AN OBSERVATIONAL STUDY ON COGNITIVE FUNCTION, SLEEP QUALITY, DEPRESSION, EDUCATIONAL BACKGROUND, AND FUNCTIONAL INDEPENDENCE ON ELDERLY AT SASANA TRESNA WERDHA RIA PEMBANGUNAN NURSING HOME, CIRACAS, EAST JAKARTA, INDONESIA

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Disubmit: 26 Juni 2024 Diterima: 26 November 2024 Diterbitkan: 01 Desember 2024
Doi: https://doi.org/10.33024/mahesa.v4i12.15811

ABSTRACT

Along with the development of society and healthcare technology, there are an increase in life expectancy and the elderly population. They must be differentiated from simply older adults because they have their own set of health problems associated with the aging process now known as geriatric syndromes. Sleep disorder, cognitive function decline, and depression are common health problems that are often found in the elderly. They are interconnected and influenced by other factors such as educational background. The culmination of all of those factors is the decrease of the elder's quality of life in the form of functional disability. To get a description of the cognitive function, sleep quality, depression, educational background, and functional independence of the elders at Sasana Tresna Werdha RIA Pembangunanan Nursing Home. The data obtained in this research are a significant predictor of the elders' quality of life and can serve as a foundation for both analytical and interventional studies that aims to improve the elder's quality of life. This research uses an observational descriptive approach using a cross-sectional method at Sasana Tresna Werdha RIA Pembangunan Nursing Home. The population for this research is all of the elderly that lives there and meets the inclusion criteria for this research which is still able to be interviewed. In total there are 44 elders that participated in this research. The sampling technique used in this research was total sampling. The data will be collected by interview using questionaires. The data will be analyzed using a univariate analysis in which categorical data will be presented its proportion in frequency and its percentage while numerical data will be presented with its mean and standard deviation if its distribution is parametrical and will be presented with its median and interquartile range if its distribution is non-parametrical. Furthermore, a crosstab will be made between two variables to be observed in more detail the possibilities of interrelationship bertween the two variables. The description of the elders's cognitive function is that out of 44 elders, 30 (68.2%) are normal, 4 (9.1%) are categorized as mild cognitive impairment, and 10 (22.7%) are categorized as dementia. The description of the elders' sleep quality is that 13 (29.5%) have good sleep quality and 31 (70.5%) have poor sleep quality. The description of the elder's depression is that 29 (65.9%) are normal, 7 (15.9%) have mild depression, 4 (9.1%) have moderate depression, and 4 (9.1%) had severe depression. The description of the elders' educational background is that 5 (11.4%) have low educational background, 10 (22.7%) have moderate educational background, 28 (63.6%) had high educational background, and 1 (2.3%) have unknown educational background. The description

of the elder's functional independence is that 10 (22.7%) are totally dependent, 2 (4.5%) are severely dependent, 7 (15.9%) are moderately dependent, 2 (4.5%) are mildly dependent, and 23 (52.3%) are independent. The majority of the elders at Sasana Tresna Werdha RIA Pembangunan have a normal cognitive function, have poor sleep quality, have no depression, have a high educational background, and are still functionally independent.

Keywords: Cognitive Function, Sleep Quality, Depression, Educational Background, Functional Independence

INTRODUCTION

Elderly refers to an age population of 65 years and older(*Age*, 2022). Alongside technological advancement, life expectancy is currently increasing which ultimately will cause the increase in the number of the elderly population. The World Health Organization (WHO) predicts that the world elderly populations will double from 1 billion lives in 2020 to 2.1 billion in 2050(*Ageing and Health*, n.d.). In Indonesia itself, the life expectancy is showing an increasing trend in both genders. For men it is 69.59 in 2020, 69.97 in 2021, and 69.93 in 2022. While for women, it is 73.46 in 2020, 73.55 in 2021, and 73.83 in 2022(Indonesia, n.d.).

The elderly population itself must be differentiated from just simply older adults as they have their own set of unique characteristics and health problems. There are some health problems whose prevalence is consistently higher in the elderly populations such as: cataracts, cognitive decline, chronic obstructive pulmonary disease, sleep disorders and many more. One thing in common to be observed from all of the disease above is that the majority of them is usually a degenerative disease caused by the aging process. This compilation of health problems is manifested to a series of symptoms such as decubitus ulcer, frailty, the increase risk of falling and delirium which are collectively known as the geriatric symptoms. With the increase of the elderly populations, this poses new challenges for the management of elderly health problems(*Ageing and Health*, n.d.).

