A qualitative description of nurses' problem to monitor and supervise vital signs in COVID19 patients in isolation room

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A qualitative description of nurses' problems to monitor and supervise vital signs in COVID-19 patients in isolation room

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ABSTRACT

Introduction: Changes and deterioration of the condition of Corona Virus Disease-19 (COVID-19) patients are unknown and can even lead to the death of the patient in the isolation room. This study focuses on identifying the problem of nurses monitoring and supervising the vital signs of COVID-19 patients in the isolation room.

Methods: A descriptive qualitative study was conducted in January 2022 at a private hospital in Sukoharjo, Central Java. Ten participants who met the inclusion criteria were involved through purposive sampling. The semi-structured interview guidelines were developed by the researcher, and they used them to obtain the data. Interviews were recorded using a recorder device. The data from the interviews were recorded verbatim and analyzed using inductive content analysis following Elo and Kyngas's method. The member checking and thick description were done to maintain the validity of the data.

Results: Three main themes were found from the emerging data, including 1) the comparison of nurses and patients is not ideal with patients' conditions that cannot be predicted, 2) personal protective equipment (PPE) and monitoring tools have not reached the appropriateness target, and 3) the demand for high-technology vital sign monitoring devices was not feasible.

Conclusions: The problems being faced by the nurses in monitoring and supervising the vital signs of COVID-19 patients in the isolation room need innovative tools. Therefore, it is important for policymakers and related parties to create high-technology solutions for the isolation rooms to improve nursing service effectively and ensure the safety of both the patients and the nurses.

Keywords: attitude; COVID-19 patients; isolation room; monitoring; supervision; vital signs

Introduction

Coronavirus Disease 2019 (COVID-19), which is also known as SARS-CoV-2, was reported to have emerged in December 2019 in Wuhan, China. This epidemic quickly spread outside China, causing the whole world to experience an emergency response, especially in health services (Nishiura et al., 2020). The disease transmission runs very easily through aerosols and droplets, which makes the number of cases continue to increase rapidly (Rahman et al., 2020).

Since medication for the COVID-19 virus has not yet been found, the health workers can be effective in caring for the patients by conducting continuous monitoring and identifying the deterioration of the patient's condition (Pimentel et al., 2020; Sharma et al., 2020). In accordance with the recommendation of the

Ministry of Health of Indonesia in 2020, patients with confirmed COVID-19 from moderate to severe degrees must be admitted to a hospital for isolation and periodic monitoring, including monitoring of general conditions, vital signs, and laboratory check-up (Indonesia Ministry of Health, 2020). Those monitored were pivotal to predict the patient's conditions and detect the changes in health outcomes during the isolation phase in COVID-19 patients (Connor and Pilar Camargo Plazas, 2021).

One of the things being monitored for the COVID-19 patients is their vital signs. Therefore, the nurses who work in the isolation room should catch up on how to monitor the patients and report the patients' health outcomes (Yuki and Sophia, 2020). The assessment of vital signs gives indication that the body is functioning in an acceptable condition or has health problems. Moreover, the monitoring of the vital signs also provides information to the healthcare providers in support of the objective data in the nursing process. Indeed, COVID-19 patients with severe conditions requiring advance monitoring can be seen every one to two hours (Noviestari et al., 2020; Yuki and Sophia, 2020).

Previous research conducted by Rao et al. (2021) and Joo and Liu (2021) has explored the experiences, challenges, and obstacles of various healthcare providers in treating COVID-19 patients from different treatment rooms. They found that caring for the COVID-19 patients is a challenging practice, with insufficient support, concerns about family, and emotional and psychological stress. Otherwise, they felt focusing on infection risk at the expense of high-quality care, struggling with dynamic and unfamiliar challenges, being overwhelmed and exhausted by personal protective equipment (PPE), information overload and confusion, and being overstretched by additional responsibilities at work were also issues. The healthcare facilities to take care of COVID-19 patients still lack innovation. The assessment and reporting of the data were not digitally recorded. It is evidence that finding the right solution to the problems is difficult.

