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NURSES' SLEEP QUALITY AND QUALITY OF LIFE DURING THE COVID-19 PANDEMIC: ANALYSIS OF CORRELATION AND DIFFERENCES IN THE RAJAWALI ISOLATION AND NON-ISOLATION WARDS

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ABSTRACT

Background: Nurses are one of the first-line fighters who treat Coronavirus disease 2019 (COVID-19) patients. They are prone to stress, anxiety, and sleep disturbances that can interfere with nurses providing medical services. Although some clinical research has established sleep quality and quality of life, the comparisons of sleep quality, quality of life, and each domain of quality of life for nurses who work in isolation and non-isolation wards are not well known. **Objective:** This study examines the relationship between sleep quality and quality of life, differences in sleep quality and quality of life of nurses in isolation and non-isolation wards for COVID-19. **Methods:** This quantitative study uses a cross-sectional approach. 51 nurses who worked in the Rajawali wards in the isolation and non-isolation wards for COVID-19 at Dr. Kariadi Semarang were included by the consecutive sampling method. The instrument used are The PSQI and The WHOQOL-BREF Indonesian versions. Bivariate analysis was analyzed using the Spearman test. **Results:** There was 1 nurse with a bad perception of quality of life. There was a correlation between sleep quality and the quality of life of nurses ($p=0.020, r=-0.325$). There was a difference between the sleep quality of nurses who worked in isolation and non-isolation wards ($p=0.03$). There was no difference between the quality of life of nurses who worked in isolation and non-isolation wards ($p=0.698$). **Conclusion:** Periodic screening is needed and the implementation of policies from hospitals for the welfare of health workers that in any unit they work, work rhythms related to sleep quality, quality of life, and feelings of anxiety subjective needs to be managed properly.

Keywords: COVID-19, nurse, quality of life, sleep quality

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) originated in Wuhan, Hubei, and has become one of the most serious problems in public health, which has an extraordinary speed of transmission. On January 30, 2020, the World Health Organization (WHO) announced that the COVID-19 outbreak is a global public health emergency. The spread of the disease has become a major public health concern.¹

Severe cases of COVID-19 can cause pneumonia, acute respiratory syndrome, kidney failure, and death. The number of sufferers causes the government to make efforts to prevent and control cases. One of the control efforts that are needed is the preparation of facilities and infrastructure for the management of cases that require isolation rooms that meet the requirements for controlling infectious diseases. Therefore, several hospitals in Indonesia have begun to be prepared so that they can be said to be feasible and capable of managing this disease whereas the Central General Hospital Dr. Kariadi is one of the referral hospitals for COVID-19^{2,3}.

Nurses play an important role as the first-line fighters who treat patients with COVID-19 and face a high risk of infection and exposure, so making them vulnerable to emotional distress. The psychological impact on nurses has negative consequences for the organization, individual well-being, patient care, and health care systems^{4,5,6,7}

Research shows that during the COVID-19 outbreak, more than a third of medical personnel experienced symptoms of insomnia, accompanied by depression and anxiety symptoms⁸. Research shows that most nurses have poor sleep quality⁹. Sleep is one of the essential things for physical health for nurses as well as a strong regulator of the immunological process. Impaired sleep quality accompanied by stress can trigger the continuous production of non-specific proinflammatory cytokines, which in turn results in immune deficiency^{10,11}. The quality of life and job satisfaction of nurses can get affected by these conditions. Nurses' quality of life is a complex entity that is under the influence and interaction with various aspects of the work environment and personal life



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outside themselves¹². Disturbing quality of life and sleep can interfere with their efficiency in providing medical services.¹³