30% of the elderly population sleep with a duration that is less than the duration that is recommended for them(Gordon et al., 2022). This is a concern as numerous studies has associated poor sleep quality as a risk factor for cognitive decline(Casagrande et al., 2022). Cognitive decline itself can also distrupt the normal circadian rhythm which can cause insomnia(Hamdy et al., 2018). Another factor to be observed is depression which plays an important role. Studies has associated depression with both cognitive decline and poor sleep quality(Aajami et al., 2020; Joo et al., 2022; Sekhon & Marwaha, 2024). Educational background of the elderly is also an important factor to not be overlooked. Numerous studies has observed that higher educational background is positively associated with a higher resistance to aging related degeneration(Fields, 2020; Fletcher et al., 2021; Mather, 2020). The interplay between those factors will ultimately affect the quality of life of the elderly in the form of functional disability(Raimo et al., 2024). From the elaboration above an observational study of sleep

quality, cognitive function, educational background, depression, and functional independence of the elderly population is important as it can be a significant predictor of their quality of life and can serve as a foundation for both analytical and interventional studies that aims to improve the elder's quality of life.

LITERATURE REVIEW

Sleep quality has a significant impact on cognitive function. The mechanism regarding that is still not fully understood but there are a few theories that has been accepted. One of them is the reduction of beta-amyloid protein clearance. The clearance of those proteins occurs during the slow wave sleep phase. The clearance is done by the glymphatic system which is a system that acts like the lymphatic system that is carried out by the astrocyte which is one of the cell populations that constitute the neuroglial cell population. The accumulation of beta-amyloid proteins can lead to the formation of a plaque which can induce inflammation and hyperphosphorilate the tau proteins that exist on the cytoskeleton of neurons to create what is known as neurofibrillary tangles which can interfere with normal axonal transport. Increased reactive oxygen species formation (ROS) has also been observed as a result from the accumulation of beta-amyloid plaques. All of this process eventually causes synaptic dysfunction, neuronal death, and neurotoxicity that culminate in cognitive function decline and cognitive impairment(Chen et al., 2017; Wennberg et al., 2017).

Cognitive decline has also been a predictor of poor sleep quality. The proposed mechanism is that the neuronal degeneration affects brain normal physiological function. If the neuronal degeneration affects center and brain parts that plays a role in normal sleeping physiology, then it can potentially cause sleep disturbance which can lead to poor sleep quality. The disturbance in normal circadian rhythm is one manifestation which results from the degeneration and degradation of the suprachiasmatic nucleus(Kiely, 2014; Wennberg et al., 2017).

Another factor that has an effect on both cognitive function and sleep quality is depression. While the exact mechanism is still unknown, it has been found that depression is positively associated with cognitive decline which usually manifest as neurodegenerative disease such as mild cognitive impairment(Aajami et al., 2020). There is also the suspicion that depression causes disturbance in the normal circadian rhythm which has an effect on both cognitive function and sleep quality(Sekhon & Marwaha, 2024).

Educational background is observed to have an effect on cognitive function. Education itself can increase what is known as cognitive reserve. The proposed mechanism is by stimulating the process of synaptogenesis in the brain. While it doesn't hinder or play a part in the process of neuronal degeneration itself, it constructs the brain to be more resistant to the degeneration process that is caused by aging. Ultimately, it manifests as a more preserved cognitive function(Fields, 2020; Fletcher et al., 2021; Mather, 2020).

Functional disability is the culmination that stems from all of the variables discussed above. Impaired cognitive function is positively associated with disability in doing activities of daily living independently which has an impact on the quality of life of these eldely(Cipriani et al., 2020; Sonmez & Karasel, 2019).

Problem formulation:

1. How was the description of the cognitive function of the elderly at Sasana Tresna Werdha RIA Pembangunan Nursing Home?
2. How was the description of the sleep quality of the elderly at Sasana Tresna Werdha RIA Pembangunan Nursing Home?
3. How was the description of the depression of the elderly at Sasana Tresna Werdha RIA Pembangunan Nursing Home?
4. How was the description of the educational background of the elderly at Sasana Tresna Werdha RIA Pembangunan Nursing Home?
5. How was the description of the functional independence of the elderly at Sasana Tresna Werdha RIA Pembangunan Nursing Home?

