DETECTION OF FACTORS THAT AFFECT THE DECLINE IN COGNITIVE FUNCTION THAT CAUSES DEMENTIA IN THE ELDERLY

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ABSTRACT

In general, the number of elderly people suffering from dementia is expected to increase. Dementia results in a decrease in the quality of life of sufferers so that it becomes a problem. This study aims to detect and identify factors that affect the decline in cognitive function that causes dementia in the elderly. This type of analytical research is conducted by the cross sectional research method. The population of this study is the elderly in Malang city, east Java, the sample size is 155 people with probability sampling technique using proportionate cluster random sampling. Data collection for the identification of cognitive aspects using instruments MMSE (Mini Mental Status Exam) instruments, data analysis using the Bier Logistic Regression test with SPSS20 for Windows. The results of the analysis showed the relationship between health status factors and the cognitive function of the elderly (p value 0.05). The results that some respondents as many as 105 people or 67,7% had normal cognitive function, and 50 respondents or 32.3% fell into the category of probable cognitive impairment. Conclusion were obtained that the decline in cognitive function in the elderly was caused by high blood pressure, smoking, having experienced a blow to the head, a sad mood, lack of exercise, lack of activity in social activities, difficulty sleeping, and prolonged illness and illness. The suggestion from the results of this study is that the elderly manage and prevent risk factors so that cognitive function does not decline so that dementia can be prevented.

Keywords: Detection, Cognitive Function, Dementia, Elderly

ABSTRAK

Secara umum, jumlah lansia yang menderita demensia diperkirakan akan meningkat. Demensia mengakibatkan penurunan kualitas hidup penderitanya sehingga menjadi masalah. Tujuan dari penelitian mendeteksi dan mengidentifikasi faktor yang mempengaruhi penurunan fungsi kognitif yang menyebabkan demensia pada lansia. Jenis penelitian analitis dengan metode penelitian cross sectional.Populasi penelitian ini adalah lansia di kota Malang Jawa Timur, jumlah sampel 155 orang dengan teknik probability sampling menggunakan proportionate cluster random sampling. Pengumpulan data untuk identifikasi aspek kognitif menggunakan instrumen MMSE (Mini Mental Status Exam), Analisis data menggunakan uji Regresi Logistik Bier dengan SPSS 20 for Windows. Hasil analisis menunjukkan hubungan antara faktor status kesehatan dengan fungsi kognitif lansia (nilai p 0,05). Hasil penelitian terdapat 105 responden atau 67,7% fungsi kognitif normal dan 50 responden atau 32,3% mengalami penurunan fungsi kognitif. Kesimpulan didapatkan bahwa penurunan fungsi kognitif pada lansia disebabkan karena tekanan darah tinggi, merokok, pernah mengalami benturan di kepala, suasana hati yang sedih, kurang olah raga, kurang

aktif dalam kegiatan sosial, kesulitan tidur, kondisi sakit dan sakit yang lama. Saran dari hasil penelitian ini agar lansia mengelola dan mencegah faktor risiko agar fungsi kognitif tidak menurun sehingga dapat mencegah terjadinya demensia.

***Kata kunci** : Deteksi, Fungsi Kognitif, Demensia, Lansia*

INTRODUCTION

In general, the number of elderly people with dementia is expected to increase. The number of elderly in Indonesia is estimated to be higher than the number of elderly in the world after that 2100 (1). This shows that the number of elderly residents in the city of Malang for 3 consecutive years has increased. The percentage of the elderly population in Malang city in 2018: 10.32%, in 2019: 10.68% and in 2020 reached 11.4% (13). To realize healthy, independent, quality and productive elderly people, health coaching must be carried out as early as possible during the human life cycle until entering the elderly phase, by paying attention to risk factors including degenerative diseases suffered by the elderly which can be the cause of dementia(2).Dementia is a neurocognitive disease characterized by deterioration in intellectual abilities including memory, learning, orientation, language, comprehension, and judgment (3).

