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The impact of occupational health, safety, workload, and stress on nurses during the COVID-19 pandemic

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Abstract

The COVID-19 pandemic impacts the clinical nurses working in hospitals. The pandemic challenged them to deal with unfamiliar problems such as heavy workloads and adaptation to using Personal Protective Equipment (PPE). When left untreated, the situation will increase the stress among nurses. Due to this reason, the objective of the study is to evaluate the impact of pandemic health, safety, workload, and stress among nurses in a hospital. The study used descriptive design and used observational methods to reach the research objective. The data collection process was started from August 2020 to October 2020. A total of 144 nurses were engaged during the study. Several instruments were used to gain data from the participants. Regression analysis was used for hypothesis testing. The finding indicated that results of this study indicate that OHS, workload, and work stress simultaneously have a significant positive effect on the nurses' performance ($p < 0.05$). This research suggests that health policymakers should provide psychological support for nurses experiencing stress when delivering care.

Keywords: occupational health; safety; nurses; psychological stress; pandemic

Introduction

Coronavirus Disease 2019 (COVID-19) infection is a disease caused by a new variant of Coronavirus that affect the respiratory system (Platto, Wang, Zhou, & Carafoli, 2021). This virus was originally discovered in Wuhan, China by the end of December 2019, then rapidly spread throughout the world (Morens et al., 2020). As of February 1, 2021, there were 103.933.199 confirmed cases worldwide with 2.255.578 deaths. Meanwhile, the Ministry of Health in Indonesia reported 1.089.308 cases with 30.277 deaths (Holmes et al., 2021). In addition to this, WHO documented that Omicron, as a new variant of viruses, appears to spread faster than the previous Delta variant. The available data suggests an increased risk of re-infection with the Omicron variant (Araf et al., 2022). Even though 1,3 million healthcare workers in Indonesia received the vaccine, a study discussing the effectiveness of the current vaccine against Omicron is scarce. Therefore, healthcare workers still must strengthen the health measure to protect from COVID-19 along with the spread of infection among patients (Dyer, 2021).

As widely acknowledged, the pandemic impact health, safety, workload, and stress among nurses in hospitals. Several studies have described these issues in their publications. For example, nurses continued to provide a high level of care to ensure the appropriate care, deployment, and education when dealing with the pandemic situation (Clari et al., 2021). In the face of a heavy and daily workload, clinical nurses have had to wear personal protective equipment (PPE) and have been confronted with a lack of PPE (Zhang et al., 2020; Tan., 2020). The International Council of Nurses (ICN) in Italy highlighted the high infection rates among nurses when delivering care in the COVID-19 ward (ICN, 2021). Clinical nurses working in the COVID-19 wards documented higher levels of exhaustion, stress, and depressive mood, as well as lower levels of work-related fulfillment, compared to other nurses in the regular wards (Zerbini, Ebigbo, Reicherts, Kunz, & Messman, 2020). Also, nurses reported being reassigned due to changes in human shortage, having to quickly learn particular skills, having to work with novice nurses, and having difficulties communicating with patients and caregivers (Gupta, Dhamija, Patil, & Chaudhari, 2021). All of the factors mentioned above could have affected the quality of nursing care during the COVID-19 pandemic.

In Indonesia, the condition is extremely concerning, since the percentage of nurses in Indonesia is just as low as 0,4 per 1000 people. This can be overwhelming in this COVID-19 crisis, as they were required to do this while wearing PPE while there amidst the increase in the number of patients. Moreover, there are some administrative duties such as making a regular report to the hospital and doing paperwork. Nurses in the hospital are required to provide nursing care according to the nursing care standards proposed by the Indonesian Nurses Association (PPNI). In addition, the nurses taking care of the COVID-19 patients were reported to have difficulty controlling the stress, and constantly feel terrified of being infected and infecting others. Although the nurses are required to do preventive measures in OHS, such as continuously using PPE, the research above mentioned the impact on physical and psychological health. Given the high need for health services during the COVID-19 crisis, the declining performance of health workers is certainly something to be avoided. According to statistics, as many as 20% of cases of COVID-19 in Indonesia were reported in Jakarta. The rapidly increasing cases cause a growing demand for healthcare facilities. Pertamina Hospital (RSPP) reported an increasing number of reports from nurses who feel exhausted from the heavy workload of handling COVID-19 patients. They were dehydrated, suffering from the heat, and feeling discomfort from using full PPE. They were also feeling the fear of infecting their family after they get home from the shifts. However, there is still limited literature that discusses the nurses' performance amidst the COVID-19 crisis in Indonesia. Given the importance, each factor related to nurses' performance was studied, namely OHS, workload, and work stress. The study aims at investigating the effect of the pandemic on nurses' work in hospitals. It is expected that the finding of this study helps the nurses to cope with this situation and increase the quality of nursing care.