METHODS

This research uses an observational descriptive approach using a cross-sectional method. The research was conducted for a time period of estimated 1 month during December 2023 – January 2024 at Sasana Tresna Werdha RIA Pembangunan which is located in Jl. Pusdika No. 8, RT. 08/RW. 07, Kelurahan Cibubur, Kecamatan Ciracas, Kota Jakarta Timur, DKI Jakarta, Indonesia.

The population for this research is all of the elderly that lives there and meets the inclusion criteria for this research which is still able to be interviewed. In total there are 44 elders that participated in this research. The sampling technique used in this research was total sampling.

The data for this research is collected by interview carried out by the researcher. Questionnaires are used for each individual data component. After interviewing the elders, the researcher will interpret the answer and directly fill in the questionnaires. In total 5 questionnaires are used in this research. The first for demographics are interviewed directly which consists of the elder's name, age, gender, and educational background. Sleep quality is assessed using the Pitsburgh's Sleep Quality Index (PSQI). Cognitive function is assessed using Mini Mental State Examination (MMSE). Depression is assessed using Geriatric Depression Scale (GDS). Functional independence is assessed using the Barthel Index for activity of daily living.

This research has been approved by the health research ethical committee of Faculty of Medicine of Universitas Tarumanagara with the document number of 257/KEPK/FK UNTAR/XII/2023.

After completing the data collection process, the data is now cleaned, organized, and analyzed using the application statistical package for the social sciences (SPSS). The analysis is a univariate analysis in which the data will be presented in tables. The categorical data will be presented its proportion in frequency and its percentage, while numerical data will be presented with its mean and standard deviation if its distribution is parametrical and will be presented with its median and interquartile range if its distribution is non-parametrical. Furthermore, a crosstab will be made between two variables to be observed in more detail the possibilities of interrelationship bertween the two variables. Percentage on the crosstab is relative to each column on the table.

RESULTS

Table 1 Research Results

Variable	Categorical Data Frequency (%)	Numerical Data Mean (SD)
Age		**78.8(7.284)**
Gender		
Male	**19 (43.2%)**	
Female	**25 (56.8%)**	
Educational Background		
Low		
Moderate	**5 (11.4%)**	
High	**10 (22.7%)**	
Unknown	**28 (63.6%)**	
	1 (2.3%)	
Cognitive Function		
Normal	**30 (68.2%)**	
Mild Cognitive Impairment		
Dementia	**4 (9.1%)**	
	10 (22.7%)	
Sleep Quality		
Good	**13 (29.5%)**	
Poor	**31 (70.5%)**	
Depression		
Normal	**29 (65.9%)**	
Mild Depression	**7 (15.9%)**	
Moderate Depression		
Severe Depression	**4 (9.1%)**	
	4 (9.1%)	
Functional Independence		
Totally Dependent		
Severely Dependent	**10 (22.7%)**	
Moderately Dependent		
Mildly Dependent	**2 (4.5%)**	
Independent		
	7 (15.9%)	
	2 (4.5%)	
	23 (68.2%)	

Researcher collect this data from Sasana Tresna Werdha RIA Pembangunan with a total of 44 elders. There was 1 elder whose educational background is unknown after the researcher directly interviewed the elder and viewed the nursing home's archive. The age data is presented with its mean and standard deviation because the data

distribution is parametric. The criteria for educational background are divided into three categories which are low, moderate, and high. Low educational background means that the elders' final education is in junior high school or lower. Moderate educational background means that the elders' final education is in senior high school. High educational background means that the elders' final education is minimum above senior high school.