The perspective of nurses who have experience caring for COVID-19 patients in the isolation room of the hospital where the study was conducted, indicated that the flow of COVID-19 patients due to this outbreak made the nursing services hectic. When the pandemic broke out, healthcare providers were not ready for health services and treatment availability. The capacity of the isolation room was for 24 patients, but the condition should be able to handle up to 29 patients. The ironic situation when the nurses are taking care of the patients is that there are only three or four nurses on duty per shift. Even with the health facilities available in the

patient's room, such as oxygen central, digital blood pressure, oxygen saturation, and more, the time to monitor and supervise the patients still lacks. Due to the limited admission in the Intensive Care Unit (ICU), the isolation room was forced to care for patients with severe conditions. In addition, the transmission of the COVID-19 virus requires the nurses to take care of the patients with personal protective equipment (PPE). The flow of COVID-19 patients in the isolation room made some patients not get maximum monitoring and supervision, so that changes and deterioration of the patient's condition were difficult to detect early (Pimentel et al., 2020).

Based on the researchers' experience, monitoring, and supervision of the vital signs of COVID-19 patients in the isolation room is manual and conventionally recorded. In the setting of the hospital, we found that there were 78% of COVID-19 patients admitted to the isolation room. Some of the patients became severely ill and required advanced nursing care in the ICU. However, since in the ICU there is no bedside, those patients should be taken care of in the isolation room. Therefore, we conducted the study to identify nurses' problems in monitoring and supervising COVID-19 patients' vital signs in the isolation room.

Materials and Methods

This study is a descriptive qualitative study that describes the problems facing nurses in monitoring and supervision the vital signs of COVID-19 patients at the isolation room. This research was conducted in the COVID-19 isolation room of the private hospital in Sukoharjo, Central Java in January 2022. The researchers ensured that the health protocols were applied by wearing masks, hand sanitizers, and keeping a distance from participants during research data collection.

The sampling technique was carried out by purposive sampling (Polit and Beck, 2015). Ten nurses who work in the isolation room participated in this study. To encourage the participants, the researchers communicated with the head nurses and head team to ask for the nurses who met the inclusion criteria. Inclusion criteria in this study were: 1) nurses had work experience of at least 6 months, 2) taking care of the COVID-19 patients in isolation room for at least 2 weeks. The exclusion criterion of the study was that if the participants were not available to complete the interview process due to their duty to take care of the patients. Informed consent was explained to the participants before the interview. The interview guidelines used in this study were developed by the

researcher. We constructed the interview guidelines based on the research questions and objectives as well as the research concepts and phenomena. The interview questions consist of: 1) What do you do in monitoring COVID-19 patients in the isolation room? 2) What does the manager do in supervising COVID-19 patients in the isolation room? 3) What are the obstacles faced by nurses in monitoring vital signs of COVID-19 patients in the isolation room? 4) What are the obstacles faced by nurses in supervising vital signs of COVID-19 patients in the isolation room? 5) Is there any innovation in monitoring and supervision vital signs other than manually? All the interview processes required 45-60 minutes for each participant.

Hospital with the number of Ethical Clearance 37/KEPK-RSISA/XII/2021 was required. The researchers also followed the rules of ethics for human subject guidance based on the Council for International Organizations of Medical Sciences (CIOMS) in collaboration with the World Health Organization (2016). Anonymity, beneficence, justice, and do not harm were practiced by researchers in the data gathering process. The participants could withdraw from this study at any time if they felt uncomfortable and there were no consequences.

Results

Table 1 Depicts an example of the data analysis process

Participant Statement	Coding	Theme
"The imbalance between the number of patients and the nurses' resources makes nurses not optimal in monitoring the vital signs of COVID-19 patients in the isolation room." (P2)	The comparison of unideal patients and nurses	The comparison of nurses and patients is not ideal with patients' conditions that cannot be predicted
"When monitoring the vital signs, there are unexpected activities, such as a patient who suddenly experiences a deterioration in their condition. The unexpected activities often cause the patient's vital signs to not be monitored properly. Nurses must be in a hurry or not be on time to monitor the vital signs of the patients." (P8)	Unpredictable situations and conditions	
"I had an experience when I was on my shift. That day, I did not assess the patient's saturation because a device was running out. I have reported it to the head nurse, but that time cannot be fixed promptly as it is a hospital regulation. We suggest the patient's family bring the oximetry to check their own saturation." (P6)	There is no monitoring of vital signs with high technology.	The demand for high- technology vital signs monitoring devices was not feasible Sub-theme 1. The condition of isolated patients requires personal monitoring device
"In the patient room, there are no vital signs devices that are continuously attached to the patient, so we cannot monitor the patient's vital signs directly from the nurse station. The deterioration of the patient's condition somehow delays response." (P10)	The absence of monitoring patients' vital signs with high technology connected to the nurse station	Sub-theme 2. The monitor devices that are connected to the nurse station directly