Method

The study engaged a cross-sectional study design by using the quantitative method from the data collected by questionnaires. The inclusion criteria were the nurses working in close contact with COVID-19 patients in the past 6 months and who agreed to participate in this study. The exclusion criterion is the nurses who were not in close contact with COVID-19 patients. The data collection process was started from August 2020 to October 2020. A total of 144 nurses were involved in the study after signing the informed consent.

The quantitative method is regression, which intends to see the effect of one variable on another variable. Characteristic socio-demographic data were also collected. Mini-interviews and direct observation were done for additional explanations to complete the research data. The validity of the questionnaires was tested using Pearson Product Moment Correlations. The items used and presented in this study were only valid items, which shows the significant correlation of each item with the total score.

After completing the validity test, the consistency and reliability of the questionnaires were tested using Cronbach's Alpha using SPSS. The items were reliable when it has consistency, and the instrument would give the same results if the measurement were to be taken again, presented by the $r > r$ table. All the questionnaire items shown in this study already passed the validity and reliability test. Data analysis is the processing of data collected to obtain a conclusion. The data were analyzed using multiple linear regression, with the data that previously passed the classical assumption test. The normality and other test were also performed for hypothesis testing. All the authors worked together to discuss the finding of the study after analyzing the data.

Results

The research was conducted with the self-administered online questionnaire through Office Forms and was done together by each unit (**Table 1**). The majority of the nurse participants were women (68%), with variable ages. The majority were bachelor's degree graduates (70.1%), and most were permanent employees (63.8%), About 85 (59%) of nurses have been working for more than 3 years. Most nurses who participated were working in the ward (51.4%). The implementation of hospital OSH associated with standard precautions from the Ministry of Health Indonesia consists of 20 aspects (**Table 2**).

Nurses at Pertamina Hospital dealing with COVID-19 patients feel a high workload related to the amount of work, including too many workers, the limited number of nurses, and too many patients (**Table 3**). Efforts should be made to explore the factors that are associated with nurses' health, workload, and psychological distress, which may lead to symptoms of anxiety and depression. There needs to be more awareness among healthcare professionals and further long-term investigation focusing on mental health as adverse mental health conditions will affect the overall health of nurses.

Table 1. Respondents' characteristics

Characteristics of respondents		n	%
Gender	Men	46	32%
	Women	98	68%
Age	21-25 years old	31	
	26-30 years old	38	
	31-35 years old	14	
	36-40 years old	13	
	41-45 years old	24	
	> 46 years old	24	
Education	Diploma 3 (D3)	101	29.9%
	Bachelor's degree (S1)	43	70.1%
Status of employment	Regular employee	92	63.8%
	Temporary employee	52	36.2%
Year of experience	< 1 year	44	30.6%
	1-2 years	10	6.9%
	2-3 years	5	3.5%
	> 3 years	85	59%
Unit	Ward	74	51.4%
	ICU/HCU	48	33.3%
	Emergency room	18	12.5%
	Others	4	2.8%

Table 3. The workload of Nurses at Pertamina Hospital

No	Workload	Score	Classification
Working time			
1	Racing against time (deadlines)	75.87%	High
2	The constant demand to work quickly	71.35%	High
Amount of work			
3	Too many works	68.23%	High
4	A limited number of nurses	75.17%	High
5	Too many patients	73.61%	High
Internal factors			
6	Feeling fatigued related to work	67.18%	Low
7	Feeling boredom with being hospitable	41.32%	Low
8	Unused medical skills	43.4%	Low
9	Mismatch of knowledge obtained in school with the actualization	46.18%	Low
External factors			
10	Usage of outmoded medical equipment	45.83%	Low
11	Unclear orders by the superiors	48.43%	Low

Discussion

The implementation of occupational health and safety (OHS) in dealing with COVID-19 patients is generally very good, with the very good implementation of all dimensions such as the usage of PPE, following the procedure, environmental management, patient safety, risk and warning signs placement, and the usage of hospital emergency codes. Furthermore, the level of the workload of Pertamina Hospital nurses in dealing with COVID-19 patients is generally quite high. A study supported that this increase in workload is mainly due to more intensive hygiene procedures, mobilization and positioning, support and care for relatives and patients, and respiratory care. Factors influencing workload include continuous hemofiltration, high medical severity of illness scores, and the high number of deceased patients (Bruyneel, Lucchini, & Hoogendoorn, 2022).