The majority of elders at Sasana Tresna Werdha RIA Pembangunan have a high educational background that is as much as 28 out of 44 elders with a percentage of 63.6%. For the assessment of cognitive function, most of the elders there, still have normal cognitive function that is as much as 30 out of 44 elders with a percentage of 68.2% but just as extreme, the population of elders at Sasana Tresna Werdha RIA Pembangunan that are classified as dementia are also quite numerous that is 10 out of 44 elders with a percentage of 22.7%. Observation on the elders' sleep quality shows that poor sleep quality is dominating with a proportion of 31 out of 44 elders with a percentage of 70.5% have it. More than 50% of elders at Sasana Tresna Werdha RIA Pembangunan has not shown sign of having depression yet. 29 out of 44 elders with a percentage of 47.7%. Functional independence data shows its distribution mostly on either end of the spectrum of its categories. As much as 23 out of 44 elders with a percentage of 52.3% is independent and 10 out of 44 elders with a percentage of 22.7% is totally dependent.

Table 2 The Description of Sleep Quality with Cognitive Function

Sleep Quality	Cognitive Function			Total
	Normal	Mild Cognitive Impairment	Dementia	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Good	8 (26.7%)	1 (25%)	4 (40%)	13 (29.5%)
Poor	22 (73.3%)	3 (75%)	6 (60%)	31 (70.5%)
Total	30 (100%)	4 (100%)	10 (100%)	44 (100%)

From the table above, it can be observed that poor sleep quality is the majority category compared to good sleep quality in all the category of cognitive function. From 30 elders that have normal cognitive function, 22 of them with a percentage of 73.3% have a poor sleep quality. In contrast to that, for the elder's population that were categorized as dementia, the distribution of sleep quality data is almost equal.

Table 3 The Description of Functional Independence with Cognitive Function

Functional Independence	Cognitive Function			Total
	Normal	Mild Cognitive Impairment	Dementia	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Totally Dependent	3 (10%)	0 (0%)	7 (70%)	10 (22.7%)

Severely Dependent	**0 (0%)**	**1 (25%)**	**1 (10%)**	**2 (4.5%)**
Moderately Dependent	**4 (13.3%)**	**3 (75%)**	**0 (0%)**	**7 (15.9%)**
Mildly Dependent	**1 (3.3%)**	**0 (0%)**	**1 (10%)**	**2 (4.5%)**
Independent	**22 (73.3%)**	**0 (0%)**	**1 (10%)**	**23 (52.3%)**
Total	**30 (100%)**	**4 (100%)**	**10 (100%)**	**44 (100%)**

From the table above, it can be observed that there is a difference in the dominant category of functional independence for each category of cognitive function. The majority of elders who have normal cognitive function is independent that is as much as 22 out of 30 elders with a percentage of 73.7%. For the elders that were classified as mild cognitive impairment, most of them is moderately dependent that is 3 out of 4 elders with a percentage of 75%. Totally dependent is the dominant category for elders that were categorized as dementia that is as much as 7 out of 10 elders with a percentage of 70%.

Table 4 The Description of Educational Background with Cognitive Function

Educational Background	Cognitive Function			Total
	Normal	Mild Cognitive Impairment	Dementia	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Low	**3 (10%)**	**0 (0%)**	**2 (20%)**	**5 (11.4%)**
Moderate	**6 (20%)**	**1 (25%)**	**3 (30%)**	**10 (22.7%)**
High	**21 (70%)**	**2 (50%)**	**5 (50%)**	**28 (63.6%)**
Unknown	**0 (0%)**	**1 (25%)**	**0 (0%)**	**1 (2.3%)**
Total	**30 (100%)**	**4 (100%)**	**10 (100%)**	**44 (100%)**

From the table above, it is shown that the majority of elders at Sasana Tresna Werdha RIA Pembangunan have a high educational background. For all the elders who have normal cognitive function, 21 out of 30 elders with a percentage of 70%, have a high educational background.

Table 5 The Description of Sleep Quality with Depression

Sleep Quality	Depression				Total
	Normal	Mild Depression	Moderate Depression	Severe Depression	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Good	**12 (41.4%)**	**1 (14.3%)**	**0 (0%)**	**0 (0%)**	**13 (29.5%)**
Poor	**17 (58.6%)**	**6 (85.7%)**	**4 (100%)**	**4 (100%)**	**31 (70.5%)**
Total	**29 (100%)**	**7 (100%)**	**4 (100%)**	**4 (100%)**	**44 (100%)**

From the table above, it is observed that all elders that have moderate to severe depression with a percentage of 100%, have poor sleep quality. For the elders that have mild depression, 6 out of 7 elders, with a percentage of 85.7%, have poor sleep quality. In the elder's population who have no depression, 12 out of 29 elders with a percentage of 41.4% have good sleep quality whereas, 17 out of 29 elders with a percentage of 58.6% have poor sleep quality.

