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Relationship between sleep quality and study concentration in Post-COVID-19 patients in Malang Raya

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ABSTRACT

Background: Long Coronavirus disease 2019 (COVID-19), also known as post-acute COVID-19 and Post-COVID-19 syndrome, is characterized by signs and symptoms that occur after the acute phase of COVID-19. Long COVID-19 is found in many COVID-19 survivors. Long COVID-19 patients report a wide range of signs and symptoms. They ranged from respiratory disorders to cognitive disorders. During sleep, serum serotonin is released from special cells in the pons and midbrain stem. Serotonin in the brain is believed to provide a sense of calm and have a sleeping effect. Serotonin improves sleep quality and concentration, increasing energy, creating a better mood, and reducing anxiety.

Methods: Analytic observational with cross-sectional data. This study's population comprised 49 respondents who were post-COVID-19 patients living in Malang Raya. Data was collected using the Pittsburgh sleep quality index (PSQI) questionnaire to assess sleep quality and the learning concentration questionnaire to assess learning concentration.

Results: A *p*-value of 0.029 showed a significant association between sleep quality and learning concentration. Furthermore, with a score of 0.312, the link between sleep quality and learning concentration is weak.

Conclusions: This study finds that there is a link between sleep quality and learning concentration in post-COVID-19 patients, implying that sleep quality has a significant impact on the occurrence of learning concentration abnormalities.

Keywords: post-COVID-19, sleep quality, study concentration,

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INTRODUCTION

A moderate coronavirus disease 19 (COVID-19) outbreak struck the world in 2019. COVID-19 is the most recent infectious disease to spread over the world. COVID-19 is the etiological agent of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 is distinct from SARS-CoV. However, it shares host receptors: human angiotensin converter 2 (ACE2) enzymes.[1,2] According to the World Health Organization (WHO) and Public Health Emergencies of Concern International (PHEIC), SARS-CoV-2 was detected in 2019 in Wuhan, China, and spread internationally, leading to a pandemic 2019-2020.[3]

The epidemic began in Asia but swiftly spread worldwide; according to WHO, this is the first coronavirus pandemic. Shortness of breath, dry cough, fever, and exhaustion are common symptoms in COVID-19 patients. COVID-19 has spread over the world to the point where WHO declared a pandemic on March 11, 2020.[4]

Long COVID, also known as post-acute COVID, Post-COVID-19, and Post-COVID-19 syndrome, is a set of signs and symptoms following the acute phase of COVID-19. Long COVID was found in many COVID-19 survivors. Long COVID patients report a wide range of signs and symptoms. Starting with respiratory issues and progressing to cognitive impairments.[5] Long-COVID is present in 25.24% of children and adolescents. Mood symptoms (16.50%), exhaustion (9.66%), sleep problems (8.42%), headaches (7.84%), and respiratory symptoms (7.62%) were the top five clinical manifestations. Cognitive (e.g., difficulty concentrating, learning, confusion, and memory loss) (6.27%).[6]

Between February 1 and August 31, 2020, researchers followed 106 patients from three regional hospitals in Hong Kong for six months. COVID-19 patients after three and six months, respectively. At six months, the most prevalent symptom was difficulty sleeping (20.8%). At six months, there were no significant changes in age, gender, comorbidities, antibiotic use, antiviral drug use, or severity of COVID-19 in patients with or without PACS.[7]

Another meta-analysis by Deng (2020), which included 31 studies and showed that 47% of COVID-19 patients had anxiety and 34% experienced sleep disturbances, found that 47% of COVID-19 patients experienced anxiety and 34%

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had professional sleep problems.[8] Previous research has found that psychological responses, including anxiety and excessive sleep disturbances, might interfere with patient's daily activities, compromising their physical health and outcomes.[9,10]

Sleep is a physiological human need characterized by a decline or loss of perception and reactivity to the environment. Decreased sleep quality is marked by excessive drowsiness, weakness, and difficulty concentrating on learning, closely related to academic achievement results. Among the functions of sleep, where sleep is believed to allow the body to repair itself, affect balance the hormones in the body, restore and rest physical activity after daily activities, reduce stress and improve anxiety-damaged body cells, save energy, and improve immunity, improve the ability to concentrate when doing everyday activities.[11]

This study was conducted to determine the correlation between sleep quality and study concentration in post covid-19 patients based on the problems, the presentation of preliminary study results, and the lack of research on the relationship between sleep quality and study concentration in post covid-19 patients in Malang Raya.

METHODS

An analytic observational cross-sectional design was adopted in this study. This study was done online in January 2023 using Google Forms. This study's population consisted of post-COVID-19 patients from Malang Raya. Purposive sampling was utilized in this investigation, with inclusion and exclusion criteria set. Forty-nine respondents gathered the number of samples. The Pittsburgh sleep quality index (PSQI) questionnaire was utilized to collect data, and the learning concentration questionnaire was employed to determine the amount of learning concentration. The data was then processed and analyzed using the SPSS 20 computer program with the *Shapiro-Wilk* and *Spearman Rho* correlation tests.

RESULTS

Age, gender, occupation, sleep quality level, and study concentration were the characteristics of the respondents observed in this study. According to Table 1, the majority of responders, up to 86%, are between the ages of 21 and 59. The most gender was male, up to 51%, for work dominated by students, up to 96%. The level of poor sleep quality was the most dominant level of sleep quality, up to 41%, and the concentration of learning most agreed, up to 39%.

Table 2 indicates significant results p=0.029 and r=0.312, suggesting a relationship between sleep quality and learning concentration. Furthermore, with a score of 0.312, the link between sleep quality and learning concentration is weak.

