

THE RELATION OF LONG-SUFFERING FOR HYPERTENSION AND FRAILITY WITH COGNITIVE FUNCTION STATUS IN ELDERLY AT PSTW BUDI MULIA 2 CENGKARENG

Hera Hastuti¹, Shieva Nur Azizah Ahmad², Nanda Rizki Oktavia³, Karina Winahyu⁴

Faculty of Health Sciences University of Muhammadiyah Tangerang, Jl Perintis Kemerdekaan 1/33 Cikokol
Tangerang Banten 15118

Abstract

The increase in the number of elderly people in the world has resulted in an epidemiological transition in the health sector so that there can be an increase in morbidity due to degenerative diseases, namely cognitive function problems. This study aims to determine the relationship between long suffering from hypertension and frailty with cognitive function status in elderly patients at PSTW Budi Mulia 2 Cengkareng. The research design is descriptive analytic with a cross sectional approach. Data collection using Edmonton Frailty Scale (EFS) and Short Portable Mental Status Questionnaire (SPMSQ) questionnaires. The sample consisted of 58 respondents with purposive sampling technique. Data analysis with Pearson correlation. Research shows that 81% of respondents are aged between 60-74 years, female sex is 67.2%, and elementary school education level is 56.9%. While the duration of suffering from hypertension for 5 years in the elderly is 65.5%, mild frailty is 67.2%, and moderate cognitive dysfunction is 36.2%. The results of the Pearson correlation statistical test showed that there was a relationship between length of time suffering from hypertension and cognitive function status with p value = 0.004 and there was a relationship between frailty and cognitive function status with p value = 0.001. The elderly are advised to support health by controlling a low-salt diet so that cognitive decline does not become chronic.

Keywords: Frailty; Length of Suffering from Hypertension; Status of Cognitive Function

Article info: Sending on May 27, 2021; Revision on September 29, 2021; Accepted on October 10, 2021

*) Corresponding author:

Email: shifa.ahmad14@gmail.com

1. Introduction

Almost every country in the world is experiencing growth in the size and proportion of elderly (elderly) in the population group. The elderly population of people in the world in 2019 was 703 million people and increased to 9 percent since 1990 (Department of Economic and Social Affairs, 2019). In 2010, the elderly population group was 7.56% and in 2019 the elderly population in Indonesia was 9.7% of the total population of around 25.9 million people, resulting in an increase in the elderly population by 2.14% (Ministry of Health of the Republic of Indonesia, 2019). The elderly population in DKI Jakarta in 2015 was 6.4% and increased to 7.8% in 2019 (Central Statistics Agency, 2019). The increase in the elderly population has resulted in an epidemiological transition in the health sector so that there can be an increase in the number of morbidity due to degenerative diseases. In 2014, the morbidity rate for the elderly in Indonesia was 25.05%, meaning that for every 100 elderly people there are 25 elderly people who suffer from degenerative diseases (Ministry of Health Republic of Indonesia, 2016). According to the 2015 Central Bureau of Statistics, the morbidity rate experienced by the elderly in

Indonesia increased to 28.62%. The morbidity rate experienced by the elderly in DKI Jakarta in 2015 was 52.572%.

Degenerative diseases have clinical symptoms, especially disturbances in brain function associated with cognitive disorders. One of the degenerative diseases experienced by the elderly is a decrease in intellectual or cognitive function. Cognitive problems are also called degenerative diseases in the elderly (Utari, 2019). Cognitive or intellectual problems can be detected through various types of examinations, one of the Short Portable Mental Status Questionnaire (SPMSQ) questionnaire. According to Palestini (2006) the Short Portable Mental Status Questionnaire (SPMSQ) questionnaire can be used as a measuring tool to detect cognitive problems in elderly people in Indonesia because its validity and reliability have been tested in Indonesian. According to Franco (2010), the SPMSQ cognitive problem examination is more effective than other tests such as the Mini Mental Status Examination (MMSE) because it is relatively insensitive to very mild cognitive decline, especially in people with higher education status.

Based on the research of Eni and Safitri (2018), it is state that the elderly who experience cognitive impairment have a risk of falling. According to research conducted by Suardana et al (2014), it is state that the elderly at Public Health Tampaksiring, Gianyar who have poor cognitive function can have an impact on their low quality of life. According to Purba (2006), states that the impact of cognitive impairment on the elderly will shift the role of the elderly in social interactions in society and within the family. This is support by attitude of the elderly who tend to selfish and reluctant to listen to other people's opinions, so that it will cause the elderly to fall socially isolated and ultimately fell isolated and feel useless. Poor cognitive function status can influenced by one of the domains, namely health risk factors such as frailty and domains of respondent characteristics such as long history of hypertension. According to Power et al (2014), the longer a person has a history of hypertension, the worse their cognitive function will be. According to Ma et al (2019), the more a person experiences frailty or weakness, the worse the cognitive status.

