

## THE RELATIONSHIP BETWEEN STRESS AND THE SLEEP QUALITY OF HEALTH WORKERS DURING THE COVID 19 PANDEMIC

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### ABSTRACT

*Psychological stress is the body's way to cope with stressors. We are not able to evade stressors. In fact, we need stressors to keep ourselves going. So stress to an extent is a good thing. It is harmful when it becomes a distress, in which it starts to affect our bodily function, including our sleep quality. Psychological stress will activate the body's HPA-axis and the sympathetic pathway of the autonomic nervous system, releasing hormones such as Cortisol and Catecholamine. These hormones can cause the disturbance of sleep. The aim of this study is to find the relation between the level of stress and the sleep quality in healthcare workers during the COVID-19 pandemic. PSS (Perceived Stress Scale) was used to calculate the level of stress and PSQI (Pittsburgh Sleep Quality Index) was used to calculate sleep quality. In this study we found that the level of stress is related to sleep quality in healthcare workers during the COVID-19 pandemic. The relation is positive, significant ( $P = 0.002$ ), and moderate ( $r = 0.4$ ). To conclude, there is a relation between stress and sleep in healthcare workers during the COVID-19 pandemic.*

**Keywords:** psychological stress, stressors, sleep quality, HPA-axis, sympathetic nervous system, cortisol, catecholamine.

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## INTRODUCTION

The average population of the world in 2020 experienced moderate stress<sup>1</sup>. Stress is the body's way to cope with demands from the outside environment or stressors, which is good to an extent. Passing that threshold, eustress or good stress becomes distress (also known as pathological stress), which can affect the body's normal function<sup>2</sup>, including sleep.

The quality of sleep is seen from the initiation of sleep, the maintenance of sleep, the quantity of sleep, and the feeling of refreshed during the time of wake<sup>3</sup>. The relationship between the two is in the HPA-axis or the Hypothalamic-pituitary-adrenocortical axis, which produces the hormone Cortisol as a response to psychological stress, and the sympathetic nervous system which produces Catecholamines. Both Cortisol and Catecholamines (which includes Epinephrine and Norepinephrine) can cause the disturbance of sleep by affecting the circadian rhythm and give rise to the body's "fight or flight" response<sup>4</sup>.

During the COVID-19 pandemic, it was found that 30% of people in China have poor sleep quality<sup>5</sup>. It was also found that those who work as healthcare workers have worse quality of sleep compared to non-healthcare workers<sup>6</sup>. Healthcare workers also experienced mental health problems relating to the pandemic, including stress<sup>7</sup>. Based on these previous researches, the COVID-19 pandemic has shown effects on both the level of stress and the quality of sleep in healthcare workers.

This research's aim is to find the relation between the level of stress and sleep quality of healthcare workers during the COVID-19 pandemic in Baptis Kediri Hospital in Jawa Timur, Indonesia.

## METHODS

This is a correlational research, which includes the level of stress as the independent variable and quality of sleep as the dependent variable. PSS (Perceived Stress Scale) was used to measure the level

of stress. PSS measures psychological stress subjectively, which means it measures stress based on the person's own perspective. Then PSQI (Pittsburgh Sleep Quality Index) was used to measure sleep quality. To find the relationship between stress and sleep, we used Spearman Correlation test on SPSS.

Besides the stress level and sleep quality, we also collected socio-demographic data which include age, gender, marital and parental status, and occupation (doctor, nurse, midwife, radiographer, laboratory analyst, physiotherapist, pharmacist, nutritionist/dietician, and medical record workers). We also collected the weight, height, and comorbidities of the respondent to determine the exclusion criteria, which are: a BMI (body mass index) above 25 and any history of comorbidities. Then to measure the relation between age, gender, marital status, and parental status with stress and sleep, we used Chi-Square.

This research was held from July 9<sup>th</sup> to 30<sup>th</sup> 2021. Information for Consent and Informed Consent were sent to the participants and collected online through the application "JotForm". The socio-demographic, PSS, and PSQI data were collected through "Google Form". The whole of this research was done online due to the COVID-19 policy.

## RESULTS

A total of 105 healthcare workers responded to this research. Based on the exclusion criteria, only 58 healthcare workers are eligible to contribute in this research. Participants with BMI value above 25 was excluded because it was found that higher BMI affect the duration of sleep. It was also found that the number of comorbidities affect both duration of sleep and the overall quality of sleep<sup>8</sup>.