DISCUSSION

People discovered the virus was dreadful in early 2020. COVID-19 duration is harmful to health. Even people's lives worldwide generate modifications in the typical human existence. These alterations impacted human mental health since they had to deal with the consequences of the virus's losses. The findings suggest that there are mental health issues in society, such as panic buying, anxiety, stress, fear, despair, toxic masculinity, drugs and alcohol, psychosomatic diseases, and so on.[12]

Female gender has been identified as a potential risk factor for post-COVID-19 syndrome in studies. This is supported by differences in immunological responses between men and women, psychosocial stress, and the belief that women prioritize their health. Sleep is a basic physiological human requirement in which perception and reactivity to the environment are reduced, but it is still sufficient. Everyone requires adequate sleep for the body to function normally. Excessive tiredness, weakness, and difficulty concentrating on learning are all symptoms of poor sleep quality.[13] Sleeplessness is also widely observed following covid-19 recovery. Several studies have found that poor sleep quality and sleep disruptions are prevalent after recovering from an acute illness.[14,15]

Research conducted by Crook et al. (2021) states that insomnia occurs in many patients recovering from COVID-19, where a person has difficulty starting or maintaining sleep, called Coronasomnia. Coronasomnia can arise with stress and anxiety related to the COVID-19 pandemic and disease.[16] During sleep, serum serotonin is retained from special cells in the pons and midbrain stem. Serotonin in the brain is believed to provide a sense of calm and have a sleeping effect. Serotonin improves sleep quality and concentration, increases energy, improves moods, and reduces anxiety. When someone is sleep deprived, holding serotonin is disrupted, reducing attention and energy, and lowering mood.[17]

The focus of attention in altering behavior represented in mastery, usage, and assessment of or about attitudes and values, knowledge, and basic measures discovered in numerous disciplines of study is learning concentration. Also, learning concentration can be interpreted as an ability to a sense of attention that is closely related to memory

Table 1. Characteristics of post-COVID-19 patient respondents

Characteristics	Frequency (n)	Percentage (%)
Age		
<20	7	14%
>21-59	42	86%
Gender		
Men	25	51%
Women	24	49%
Work		
Student	2	4%
College Student	47	96%
Sleep quality level		
Never	18	37%
Pretty good	8	16%
Bad	20	41%
Very bad	3	6%
Learning concentration level		
Strongly Agree	4	8%
Agree	19	39%
Don't agree	9	18%
Disagree	17	35%

Table 2. The relationship between sleep quality and study concentration in Malang Raya post-COVID-19 patients

Variable	Frequency	*P*-value	*R*
Quality of sleep level	49	0.029	0.312
Study Concentration	49	0.029	0.312

and is helpful in the learning process.[7]

Based on age and its relationship with concentration levels in Post COVID-19 patients. This aligns with research conducted by Asadi et al. (2021). COVID-19 can harm the brain in a variety of ways. On the other hand, other long-term effects of COVID-19 on the brain may be more modest; for example, chronic problems in attention or continuing cognition. Brain fog is a broad word for feeling intellectually sluggish, hazy, or abandoned. It impairs one's capacity to think or focus. As doctors, we have heard from numerous COVID-19 survivors who have had "brain fog" after recovering from the disease. This was notably true for those above 18 with brain fog (194;7.2%).[18,19]

Coronaviruses, including SARS-CoV-2, can enter the central nervous system (CNS) through hematogenous or neuronal retrograde neuro-invasive pathways.[20] The mode of entrance and subsequent CNS infection may explain the increased incidence of neuro-inflammation found in covid-19 patients. They may have long-term negative consequences, with previous research linking viral infections and persistent neuro-inflammation to neurodegenerative and mental problems.[21]

The state of sleep can enter a state of rest, and at that moment, the awareness of nature stops so that the body can rest. The brain has several functional structures and a sleep center that regulates sleep and wake cycles. At the same time, the body produces substances that, when released into the bloodstream, make a person restless. Suppose a person experiences a sleep disorder where a person experiences pauses in breathing or loses their breath during sleep, which affects oxygen levels in the blood or movement of limbs. In that case, it can interfere with a person's sleep.[5]

Young adults who experience obstacles in the learning process are caused by anxiety and fatigue due to lack of sleep, so their concentration in learning decreases. This needs serious attention because sleep deprivation can affect learning processes, impaired memory, and emotional health.[22] Poor sleep quality has negative consequences, such as headaches and difficulties concentrating; sleep deprivation can impair the body's metabolism. Sleep, as we all know, is a process of cell recovery. If this process is hampered, the body's cell regeneration will suffer. As a result, the body weakens and becomes more prone to disease.[16]

This study's weakness. First, consider the limited sample size. A multicenter investigation with a bigger sample size is required to confirm our findings. Second, because this was a cross-sectional survey, We could not see the disturbance in the patient's sleep quality level dynamically, making it difficult to investigate the causal relationship between the variables. Researchers hope to examine the severity of sleep disturbance and learning concentration in post-COVID-19 patients.

CONCLUSIONS

This study finds that there is a link between sleep quality and learning concentration in post-COVID-19 patients, implying that sleep quality has a significant impact on the occurrence of learning concentration abnormalities.

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CONFLICT OF INTEREST

In this study, the author reports no conflicts of interest.

ETHICAL CONSIDERATION

Before we started the study, the authors asked for permission and then got approval for the sample information to be provided.

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THE AUTHOR'S CONTRIBUTION

DNP designed the project, collected and analyzed data, and wrote the publications. AM and NAR interpret the data, conduct the research, and write the manuscript.

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