Some previous studies concluded that there was a relationship between sleep quality and quality of life among nurses^{14,15,16,17}. However, previous studies did not compare sleep quality and quality of life between nurses who served in isolation rooms and non-isolation rooms. Previous research also did not describe the distribution of nurses' quality of life. A study showed that nurses had poor sleep quality during 1 year of the COVID pandemic, but this study did not link sleep quality to nurses' quality of life.⁹ Concerning previous studies and the importance of sleep quality and quality of life among nurses in their work caring for COVID-19 patients, the authors aim to determine the correlation between sleep quality and the quality of life among the nurses at Dr. Kariadi General Hospital Center during the COVID-19 pandemic. This study also looks for differences in whether there are differences in sleep quality, quality of life, and quality of life domains between nurses in isolation wards and non-isolation wards; It is hoped that it can add insight to readers, nurses, future researchers, the public, and hospital policymakers regarding sleep quality and quality of life

METHOD

Research design

This research is a quantitative study with a cross-sectional approach. It was conducted at Dr. Kariadi General Hospital Center in May 2021

Population and sample research

The population in this study were nurses at Dr. Kariadi General Hospital Center. The study samples were selected using the consecutive sampling method on nurses caring for patients in the Rajawali ward in the isolation and non-isolation wards for COVID-19. Nurses who meet the research inclusion criteria will be used as research samples. Inclusion criteria included: nurses who served in Dr. Kariadi General Hospital Center, aged 22 - 50 years, work in the COVID isolation room for at least 6 months. Exclusion criteria included: nurses who refused to participate in the research, taking medication from psychiatry before and during the COVID-19 pandemic, pregnant, nurses who are using drugs (Narcotics, Psychotropics, and Other Addictive Substances).

This study used the consecutive sampling method. The sample size was computed using the formula with a minimum sample of 46 nurses caring for patients in the COVID-19 isolation ward and the non-isolation inpatient wards of Dr. Kariadi General Hospital Center. 51 nurses who met the inclusion and exclusion criteria were taken as research subjects.

$$n = \left[\frac{Z\alpha + Z\beta}{0,5 \ln \left(\frac{1+r}{1-r} \right)} \right]^2 + 3$$

Materials and research tools

Data collection was carried out for 1 month. Every respondent filled out informed consent, sociodemographic questionnaire, Pittsburgh Sleep Quality Index (PSQI) Indonesian version, and The WHO Quality of Life-BREF (WHOQOLBREF) Indonesian version. In this study, sleep quality is the independent variable, and quality of life is the dependent variable. The confounding variables in this study include gender, marital status, education level, and history of physical illness. The sociodemographic data obtained includes age, gender, marital status, education level, physical illnesses, history of suffering from COVID-19, history of COVID-19 examination, history of providing care for COVID-19 patients, feelings of worry to assess the psychological condition of the nurse, the workplace to assess the condition of the nurse's environment and history of exclusion by the local community to assess social conditions. The PSQI score, which consists of 7 (seven) components, is a self-rating questionnaire. The scores of the seven components are added up to 1 (one) global score with a value range of 0 - 21. A lower total score reflects better sleep quality. The WHOQOL-BREF instrument is an abridged version of the original instrument where it consists of 26 items measuring 4 domains, namely: physical health (7 items), psychological health (6 items), environment (9 items), and social interaction (4 items). In addition, there were two general items for assessing the overall quality of life and general health of the participants. Participants rate each item, on a 5-point Likert scale. Each domain has its score transformation with the highest score indicating a better quality of life.

Data analysis



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The collected data were processed and analyzed using IBM SPSS 21. The data were described using frequency, percentage, mean, median, and standard deviation. Correlation analysis using the correlation Spearman test, Chi-square test, and Fisher exact test. The relationship between sleep quality and each quality of life domain was also examined. The differential test for sleep quality, the quality of life, and each quality of life domain between nurses in the COVID-19 isolation wards and the usual inpatient (non-isolation) wards will be analyzed using the independent T-test and the Mann

Whitney test, with a significance limit <0.05 and a 95% confidence interval.

Ethical consideration

This research has received proper ethical clearance from the Research Ethics Commission of the Faculty of Medicine, Diponegoro University number 137 / EC / KEPK / FK-UNDIP / V / 2021.