Symptoms of dementia depend on the type of dementia. The most common types of dementia in older adults are AD, vascular dementia, Mixed Alzheimer's or vascular dementia, Parkinson's dementia, retribution body dementia, anterior temporal lobe dementia(4).Cognitive deterioration indementia usually begins with deterioration of memory or memory. Dementia can be characterized by an inability to remember people around and time, damage to the client's spatial abilities, and behavior of self-confinement or fear of meeting others. It is predicted There are an estimated 50 million people living with dementia in the world, and of them 60% live in developing countries.The estimated number of people with dementia for people over 60 years old in Indonesia, Thailand, and Sri Lanka in 2001 was 0.6 percent of the population, the number is estimated to increase in 2020 to 1.3% and to 2.7% by 2040 (5,6). The number of people with dementia is predicted to increase to 82 million by 2030 and 152 million by 2050. The WHO estimates that an ageing population will cause the global prevalence of dementia to triple in the next 30 years, from 47 million in 2015 to 150 million by 2050. Similarly several modeling studies have investigated the effects of population aging on global and country-specific prevalence and concluded that the prevalence of dementia will double every 20 years million by 2050 (7).

Meanwhile, the exact data on the number of dementia sufferers in Indonesia is still unknown. Prevalence in Indonesia remains scarce, it was estimated that there were about 1 million cases in 2011. Given the rising life expectancy in Indonesia, this number is likely to continue growing. There have been no reports of the incidence of dementia due to the lack of public understanding of dementia and its causative factors, making this case like an iceberg phenomenon.This situation leads to a significant decrease in the quality of life for individuals affected by dementia, posing a considerable challenge for developing countries that may lack the resources to manage the increasing number of patients requiring care(8).

The current challenge is to recognize individuals at high risk of dementia in the community, find individuals at risk of dementia, establish medical diagnoses, carry out therapy with cross-professional involvement and help

the adaptation of patients and the surrounding community decreased memory and orientation of places and times at high risk of injury and threats to the daily safety of the elderly. Attention in the elderly averages on visible physical aspects, while psychological, emotional and memory aspects are not well studied.

The decline in cognitive function is risk factors can inhibit neurotransmitter production, particularly affecting cholinergic and dopaminergic systems,wich cuses a small production of wich causes of acetylcholine resulting ina deficit of cognitive function(9). If the elderly who experience the early signs of dementia do not immediately receive attention to prevention, especially the risk factors for dementia, it will result in an increase in elderly dementia and other cognitive disorders in the future, which if not controlled will have a huge impact on the economic, social, and political life of the nation (10).

Spouses and caregivers will also experience a greater caregiver burden, distress, increased levels of depression, and decreased sleep related to behavioral disorders, which have an impact on their health and well-being (11,12). One of the goals of national development is to treat dementia so that the elderly remain at a healthy and productive age (2). Initial data from this study can significantly contribute to addressing current global challenges related to the rising incidence of dementia among the elderly, supporting the implementation of early detection and holistic management as specified in the fourth action step of the national strategy. This study does not involve intervention or treatment of the independent variable in relation to the dependent variable. Instead, its primary aim is to identify factors associated with cognitive function decline that contribute to dementia risk in the elderly. The findings are intended to support government initiatives and programs aimed at improving dementia care and prevention.

METHODS

The design in this study is analytical with a cross-sectional method, which is a study that emphasizes the measurement time or observation of independent and bound variables that are carried out simultaneously. The focus of the research is on the elderly population to identify factors associated with the risk of dementia. The population is all elderly people aged 60 years and above who live in the city of Malang amounting to 98,124 thousand. Data collection for the identification of cognitive aspects uses instrument *MMSE* (Mini Mental Status Exam) instruments.The *MMSE* instrument is the gold standard for assessing memory and has been tested by the Institute of Mental Health USA with a sensitivity level of 100% and a specificity of 90% so that researchers do not conduct validity and reliability tests anymore. Data analysis using Bier Logistic Regression test with SPSS 20 for Windows.

