: Penurunan fungsi kognitif pada lansia merupakan penyebab terbesar terjadinya ketidakmampuan dalam melakukan aktifitas normal harian, dan juga merupakan alasan terbanyak menyebabkan ketergantungan terhadap orang lain untuk merawat diri sendiri. Diharapkan Pelayanan di Panti terutama caregiver dapat meningkatkan kualitas pelayanan lansia dengan lebih meningkatkan perhatian secara menyeluruh baik memberikan upaya diagnosis yang holistik, komprehensif, dengan memperhatikan peran lansia sehingga kualitas hidup lansia lebih meningkat.*

Kata Kunci*: Fungsi Kognitif, Tingkat Kemandirian, Wanita Lansia*

INTRODUCTION

The success of the health plan and socio-economy development plan of a country can usually be seen from the increase in the life expectancy of its population. As a result of the demographic transition, the life expectancy of the Indonesian population (male and female) is expected to keep increasing. The increase in life expectancy causes an increase in the number of elderly people from year to year (Sutikno, 2020).

Life expectancy in Indonesia has increased from 70.1 years in 2010 to 2015 to 72.2 years in 2030 to 2035. However, data on Healthy Life Expectancy (HALE) was only 62.1 years, which means that there was a difference of about eight years being in an unhealthy condition (Cicih, 2019). According to Aging Index data in 2035, it is projected that there will be 73 elderly people per 100 population every year. The number increased rapidly compared to 2015 which was still as many as 35 people. Meanwhile, the Potential Support Ratio showed a decrease from 12.5 years in 2015 to 6.4 years in 2035 (WHO, 2019).

An increase in the number of elderly people will cause an impact on socio-economy including in the family, community, and government (Edelman, Mandle and Kudzma, 2017). An important economic implication of the increase in population is an increase in the old age ratio dependency; the dependency of the elderly is due to the condition of the elderly experiencing various physical and psychological degradation (Sulthon and Purwanti, 2019).

In general, the physical condition of a person who has reached the elderly stage will experience degradation. It can be seen from several changes including a change in the appearance of wrinkled skin, change in internal body organs such as the nervous system, gastrointestinal tract, change in the five senses, and motoric changes (Urena *et al.*, 2018). These motoric changes include reduced in strength, speed, and activity. These changes generally lead to a physical and psychological health degradation which will eventually affect daily life activities (Sitanggang *et al.*, 2021).

The life expectancy of women in Indonesia is longer than men. Women who have reached the process of transition from reproductive to old age (also known as senium period) will experience degradation of body organs and physical ability as the process of becoming old (Pinilih, Astuti and Rini, 2018). During the senium period, osteoporosis may occur with different intensities in each woman. Although the cause is not clear, the reduced effect of steroid hormones and reduced osteoblast activities play an important role in this case. As a result of physical degradation during this senium period, it will affect the level of independence and in need of help from others to fulfill the daily activities of the elderly (Lubis, 2016).

In addition to changes and physical degradation, the elderly also experience degradation in intellectual function. Most studies showed that after reaching the peak at the age of 45 to 55 years, most of a person's abilities will continuously experience degradation. This condition also applied to the elderly (Gitlin and Czaja, 2015).

The use of various memorization strategies for the elderly is not only possible to prevent intellectual degradation but also can increase the memory strength of the elderly. The intellectual degradation of the elderly is generally something that cannot be avoided (Picton, Marino and Nealy, 2018).

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This condition is caused by various factors including illness and anxiety or depression. But the intellectual ability can basically be maintained. One of the factors that can maintain these conditions is to provide an environment that can stimulate or train the elderly intellectual skill and can also anticipate the occurrence of senility (Groot *et al.*, 2016).

Women are more at risk of experiencing cognitive function degradation due to estradiol hormone level in the changes in cognitive function (Hackney, 2016). In addition, women have a higher risk compared to men to suffer from cognitive function disorders such as Alzheimer's dementia, this is caused by the life span of women that is longer than men, while men have a higher risk of developing vascular dementia. It is estimated because men are more likely to engage in habits that can trigger vascular disorders such as smoking and consuming alcohol, while women do not have habits that can lead to vascular disorders (Kivipelto, Mangialasche and Ngandu, 2018).

The decline in cognitive function in the elderly is the biggest cause of the inability to carry out normal daily activities and is also the most common reason that causes dependence on others to take care of themselves, especially the elderly living in nursing homes (Yusuf, Indarwati and Jayanto, 2017). This condition is due to a lack of activities and physical limitations that affect cognitive function.