Hypertension is a disease that is quite high in the elderly. Elderly in Indonesia in 2017 experienced hypertension amounting to 34.1% of the total elderly population. The hypertension rate in the elderly in Jakarta in 2017 reached 48.9% (Ministry of Health of the Republic of Indonesia, 2018). Rahmayanti's research (2018) states that there is a significant relationship between the length of suffering from hypertension and cognitive function in the elderly ($p = 0.035$). Taufik's research (2014) states that there is a relationship between someone who has a history of hypertension for more than five years with decreased cognitive function ($p = 0.001$). Tribowo and Suratini's research (2016) states that there is no relationship between history of hypertension and the incidence of cognitive problems with dementia ($p = 0.375$).

Elderly experienced a lot of frailty or weakness. Elderly who experienced frailty in Indonesia in 2018 amounted to 25.2% of 448 geriatric clinics (Setiadi, 2019). Frailty for the elderly in Jakarta in 2018 was 29.17% of the total elderly population (Setiati et al, 2019). Research by Rini et al (2019) at PSTW Wana Seraya Denpasar said frailty ($p = 0.017$) was associate with cognitive impairment in the elderly. Elderly who are classified as frailty will experience weight loss, decreased calorie intake and specific nutrients which will cause changes in body composition and physical function, causing the elderly to experience less energy and protein so they experience worse cognitive function (Panza et al, 2012). Research by Miyamura et al (2019) with a literature study research design said that four analytical studies showed that there was no significant relationship between frailty and cognitive impairment ($p = 0.77$). Gerontic nurses have a role

and function in the prevention and control of risk factors for cognitive impairment in the elderly. According to research conducted by Sauliyusta and Rekawati (2016) in Tanah Sareal District, Bogor, states that the role of nurses in optimizing nursing services is relate efforts to prevent cognitive decline, namely by knowing the factors that can cause cognitive decline in the elderly. In addition, nurses act as nursing care providers to keep up cognitive function.

Based on earlier research conducted by Sartono (2016) states that as many as 11 out of 60 elderly people experience cognitive impairment at PSTW Budi Mulia 2 Cengkareng. The study used a cross-sectional study design with purposive sampling method of selecting samples. The characteristics of the elderly who experience cognitive impairment are eight elderly people aged 60-74 years, one elderly person in the 75-90 age range, and two elderly people aged more than 90 years who experience cognitive dysfunction. This study aims to find the relationship between long-suffering from hypertension and frailty on the cognitive function status of the elderly at PSTW Budi Mulia 2 Cengkareng in 2020.

2. Methods

This research uses quantitative research with cross sectional research design. The research conducted at the Tresna Werda Budi Mulia 2 Social Institution, Cengkareng, West Jakarta. This research conducted from March to July 2020. The data was collected for 7 days. Based on a literature study using Sartono's (2016) research, a population of 60 elderly who live in PSTW Budi Mulia 2 Cengkareng. The research sample consisted of 58 respondents from the calculation of the Harry King Nomogram formula. Sampling using a random method with purposive sampling method. The research instruments used by researchers were The Edmonton Frail Scale Questionnaire and the Short Portable Mental Status Questionnaire (SPMSQ) Questionnaire.

The condition when the research occurred was the *Covid-19* pandemic and the decision of the DKI Jakarta provincial government to limit visits to all transnational social institutions in the Jakarta area, so that in the data collection process the researcher assisted by an enumerator, namely four nurses for primary data collection from each guest house because of the *Covid-19* pandemic so that the elderly as respondents in this study were not allowed to have direct contact with people who live outside the institution. Researchers do perception equation with nurses who help retrieve data via online (zoom application). The preparations made by the researcher were by doing the enumerator's perception equation through video calls related to the questionnaire to be used in the study and the criteria for the elderly who could be the

sample. The researcher must explain repeatedly so that the information received by the enumerator is the same as the information provided. Prospective respondents received an explanation about the purpose of the study and confidentiality of their identity by the researcher by telephone and assisted by a nurse who took the data. Prospective respondents who are willing to become respondents are asked to sign an informed consent form.