The sample in this study is the elderly who participate in activities at the integrated service center/ *pusat pelayanan terpadu* for the elderly in Malang city. The sample was measured using probability sampling technique using proportionate cluster random sampling and the sample size used an estimated to be proportion: Lemeshow et al were 155 people. Which became an independent variable in the study of dimensional risk in the elderly Meanwhile, the dependent variable is a factor that causes the cognitive function of the elderly to decline. Assessment of cognitive function was utilized using the Mini-Mental State Examination (MMSE) questionnaire with interpretation of results categorized as follows: scores of 24-30 indicate normal cognitive function, 17-23 suggest probable cognitive impairment, and 0-16 indicate definite cognitive impairment.The sample in this study was the elderly who were in theHealth Center area of Malang city and

data collection was carried out in2023 and all data utilized in the study are primary with ethical clearance certificate number: 272/HRECC.FODM/III/2023.

Data Analysis

Data analysis was performed using SPSS version 20 for Windows. In the univariate analysis, all variables were analyzed using descriptive analysis with the help of software to test independent variables, namely factors that affect the decline in cognitive function that causes dementia in the elderly which include: age, gender, marital status, education, occupation, which are analyzed and presented in the form of a frequency table where the existing scores are calculated and included in the table in the form of numbers (frequencies) and percentages. Meanwhile, the non-parametric statistical test, by using the Bier Logistic Regression test with SPSS 20 for Windows to test the dependent variable, namely cognitive function in the elderly.

RESULT

The results of this study show that the decline in cognitive function that can cause dementia in the elderly is due to high blood pressure, smoking, having experienced a blow to the head, sad mood, lack of exercise, lack of activities, difficulty sleeping, and prologed sick.

Table 1. Characteristics of respondents

Characteristic	Sum (N)	Percentage (%)
Gender		
Male	58	37.4%
Female	97	62.6%
Education level		
No school	10	6.5%
primary school	34	21.9%
JuniorHighSchool	63	40.6%
High School	42	27.1%
College	6	3.9%
Age group		
Age 45-59 years old	32	20.7%
Age 60-74 years old	100	64.5%
Age 75-90 years old	23	14.8%
Marital Statue		
Married	150	96.8%
Unmarried	5	3.2%
Work		
Private	25	16.1%
Labor	20	12.9%
Pensioners	85	54.9%
Others	25	16.1%

Source: Descriptive analysis of elderly variables in Malang city

From table 1. most of the respondents are women (62.6%) totaling 97 people. The vast majority (40.6%) of the 63 had a junior high school education. The age of respondents is mostly r (64.5%) amounting to 100 people aged 60-74 years. Most

respondents (96.8%) amounted to 150 people of married status. The vast majority (54.9%) of the 85 people are retirees.

Table 2.Frequency distribution variable of cognitive function to independent variables

Variable	Normal (n=105) %	Probable cognitive impairment (n=50) %	Total n=155) %
Blood pressure			
Normal	77 (49.7%)	19 (23.0%)	96 (61.9%)
Abnormal	28 (18.1%)	31(20.0%)	59 (38.1%)
Ideal Body Weight			
Normal	75 (48.4%)	16 (10.3%)	91 (58.7%)
Overweight/Obesity	30 (19.4%)	34 (21.9%)	64 (41.3%)
Activity in the community			
Active	99 (63.9%)	43 (27.7%)	142 (91.6%)
Inactive	6 (3.9%)	7 (4.5%)	13 (8.4%)
Smoke			
No	99 (63.9%)	46 (29.7%)	145 (93.5%)
Yes	6 (3.9%)	4 (2.6%)	10 (6.5%)
Head impact			
No	97(62.6%)	36 (23.2%)	133 (85.8%)
Yes	8 (5.2%)	14 (9.0%)	22 (14.2%)
More grieving			
No	94 (60.6%)	40 (25.8%)	134 (86.5%)
Yes	11 (7.1%)	10 (6.5%)	21 (13.5%)
Difficulty sleeping			
No	46 (29.7%)	15 (9.7%)	61 (39.4%)
Yes	59 (38.1%)	35 (22.6%)	94 (60.6%)
Activity			
Independent	99 (63.9%)	50 (32.3%)	149 (96.1%)
Not independent	6 (3.9%)	0 (0.0%)	6 (3.9%)
Being sick			
No	64 (41.3%)	22 (14.2%)	86 (55.5%)
Yes	41 (26.5%)	28 (18.1%)	69 (44.5%)
Long illness			
< 1 year	84 (54.2%)	25 (16.1%)	109 (70.3%)
1 – 5 years	21 (13.5%)	25 (16.1%)	46 (29.7%)

Source: Descriptive analysis of elderly variables in Malang city

From table 2, it was obtained that some respondents as many as 105 people or 67.7% had normal cognitive function, and 50 respondents or 32.3% fell into the category of probable cognitive impairment.The variable blood pressure, there are 2 categories, namely normal and abnormal.