DISCUSSION

In this research, it is found that the description of cognitive function of elderly in Sasana Tresna Werdha RIA Pembangunan Nursing Home is that 30 out of 44 elders with a percentage of 68.2% have a normal cognitive function, 4 out of 44 elders with a percentage of 9.1% is classified as mild cognitive impairment, and 10 out of 44 elders with a percentage of 22.7% is categorized as dementia. From this distribution we can observe that the majority of elders there have a normal cognitive function. On the other hand, the population of elders that were categorized as dementia are quite high too that is 10 out of 44 elders with a percentage of 22.7%. The description of sleep quality there was that the majority of elders have a poor sleep quality. 31 out 44 elders with a percentage of 70.5% have poor sleep quality whereas only 13 out of 44 elders with a percentage of 29.5% have good sleep quality.

Observation on the crosstab between sleep quality with cognitive function discovered that all the elder's population have a majority of poor sleep quality regardless of which category of cognitive function they are categorized. This is in line with the research that is done by Wulandari (2023) in Muara Kumpe, Jambi, that states that poor sleep quality is associated with cognitive function impairment(Wulandari et al., 2023). Another research is done by Utami (2023) in Pucang Gading, Semarang also stated something similar(Utami et al., 2023). Comparing to studies done in overseas, there is a study done to six middle income countries by Gildner (2014) which concludes the same result(Gildner et al., 2014).

Another observation is done to evaluate depression. It was found that the majority of elders there have not shown sign of depression that is as much as 29 out of 44 elders with a percentage of 65.9%. For the elders that have depression, the findings were 7 out of 44 elders with a percentage of 15.9% have mild depression, 4 out of 44 elders with a percentage of 9.1% have moderate depression, and 4 out of 44 elders with a percentage of 9.1% have severe depression.

Crosstab between depression and sleep quality are observed. All elders who have moderate to severe depression, have a poor sleep quality. This finding is in line with the research that was done by Illahiyah (2020) from University of Indonesia at West Jakarta(Siti Fatimah Nur Illahiyah, 2020). Othe studies from overseas also support this finding, such as the studies that was done by Joo (2022) in Korea(Joo et al., 2022), and the studies that was done by Hu (2020) in China(Hu et al., 2020). However, for the population of elders that were not categorized to have depression, most of them also have poor sleep quality. This finding is not in line with all of the studies above.

Observation of the educational background of the elders in Sasana Tresna Werdha RIA Pembangunan

shows an increasing trend. Low educational background shows the least elders to be categorized of that is as much as 5 out of 44 elders with a percentage of 11.4%. Next is elders with moderate educational background that is as much as 10 out of 44 elders with a percentage of 22.7% and the majority of elders there have a high educational background that is as much as 28 out of 44 elders with a percentage of 63.6%. 1 out of 44 elders with a percentage of 2.3% have unknown educational background.

A crosstab between educational background and cognitive function shows that out of all the elders that have high educational background which is 28 elders, 21 of them have normal cognitive function. If it is observed from another point of view, out of all the elders that have normal cognitive function, that is 30 elders, 21 of them with a percentage of 70% have a high educational background. For the population of elders that have dementia, the results are more evenly distributed. High educational background still is the majority category for the educational background of the dementia categorized elders that is as much as 5 out of 10 elders with a percentage of 50%. However, this finding is interpretated less significant compared to the first finding because of the small population of elders that have dementia which can cause significant change in result with only the difference in one or two elders. This finding is in line with a study done by Lenehan (2015) in Australia shows that there is positive relationship between a person's educational background and their cognitive function where a higher educational background tends to create more cognitive reserve which made the person more resistant to age related cognitive degeneration which can cause a decline in cognitive function(Lenehan et al., 2015).

An observation on the elder's functional independence was done and the results show that most of them are still independent that is as much as 23 out of 44 elders with a percentage of 52.3%. The elders that were mildly dependent were as much as 2 out of 44 with a percentage of 4.5%, the elders that were moderately dependent were as much as 11 out of 44 elders with a percentage of 15.9%, the elders that were severely dependent were as much as 2 out of 44 elders with a percentage of 4.5% and the elders that were totally depedent were as much as 10 elders with a percentage of 22.7%. Aside from the elders that were independent, it is also worthy to mention that there quite a significant number of elders that is totally dependent.