Researchers assisted by PSTW Budi Mulia 2 Cengkareng identified respondents who met the inclusion criteria of respondents by looking at the history of the elderly, elderly with a history of hypertension and the elderly with an Edmonton Frail Scale score of more than 7 can be the study samples. Respondents were given the Short Portable Mental Status Questionnaire (SPSMQ) assessment. Respondents who have filled in all the questionnaire sheets are asked to collect them from the researcher through PSTW Budi Mulia 02 Cengkareng.

Researchers checked the correctness of the questionnaire data that the respondents had filled in randomly by telephone. Then the data processed and analyzed to find the results of these studies. The statistical test analysis in this study used the Pearson correlation test. This research has been carried out by the ethics committee of the medical and health

Table 2 The frequency distribution of frailty and cognitive function status in the elderly

Variable	Total	
	N	%
1. Frailty		
Mild frailty	39	67,2%
Moderate frailty	12	20,7%
Heavy frailty	7	12,1%
2. Cognitive Function Status		
Intact cognitive function	14	24,1%
Mild cognitive dysfunction	16	27,6%
Moderate cognitive dysfunction	21	36,2%
Severe cognitive dysfunction	7	12,1%

Table 2 shows that the most frequent respondents are mild frailty as many as 39 respondents (67.2%) and the majority of respondents experiencing moderate cognitive impairment as many as 21 respondents (36.2%).

Based on table 3, a significance value of 0.004 ($p \leq 0.05$) is obtained, which indicates that the correlation between the long suffering from hypertension and the status of cognitive function is significant. Thus H_a accepted and H_0 rejected. Further statistical calculations obtained the results of the correlation coefficient value of 0.371 indicating

Status is significant. Thus H_a accepted and H_0 rejected. Further statistical calculations obtained the results of the correlation coefficient

Faculty University of Muhammadiyah Jakarta with number 015 / PE / KE / FKK-UMJ / VII / 2020.

3. Results and Discussion

Table 1. Characteristics of Respondents

Characteristic	Total	
	N	%
1. Age		
60-74 years	47	81,0 %
75-90 years	11	19,0 %
>90 years	0	0 %
2. Gender		
Men	19	32,8 %
Woman	39	67,2 %
3. Level of education		
No school	20	34,5 %
Primary school	33	56,9 %
Junior high school	5	8,6 %
College	0	0 %
4. Long Suffering		
Hypertension	38	65,5 %
≤5 years	20	34,5 %
>5 years		

moderate correlation strength with positive correlation, meaning that the longer the respondent suffered from hypertension, the more impaired the cognitive function status was.

Table 3 Relationship Long Suffering from Hypertension With Cognitive Function Status

	Cognitive Status	Function
Long Suffering from Hypertension	0,004**	
	r(58) = 0,371	
**p<0.05		

Table 4 Relationship Long Suffering from Hypertension With Frailty

	Cognitive Status	Function
Frailty	0,001**	
	r(58) = 0,596	
** $p < 0.05$		

Based on table 4, a significance value of 0.001 ($p \leq 0.05$) obtained, which indicates that the correlation between frailty and cognitive function value of 0.596, indicating the strength of a strong correlation with a positive correlation, meaning that

the higher the frailty score, the more impaired the cognitive function status was.

According to Effendi and Makhfudli (2013), the aging process in the cardiovascular system of the elderly is that the heart valves thicken and stiff so that the ability to pump blood decreases (decreased contraction and volume), elasticity of blood vessels and increased resistance of peripheral blood vessels so that blood pressure increases.

When entering the age of more than 50 years, generally women enter menopause, then there is a decrease in the hormone estrogen. The decrease in the hormone estrogen causes the arterial blood vessels to become stiff, and damages the cell lining of the blood vessel walls (endothelium) so that it can trigger plaque formation so that blood pressure can increase continuously (Efendi and Makhfudli, 2013).

The results of this analysis are in line with research conducted by Sumantunkul (2014) which states that women experience hormonal changes, namely a decrease in the ratio of estrogen and androgens which causes an increase in the release of renin, which triggers an increase in blood pressure.

The level of education is closely related to the level of knowledge. The low-level of knowledge, especially on hypertension and its management can lead to severity of hypertension. The results of this analysis are in line with the research of Rano et al. (2017) that patients with low education tend to have the awareness to behave less healthy.

According to Fried (2017) at the age of more than 60 years, there is a decline in organ function with the characteristics of reduced functional ability, impaired function and impaired adaptation function caused by decreased body systems, as well as increased susceptibility to various kinds of stresses that can cut a person's functional performance.