According to the description above, this study was conducted to determine the determinants of the cognitive function of the elderly related to the level of independence in fulfilling daily activities at the Islamic Village Nursing Home in Tangerang.

METHODS

The study used a cross-sectional analytic design study with the main objective of finding the relationship between risk factors and effects, measurement of the independent and dependent variables carried out once at a time. The location of the study was carried out at the Islamic Village Nursing Home in Tangerang. Data collection was carried out from March to April 2020. The population of this study was all elderly women living at the Islamic Village Nursing Home in Tangerang with the reason of choosing women for the sample because the residents of the nursing home were mostly women, while the total of men residents were only 4 people. The sampling technique uses total sampling. The total of respondents involved were 48 elderly women respondents.

The dependent variables in this study were the characteristic of the elderly and the level of independence. The independent variable in this study was cognitive function. Data collection technique using standardized questionnaires. Cognitive function was measured using the standard Mini-Mental State Exam (MMSE) and the level of independence was measured using the standard Barthel Index checklist. The explanation before conducted the study (Informed Consent) was given to the elderly before the data collection process is done. Other respondent characteristics data were collected through interviews and observations.

The data obtained were analyzed descriptively and analytically using the chi-square test to determine the relationship between the independent variable and the dependent variable. The statistical test using α=5%. Multivariate analysis used logistic regression because the independent and dependent variables were categorical data types.

This study has gotten ethical approval from the Ethics Committee of the Institute for Research and Community Service (LPPM) of the National University of Karangturi No. ECR/UNK/92/VI/ 2019.

RESULTS AND DISCUSSION

The results of the study conducted at the Islamic Village Nursing Home in Tangerang, from the total of 48 elderly women respondents was obtained data as presented in Table 1. Of the 48 respondents, as many as 25 respondents (52.1%) aged ≥ 77 years, 43 respondents (89.6%) were included in the schooled category, 25 respondents (52.1%) were included in the category of the length of stay in the nursing home for ≤ 2 years, and 42 respondents (87.5%) included in the category not sick for the health status variable. According to the cognitive function in the elderly, 19 respondents (39.6%) had cognitive impairment. The level of independence in the elderly was

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obtained from 48 respondents, there were 17 respondents (35.4%) who experienced dependence in fulfilling the needs of daily mobilization.

Table 1. Characteristics of Elderly Women by Age at the Islamic Village Nursing Home in Tangerang

Characteristics	n	%
Age		
< 77 years	23	47.9
≥ 77 years	25	52.1
Education		
Schooled	43	89.6
Unschooled	5	10.4
Length of Stay		
≤ 2 years	25	52.1
> 2 years	23	47.9
Health Status		
Sick	6	12.5
Not sick	42	87.5
Cognitive Status		
Normal	29	60.4
Cognitive impairment	19	39.6
Level of Independence		
Independent	31	64.6
Dependent	17	35.4
Total	48	100

As getting older, the body's physiological reserves will decrease which make it more susceptible to disease. Approximately 5% of the elderly will experience dementia and it doubles every 5 years. In industrialized countries such as America, the number of dementia in the elderly reached 10 to 15%. The number of elderly who experience cognitive impairment was at greater risk as they get older, it was also related to women who suffer more cognitive impairment compared to men (Cacciottolo *et al.*, 2017).

Education variable according to the study showed that there was a relationship between education and the cognitive function of elderly women (P-Value = 0.047 < α = 0.05). Education is a process of adding more life experiences as well as a process of intellectual stimulation that will affect one's cognitive (Susanti and Livana, 2019). A low level of education means that there is a less mental and environmental experience which results in less intellectual stimulation. As a result is the poor cognitive of oneself (Dewi, 2018).

Table 2. Distribution of MMSE Score by Age

Age	MMSE Score					
	Normal		Probable		Definite	
	n	%	n	%	n	%
< 77 years old	16	51.8	6	43.4	1	33.2
≥ 77 years old	15	48.2	8	56.6	2	66.8

Table 3. Determinants of Cognitive Function in Elderly Women

Variables	Cognitive Function				P-Value
	Normal		Cognitive Impairment		
	n	%	n	%	
Level of Independence					
Independent	23	79.3	6	20.7	0.020
Dependent	8	42.1	11	57.9	
Age					
< 77 years	16	69.6	7	30.4	0.696
≥ 77years	15	60.0	10	40.0	
Education					
Schooled	30	69.8	13	30.2	0.047
Unschooled	1	20.0	4	80.0	
Length of Stay					
≤ 2 years	19	76.0	6	24.0	0.155
> 2 years	12	52.8	11	47.8	
Health Status					
Sick	4	66.7	2	33.3	1.000
Not sick	27	64.3	15	35.7	