A crosstab between functional independence and cognitive function shows that most of the elders that have normal cognitive function, are independent that is as much as 22 out of 30 elders with a percentage of 73.3%. Along with the trend of this data, the majority of elders that have dementia were totally dependent that is as much as 7 out of 10 elders with a percentage of 70%. This is in line with few researches nationally such as one that is done by Azis (2024) in Padang, West Sumatra(Azis et al., 2024). There is another research that support this claim such as the one that is done by Sako (2024) in Manado(Sako et al., 2024). There is a study done overseas that is also in line with this finding. A systematic review done in Italy by Raimo (2024) stated that there is relationship or asscociation between a person's cognitive function and functional independence that is being measured as the ability to do

activities of daily living (ADL)(Raimo et al., 2024). However, a study done by Prakoso (2016) to post-stroke patients in Dr. Hasan Sadikin Hospital in Bandung, West Java state the opposite that there is no relationship that is significant between a person's cognitive function and their functional independence(Prakoso et al., 2016).

It can be summarized that in this research the description of the cognitive function, sleep quality, depression, educational background, and functional independence are shown above. Educational background and functional independence are 2 variables that have relation and association to cognitive function. The findings in this research are In line with previous studies. In contrast to that, sleep quality itself is also found from previous research that it has a positive association with cognitive function but the finding in this research shows the opposite. Studies in the past have shown that depression is positively associated with poor sleep quality and the results in this research are in line with previous researches however there are some incompatibilities in the data distribution that suggest some possibilities of the existence of another factor that are not being observed by the researcher that can have an influence on the sleep quality data's results and distribution.

CONCLUSION

This research's results show that the description of cognitive function of the elders at Sasana Tresna Werdha RIA Pembangunan is that out of 44 elders, 30 elders with a percentage of 68.2% have normal cognitive function, 4 elders with a percentage of 9.1% are categorized as mild cognitive impairment, and 10 elders with a percentage of 22.7% are categorized as dementia. The majority of elders there have normal cognitive function. The description of sleep quality there is that out of 44 elders, 13 with a percentage of 29.5% have good sleep quality and 31 with a percentage of 70.5% have poor sleep quality. The majority of elders there have poor sleep quality. The description of depression there is that out of 44 elders, 29 elders with a percentage of 65.9% are normal, 7 elders with a percentage of 15.9% have mild depression, 4 elders with a percentage of 9.1% have moderate depression, and 4 elders with a percentage of 9.1% have severe depression. The majority of elders there have no depression. The description of educational background there is that out of 44 elders, 5 elders with a percentage of 11.4% have low educational background, 10 elders with a percentage of 22.7% have moderate educational background, 28 elders with a percentage of 63.6% have high educational background, and 1 elder with a percentage of 2.3% have unknown educational background. The majority of elders there have high educational background. The description of functional independence there is that out of 44 elders, 10 elders with a percentage of 22.7% are totally dependent, 2 elders with a percentage of 4.5% are severely dependent, 7 elders with a percentage of 15.9% are moderately dependent, 2 elders with a percentage of 4.5% are mildly dependent, and 23 elders with a percentage of 52.3% are independent. The majority of elders there are independent functionally.

Future research can investigate more about the possible factors that can affect the sleep quality of the elderly at Sasana Tresna Werdha RIA Pembangunan as

the data distribution of the elder's sleep quality found on this research shows an irregularity which shows a tendency towards poor sleep quality. Researcher hope that the findings in this research can serve as as references for future analytical or interventional research that aims to improve the sleep quality of the elders there which ultimately will improve their quality of life.