According to Xue (2011), they tend to more vulnerable than men. In women, sex hormone levels drop quite suddenly with the onset of menopause and oria, testosterone levels also drop, but not suddenly. Growth hormone levels also decrease with age. In addition, the elderly shown to have decreased insulin-like growth factor-1 (IGF-1) so that they experience decreased strength and mobility. According to Ortuno (2010), elderly people with a history of low education are more susceptible to frailty. Elderly with low education level have lower awareness compared to elderly with higher education.

According to the International classification of Diseases 10 (2010), memory decline is most pronounced when receiving and learning new information. In more severe cases the memory of the information that has been learn also decreases. The decrease occurred in verbal and non-verbal material. This reduction must also be obtained objectively by obtaining information from the people he is with, or from neuropsychological tests or measures of

cognitive function status. Severity of cognitive decline is mild, moderate and severe.

In mild cognitive decline, there is memory loss which is enough to interfere with daily activities even though it is mild, but the elderly who experience mild cognitive dysfunction are unable to live independently. The main function affected is difficulty learning new things and unable to do more complex daily tasks or recreation.

The decline in cognitive function is an obstacle to living independently. Only very important things can be remembered. New information stored only occasionally and very briefly. Individuals cannot remember basic information about where they lived, things they have done in the past week, or names of familiar people.

The decline in severe cognitive function that occurs is memory loss characterized by a complete inability to store new information. Only some of the previously learned information can be remembered. The person fails to recognize even his close relatives.

The older a person is, naturally there will be apoptosis in neuron cells which results in atrophy in the brain starting from cortical atrophy, central atrophy, substantia alba and paraventricular hyperintensity which results in decreased cognitive function in a person. This neuron cell damage caused by free radicals, a decrease distribution of energy and brain nutrition (Carayannis, 2001). According to Lin et al (2017), cognitive impairment occurs more in women than men. Gender related to lifestyle, social activities that can indirectly interfere with cognitive function abilities.

The level of education can affect cognitive health in a person, because someone with high education will be accustomed to remembering and concentrating compared to those with low education. Cognitive problems experienced in the elderly with low education are the ability to remember low, difficult to say something that thought, difficulty remembering new information, and memory loss of old problems. The more often we train the brain, the cognitive decline can be slowed down (Lumbantobing, 2006).

Rahmayanti's research (2017) at the Meuraxa Hospital, Banda Aceh City, found 15 respondents who suffered from hypertension ≤ 5 years, including 9 people in normal conditions, 5 people in a state of moderate cognitive dysfunction and 1 person in a state of severe cognitive dysfunction. . Meanwhile, the number of respondents who suffered from hypertension > 5 years was 46 people including 13 people with moderate cognitive dysfunction and 17 people with severe cognitive dysfunction. The results of the bivariate analysis using the chi-square test showed that there was a significant relationship between the long-suffering from hypertension and decreased cognitive function ($p = 0.035$).

Taufik's research (2014) in the outpatient geriatric clinic of Dr. Kariadi Hospital, Semarang, obtained a research sample of 49 respondents. The results of this study found that 38 respondents experienced cognitive dysfunction who had a history of hypertension for more than 5 years. The result of the old statistical test of suffering from hypertension on cognitive function using the Spearman correlation test is that there is a significant value ($p = 0.001$), which means that there is a long relationship with hypertension to cognitive function in the elderly.

The results of Tribowo and Suratini's research (2016) at the Tresna Werdha Yogyakarta Social Service Center Unit Budhi Luhur Kasongan Bantul found 40 elderly respondents. There were 37 elderly people with a history of hypertension in the 5-10 year group, most had mild dementia cognitive function disorders as many as 29 people, 6 people had moderate dementia cognitive function disorders, and as many as 2 people experienced severe dementia cognitive function disorders. Meanwhile, 3 people suffered from hypertension for a long time in the group of more than 10 years as many as 3 people, there were 2 people experiencing cognitive dysfunction in the mild group of dementia and 1 person experiencing moderate dementia cognitive function disorders. The results of statistical tests using the Kendall tau test showed $p = 0.375$ which stated that there was no relationship between long-suffering from hypertension and incidence of dementia in the elderly.

According to Waldstein and Katzel (2001), patients who suffer from hypertension for more than 5 years can affect cognitive function. Hypertension of more than 5 years results in reduced memory and thinking abilities in old age. This can occur because the large blood vessels (carotid arteries) that supply the brain and small blood vessels in the brain also experience hypertension. Hypertension causes damage to the endothelium of the cerebral arteries. This damage can cause disruption of the blood brain barrier, so that toxic substances can easily enter the brain. In addition, damage to blood vessels can decrease blood supply to the brain, leading to atherosclerosis of the large arteries and blockage of the arterioles. This process causes damage to the white matter which plays a role in transmitting messages from one brain region to another, also causing minor strokes or also called silent infarctions because the symptoms that seem are not clear.