RESULTS

This study involved 51 respondents who were working as nurses at the isolation and non-isolation wards. The characteristics data of the subjects can be seen in table 1.

Table 1. Characteristics of respondent characteristics based on workplace

Charateristic	Group	
	Isolation(n=27)	Non isolation (n=24)
Age; (year)	31,26 ±4,19; 30,00(25-41)	32,00 ± 5,39; 30,50 (26-47)
Gender; (%)		
- Male	12 (44,4%)	4 (16,7%)
- Female	15 (55,6%)	20 (83,3%)
Marital status		
- Single	1 (3,7%)	1 (4,2%)
- Married	26 (96,3%)	23 (95,8%)
Level of Education		
- D3	16 (59,3%)	15 (62,5%)
- Ners	11 (40,7%)	9 (37,5%)
Physical illnesses		
- Exist (Hypertension)	2 (7,4%)	0 (0 %)
- Does not exist	25 (92,6%)	24 (100 %)
History of suffering from COVID		
- Ever	5 (18,5%)	3 (12,5%)
- Never	22 (81,5%)	21 (87,5%)
History of treating COVID patients		
- Ever	27 (100%)	17 (70,8%)
- Never	0 (0%)	7 (29,2%)
Feeling worried		
- Exist	21 (77,8%)	18 (75,0%)
- Does not exist	6 (22,2%)	6 (25%)
Exclusion		
- Exist	4 (14,8%)	5 (20,8%)
- Does not exist	23 (85,2%)	19 (79,2%)
Quality of Life		
- Bad	1 (3,7%)	0 (0,0%)
- Normal	8 (29,6%)	10 (41,7%)
- Good	14 (51,9%)	12 (50,0%)
- Very good	4 (14,8%)	2 (8,3%)
Dimensions of Quality of Life		
- Physical domain	50,59 ± 9,13; 50 (31-63)	50,83 ± 8,89; 50 (38 – 75)
- Psychological domain	56,30 ± 12,59; 56 (13-75)	57,96 ± 10,0; 56 (44-81)
- Social interaction domain	68,30 ± 12,39; 75 (50-100)	68,21± 14,97; 75 (31-100)
- Environmental domain	62,41 ± 11,44; 63 (31-88)	63,17 ± 11,55; 63 (44-88)
Sleep quality	5,70 ± 2,76; 6 (1-11)	4,08 ± 2,53; 3,5 (1-11)



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The age of nurses in isolation wards ranges from 25 to 41 years old while the age range of nurses in non-isolation wards is 26-47 years old. For the general quality of life perception, 1 (3,7%) nurse who

worked in isolation wards had a bad quality of life perception and no nurse who worked in the non-isolated ward with bad quality of life perception. The sleep quality of nurses who worked in isolation and non-isolation wards were in the range of 1-11.