The age of the participants range from 20 to 60 years. The majority of participants in this research are females. Then 60% of the participants are married

and 55.2% does not have children. Most of the participants are nurses (55.2%).

**Table 1** Socio-demographic characteristics of the participants

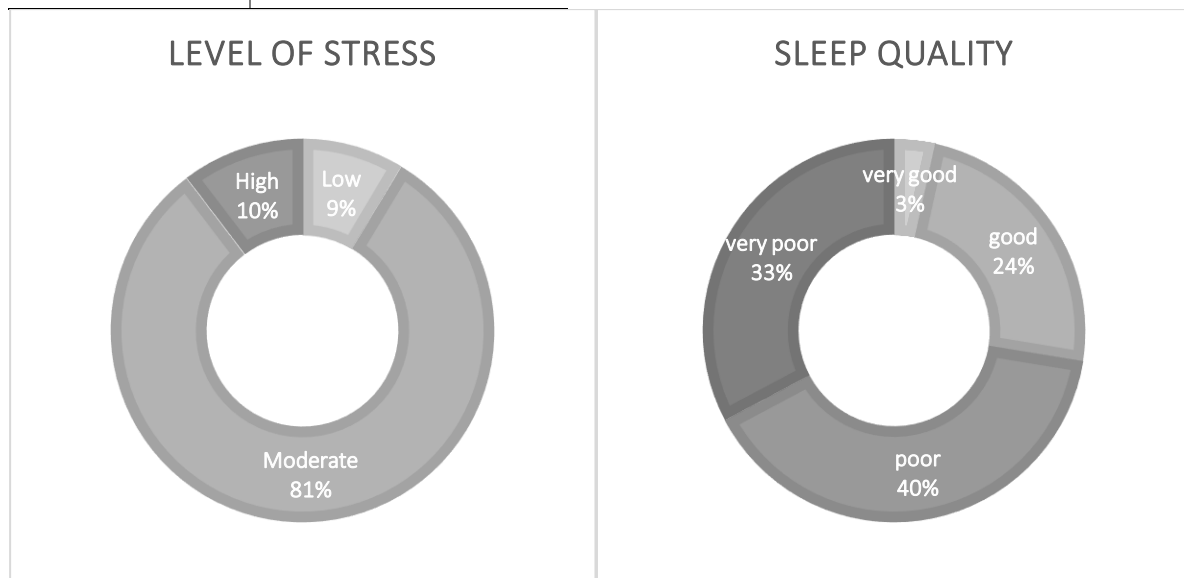
	frequency	percentage
Gender		
Female	43	74.1%
Male	15	25.9%
Marital Status		
Married	35	60.3%
Single	23	39.7%
Parental Status		
Doesn't have children	26	44.8%
Has children	32	55.2%
Occupation		
Doctor	8	13.8%
Nurse	32	55.2%
Midwife	4	6.9%

Laboratory Analyst	3	5.2%
Pharmacist	3	5.2%
Dietician/ Nutritionist	1	1.7%
Radiographer	3	5.2%
Physiotherapist	2	3.4%
Medical Record Workers	2	3.4%

This research also found that there are no significant relation between gender, marital status, and parental status to both level of stress and sleep quality.

**Table 2** Relation between gender, marital status, and parental status to stress and sleep quality

	Level of stress	Sleep quality
Gender	$P = 0.17$	$P = 0.52$
Marital status	$P = 0.26$	$P = 0.45$
Parental status	$P = 0.67$	$P = 0.37$



**Fig. 1** PSS and PSQI results

This research found that 81% of the healthcare workers experience moderate stress, with the average PSS score of 20.5. Then 40% of the healthcare workers have bad sleep quality, with the average PSQI score of 7.2. The Spearman's Correlation test between PSS and PSQI found that there is a significant, positive, and moderate relation between the level of stress and sleep.