According to Taufik (2014) which states that one of the factors that can affect incidence of dementia is the long-suffering from hypertension. Chronic hypertension or those that occur for a very long time will make the smooth muscle cells of the brain blood vessels proliferate. This proliferation results in the lumen getting narrower and the walls of the blood vessels getting thicker so that the nutrients that carried by blood to

the brain are also disturbed. Neuron cells in the brain will experience ischemic if not treated immediately. When an ischemic occurs, the ion pump that requires ATP will not function so that sodium and calcium ions will trap in neuron cells. Sodium and calcium will eventually make neuron cells die and cause cognitive decline, one of which is memory function which, if left chronically, can cause dementia.

Aryana's research (2018) at PSTW Wana Seraya Denpasar, Bali. There were 30 respondents and found 13 people experiencing frailty, including 1 person in a normal cognitive state and 12 people experiencing cognitive impairment. The results of statistical tests using the chi-square result obtained $p = 0.017$, meaning that there is a relationship between frailty and cognitive function. Research by Hsu (2014) which conducted in Taiwan with a longitudinal research design, obtained the result of $p = 0.0168$, which means that there is a relationship between frailty and cognitive function in the elderly in Taiwan. Research by Miyamura et al (2019) with the systematic literature review method stated that for analysis studies showed no significant relationship between frailty syndrome and cognitive impairment in the elderly ($p = 0.77$).

According to Ma et al (2015), frailty and cognitive disorders are complex and multifactorial. Several pathways and mediators thought to play a role in occurrence of cognitive impairment in elderly people with frailty, namely hormonal, inflammatory, nutritional, vascular and neuropathological factors, and metabolic factors that thought to give. Sarcopenia, which causes muscle dysfunction and decreased walking speed, has a strong association with cognitive impairment.

The I-Lan Longitudinal Aging Study (ILAS) in Panza et al (2012) identified the role of metabolic factors that can lead to cognitive impairment in frailty elderly. ILAS states that in frailty elderly there is a decrease in metabolic activity, namely poor nutritional status, higher glycated hemoglobin, lower HDL, insulin secretion that is incompatible with the response to increased plasma glucose due to insulin resistance, causing hyperinsulinemia that will make cells. Cells are exposed to high insulin levels for a long time. This condition will cause impaired cell function and survival, especially neuron cells. Nutritional factors have a role in the occurrence of cognitive impairment in frailty elderly. Elderly who are classified as frailty due to weight loss, decreased calorie intake and specific nutrients that cause changes in body composition and physical function, causing disability. Elderly who experience a lack of energy and protein are shown to have poorer cognitive function. Sarcopenia also explains the relationship between frailty and cognitive impairment through low testosterone levels in elderly men. Testosterone will induce synaptic plasticity of the hippocampus and regulate amyloid deposition while

in the elderly there is a decrease in testosterone which is associated with frailty due to conditions due to muscle mass and muscle strength.

With aging there is also a decrease in thyroid sex hormone levels, growth hormone levels and vitamin D levels. Increased basal cortisol levels are also associated with impairment and associated with decreased hippocampal volume in patients with Cushing's syndrome, Alzheimer's dementia, and depression. Increased basal cortisol has been shown to associate with cognitive impairment in terms of language and speed processing information, eye-hand coordination, executive function and verbal and visual memory. Hypothalamic-pituitary-adrenal axis (HPA Axis) dysregulation is one of the triggers of cognitive impairment in the elderly. Depression is also a risk factor for cognitive impairment in frailty elderly. Depression will affect cognitive function because it is often associated with social isolation and loneliness which contribute to the occurrence of frailty which will result in cognitive impairment.

4. Conclusion and Suggestion

In general, the characteristics of the elderly in PSTW Budi Mulia 2 Cengkareng are many aged 60-74 years, most have female gender and the education level of majority of respondents is primary school. The most elderly suffering from hypertension is ≤ 5 years with the most experienced frailty group, namely mild frailty and the most cognitive function status is moderate cognitive function disorders. There is a relationship between the long-suffering from hypertension to the cognitive function status of the elderly with a moderate level of correlation and direction of the positive correlation means that the longer the respondent suffers from hypertension, the more impaired the cognitive function status is. In addition, there is a relationship between frailty and cognitive function status in the elderly with a strong correlation level and positive correlation, meaning that the higher the frailty score, the more impaired the cognitive function status will be.