The results of the length of stay variable showed that there was no significant relationship between the length of stay at the nursing home and the cognitive function of elderly women (P-Value = 0.155 > α = 0.05). The elderly residents of the nursing home lack both physical and cognitive activities, this has

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become a concern because the lack of physical and cognitive activities will lead to an increase in the risk of cognitive degradation (Dewi and Ners, 2015). Likewise in terms of social engagement compared to the elderly who live with their families. Elderly with poor social engagement had a 2 times greater risk of getting poor cognitive function (Donnelly *et al.*, 2016). Elderly women who have stayed in the nursing home for a long time have been able to adapt to the lack of care givers personnel in the nursing home which made them still have to be independent whenever they got sick and experienced a lack of activities.

The analysis results of health status characteristics of elderly women showed that the majority of respondents were included in the category of not sick (87.5%). The result of the study showed that there was no significant relationship between health status and cognitive function (P-Value = 1.000 > α = 0.05). The elderly with a normal cognitive function are those with quite prime physical and psychological health. The highest percentage was those who have good health. The elderly with good health can carry out daily life activities (Muhith and Siyoto, 2016).

There were several elderly women at the nursing home who suffer from hypertension. Several diseases were risk factors of dementia including hypertension, heart arrhythmias, diabetes mellitus, hypercholesterolemia, heart failure, obesity, and nutritional disorders (Turana *et al.*, 2019). It showed that most of medical history of hypertension would gradually affect the cognitive abilities of the elderly and would likely shifted to a more severe cognitive impairments if prevention was not carried out, one of which is by providing facilities for the elderly to always actively carry out activities that can train their coordination and concentration abilities, such as gymnastics and other stimulation. It was caused by health conditions, both physically and psychologically, which sometimes get sick or experience a certain disorder that caused them cannot carry out their daily activities by themselves and need the help of others in some of their activities (Gumay *et al.*, 2018).

The relationship of cognitive function and the elderly level of independence according to the result of the study showed that there were 39.6% of the respondents experienced cognitive impairment after conducting a test using Mini-Mental Status Exam (MMSE). The degradation of cognitive function were shown in speed, short-term memory, working memory, and long-term memory. These changes have been associated with changes in brain structure and function (Shim *et al.*, 2017). The outline of various post mortem changes in the elderly brain including reduced brain volume and weight, ventricular enlargement and sulcus widening, loss of nerve cells in the neocortex, hippocampus, and cerebellum, nerve constriction and dysmorphology, reduced of synaptic density, mitochondrial damage, and degradation of DNA repairing ability (Gardener and Rainey-Smith, 2018). Thorough degradation in central nervous system function was believed to be a major contributor to changes in cognitive abilities and efficiency in processing information (Zhang *et al.*, 2019).

The results of the study showed that there was a significant relationship between cognitive function and the level of independence in elderly women (P-Value = 0.20 < α = 0.05). Over time, the elderly will experience the degradation of cognitive function. Degradation of cognitive function is a quite serious problem because it can interfere with daily activities and reduce the level of independence. The more daily activities carried out by the elderly, the better their cognitive function. Too much activity in the elderly will cause a tendency to forget the things they have done because the elderly have experienced a decrease in brain mass (Muchiri *et al.*, 2018).

In the central nervous system, namely the reduction in brain mass and reduced blood flow to the brain will cause astrocytes to proliferate which causes neurotransmitters (dopamine and serotonin) to change. The changes in this neurotransmitter will increase the monoamine oxidases enzyme (MAO) (Chalazonitis and Rao, 2018). Another impact is a slowdown in central processes and reaction times which cause the cognitive and occupational functions to experience significant degradation in previous abilities (Botwinick, 2013). This causes the elderly to lose interest in their daily life activities. The elderly need several activities that they were formerly able to do on their own.

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Table 4. Multivariate Analysis of Logistic Regression between Candidate Variable of Elderly Women's Independence Level at the Islamic Village Nursing Home in Tangerang.

Variable	P-value	OR	CI 95%	
			Lower	Upper
Length of Stay	0.106	3.012	0.793	11.448
Cognitive Function	0.013	5.402	1.430	20.426

The results of multivariate analysis using logistic regression test of 5 variables included in the multivariate model was cognitive function variable which statistically showed a significant relationship with the level of independence in elderly women (OR = 5.402; P-Value = 0.013; CI = 95% 1.430 – 20.426). The results indicated that elderly women whose cognitive function was impaired (MMSE score > 23) were at risk of experiencing a dependency level of 4.5 times in fulfilling daily activities compared to elderly women whose cognitive function was normal.