From the results of the research, 96 respondents were found in the normal and

59 respondents abnormal group. Of the 96 normal respondents, 77 respondents with normal cognitive function and 19were categorized as having probable cognitive impairment. While of the 59 respondents in the abnormal group, 28 respondents with normal cognitive function and 31 were identified with probable cognitive impairment.The ideal weight variable has 2 categories, 91 respondents with normalweight and 64 respondents with overweight or obese. From 91 normal group respondents, 75 respondents with normal cognitive function and 16 were categorized as having probable cognitive impairment.

The 64 respondents in the overweight/obese group, 30 respondents with normal cognitive function and 34 were classified as having probable cognitive impairment.Variable activeness in the community with 2categories, 142 respondents were active in social activities and 13 were not active in social activities in the community.

The variable "activeness in the community" is divided into two categories: 142 respondents in the active group and 13 respondents in the inactive group. Among the active group, 99 respondents exhibited normal cognitive function, while 43 were classified as having probable cognitive impairment. In the inactive group, 6 respondents demonstrated normal cognitive function, whereas 7 were categorized as having probable cognitive impairment.

The smoking variable is categorized into two groups. Among the 145 respondents in the nonsmoking group, 99 exhibited normal cognitive function, while 46 were classified as having probable cognitive impairment.

The 133 respondents in the group there was no head collision, 97 respondents with normal cognitive function and 36 respondents who have cognitive function with a category of possible cognitive impairment. The variable again grieved with 2 categories, of the 134 respondents of the no group, 94 respondents with normal cognitive function and 40 respondents who have cognitive function with a category of possible cognitive impairment.

The 21 respondents of the yes group, 11 respondents with normal cognitive function and 10 respondents who have cognitive function with a category of possible cognitive impairment.The variable is difficulty sleeping of the 61 respondents in the no group, 46 respondents with normal cognitive function and 15 respondents who have cognitive function with a category of possible cognitive impairment.

The 94 respondents of the yes group, 59 respondents with normal cognitive function and 35 respondents who have cognitive function with a category of possible cognitive impairment. Activity variables of the 149 respondents in the independent group, 99 respondents with normal cognitive function and 50 respondents who have cognitive function with a category of possible cognitive impairment.

The 6respondents, the group was not independent, including normal cognitive function.The variables were sick, of the 86 respondents in the no-group, 64 respondents with normal cognitive function and 22 respondents who have cognitive function with a category of possible cognitive impairment.

The 69 respondents of the yes group, 41 respondents with normal cognitive function and 28 were categorized as having probable cognitive impairment.The variable "length of illness" is divided into two categories. Among the 109 respondents in the group with an illness duration of less than one year, 84 exhibited normal cognitive function, while 25 were categorized as having probable cognitive impairment.

Table 3.Prediction Accuracy (Block = 0)

Observation		Predictions Cognitive function		Percentage Correct
		Usual	Probable Cognitive Impairment	
Cognitive function	Usual	105	0	100.0
	Probable Cognitive Impairment	50	0	0.0
Overall Percentage				67.7

Source: Logistic Regression Analysisof elderly variables in Malang city

The table 3 above shows the accuracy of predictions before the influence of independent variables or can be said to see predictions of initial cognitive function variables. The accuracy of predictions without involving independent variables was 67.7%.

