The Relationship Between Brain Tumor And Sleep Components (Psqi) In Siloam Hospitals Lippo Village 2015-2018

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Citation : Uranus HC, July J. The Relationship Between Brain Tumor And Sleep Components (Psqi) In Siloam Hospitals Lippo Village 2015-2018
Medicinus. 2018 October; 7(4):103–107.
Keywords : Brain tumor, PSQI, Sleep components, Sleep quality.
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Online First : March 2020

Abstract

Introduction: Brain tumor can cause symptoms such as headache and seizure which might reduce sleep quality. Currently, sleep quality in brain tumor patients aren't getting much attention. This study's purpose is to determine the effect of brain tumor to sleep quality and its components in patients.

Methods: The design of this study is a retrospective cohort, and it is done in Siloam Hospitals Lippo Village and Paviliun Umum Rumah Sakit Siloam from January-April 2019 with sample population consisting of brain tumor patients from age 19 until 59 years old. The sample amount is 29 subjects. PSQI is used to assess sleep quality and components. Data analysis uses the SPSS version 24.0 software and statistical analysis using chi^2.

Result: Brain tumor patients have worse sleep quality compared to the control, with 26 patients (89.7 %) having bad sleep quality. For the control, there are only 18 people (62.1%) who have bad sleep quality. The relationship between brain tumor and sleep quality have a p value of 0.032 and relative risk (RR) of 3,7. Brain tumor has a significant relationship with sleep latency (p value 0,015) and daytime dysfunction (p value 0,02)

Conclusion: The relationship between brain tumor and sleep quality in brain tumor patients of Siloam Hospitals Lippo Village and Paviliun Umum Rumah Sakit Siloam, which was measured with the PSQI questionnaire is significant. Brain tumor also has a significant relation with sleep latency and daily dysfunction.

Introduction

Brain tumor is an uncontrolled growth of cells from within the brain (primary brain tumor) or arise from cells outside the brain (metastatic tumor). Primary tumors consist of glial which arise from glial cells and non-glial which can arise from nerves, blood vessels, or glands.[1] Brain tumor can cause symptoms such as headache and seizure which can decrease sleep quality.[2] Sleep quality in brain tumor patients is generally not noticed even though sleep disturbance is reported in 17-54 % of Brain tumor patients.[3] According to the *Central Brain Tumor Registry of The United States* (CBTRUS), Brain tumor in The United States has an incidence rate of 57.3 in every 100000 people per year.[4] A Systematic review and meta analysis found that Brain tumor worldwide has an incidence rate of 10.82 in every 100000 people per year.[5]

There are only a few studies that have researched about the relationship between brain tumor and sleep. One study found that glioma has a relationship with insomnia, which is affected by many factors.[6]

Another study found that sleep disturbance is a common occurrence in primary brain tumor patients, especially those undergoing radiotherapy.[7]
The guideline for Brain tumor Care which is published by the Health Ministry in Indonesia doesn't have a part that discusses about sleep in Brain tumor patients, so it can be inferred that it is also not noticed much in Indonesia.[8]

Information about sleep quality in Brain tumor patients in Indonesia is needed because Indonesia have factors such as race and culture that separates it from other countries. There are also some studies which determined that Indonesian people have less sleep disturbance compared to another Asian country such as Bangladesh[9] and that there are fewer people with longer sleep duration and bad sleep quality in southeast Asia compared to other regions such as the middle east, central Asia and Latin America.[10] The amount of attention to sleep in brain tumor patients is concerning, because sleep quality is very important for a good prognosis which is why research about this topic is needed.

Methods

This study was a retrospectional cohort.The subjects are brain tumor patients aged 19-59 years old from Siloam Hospitals Lippo Village and Paviliun Umum Rumah Sakit Siloam in January-April 2019. The control group were subjects aged 19-59 years old without a brain tumor. Sleep quality and sleep components are determined using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The PSQI consists of 19 self-rated questions and five questions rated by the bedpartner or roommate. These I9 items are grouped into seven component scores, each weighted equally on a 0-3 scale. The seven component scores are then summed to yield a global PSQI score.

The PSQI global score below 5 is defined as good sleep quality while PSQI global score of 5 and above are defined as poor sleep quality. Subjective Sleep quality habitual sleep efficiency is defined by a score of 0-1 (good) and 2-3 (poor). Habitual sleep efficiency is defined by a score of 0-1 (≥ 85%) and 2-3 (< 85%). Sleep disturbance and daytime dysfunction is defined by a score of 0 (none), 1 (mild), 2 (intermediate), and 3 (severe). Sleep latency is defined by a score of 0 (none), 1 (seldom), 2 (sometimes), and 3 (often). Sleep duration is defined by a score of 0 (>7 hours) and 1-3 (≤7 hours). Use of sleep medication is not included in this study.

Inclusion criteria is patients aged 19-59 years old and diagnosed with brain tumor. Subjects with obesity, caffeine consumption 6 hours before sleep, pregnancy, use of sleep medication and alcohol consumption were excluded. There were 58 subjects in this study with 29 brain tumor patients and 29 subjects in the control group. Chi^2 was used to determine p value and relative risk between the variables.