**Table 3** Average score of PSS and PSQI, and the correlation coefficient and *P*-value between PSS and PSQI

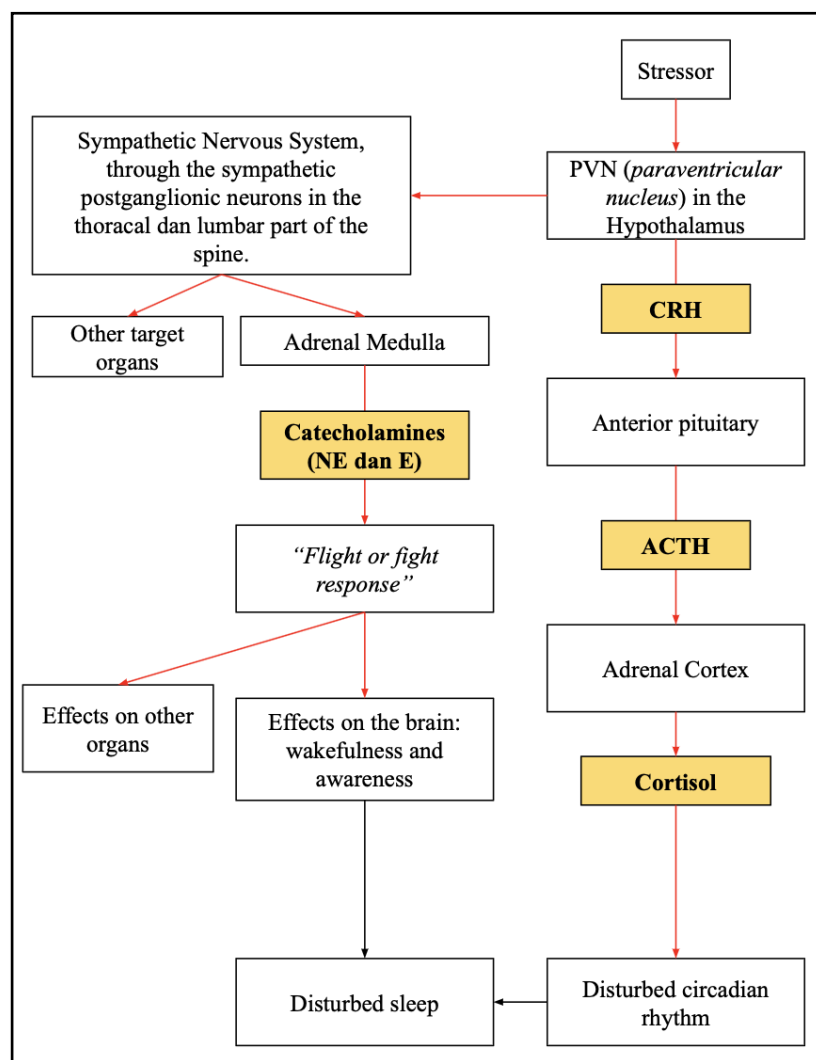
Variable	Average score	PSS
PSQI	7.2	$r = 0.4$ $P = 0.002$
PSS	20.5	

**DISCUSSION**

This research examines the relation between the level of stress and sleep quality among healthcare workers in Baptis Kediri Hospital, using the PSS and the PSQI questionnaire. The average score of PSS is 20.5, which indicates moderate stress. Then the average score of PSQI is 7.2, which indicates poor sleep quality. Then the relationship between the two was found to be positive, moderate, and significant. This result is different from the previous study which found that there is a positive, weak, and insignificant relation between the level of stress and sleep<sup>9</sup>. How stress caused the release of Cortisol and Catecholamines, and

their role in disturbing sleep are shown in Figure 2.

This research also found that there are no significant relation between the level of stress and sleep quality with gender. These results differ from the previous researches that found that women have lower sleep quality and higher level of stress<sup>1,8,9</sup>. This research also found that there are no significant relation between the level of stress and sleep quality and marital status, which is supported by the previous research<sup>1</sup>. It was also found that both level of stress and sleep quality is not related to parental status, whereas the previous study found that parents have higher stress level compared to before the pandemic<sup>10</sup>.



**Fig. 2** How stressors affect sleep

### **Conclusions and Suggestions**

There is a positive, moderate, and significant relation between the level of stress and sleep quality of healthcare workers in Baptis Kediri Hospital during the COVID-19 pandemic.

We suggest for healthcare workers to do stress management and to develop a good sleeping habit. For further research, we suggest to do a comparison between the level of stress and sleep quality during and after the pandemic. We also suggest to take a more even number of respondent from both gender, to include physical activity as a measured variable, and to measure sleep quality directly through face to face meetings with the respondents, in order to lessen the excluded participants due to invalid answers of the PSQI questionnaire.

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