Table 2. Correlation between characteristic and the quality of life

Charateristic	Perception of Quality of life				p	r
	Bad	Normal	Good	Very good		
Age; (year), (mean±SD; median (min-max))	30,00± 0 30,00 (30-30)	32,06 ± 4,72 31,00 (27- 46)	31,04 ± 3,99 30,00 (25-47)	33,00 ± 8,09 30,00 (25-47)	0,621 [†]	-0,071
Gender; (%)						
- Male	0 (0,0%)	6 (37,5%)	7 (43,8 %)	3 (18,8%)	0,674 [‡]	0,179
- Female	1 (2,9%)	12 (34,3%)	19 (54,3%)	3 (8,6%)		
Marital status						
- Single	0 (0,0%)	1 (50,0%)	1 (50,0%)	0 (0,0%)	1,000 [‡]	0,090
- Married	1 (2,0%)	17 (34, 7%)	25 (51,0%)	6 (12,2%)		
Level of Education						
- D3	1 (3,2%)	12 (38,7%)	16 (51,6%)	2 (6,5%)	0,459 [‡]	0,228
- Ners	0 (0,0%)	6 (30%)	10 (50,0%)	4 (20,0%)		
Physical illnesses						
-Exist(Hypertension)	0 (0,0%)	1 (50,0%)	1 (50,0%)	0 (0,0%)	1,000 [‡]	0,090
- Does not exist	1 (2,0%)	17 (34,7%)	25 (51,0%)	6 (12,2%)		
History of suffering from COVID						
- Ever	0 (0,0%)	5 (62,5%)	3 (37,5%)	0 (0,0%)	0,361 [‡]	0,258
- Never	1 (2,3%)	13 (30,2%)	23 (53,5%)	6 (14,0%)		
History of treating COVID patients						
- Ever	1 (2,3%)	15 (34,1%)	24 (54,5%)	4 (9,1%)	0,275 [‡]	0,237
- Never	0 (0,0%)	3 (42,9%)	2 (28,6%)	2 (28,6%)		
Feeling worried						
- Exist	1 (2,6%)	12 (30,8 %)	24(61,5 %)	2 (5,1 %)	0,007* [‡]	0,423
- Does not exist	0 (0,0%)	6 (50,0 %)	2 (16,7 %)	4 (33,3%)		
Exclusion						
- Exist	0 (0,0%)	4 (44,4%)	5 (55,6%)	0 (0,0%)	0,734 [‡]	0,185
- Does not exist	1 (2,4%)	14 (33,3%)	21 (50,0%)	6 (14,3%)		
Workplace						
- Isolation	1 (3,7%)	8 (29,6%)	14(51,9%)	4(14, 8%)	0,698 [‡]	0,188
- Non Isolation	0 (0,0%)	10 (41,7%)	12 (50,0%)	2 (8,3%)		
Sleep quality, (mean±SD; median (min-max))	10,00 ± 0 10,00 (10 – 10)	5,72 ± 2,19 5,50 (1 – 9)	4,38 ± 2,76 4,00 (1 – 11)	4,17±3,43 2,50 (1 – 9)	0,020* [†]	-0,325

Note: * significant (p < 0,05); † Spearman correlation, ‡ Fisher's Exact test

Table 2 shows the correlation between characteristics and perception of quality of life. A nurse with bad perception of quality of life aged 30, female (2,9%), married (2,0%), D3 education level (3,2%), without physical illness (2,0%), without history of suffering from COVID (2,3%), with history of treating COVID patients (2,3%), with

feeling of worried about the current job (2,6%) and working in isolation ward (3,7%) had a poor perception of quality of life. A nurse with a perception of poor quality of life had the lowest sleep quality (highest PSQI score among other nurses) with a score of 10.



There was a significant relationship between feelings of worried and the quality of life of nurses with a moderate correlation ($p = 0.007$, $r = 0.423$).

The score of sleep quality on nurses with a very good perception of quality of life was 4.17 ± 3.43 with a mean of 2.50, the lowest score was 1 and the highest was 9. Nurses with lower sleep quality scores had a significant correlation with better quality of life ($p = 0,020$, $r = -0,325$).

There was no significant correlation ($p > 0.05$) on the variables of age, gender, marital status, education level, physical ailments, history of suffering from COVID-19, history of treating COVID patients, workplace, and social variables (which is getting exclusion) to quality of life .

Table 3. Bivariate analysis test results between sleep quality variable and nurses' quality of life domains

Characteristic	p	r
Physical domain	0,012 [†]	-0,349
Psychological domain	0,047* [†]	-0,280
Social interaction domain	0,003* [†]	-0,406
Environmental domain	0,001* [†]	-0,453

Note: * significant ($p < 0,05$); [†] Spearman correlation

Table 3 presents the correlation between the sleep quality to nurses' quality of life domains. There was a significant relationship that the lower the sleep quality score, the better the quality of life domains (physical, psychological, social interaction, and environmental domains) with $p < 0.05$ and a negative correlation. The correlation between sleep quality to the social interaction and environmental domains had a moderate correlation strength.