Table 2. Implementation of OSH by nurses at Pertamina Hospital

No	Implementation of OSH	Score	Classification
The usage of PPE			
1	Usage of the PPE according to standard	93.05%	Very good
2	Providing good quality PPE	86.1%	Very good
Following Standard Operating Procedures (SOP)			
3	Following SOP in the hospital	91.67%	Very good
4	Work within their authority	93.47%	Very good
5	Operating medical devices within their authority	92.7%	Very good
6	Working in a determined schedule	87.85%	Very good
7	Operating the medical device following the procedure	98.4%	Very good
8	Doing work wide-awake	94.62%	Very good
Environmental management			
9	Turning off unused equipment	95.83%	Very good
10	Maintaining the equipment in good condition	99.13%	Very good
11	Returning used equipment in place	85.6%	Very good
12	Doing work cautiously	84.37%	Very good
13	Hand hygiene and maintaining a clean work environment	91.32%	Very good
Patient safety			
14	Availability of bed handrails, dividers between patients, and safety handles in the bathroom	74.65%	Very good
15	Fall risk assessment and prevention	84.54%	Very good
Risk and warning signs placement			
16	Availability of danger signs (red zone, yellow zone, green zone)	90.45%	Very good
17	Availability of warning signs of COVID-19 risks	93.22%	Very good
Usage of hospital emergency codes			
18	Hospital emergency codes socialization (code blue, code red, code green, code pink, code black)	84.37%	Very good
19	Availability of symbols related to COVID-19 alert area	86.98%	Very good

The perceived workload in working time and amount of work is found to be high, while on the other hand, the internal and external factors are perceived as a low workload. In line with the finding, a study highlighted that the successful management of the pandemic depends on our ability to mitigate the effects of this workload, especially in light of the quantitative and qualitative importance of nursing in healthcare institutions (Souza, 2021). The level of work stress of Pertamina Hospital nurses in dealing with COVID-19 patients is generally low, with dimensions of psychological, physical, and behavioral symptoms perceived as low, and cognitive symptoms as very low. During the pandemic, it is thought that nurses working at more intensive levels and in high-risk areas may increase their stress and decrease their motivation and performance (Ardıç, Ünal, & Türkteviz, 2022).

Partially, OHS has a significant positive effect on the performance of nurses, work stress has a significant negative effect on the performance of nurses, while there was no effect of workload on the performance of nurses in Pertamina Hospital in handling COVID-19 patients. Simultaneously, OHS, workload, and work stress together have a positive and significant effect on the performance of Pertamina Hospital nurses in handling COVID-19 patients. However, a study described that stress can cause reluctance to go to work, unwillingness to work, making mistakes, poor quality of work, leaving work, deterioration of relationships and cooperation with colleagues, making inaccurate decisions, and negative behaviors (Aggar et al., 2022).

The ability of the independent variable to explain the variation in the performance of nurses is 16.9%, while the remaining 83.1% is explained by other variables. Due to the increasing evidence of re-infection associated with a recent variant of concern, the authority made some changes in recommendations regarding healthcare settings. For example, Kemenkes regulation requires all probable and confirmed cases of Omicron, even asymptomatic, should be isolated in the hospital (Haq et al., 2021). The usage of PPE by healthcare workers is advised in the new regulations from WHO regarding the Omicron variant. On the other hand, CDC released emergency guidance for healthcare facilities to prepare Omicron surge, concerning the SOP of isolation and quarantine for healthcare workers, anticipating an increasing turnover of nurses. The possible nurse turnover can hopefully be prevented and the increase in workload can be minimized. Hospitals were advised to refer to their guidelines according to the recent findings.