The results of the interviews were recorded using a tape recorder and were verbatim. The data were then analyzed to obtain the themes according to the research objectives. Content analysis of the research data was with an inductive approach following the Elo and Kyngas method. The data analysis consisted of an open coding process, coding sheets, grouping, categorization, and abstraction (Elo and Kyngäs, 2008). An example of the data analysis process is shown in Table 1.

To ensure trustworthiness, the researchers conducted data validity by conducting a member check to know the participants' validation of the interview results. Transferability was tested by comparing the results of this study with similar studies to explain the concept of the phenomena. To verify the emergent themes from the data, the researchers consulted an external expert to justify the theoretical and methodological discussion (Korstjens and Moser, 2018).

To guarantee the ethical consideration for this study, research ethics approval from Sultan Agung Islamic

Characteristics of the Participants

The characteristics of participants include age, sex, education level, work experience, and time to take care of the COVID-19 patients in the isolation room. All participants were female nurses, with an age range of mostly 26 to 35 years old (80%). The participants' education background was 80% graduated from Diploma III and had work experience as nurses for 10 years (50%). The time spent by participants taking care of COVID-19 patients in the isolation room was within 4-6 months (50%). Table 2 shows the demographic characteristics of the participants.

This study found three main themes in nurses' problems in monitoring and supervision of COVID-19 patients' vital signs in the isolation room. They are: 1) the comparison of nurses and patients is not ideal with patients' conditions that cannot be predicted, 2) personal protective equipment (PPE) and monitoring tools have not reached the appropriateness target, and

3) the demand for high-technology vital sign monitoring devices was not feasible.

Theme 1: The comparison of nurses and patients is not ideal with patients' conditions that cannot be predicted

The participants explained that the comparison of nurses and patients was not ideal under the conditions. The worsening of the patient's condition could not be predicted because of the obstacles to monitoring the vital signs of COVID-19 patients in the isolation room. The nurse-patient ratio is not ideal due to the lack of nurses compared to the high rate of admission of COVID-19 patients and the workload of nursing care. This condition is exacerbated by unpredictable conditions such as unexpected activities or deterioration of the patient's condition. The statement was expressed by four participants as follows:

"The imbalance between the number of patients and the nurses' resources makes nurses not optimal in monitoring the vital signs of COVID-19 patients in the isolation room." (P2)

"When monitoring the vital signs, there are unexpected activities, such as a patient who suddenly experiences a deterioration in their condition. The unexpected activities often cause the patient's vital signs to not be monitored properly. Nurses must be in a hurry or not be on time to monitor the vital signs of the patients." (P8)

"Here, we (the nurses) work in the isolation room based on the managerial setting. The comparison between nurses and patients is not ideal. Sometimes we feel that what we do in monitoring the patients does not complete due to the limited sources of information between patients and nurses." (P9)

"Nurses should have approximately 30 minutes in the patient room to complete the treatment for a patient. All monitoring and supervision of patients in the isolation room are done on paper. We can imagine what a load of work this is here." (P10)

Theme 2: Personal protective equipment (PPE) and monitoring tools have not reached the appropriateness target

Participants argued that personal protective equipment (PPE) and monitoring devices had not yet reached the appropriateness target. Quality standards, such as comfort and protection, should be met by the PPE target. However, the PPE that was provided for them was still low quality, so they felt uncomfortable wearing it. In addition, the supply of the devices for vital signs monitoring was limited compared to the number of patients whose vital signs should be continuously assessed. Four participants expressed it as follows

"Because of the quality standard of PPE, we have problems assessing the respiratory rate of COVID-19 patients. If we use it, we feel discomfort and somehow perspire." (P1)

"For monitoring the vital signs of COVID-19 patients in the isolation room, it is constrained by the equipment of vital signs devices that are still lacking." (P3)

"The problem for nurses in monitoring and supervision of COVID-19 patients' vital signs in the isolation room is that the devices provided are still lacking. We use the old instruments that the hospital provided. In the reality of this situation, we need innovation and technology-based monitoring to monitor the patients." (P9)