REFERENCES

Aajami, Z., Kazazi, L., Toroski, M., Bahrami, M., & Borhaninejad, V. (2020). Relationship Between Depression And Cognitive Impairment Among Elderly: A Cross-Sectional Study. *Journal Of Caring Sciences*, *9*(3), 148–153. Https://Doi.Org/10.34172/Jcs.2020.022

Age. (2022, August 11). National Institutes Of Health (Nih). Https://Www.Nih.Gov/Nih-Style-Guide/Age

Ageing And Health. (N.D.). Retrieved April 3, 2024, From Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Ageing-And-Health

Azis, P. N. S., Afriwardi, A., & Liza, R. G. (2024). Hubungan Fungsi Kognitif Dengan Tingkat Kemandirian Lansia Di Wilayah Puskesmas Padang Kandis. *Sentri: Jurnal Riset Ilmiah*, *3*(4), Article 4. Https://Doi.Org/10.55681/Sentri.V3i4.2309

Casagrande, M., Forte, G., Favieri, F., & Corbo, I. (2022). Sleep Quality And Aging: A Systematic Review On Healthy Older People, Mild Cognitive Impairment And Alzheimer's Disease. *International Journal Of Environmental Research And Public Health*, *19*(14), 8457. Https://Doi.Org/10.3390/Ijerph19148457

Chen, G., Xu, T., Yan, Y., Zhou, Y., Jiang, Y., Melcher, K., & Xu, H. E. (2017). Amyloid Beta: Structure, Biology And Structure-Based Therapeutic Development. *Acta Pharmacologica Sinica*, *38*(9), 1205–1235. Https://Doi.Org/10.1038/Aps.2017.28

Cipriani, G., Danti, S., Picchi, L., Nuti, A., & Fiorino, M. D. (2020). Daily Functioning And Dementia. *Dementia & Neuropsychologia*, *14*(2), 93–102. Https://Doi.Org/10.1590/1980-57642020dn14-020001

Fields, R. D. (2020). The Brain Learns In Unexpected Ways. *Scientific American*, *322*(3), 74–79.

Fletcher, J., Topping, M., Zheng, F., & Lu, Q. (2021). The Effects Of Education On Cognition In Older Age: Evidence From Genotyped Siblings. *Social Science & Medicine (1982)*, *280*, 114044. Https://Doi.Org/10.1016/J.Socscimed.2021.114044

Gildner, T. E., Liebert, M. A., Kowal, P., Chatterji, S., & Snodgrass, J. J. (2014). Associations Between Sleep Duration, Sleep Quality, And Cognitive Test Performance Among Older Adults From Six Middle Income Countries: Results From The Study On Global Ageing And Adult Health (Sage). *Journal Of Clinical Sleep Medicine : Jcsm : Official Publication Of The American Academy Of Sleep Medicine*, *10*(6), 613–621. Https://Doi.Org/10.5664/Jcsm.3782

Gordon, N. P., Yao, J. H., Brickner, L. A., & Lo, J. C. (2022). Prevalence Of Sleep-Related Problems And Risks In A Community-Dwelling Older Adult Population: A Cross-Sectional Survey-Based Study. *Bmc Public Health*, *22*(1), 2045. Https://Doi.Org/10.1186/S12889-022-14443-8

Hamdy, R. C., Kinser, A., Dickerson, K., Kendall-Wilson, T., Depelteau, A., Copeland, R., & Whalen, K. (2018). Insomnia And Mild Cognitive Impairment. *Gerontology And Geriatric Medicine*, *4*, 2333721418778421. Https://Doi.Org/10.1177/2333721418778421

Hu, Z., Zhu, X., Kaminga, A. C., Zhu, T., Nie, Y., & Xu, H. (2020). Association Between Poor Sleep Quality And Depression Symptoms Among The Elderly In Nursing Homes In Hunan Province, China: A Cross-Sectional Study. *Bmj Open*, *10*(7), E036401. Https://Doi.Org/10.1136/Bmjopen-2019-036401

Indonesia, B. P. S. (N.D.). *Angka Harapan Hidup (Ahh) Menurut Provinsi Dan Jenis Kelamin—Tabel Statistik*. Retrieved April 3, 2024, From Https://Www.Bps.Go.Id/Id/Statistics-Table/2/Ntaxizi=/Angka-Harapan-Hidup-Laki-Laki--2022.Html

Joo, H. J., Kwon, K. A., Shin, J., Park, S., & Jang, S.-I. (2022). Association Between Sleep Quality And Depressive Symptoms. *Journal Of Affective Disorders*, *310*, 258–265. Https://Doi.Org/10.1016/J.Jad.2022.05.004