This study is expected to be able to be a consideration for the hospital to improve the performance of the nurses in the COVID-19 crisis. The first implication of this study is to introduce a convenient working strategy for nurses. A study supported that organizational performance may be reflected in nursing workforce retention as the risk for workforce attrition appears high. It is also clear from the reports that nurses appear to have assumed higher occupational health risks during the pandemic when compared to other healthcare providers (Squires, Clark-Cutaia, Henderson, Arneson, & Resnik, 2022). In this study, Pertamina Hospital tries to overcome the extensive use of full PPE by dividing nurses' shifts into 2 zones. The nurses should only wear level 3 PPE for 4 hours, whilst the next 4 hours would only require them to wear level 1 PPE because they were not involved directly in-patient care. This prototype may further be introduced to other COVID-19 hospital settings with specific adjustments accordingly. The second implication stems from our findings that the workload felt by the nurses was mainly from the working time and amount of work, instead of internal factors such as the fatigue and boredom felt from providing care or the unsuitable skills/knowledge and not even external factors like the working conditions. Thus, limiting the time and amount of work is very important in managing the workload of nurses. This can be achieved by regular assessments of workload and risks and also adjustments of existing needs, taking into account the turnover of nurses caused by infection of COVID-19.

Despite the heavy workload felt by the nurses, the work stress of nurses in Pertamina Hospital is generally low. The third implication of this study is how our findings suggest that the health workers who were feeling appreciated and were given enough appreciation from the hospital from the expression of gratitude to extra allowance have a lower level of work stress. A study showed that a larger number of financial incentives (FIs) are an important motivation to work in the COVID-19 ward (Morishita, Takase, Ishikane, & Otomo, 2021; Waitzberg et al., 2022). In the recent report by MKK FKUI which shows that generally, 84% of nurses in Indonesia were feeling moderate-severe burnout, this appreciation technique can be proposed. In this sense, although this research cannot develop fully-formed suggestions that can be used in every single COVID-19 hospital (given its descriptive and specific nature), these findings can be used as a reflection for any COVID-19 hospital to evaluate the mentioned focuses. Given the prevalence of burnout in nurses and because nurses are the largest portion of the healthcare providers who are in close contact with patients infected by COVID-19, healthcare policymakers must adopt strategies for preventing or reducing burnout among nurses (Zareei, Tabanejad, Oskouie, Ebadi, & Mesri, 2022; Wei et al., 2022). Regular observations and evaluations regarding the implementation of OHS, the level of workload, and the work stress of nurses are necessary to obtain. The amount of work and working time should be adjusted periodically, concerning that some nurses are being infected with COVID-19 should be taken into consideration. Although the work stress of the nurses was still low, psychological support and assistance should always be provided by the hospital if needed, so the nurses can have their best coping strategies, thus increasing their performance in battling with the COVID-19 pandemic. All these findings were studied and evaluated in a hope that the performance of nurses can be the best that it can be, amidst the possible surge of the new variant and other future pandemics.

Our study has several limitations due to it being conducted in a COVID-19 crisis, the data collection process is limited in a way that the workload assessment can only be done subjectively. The time and motion studies cannot be done at the moment due to the safety issues of the researchers. The population of the study was also still focused on the nurses due to minimalizing unnecessary contact with other healthcare workers. Further research should address a few suggestions. Firstly, the research can measure the workload with objective methods (namely time and motion studies) where the researchers follow and observe the subjects directly so that it can offer a different and more objective view. Secondly, if possible, the other healthcare workers should be studied to provide a more comprehensive understanding of the COVID-19 crisis. Thirdly, the study of stress determinants regarding COVID-19 in Indonesia should be carried out. Fourthly, further research on the good coping mechanism for COVID-19-related stress should be studied so that the stress can be managed. Lastly, this study can be used as a pilot study for other hospitals or healthcare centers in other cities to provide a sharper generalization of the condition of the COVID-19 crisis in Indonesia.

Conclusion

The results of this study indicate that OHS, workload, and work stress simultaneously have a significant positive effect on the performance of Pertamina Hospital nurses. This would have an impact on clinical nursing practice. Further studies are needed to evaluate the long-term outcomes of this impact. Using a different population of nurses is also important for the coming studies.

Author's declaration

The authors made substantial contributions to the conception and design of the study and took responsibility for data analysis, interpretation, and discussion of results. For manuscript preparation, all the authors read and approved the final version of the paper.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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