"The use of PPE makes it difficult for nurses to feel the pulse and see the patient's breathing. This is due

Table 2. Participant characteristics (n = 10)

Demographic Characteristic	n	%
Sex		
Female	10	100
Age (Year)		
17-25	2	20
26-35	8	80
Education background		
D3 Nursing Program	8	80
Certified Nurse Profession	2	20
Work Experience (Year)		
1-5	5	50
6-10	5	50
Time to take care of COVID-19 patients in the isolation room (months)		
1-3	3	30
4-6	5	50
10-12	2	20

to the use of gloves that must be doubled and google glass often condenses, thus limiting nurses in monitoring the vital signs of COVID-19 patients." (P10)

Theme 3: The demand for high-technology vital signs monitoring devices was not feasible

The need for high-technology devices to monitor vital signs is not feasible yet in this setting. Two sub-themes emerge from the data, namely, that isolated patients require personal monitoring devices, and those monitoring devices are connected directly to the nurse station

Sub-theme 1. The condition of isolated patients requires a personal monitoring device

Monitoring of the vital signs of COVID-19 patients in the isolation room should follow the regulation of one device per patient. However, the situation might not be accomplished because the devices were often in error, such as running out of battery and out of service. One of the factors that cause frequent battery runout and device errors is the sterilization process and too frequent use, considering that these devices must be used alternately for all patients. Digital blood pressure, thermometer, and oximetry instruments, for example, must be calibrated to ensure the feasibility and accuracy of the data measured. The statement was expressed by three participants as follows:

"For example, we (the nurse) should check the digital thermometer and the oximetry before using it. The devices are out of service due to a low battery charge and high utilization for all patients. Therefore, we need to check two or three times before and after assessing the patient's vital signs to record the right data." (P2)

"I had an experience when I was on my shift. That day, I did not assess the patient's saturation because a device was running out. I have reported it to the head nurse, but that time cannot be fixed promptly as it is a hospital regulation. We suggest the patient's family bring the oximetry to check their own saturation." (P6)

"A digital sphygmomanometer actually needs calibration to ensure actual data recorded is accurate. Nevertheless, the calibration devices are undone." (P9)

Sub-theme 2. The monitoring devices that are connected to the nurse station directly

While caring for COVID-19 patients in the isolation room, there is no monitor that can be connected to the nurse station. It is evident that the nurses find it difficult to do monitoring and supervision if they enter the patient's bedside. The nurse imagines what would happen if the monitoring and supervision of the patients' vital signs were synchronized in a good system, so the vital signs data would remain objective and accurate. Closed-circuit television (CCTV) is not a basis to check a patient's condition to date. The patient's room even has no CCTV; thus, some patients are not monitored optimally and there are even delays in knowing the deterioration of the patient's condition. Four participants said the following:

"The patient's bedside is not equipped with CCTV, so the nurses cannot control the patient's mobility

around. Thus, we should enter the room and check the patients." (P1)

"Because there is no integrating monitor installed on the patient's bedside continuously, the vital signs of the patients somehow failed to be recorded on time and to date." (P3)

"The difficulty for nurses in monitoring the vital signs of COVID-19 patients in this isolation room is that there are no vital sign devices that are continuously installed on the patient and connected to the nurse station's monitor." (P8)

"In the patient room, there are no vital signs devices that are continuously attached to the patient, so we cannot monitor the patient's vital signs directly from the nurse station. The deterioration of the patient's condition somehow delays the response." (P10)

Discussions

This study aims to identify nurses' problems in monitoring and supervising the vital signs of COVID-19 patients in the isolation room. The results of the study indicate three main themes that indicate the problems underpinning nursing services in the hospital. The need for technology-based to measure the vital signs and record them was also present in this study's results. Therefore, the development of the tools of digital or technology-based care for COVID-19 patients cannot be delayed.

The theme of the comparison of nurses and patients' radio in conditions that cannot be predicted confirmed that the high ratio of nurses to patients meant there was not the ideal situation of one nurse to one patient. They can't provide more responsibilities when monitoring COVID-19 patients who are being treated in the isolation room (González-Gil et al., 2020; Kang and Shin, 2020; Maben and Bridges, 2020). A shortage of nurse resources and an overflow number of patients result in an inability to perform regular and timely monitoring and reduce the quality of care (Tan MN, RN et al., 2020).