Kiely, K. M. (2014). Cognitive Function. In A. C. Michalos (Ed.), *Encyclopedia Of Quality Of Life And Well-Being Research* (Pp. 974–978). Springer Netherlands. Https://Doi.Org/10.1007/978-94-007-0753-5_426

Lenehan, M., Summers, M., Saunders, N., Summers, J., & Vickers, J. (2015). Relationship Between Education And Age-Related Cognitive Decline: A Review Of Recent Research. *Psychogeriatrics : The Official Journal Of The Japanese Psychogeriatric Society*, *15*, 154–162. Https://Doi.Org/10.1111/Psyg.12083

Mather, M. (2020). How Do Cognitively Stimulating Activities Affect Cognition And The Brain Throughout Life? *Psychological Science In The Public Interest : A Journal Of The American Psychological Society*, *21*(1), 1–5. Https://Doi.Org/10.1177/1529100620941808

Prakoso, K., Vitriana, V., & Ong, A. (2016). Correlation Between Cognitive Functions And Activity Of Daily Living Among Post-Stroke Patients. *Althea Medical Journal*, *3*(3), Article 3.

Raimo, S., Maggi, G., Ilardi, C. R., Cavallo, N. D., Torchia, V., Pilgrom, M. A., Cropano, M., Roldán-Tapia, M. D., & Santangelo, G. (2024). The Relation Between Cognitive Functioning And Activities Of Daily Living In Normal Aging, Mild Cognitive Impairment, And Dementia: A Meta-Analysis. *Neurological Sciences: Official Journal Of The Italian Neurological Society And Of The Italian Society Of Clinical*

Neurophysiology, *45*(6), 2427–2443. Https://Doi.Org/10.1007/S10072-024-07366-2

Sako, Y., Rantiasa, I. M., & Dwisetyo, B. (2024). Hubungan Fungsi Kognitif Dengan Tingkat Kemandirian Activity Of Daily Living (Adl) Pada Lansia Dikelurahan Singkil 1 Lingkungan 6 Kota Manado. *Obat: Jurnal Riset Ilmu Farmasi Dan Kesehatan*, *2*(1), 63–72. Https://Doi.Org/10.61132/Obat.V2i1.79

Sekhon, S., & Marwaha, R. (2024). Depressive Cognitive Disorders. In *Statpearls*. Statpearls Publishing. Http://Www.Ncbi.Nlm.Nih.Gov/Books/Nbk559256/

Siti Fatimah Nur Illahiyah, A. (2020). *Hubungan Depresi Dengan Kualitas Tidur Pada Lansia Di Panti Sosial Tresna Werdha Budi Mulia 4 Cengkareng, Jakarta Barat = The Relationship Between Depression And Sleep Quality Among Elderly At Panti Sosial Tresna Werdha Budi Mulia 4 Cengkareng, Jakarta Barat*. Universitas Indonesia Library; Fakultas Hukum Universitas Indonesia. Https://Lib.Ui.Ac.Id

Sonmez, I., & Karasel, S. (2019). Poor Sleep Quality I Related To Impaired Functional Status Following Stroke. *Journal Of Stroke And Cerebrovascular Diseases: The Official Journal Of National Stroke Association*, *28*(11), 104349. Https://Doi.Org/10.1016/J.Jstrokecerebrovasdis.2019.104349

Utami, A. Y., Rosdiana, I., & Soffan, M. (2023). Korelasi Kualitas Tidur Dengan Fungsi Kognitif Pada Lanjut Usia Studi Observasional Analitik Di Panti Wredha Pucang Gading Semarang. *Jurnal Ilmiah Sultan Agung*, *2*(1), Article 1.

Wennberg, A. M. V., Wu, M. N., Rosenberg, P. B., & Spira, A. P. (2017). Sleep Disturbance, Cognitive Decline, And Dementia: A Review. *Seminars In Neurology*, *37*(4), 395–406. Https://Doi.Org/10.1055/S-0037-1604351

Wulandari, E., Nasution, R. A., & Sari, Y. I. P. (2023). Hubungan Kualitas Tidur Dengan Fungsi Kognitif Lansia Di Puskesmas Muara Kumpe. *Jurnal Ilmiah Ners Indonesia*, *4*(1), Article 1. Https://Doi.Org/10.22437/Jini.V4i1.25253