Table 4.Prediction Accuracy

Observation		Predictions Cognitive function		Percentage Correct
		Normal	Probable Cognitive Impairment	
Cognitive function	Normal	91	14	86.7
	Probable Cognitive Impairment	16	34	68.0
Overall Percentage				80.6

Source: Prediction accuracy (block 1)Analysisof elderly variables in Malang city

The table 4 above shows the model grouped respondents into two groupsCognitive function: normal cognition and possibilities impairment. *The overall Correct Percentage* is 80.6%. This is better with a model that is only the previous constant (in table 4) with 67.7%. The accuracy of prediction of cognitive function variables in each category was 86.7% for the normal category and 68.0% for the probable cognitive impairment category.

Table 5.Odds Ratio

Variable		B	Forest	Say.	Exp(B)
Blood Pressure (1)	X1	2.625	13.902	0.000	13.805
Ideal Body Weight (1)	X1	3.069	20.252	0.000	21.518
Community Activity (1)	X2	2.490	5.584	0.018	12.066
Smoking (1)	X3	1.246	0.392	0.531	3.476
Head Impact (1)	X4	2.507	7.939	0.005	12.274
More Sad (1)	X5	1.463	4.146	0.042	4.318
Trouble Sleeping (1)	X6	0.024	0.002	0.969	1.024
Independent Activity (1)	X7	-28.399	0.000	0.998	0.000
Being sick (1)	X8	-0.882	1.699	0.192	0.414

Long illness (1)	X9	1.195	5.083	0.024	3.304
Constant		-4.332	29.823	0.000	0.013

Source: Hypothesis Testing of partial influenceof elderly variables in Malang city

From the results of logistic regression in table 5, the results are obtained with the following equation:

$$Ln\left(\frac{p}{1-p}\right) = 2.625X1 + 3.069X2 + 2.490X3 + 1.246X4 + 2.507X5 + 1.463X6 + 0.024X7 - 28.399X8 - 0.882X9 + 1.195X10 - 4.332 + ei$$

The blood pressure variable had an influence on the cognitive function variable with a wald value greater than the chi-square table (13.902 > 3.842) and α value greater than p (0.050 > 0.000). The positive regression coefficient (and exp B of 13,805) indicates that the category 1 (abnormal) Blood Pressure variable tends to the category 1 cognitive function variable (probable cognitive impairment).

The ideal weight variable had an influence on the cognitive function variable with a Wald value greater than the chi-square table (20,252> 3,842) and α value greater than p (0.050 > 0.000).Regression coefficient (and exp B of 21,518) shows that the ideal BB variable category 1 (Overweight / Obesity) tends to the variable cognitive function category 1 (probable cognitive impairment).Smoking variables had a positive and insignificant effect on cognitive function variables with Wald values smaller than the table's chi-square (0.392 < 3.842) and p-values greater than α (0.531 > 0.050). The positive regression coefficient (and exp B of 3,476) showed that the variable Smoking category 1 (yes) tended to the variable cognitive function category 1 (probable cognitive impairment) but was not significant.

The Head Impact variable had a influence on the cognitive function variables with Wald values greater than the table's chi-square (20.252 > 3.842) and α value greater than p (0.050 > 0.000). The positive regression coefficient (and exp B of 12,274) shows that the category 1 Head Impact variable (yes) tends to the category 1 cognitive function variable (probable cognitive impairment).The Again Grieving variable had a influence on the cognitive function variable with a Wald value greater than the chi-square table (4.146> 3.842) and a α value greater than p (0.050 > 0.000). The regression coefficient (and exp B of 4.318) shows that the variable Again Grieving category 1 (yes) tends to the variable cognitive function category 1 (probable cognitive impairment).

The sleeplessness variable had a positive and insignificant effectoncognitive function variables with Wald values smaller than the table's chi-square (0.002 < 3.842) and p-value is greater than α (0.969 > 0.050). The positive regression coefficient (and exp B of 1,024)indicates that the variable Sleeplessness category 1 (yes) tends to the variable cognitive function category 1 (probable cognitive impairment) but is not significant.The independentactivity variable had a negative and insignificant effect on cognitivefunction variables with Wald values smaller than the table's chi-square (0.000 < 3.842) and the p-value greater than α (0.998 > 0.050).