Physical activity is one of the factors that affect cognitive function. In the elderly who have difficulty in performing physical movements or have movement disorders, there will be a difference in the number of cognitive function scores, therefore the movement disorder can result in greater degradation of cognitive function compared to those who do not suffer any disorder (Purnomo, Apsari and Hadyanawati, 2019). Degradation of cognitive function is closely related to a decrease in the elderly level of independence. It can be concluded that the better the cognitive function, the more independent the elderly are in fulfilling their daily activities (Johnson, 2018).

The same results of the study that was conducted in 2019 showed that cognitive status was related to the functional status of independence and Barthel Activity of Daily Living (BADL) (Lin, Shih and Ku, 2019). However, the result was obtained in the elderly living in the community, while this study was conducted in the elderly living in the nursing homes. Services provided at the nursing home will most likely cause the elderly not carrying out daily activities, especially elderly women who are >85 years old and there were 14 elderly who used the help of wheelchairs also other assistive devices such as canes and there were 6 elderly who could only lie in bed and always needed the help from others especially the caregivers to help them carry out their daily activities due to their health condition which did not allow to mobilize. As many as 39.6% elderly were included in the category of those who needed assistance in daily activities.

This seems to lower the assessment results on the status of cognitive function. For example, in terms of medication, during the process of filling out the questionnaire, most of the elderly remember the time to take medication and the kind of drugs they should consume. However, the caregivers at the nursing home have prepared the medicine which causes the elderly to only need to consume it, this leads the elderly to choose the option "taking medicine if it has been prepared in advance" in the questionnaire. This also applies to other activities including shopping, preparing food, and taking care of laundry.

Activities mentioned before caused the physical activity in fulfilling the daily needs of the elderly at the nursing home to be reduced because they are used to depending on the caregivers and the more often the elderly depending on the caregiver in fulfilling their daily activities, it will affect their cognitive function.

Epidemiological data showed that regular physical activity is a protective factor against cognitive degradation and reduces the risk of dementia (Muhith and Siyoto, 2016).

Physical activity is beneficial in maintaining the cognitive function of the elderly because it is expected to be beneficial towards the vascular system which continues to the cerebrovascular system, it can be directly through the decrease of vascular morbidities including hypertension, diabetes mellitus, hypercholesterolemia, and obesity. However, even if the vascular factors have been controlled, the repair effect remains (Johnson, 2018).

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Physical activity also facilitates the metabolism of neurotransmitters (the basic ingredients of neurotransmitters are amino acids which are one of the most important brain nutrients that can increase alertness, reduce errors, and stimulate the process of neurogenesis, namely new neuron cell growth, increase the stimulation of molecular and cellular activity in the brain which later supports and maintains brain plasticity, namely the brain's ability to reorganize in the form of new interconnection in nerves). These processes are important to inhibit the hypertrophy of brain tissue that can lead to neuronal degeneration that has an impact on cognition. Sufficient physical activity can increase the flow of oxygen to the brain which helps the subject to maintain the memory (Handajani, 2019).

A similar study was conducted in the community at the Maastricht Aging Study, Netherland. This study used the Stroop Color and Word Test (SCWT), Concept Shifting Task (CST), Visual Verbal Learning Test (VVLT), and MMSE as the parameters of cognitive status. Meanwhile, independence status was measured by Short Form (SF-36). The result of the study showed that cognitive status can be used to predict the independence status of the elderly in the short-term (<3 years), however, it did not apply to long-term predictions (>3 years) (Franssen *et al*., 2018). The predicted independence status in a short term was closely related to the executive function owned by the elderly during the process of answering the independence status questionnaire (actual moment of testing) (Lorio et al., 2017). The most important executive function in determining functional status continues to decline as age increasing.

CONCLUSION

Degradation in cognitive function in the elderly is the biggest cause of the inability to carry out normal daily activities and is also the most common reason that causes them to depend on others to take care of themselves. Elderly women whose cognitive function is impaired are at risk of experiencing dependency on others for the fulfillment of daily activities compared to elderly women whose cognitive function is normal.

The implications of the result of this study are expected to be used for problem-solving, preventing the occurrence of dementia in the elderly, and making policies in the administration of nursing homes. As well as increasing knowledge and making donations, especially for the elderly who live in nursing homes which can help to improve their life's welfare.

It is hoped that services at the nursing home, especially caregivers, can improve the quality of service for the elderly by further increasing overall attention both by providing a holistic, comprehensive diagnostic effort, by paying attention to the role of the elderly so that the quality of life of the elderly can be improved.

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