After the elderly know the status of cognitive function that is mostly impaired cognitive function, the elderly advised to keep up their health by controlling a low salt diet so that sodium and calcium levels are not high so that the decline in cognitive function does not become chronic and does not become dementia. In addition, the elderly need to take care of condition of frailty by consuming foods high in energy and protein so that they do not worsen their cognitive function. Nurses need to pay attention to a low-salt diet that needed by hypertensive patients, a protein diet for frailty elderly people so that it does not worsen condition of cognitive function. The orphanage expected to pay more attention to nutrition for the elderly by providing foods low in salt and high in protein. Future research can check interventions such as brain exercise, giving a low-salt diet, or giving high-protein foods that can

done to support the cognitive function of the elderly so they don't experience worse disorders.

5. References

- Ahmed, S. I., Mitchel, J., Arnold, R., Dowson, K. P., & Hodges, T. R. (2008). *Memory Complaints In Mild Cognitive Impairment, worried Well and Semantic Dementia*. *Alzheimer Dis Assoc* 22(3):227-35. <https://doi.org/10.1097/wad.0b013e31816bbd27>
- Amblas dan Novellas. (2018). *Frail-VIG index : a Concise Frailty Evaluation Tool for Rapid Geriatric Assesment*. *BMC Geriatrics*, 2(1):1-12. 10.1186/s12877-018-0718-2
- Bandiyah. (2009). *Elderly and Gerontic Nursing*. Yogyakarta: Nuha Medika
- Caryannis, G. (2001). *Memory Cognitive Functional Loss. Regeneresis Medical Centre*. <https://dx.doi.org/10.1097%2FADM.0b013e31820c23fa>
- Central Bureau of Statistics. (2016). *Elderly Population Statistics*. Jakarta: Mold I.
- Central Bureau of Statistics. (2016). *National Socio-Economic Survey*. Jakarta: Mold I.
- Central Bureau of Statistics. (2019). *Elderly Population Statistics*. Jakarta: Mold I.
- Crooks, V. C., Lubbenj, Pehti, D. B., Little, D., & Chiu, V. (2006). *Social Network Cognitive Function and Dementia Incidence Among Eldery Woman*. *AMJ Public Health*. <https://dx.doi.org/10.2105%2FAJPH.2007.115923>
- Darmojo, R. (2014). *Elderly Health Sciences*. Jakarta: Buku Ajar Boedhi.
- Dharma, K. (2011). *Nursing Methodology (Guidelines for Implementing and Implementing Research Results)*. Jakarta: CV. Trans Info Media cetakan 13.
- Deary, I. J., & Cockey, J. (2009). *Age Assosiated Cognitive Decline British Medical Rullctin*. <https://doi.org/10.1093/bmb/ldp033>
- Departement of Economic and Social Affairs. (2019). *World Population Ageing 2019*. New York : United Nation
- Dorlan, W. A., & Newman. 2002. *Dorlan's Medical Dictionary*. Jakarta: EGC.
- Egan, B. M. (2018). *Defining Hypertension by Blood Pressure 130/80mmHg*. *Journal of the American Heart Association*, 7(4):1-8. <https://doi.org/10.1161/JAHA.118.009971>
- Eni, & Safitri. (2018). *Cognitive Disorders of the Risk of Falling in the Elderly*. *Jurnal Ilmiah Ilmu Keperawatan Indonesia*, 8(1). <https://doi.org/10.33221/jiiki.v8i01.323>