A negative regression coefficient(and exp B of 0.000) indicates that the category 1 self-activity variable (not independent) has a tendency toward category 0 (normal) cognitive function variables but is not significant.The variable moderately ill had a insignificant effect on cognitive function variables with Wald values less than the chi-square table (1.699 < 3.842) and p-values greater than α (0.192 > 0.050). The negative regression

coefficient (and exp B of 0.414) indicates that the variable Moderate category 1 (yes) tends to the variable cognitive function category 0 (normal) but is not significant.The longillness variable had a positive and significant effect on cognitive function variables with Wald values greater than the chi-square table (5.083> 3.842) and p-values smaller than α (0.024< 0.050). The positive regression coefficient (and exp B of 3.304) shows that the variable Length of illness category 1 (1–5 years) tends to the variable cognitive function category 1(probable cognitive impairment).

DISCUSSION

The initial stage in modeling to identify determinant factors involves the systematic identification of potential covariates. This is achieved through logistic regression analyses of any covariate in relation to the dependent variable. Covariate has a p-value of less than 0.05 are regarded as candidates for inclusion in the multivariate model. However, beyond the threshold established by the p-value, consideration of scientific rationale and substantive relevance is imperative.

Consequently, a covariate may still be retained in the model even if its p-value is greater than 0.05, provided it possesses theoretical or clinical significance. In this study ten logistic regression analyses were carried out for each variable of elderly health status that can be a risk factor for cognitive function decline, namely: Blood Pressure test results, Ideal weight results, activeness in the community, smoking habits, never experienced a collision of heads, sad mood, difficulty sleeping, activities, sick conditions and chronic diseases.

The results of the analysis in table 5 can be seen that the variable smoking, difficulty sleeping, and independent activity have a p-valueof > 0.05. So that there are seven covariate variables that are included in the multivariate model, namely Blood Pressure, ideal weight, activeness in the community, whether you have experienced a head collision, sad mood, sick conditions and long illness which results in a positive and significant effect on cognitive function variables. The Head Impact variable had a influence on the cognitive function variables. Elderly who experience a decrease in cognitive function have a change in brain composition structures, adversely affecting overall brain function. Sleep duration greatly affects the risk of dementia in the elderly. During sleep, the brain processes and consolidates the information obtained, so sleep deprivation can cause difficulty remembering new information. Poor sleep quality can accelerate brain aging because of the accumulation of β-amyloid, which is closely related to the development of Alzheimer's Dementia disease (14).

Anxiety and prolonged frailty are significant factors contributing to depression in this population. Changes in the mood or mental status of the elderly which can later lead to a depressive condition that will have an impact on cognitive function decline. Theoretical frameworks suggest that feelings of sadness and anxiety, particularly in the later stages of life, may elevate cortisol levels, thereby inhibiting neurotransmitter activity essential for the production of cholinergic and dopaminergic pathways. This inhibition results in reduced acetylcholine production, leading to cognitive deficits (9).

Furthermore, such stressors caninflict damage on brain regions responsible for memory and recall, specifically the hippocampus (15). The influence of physical activity on cognitive function in older adults is notably supported by intervention studies, which indicate that adults who engage in structured physical activity programs that yield significantimprovements in cardiovascular and respiratory health,

often show improved cognitive performance (16).

Mid-life obesity is closely related to the risk of developing dementia. Overweight and obesity have a strong association with the risk of dementia. Obesity is one of the biggest contributors to abnormal lipoprotein build-ups that aggregate brain nerves and affect acetylcholine production (15). Exercise prevents atrophy in the hypocampuswhich functions as a memory store, as well as exercise reduces the amount of cortisol in the blood, which is useful for reducing stress (17).

CONCLUSION AND SUGGESTION

Conclusion

Factors that influence the decline in cognitive function that causes dementia in the elderly is high blood pressure, smoking, having had a blow to the head experienced, sad mood, lack of activity, activeness in the community, difficulty sleeping, sick conditionsand long illnes.

Suggestion

The elderly are expected to be able to maintain their health andavoid risk factors, especially blood pressure, weightis maintained to remain ideal, active in the community, strived not to get sick and stay healthy and maintain emotions to prevent cognitive function decline that causes dementia.