Table 4. Test the difference between the variables of quality of life and sleep quality for respondents who served in isolation and non-isolation wards

	Group		p
	Isolation (n=27)	Non Isolation (n=24)	
Sleep quality	5,70 ± 2,76; 6 (1-11)	4,08 ± 2,53; 3,5 (1-11)	0,03* [§]
Quality of Life			
Bad	1 (3,7%)	0 (0%)	0,698 [‡]
Normal	8 (29,6%)	10 (41,7%)	
Good	14 (51,9%)	12 (50%)	
Very good	4 (14,8%)	2 (8,3%)	
Physical domain	50,59 ± 9,13 50 (31-63)	50,83 ± 8,89 50 (38 – 75)	0,877 [§]
Psychological domain	56,30 ± 12,59 56 (13-75)	57,96 ± 10,01 56 (44-81)	0,977 [§]
Social interaction domain	68,30 ± 12,39 75 (50-100)	68,21 ± 14,97 75 (31-100)	0,746 [§]
Environmental domain	62,41 ± 11,44 63 (31-88)	63,17 ± 11,55 63 (44-88)	0,848 [§]

Note: * significant ($p < 0,05$); [§] Mann Whitney test, [‡] Fisher's Exact test

Table 4 presents the differences in the variables of quality of life and sleep quality for respondents who worked in isolation and non-isolation wards. There were 1 (3,7%) of nurses who worked in an isolation ward who had a bad perception of quality of life. In addition, there was no significant difference in the quality of life between nurses who worked in isolation and non-isolation wards ($p > 0.05$)

The sleep quality score of nurses who worked in isolation wards is lower than in non-isolation wards with a value of 4.08 ± 2.53 and a mean of 3.5. Sleep quality (defined by PSQI score) of nurses who worked in non-isolation wards was significantly different from nurses who worked in isolation wards ($p < 0,05$)



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There was no difference ($p > 0.05$) in the domains of quality of life for nurses who worked in isolation and non-isolation wards.

DISCUSSION

Most gender in this study were women, where 15 (55.6%) served in isolation wards and 20 (83.3%) served in non-isolation wards. This result is in line with Stojanov's research (2020) which shows that the majority of nurses are women with 65.6% of nurses on duty for COVID-19 patients in isolation wards and 66.3% of nurses were on duty for non-COVID-19 patients in non-isolation wards.

In this study, there was a significant correlation between sleep quality and the quality of life of nurses. This is similar to Stojanov's study (2020) which states that there is a correlation between sleep quality and the quality of life. Nurses caring for COVID-19 patients have poorer sleep quality which increased anxiety regarding their health status¹³. Impaired sleep quality increases morbidity and mortality and also reduces the quality of life. A person who has impaired sleep quality can have problems with memory, concentration, social isolation, anxiety, and low self-esteem, which can affect the quality of life^{14,16,17}.

There was a significant correlation between sleep quality and the physical domain of quality of life in this study. This is in line with the research conducted by Lu et al (2021). Sleep is one of the important things for a nurse's physical health because sleep is a strong regulator of the immunological process^{10,11,17}. People with adequate sleep quality have more energy, better cognitive function, a healthier immune system, better memory, alertness, attention, and performance throughout the day. Therefore, better sleep quality predicts better physical condition and improves the quality of life¹⁸.

This study showed that there was a correlation between sleep quality and the psychological domain of the nurses' quality of life. It's similar to the research conducted by Lu et al (2021) which stated that there was a significant correlation between sleep quality and the psychological domain of the nurses' quality of life. Sleep quality problems can cause stress to nurses^{16,17}. Stress and repetitive negative thinking patterns are associated with sleep issues¹⁹. Normal quality of sleep is an important physiological issue for humans, but poor sleep quality can lead to serious

psychological health problems and have an impact on quality of life¹⁷.