Result

Table 1. Analysis of Relationship between Brain tumor and Sleep Component

Sleep Components		Brain Tumor (n)	Control Group (n)	P Value	Relative Risk (RR)	CI (95%)
Sleep Quality	Good	3	11	0.032	3.7	1.14-11.793
	Poor	26	18			
Subjective Sleep Quality	Good	17	21	0.4	1.5	0,72-3,12
	Poor	12	8			
Sleep Duration	>7 hours	10	10	1	1	0,68-1,45
	≤7 hours	19	19			
Sleep Latency	Sometimes/often	12	3	0.015	4	1.25-12.7
	None/seldom	17	26			
Habitual Sleep Efficiency	≥ 85%	27	29	0.97	2.07	0,2-21,6
	< 85%	2	0			
Sleep Disturbance	Intermediate-severe	4	0	0.32	4.1	0.5-34.9
	None-mild	25	29			
Daytime dysfunction	Severe	12	3	0.02	4	1.67-9.63
	Intermediate	10	15			
	Mild	6	6			
	None	1	5			

Analysis using SPSS version 24.0 found that the relationship between brain tumor and sleep quality has a p value of 0,032 which is significant, with a relative risk of 3.7 which means that a brain tumor patient is 3.7 times more likely to have poor sleep quality. The relationship between brain tumor and sleep latency has a p value of 0.015 which is significant, with a relative risk of 4 so a brain tumor patient is 4 times more likely to have sleep latency. Relationship of brain tumor and daytime dysfunction has a p value of 0.02 which is significant, with a relative risk of 4 so a brain tumor patient is 4 times more likely to have daytime dysfunction. Analysis of the relationship between brain tumor and sleep components subjective sleep quality, sleep duration, habitual sleep efficiency, and sleep disturbance has a p value above 0.05 so they are not significant.

Discussion

Analysis of the relationship between brain tumor and sleep quality has a p value 0.032 which is significant. With a relative risk of 3.7, this means that a brain tumor patient is 3.7 times more likely to have poor sleep quality. This finding is also found in studies done by Leistner *et al* (2015) and Pickering *et al* (2014) where they also found that brain tumor patients have worse sleep quality compared to the control group using PSQI.[11-12] Sleep latency is another component that has a significant relationship with brain tumor, having a p value of 0.015 and relative risk of 4. Sleep latency is defined as the amount of time it takes from when the lights are turned off and someone falling asleep.[13] Having more sleep latency might explain why brain tumor patients have worse sleep quality compared to normal people.

The result of having can be seen in brain tumor patients having more daytime dysfunction. Analysis of the relationship is significant with a p value of 0.02 and relative risk of 4 so brain tumor patients are more likely to be sleepy during the day which affects their daily activities and performance at work. Even though sleep quality is significant in relation to brain tumor, subjective sleep quality assessed by PSQI is not significant, which might be affected by this study being a retrospective cohort so the subjects may not have good memory of it.

Sleep quality, sleep latency and daytime dysfunction having a significant relationship with brain tumor is an indication that this is a problem that brain tumor patients experience, and should be an aspect that is noticed more in caring for them.

Other studies have already concluded the relationship between poor sleep and chronic illnesses such as a study done by Kristen *et al* (2006) that poor sleep quality increases the risk of having Diabetes Mellitus type 2,[14] while Nagai *et al* (2010) found that shorter sleep duration is a risk factor for hypertension and coronary heart disease.[15] So having a good sleep quality is important for preventing those diseases. For brain tumor patients having good sleep quality might be important to prevent the disease from getting worse and having a better sleep quality, as good sleep quality has an impact in creating better quality of life.[16]

In a study done by Mark *et al* (2015), it is stated that sleep has a bidirectional relation with the immune system where sleep deficiency can cause inflammation, while an immune response itself can also affect someone's sleep. This is important because it explains why sleep can increase the risk of having cancer, where it is found that sleeping in the afternoon can reduce the risk of having cancer.[17] This also applies in brain tumor where Terri *et al* (2016) found that sleep disturbance is directly connected with worse symptoms for the patient.[3]

In treatment it is important to consider the patient's sleep quality in order to pursue a better response to the treatment. But, in brain tumor it isn't so simple as some treatments for brain tumor can negatively impact their sleep quality. Hong *et al* (2014) found that chemotherapy can cause peripheral nerve damage which causes symptoms that can affect sleep. When someone already has damage to their peripheral nerves a doctor can consider reducing the dose, changing the drug or even stopping the chemotherapy.[18] But, this can't always be done as chemotherapy is an important part of treatment for the patient. Terri *et al* (2016) found that radiotherapy can cause sleep disturbance[3], and Sejal *et al* (2013) also found that antiepileptic drugs could also affect someone's sleep.[19] So, preserving someone's sleep quality in brain tumor treatment is not easy but it is something important to consider.

Conclusion

Brain tumor has a significant relation with poor sleep quality, sleep latency and daytime dysfunction. Sleep quality is still seldom considered in the treatment of brain tumor, which is a problem. This study can hopefully raise more awareness to the subject in treating brain tumor.

Acknowledgement

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Conflict Of Interest

None

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