- Effendi, F., & Makhfudli. (2013). *Community Health Nursing Theory and Practice in Nursing*. Jakarta: Salemba Medika.
- Franco, D. (2010). *The Mini Mental State Examination Revisited : Ceiling and Floor Effects After Score Adjustment for Educational Level in An Aging Mexican Population*. *IntPhyshogeriatrics*, 22(1):72-81.10.1017/S1041610209990822
- Fried, L. P. 2001. Frailty In Older Adults : Evidence For a Phenotype. *J Gerontol A Biol Sci Med Sci*, 56(3). doi:10.1093/gerona/56.3.m146
- Hsu, H. S. (2014). Relationship Between Frailty And Cognitive Function Older Adults in Taiwan. *The Journal of Frailty and Aging*, 3(3) : 153-157. <https://doi.org/10.14283/jfa.2014.17>
- Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. (2003). *The Seventh Reeport of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood (JNC-VII)*. Bethesda:NIH Publication.
- Kandel, E. R., Schwant , S., & Jezzel, T. M. (2013). *Principle Of Neural Science 5th*.Newyork: Mc Grew Hili Medical.
- Kholifah. (2016). *Gerontic Nursing*.Jakarta: Ministry of Health of the Republic of Indonesia
- Law of the Republic of Indonesia Number 2 Year About Elderly Health Workers. 30 Nov 1998. State Gazette of the Republic of Indonesia 1998 No 3587. Jakarta.
- Latipah, E. (2017). *Psychology For Teachers*. Bandung: PT Remaja Rasdokarya.
- Lumbantombing, S. M. (2006). *Intelligence in the elderly and dementia*. Jakarta: Balai Penerbit Fkui.
- Ma Lina, Li Zhang, Fei Sun, Yun Li, Zhe Thang. (2019). *Cognitive Function in Prefrail and frail Community-dwelling Older Adults in China*. *BMC Geriatrics*, 53(1):3-7 <https://doi.org/10.1186/s12877-019-1056-8>
- Maryam, S., Mia, F. E., Rosida, W., Ahmad, J., & Irwan, B. (2011). *Getting to know the elderly and their care*. Jakarta: Salemba Medika.
- Ministry of Health of the Republic of Indonesia. (2005). *Guidelines for Elderly Health Development for Health Care Officers*. Jakarta: MOH RI.
- Ministry of Health of the Republic of Indonesia. (2016). *Data and Information Center of the Ministry of Health of the Republic of Indonesia, Situation of the Elderly in Indonesia*. Jakarta: First Printing of the Indonesian Ministry of Health.
- Ministry of Health of the Republic of Indonesia. (2018). *RISKESDAS 2018 report*. Jakarta: First printing of the Indonesian Ministry of Health.
- Ministry of Health of the Republic of Indonesia. (2019). *Indonesia Entering the Aging Population Period*. Retrieved April Sunday, 2020, from the Bureau of Communication and Community Services.
- Miyamura, K., Fhon, J., Bueno, A., Neira, W., Silveira, R., & Rodrigues, R. (2019). *Frailty Syndrome and Cognitive Impairment in Older Adults : Systematic Rivew of the Literature*. *Revista Latino Americana de Enfermagen*, 27: 1-12. <http://dx.doi.org/10.1590/1518-8345.3189.3202>
- Mujahidullah, K. (2012). *Geriatric Nursing*. Yogyakarta : Pustaka Belajar.
- Notoatmodjo, S. (2012). *Health Research Methodology*. Jakarta: Catatan II Rineka Cipta.
- Nugroho, I. A., Asti, D. A., Kuartno, L. (2017). *The Relationship between Education Level and Physical Activity on Cognitive Function of the 60 Year Old Elder in the Work Area of Gombong II Public Health Center, Kebumen Regency*. *Jurnal Ilmiah KesehatanKeperawatan*,13(3):146-150.<https://doi.org/10.26753/jikk.v13i3.233>
- Nuraini. (2018). *Public Knowledge About Hypertension*. *Jurnal Ilmu Kesehatan UNMUH*, 7(4):1-8.
- Orimo, H., Ito, H., Suruki, T., Araki, A., Hosoi, T., & Sawabe, M. (2006). Reviewing the defemtion of "elderly". *Genattic and Gerentoloqi Interational*, 149-158.
- Palestin, B. (2006). *The Influence of Age, Depression and Dementia on Elderly Functional Disabilities in PSTW Abiyoso and PSTW Budi Dherma Province D.I. Yogyakarta*. Jakarta: Universitas Indonesia.
- Panza, F., Solfrizzi, V., Logroscino, G. (2012). *Current epidemiological approaches to the metabolic-cognitive syndrome*. *Journal of Alzheimer's Disease*, 6(2): 90-106. <https://dx.doi.org/10.3233%2FJAD-170963>
- Pattison, D. N. T. and Neill, P.O. (2018). *Medical Student Attitudes and Conceptst of frailty and delirium*. Spinger International Publishing, 5(3):10-19. <https://doi.org/10.1007/s41999-017-0018-y>