The unpredictable situation is also felt to be a problem for nurses in monitoring and supervising the vital signs of COVID-19 patients in the isolation room. This is due to unexpected responsibilities and the ratio between the nurses and the patients was not ideal. For example, if one of the patients experiences a critical condition, the hectic situation becomes more chaotic. Patients with COVID-19 have a higher risk of deterioration and severity than sufferers of other viruses, so many patients experience a sudden

deterioration. This increases the nurses' workload in monitoring and supervising COVID-19 patients in the isolation room (Pimentel et al., 2020). The nurses' workload resulted in physiological and psychological responses such as anxiety, stress, and difficulty sleeping (Ismail, Ridlo and Rochana, 2021). Joo and Liu (2021) argued that unexpected tasks when caring for COVID-19 patients are the obstacles for nurses in monitoring COVID-19 patients in the isolation room. Nurses must do other work and even complete the duties of other health team members (Lee and Lee, 2020; Schroeder et al., 2020). Moreover, this pandemic has made the care of COVID-19 patients increase in direct care time, missed treatment time, and waiting time for nurses' duties by 27%, 311%, and 44%, respectively (Qureshi et al., 2021).

The results of the study also stated that PPE and monitoring devices had not reached the appropriateness target. The result of the study was in line with Tallulembang, Widaniand Bandur's (2020) finding that the limited supply of PPE, care devices, or facilities were the obstacles for nurses in implementing nursing care. Atay and Cura (2020) also agreed that one of the barriers for nurses in monitoring COVID-19 patients was the use of PPE. As the PPE and monitoring devices were necessary in assessing the vital signs of COVID-19 patients, it was necessary for the manager to provide good quality PPE and supply the vital signs tools appropriately (BoSkoski et al., 2020).

The participants explained that the monitoring of vital signs in COVID-19 patients was still done manually by nurses. It is because there were no vital signs monitoring device connected to the nurse's station. These results are in line with previous research which stated that technology-based monitoring of vital signs for the COVID-19 in the isolation room cannot be provided automatically and remotely. Nurses must remain present with patients if they wish to monitor the patients' vital signs (Giménez-Espert, Prado-Gascó and Soto-Rubio, 2020; Lee and Lee, 2020). Based on the results of the study, it is important to provide high technology to monitor vital signs in the isolation room. The technology based on monitoring and supervision of the patient's condition can influence the quality of nursing care. It is better for the healthcare division to develop high-tech medical devices that can be the right solution in caring for COVID-19 patients (Sera et al., 2020).

This research has several strengths, including: 1) the data taken are from the nurses who were taking care of COVID-19 patients directly, so that they can deliver the real information through monitoring and supervision of the vital signs of those kinds of patients; 2) this study focuses on describing the nurses' problems in monitoring and supervision of the COVID-19 patients' vital signs in the isolation room. Meanwhile, the weakness of this study was noted as this is a descriptive qualitative approach, which means the phenomena, or the problem might not have been explored deeply enough yet. The sample took 10 nurses and was conducted in one hospital where the equipment needs more new stock. Moreover, the obstacles faced during the research were those of the interview Thus, the situation was not clear to hear. To limit the barriers of communication, we did clarification after the interview process, which we explained in trustworthiness

Conclusions

COVID-19 patients are challenging for nurses now, particularly to monitor and supervise their vital signs while patients are in the isolation room. The findings of this study have illustrated the problems and what the impact on the entire patient's health outcomes is. The health outcomes of COVID-19 patients are to improve their quality of life. The improvement of the quality of life of the patients should be based on the quality of nursing care that is provided by the nursing team and healthcare providers. The nurses should know how to solve the problems by doing continuous monitoring and supervision in caring for the COVID-19 patients, and the nursing manager should be aware of the nurses' work thoroughly.

This study highlights that there exist problems for nurses in monitoring and supervising vital signs of COVID-19 patients in isolation rooms, and that the problems might remain the same with other nurses outside the setting. These problems are related to time, devices, and resources. Therefore, it is necessary to develop a high-technology-based vital signs monitoring device to monitor and supervise the vital signs of COVID-19 patients in the isolation room. Moreover, the monitoring can be completed automatically, and the data recorded in real time. There is definitely no paper-based method to support a green economy and green digitalization.

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