This study revealed a correlation between sleep quality and the social domain of the nurses' quality of life. It's confirmed by the research conducted by Lu et al. A person with impaired sleep quality tends to overreact to situations that usually don't confuse him or her. The neural mechanism thought to underlie these effects of impaired sleep quality involves hypersensitivity in brain areas that alert people to any kind of interactions so that they reject social interactions. This condition will eventually lead to conflicts and unsatisfactory correlations with other people^{10,11,17}. These negative social interactions will reduce the quality of life. In addition, people with poor sleep quality tend to have a deteriorating correlation with family and society so that feelings of caring, love, and feelings of belonging will decrease, which in turn will reduce their quality of life²⁰.

The correlation between the sleep quality and the environmental domain of the nurses' quality of life was significant in this study. Research conducted by Lu et al (2021) showed a similar result. Impaired sleep quality can cause problems in communication skills and decreased ability to cope with work environment problems. In the end, this condition will cause a decrease in the nurses' quality of life, especially in the environmental domain^{17,21}.

This study showed that there was a significant difference between the sleep quality of nurses on duty in isolation wards and non-isolation wards. This is in line with Momeni's study (2016). In the intensive care unit, nurses have more complex nursing care, such as administering medication and monitoring the patient's vital signs continuously, while nurses who work in regular wards do not monitor the patient's condition and vital signs continuously^{22,23}. In addition, families can help monitor the condition of patients treated in regular wards.

There was no significant difference between the perceptions of quality of life and each domain in nurses working in isolation and non-isolation wards. This finding might be because nurses had been trained on how to handle COVID-19 patients. In addition, nurses who worked in the isolation ward have been facilitated with complete personal protective equipment. These things caused nurses who worked in isolation wards to be more confident in their ability to successfully carry out the nursing



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care provided (self-efficacy). High self-efficacy will develop a strong personality in a person, reduce stress, and enhance confidence to work under difficult and high levels of complex situations²⁴. In addition, the workplace rotation system can also be the cause of the insignificant difference in perceptions of the quality of life of nurses working in isolation and non-isolation wards. Based on the results of the study, as many as 17 nurses (70.8%) who worked in non-isolation wards had previously treated COVID-19 patients. Several nurses who work in non-isolation wards have also encountered COVID-19 patients while being treated in non-isolation wards (because the patient was misdiagnosed) and without realizing it, have been treating COVID-19 patients for days without using standard types of personal protective equipment.

Limitation: Our study does not examine in-depth psychological, social, or environmental problems, the respondents' lifestyle factors, and other psychosocial problems that maybe become potential stressors for nurses, affecting their sleep quality and quality of life.

Further research is still needed by adding other factors, including lifestyle or psychosocial factors, as well as an in-depth examination of the environmental, social, and psychological factors which could impact the overall nurses' quality of life. Suggestions in this research are any examination, periodic screening, implementation of nurse welfare regulations wherever every work unit and accurate management of nurses' subjective emotions of anxiety associated with work rhythm are important to be managed properly to optimize their care.

CONCLUSION

From this study, it was found that there was a significant correlation between sleep quality and the nurses' quality of life. There are variations in demographic characteristics of nurses who work in isolation and non-isolation wards. This study also showed a significant difference in the nurses' sleep quality who worked in isolation and non-isolation wards. There's no significant difference between the perception of quality of life of nurses in isolation and non-isolation wards so further examination, periodic screening, implementation of nurse welfare policies wherever each work unit and proper management of nurses' subjective feelings of anxiety related to work rhythm are needed.

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CONFLICT OF INTEREST

The authors state there is no conflict of interest

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AUTHOR CONTRIBUTION

The contribution of this research is as follows: "Conceptualization, Hang, Natalia and Nurhasanah; methodology, Hang Natalia, Widodo, Witrie; software, Nurhasanah; validation, Hang, Natalia, Widodo, Witrie and Nurhasanah; formal analysis, Hang and Natalia; investigation, Hang and Natalia; resources, Nurhasanah; data accuracy, Nurhasanah; writing — preparation of the original draft, Nurhasanah; writing — reviewing and editing, Nurhasanah; visualization, Nurhasanah; supervision, Hang, Natalia, Widodo and Witrie; project administration, Hang and Natalia; fund acquisition, Natalia.

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