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REFERENCES

1. The National Team For The Acceleration Of Poverty Reduction, The SMERU Research Institute. The Situation of the Elderly in Indonesia and Access to Social Protection Programs: Secondary Data Analysis [Internet]. Jakarta Pusat; 2020.
2. Menteri Kesehatan RI. PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 25 TAHUN 2016 TENTANG RENCANA AKSI NASIONAL KESEHATAN LANJUT USIA TAHUN 2016-2019 [Internet]. 2016.
3. Toh HM, Ghazali SE, Subramaniam P. The acceptability and usefulness of cognitive stimulation therapy for older adults with dementia: A narrative review. Int J Alzheimer's Dis. 2016;2016(1):5131570. https://doi.org/doi.org/10.1155/2016/5131570
4. Touhy TA, Jett KF. Ebersole & Hess' Toward Healthy Aging-E-Book: Human Needs and Nursing Response [Internet]. Elsevier Health Sciences; 2013.
5. Rizzi L, Rosset I, Roriz-Cruz M. Global epidemiology of dementia: Alzheimer's and vascular types. Biomed Res Int. 2014;2014(1):908915.

https://doi.org/doi.org/10.1155/2014/908915
6. Baltasar A, Serra C, Pérez N, Bou R, Bengochea M, Ferri L. Laparoscopic sleeve gastrectomy: a multi-purpose bariatric operation. Obes Surg. 2005;15(8):1124–8. https://doi.org/doi.org/10.1381/0960892055002248
7. Prince M, Guerchet M, Prina M. The global impact of dementia 2013-2050. 2013;
8. Menteri Kesehatan RI. PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 69 TAHUN 2014 TENTANG KEWAJIBAN RUMAH SAKIT DAN KEWAJIBAN PASIEN [Internet]. 2014.
9. Wang X-L, Iwanami J, Min L-J, Tsukuda K, Nakaoka H, Bai H-Y, et al. Deficiency of angiotensin-converting enzyme 2 causes deterioration of cognitive function. npj Aging Mech Dis. 2016;2(1):1–8. https://doi.org/doi.org/10.1038/npjamd.2016.24
10. Eni E, Safitri A. Gangguan Kognitif terhadap Resiko Terjadinya Jatuh Pada Lansia. J Ilm Ilmu Keperawatan Indones [Internet]. 2018;8(01):363–71.
11. Springate BA, Tremont G. Dimensions of caregiver burden in dementia: impact of demographic, mood, and care recipient variables. Am J Geriatr Psychiatry. 2014;22(3):294–300. https://doi.org/doi.org/10.1016/j.jagp.2012.09.006
12. Caceres-Cruz J, Arias P, Guimarans D, Riera D, Juan AA. Rich vehicle routing problem: Survey. ACM Comput Surv. 2014;47(2):1–28. https://doi.org/doi.org/10.1145/2666003
13. BPS Jawa Timur. Profil Penduduk Lanjut Usia Provinsi Jawa Timur 2020 [Internet]. 2021.
14. Yoshida D, Ohara T, Hata J, Shibata M, Hirakawa Y, Honda T, et al. Lifetime cumulative incidence of dementia in a community-dwelling elderly population in Japan. Neurology. 2020;95(5):e508–18. https://doi.org/doi:10.1212/WNL.0000000000000991
15. Baumgart M, Snyder HM, Carrillo MC, Fazio S, Kim H, Johns H. Summary of the evidence on modifiable risk factors for cognitive decline and dementia: a population-based perspective. Alzheimer's Dement. 2015;11(6):718–26. https://doi.org/doi.org/10.1016/j.jalz.2015.05.016
16. Bherer L, Erickson KI, Liu-Ambrose T. A review of the effects of physical activity and exercise on cognitive and brain functions in older adults. J Aging Res. 2013;2013(1):657508. https://doi.org/doi.org/10.1155/2013/657508
17. Lee B, Shim I, Lee H, Hahm D-H. Melatonin ameliorates cognitive memory by regulation of cAMP-response element-binding protein expression and the anti-inflammatory response in a rat model of post-traumatic stress disorder. BMC Neurosci. 2018;19:1–15. https://doi.org/doi.org/10.1186/s12868-018-0439-7