- Pertiwi, I. A. (2018). *The Relationship between Education Level and Cognitive Function in the Elderly in Gebangsari Village, Semarang*. Jurnal Unissula, 7(2):1-8. <https://doi.org/10.33859/dksm.v10i>
- Peterson, R. (2004). Mild Cognitive Impairment As a Diagnostic Entity. *Journal of Internal Medicine*, 256 (3): 183-194. <https://doi.org/10.1111/j.1365-2796.2004.01388.x>
- Purba, J. (2006). *Dementia and Al Zhamer's Disease*. Jakarta: BP FKUI.
- Power MC, Tchetsgen EJT, Sparrow D, Schwartz J, Weisskopf MG. (2014). *Impact of Hypertension on cognitive function*. *Int Psychogeriatrics*, 22(1):72-81. <https://dx.doi.org/10.1161%2FHYP.000000000000053>
- Rahmayanti, Y. (2018). The Old Relationship of Suffering from Hypertension with Decreased Cognitive Function in the Elderly. *Jurnal Aceh Medika*, 2(2) : 241-246. ISSN 2548-9623
- Rano, K., Siagan, B. J., Taufik, A., Destiani, D. P. (2017). Knowledge of Hypertension Levels in Hypertension Patients in Bandung City. *Jurnal Farmasi Klinik Indonesia*, 6(4) : 290-297. ISSN 22526218
- Rasyid, I. A., Syafrita, Y., Sastri, S. (2017). *The Relationship between Risk Factors and Cognitive Function in the Elderly in Padang Panjang Timur Subdistrict, Padang Panjang City*. Jurnal Kesehatan Andalas, 6(1): 34-41. <https://doi.org/10.25077/jka.v6i1.643>
- Rini, S. S., Kuswardhani, T., & Aryana, S. (2019). Factors Associated with Cognitive Disorders in the Elderly at the Terna Wardha Wara Social Institution Seraya Denpasar. *Jurnal Penyakit Dalam Kdayana*, 2(2) : 32-37. <https://doi.org/10.36216/jpd.v2i2.35>
- Robert. (2008). *Cognitive Psychology*. Yogyakarta: Pustaka Belajar.
- Romero, & Ortan. (2010). A Frailty Instrumen Primary Care : Fendass From the Survey of Healty. *Ageing and Retirement in Europe*.
- Sartono, F.(2016). *The Effect of Brain GYM on Cognitive Function in the Elderly of Ekamasia*.Tangerang: UMT Indonesia.
- Sauliyusta, M dan Rekawati, E. (2016). *Physical Activity Affects Elderly Cognitive Function*.Jurnal keperawatan Indonesia, 19(2): 71-77. <http://dx.doi.org/10.7454/jki.v19i2.463>
- Setiadi, S. (2017). *Frailty Status and its Associated Factors among Indonesian Elderly People*. *Innovating in Aging*, 1(1): 386-390. DOI: 10.1093/geroni/igx004.1400
- Setiati, S. Laksmi, P.W. Aryana, S. Sunarti, S. (2019). *Frailty State Among Indonesian Elderly: Prevalence, Associated Factors, and Frailty State Transition*. *Jurnal BMC Geriatric*, 19(1) : 1-10. <https://doi.org/10.1186/s12877-019-1198-8>
- Suwarni, S., Setiawan, M. (2017). *Relationship Dementia age and functional ability in the elderly*. Jurnal Keterapian Fisik, 2(1): 7-15.
- Taufik, E. (2012). Hypertension Relationship with Impaired Cognitive Function in the Elderly. *Jurnal Penyakit Dalam Udayana*, 2 (1): 14-17. ISSN : 2580-2925
- Taufik, E. S. (2014). Effect of Hypertension Against Cognitive Function in the Elderly. *Jurnal Media Medika Muda*, 2(2) : 54-59.
- Tribowo, A dan Suratini. (2016) Relationship History of Hypertension with the Incidence of Dementia in the Elderly at the Tresna Werdha Yogyakarta Social Service Center, Unit Budhi Luhur Kasongan. *Jurnal Universitas 'Aisyiyah Yogyakarta*, 3(4) : 1-18.
- Ulfa, Z. (2017). *The factors that are Affecting the Cognitive Function of the Elderly in UPTD Seujahtera Geunaseh Sayang Banda Aceh*.Jurnal Universitas Syiah Kuala , 4(1): 10-18.
- Utari, R. (2019). *Jenis Penyakit Degeneratif yang Umum Terjadi Kangker Hingga Penyakit Jantung*. Jakarta.
- Undang-undang Republik Indonesia Nomor 2 Tahun Tentang *Tenaga Kesehatan Lanjut Usia*. 30 Nov 1998. Lembaran Negara Republik Indonesia Tahun 1998 No 3587. Jakarta.
- Xue, Q. L. (2011). *The Frailty Syndrome: Definition and Natural History*. *Clin Geriatr Med*, 27 (1) : 1-1