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Indonesian hospital's preparedness for handling COVID-19 in the early onset of an outbreak: A qualitative study of nurse managers

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ABSTRACT

Background: Hospitals must be well-prepared to respond to pandemics. Hospital preparedness is critical to ensure optimal health service functioning and care delivery to reduce the transmission of COVID-19. Nurse managers play critical roles and provide expert advice on hospital preparedness models, to facilitate the delivery of safe and effective care, within the pandemic context.
Aim: To explore nurse managers' perspectives of hospital preparedness to handle the COVID-19 pandemic in its early phase.
Design: Descriptive qualitative study.
Methods: Nurse managers were recruited from two public hospitals designated for handling COVID-19, in East Java of Indonesia, using purposive sampling. Semi-structured interviews were conducted via phone and video conference. Data were analysed using the content analysis.
Results: A total of nine nurse managers participated and were included in analyses. Three main categories were identified. These were (1) operational policy, (2) infrastructure arrangement, and (3) healthcare personnel management.
Conclusions: The Indonesian healthcare system has made responsive adjustments to handle COVID-19 by increasing the flexibility and adaptability of institutional physical structures, services, and human resources on the early phase of the COVID-19 pandemic.

Introduction

The World Health Organization (WHO) declared the coronavirus disease (COVID-19) as a pandemic on March 11, 2020 [1]. Since then, the disease has spread throughout the world. COVID-19 has created logistical challenges in healthcare because of the substantial number of infected patients presenting to emergency departments, being hospitalized, and requiring care in specialized intensive care units [2]. The high number of cases, especially in those with a critical condition, placed a significant demand on hospitals with a limited capacity [3]. As a result, pandemics have now become associated with unpredictable and surging patient demands that impact hospitals' capacity, capabilities, and the overall functioning. Preparing and implementing hospital-wide measures aimed to minimize and manage the imminent surge in hospitalized patients with COVID-19 was required [4].

Indonesia has recently been recognized as a lower-middle income country [5]. As one of the developing countries in the world [6], the evolution of the healthcare system in Indonesia might be similar to that of other developing countries [7]. Yet, Indonesia has some unique characteristics. Indonesia is known as the fourth most populous country in the world with a population of 275.122.131, after China, India, and the United States [8]. This country is a diverse nation with a vast archipelago, consisting of at least 17,500 islands, 300 ethnic groups, and 34 provinces [9]. There are many difficult to reach locations because of limited transport, and this makes it challenging to monitor, manage, and suppress COVID-19 cases that occur in rural and remote areas [10]. Those situations illustrate the country's response to meet an increased demand for handling

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COVID-19 and predicted to be affected significantly by COVID-19 over a longer period [11].

The COVID-19 pandemic has presented a life-threatening reality against multiple aspects of healthcare systems, questioning overall preparedness and pandemic strategy [12]. To cope with the pandemic, hospitals must have undertaken preparations well before events occur. The preparedness of healthcare institutions and healthcare workers is crucial to apply effective prevention and control measures [13]. Preparedness is one of the fundamental stages of a crisis management cycle. A systematic review examining the experiences of nurses during the COVID-19 pandemic revealed the significant impact of unpreparedness on health institutions and nursing departments [14]. Hospital preparedness is a key determinant of the extent to which hospitals can maintain health services and control the spread of COVID-19. Previous studies on preparedness for healthcare during the pandemic have mostly concentrated on a unit level such as critical care units [15] and mass critical care [16] through critical care perspectives [17]. Only a few studies have explored nurse managers' perspectives on the preparedness on health institutions and hospitals at the outset of the COVID-19 pandemic.

Aim

This study aimed to explore the hospital preparedness to handle the COVID-19 pandemic from the perspective of nurse managers.

Methods and materials

Design

The study used a descriptive design with a qualitative content analysis. Recruitment occurred from July to August 2020, which was identified as the fourth month after two cases of COVID-19 infection were first confirmed in Indonesia on March 2, 2020 [18]. This complies with the Consolidated Criteria for Reporting Qualitative Research (COREQ) [19] (See Supplementary File 1).

Participants and settings

Study participants included a total of nine nurse managers, who were purposively recruited from two public government hospitals, designated for handling COVID-19 in two different regions in East Java, Indonesia. These two hospitals were categorized as regional general hospitals, on the Eastern part of Java Island, which were known as the second most populous regions in Indonesia during 2020 [20]. Nurses were included as participants if they met the following inclusion criteria including registered clinical nurse; civil servant; serving as nurse managers; including the head of the hospital's nursing division; the head of the nursing committee; and the head of the COVID-19 units and willing to participate voluntarily. Nurse managers were excluded if they were on workplace furlough because of COVID-19.

After study approval, there were five eligible nurse managers in each hospital who were approached by telephone. One nurse manager declined to participate the study because of the COVID-19 illness. After this, the principal researcher outlined the objectives and benefits of the study to participants. All participants signed the informed consent sheet and indicated their agreement to participate in the study. After the recruitment, the interviewer did not initiate any communication with eligible participants to ensure there were no established relationships between a researcher and participant.

Data collection

Semi-structured interviews were conducted to explore the nurse managers' perspectives on hospital preparedness on the early stage of the COVID-19 pandemic. Interviews explored how the hospitals had prepared for handling the COVID-19 pandemic. The open-ended core questions asked each participant *"how your institutional had prepared for handling COVID-19?"* and *"what your hospital did as preparedness for receiving COVID-19 patients?"*. Experienced nurse researchers in the qualitative research developed a interview guide related to COVID-19 and its management. The interview guide was piloted with two nurses, and after evaluating the nurses' responses to the questions, a few questions were revised to increase clarity and flow during interview processes.

A single interview per participant was conducted by an experienced qualitative researcher (N.A.) by video call or online video conference. This was digitally recorded. Only the participants and researcher were present. Data were enriched with written researcher field notes, which augmented the information collected and were included in the analysis. Participants had preferred to be interviewed virtually when they were at home or outside their regular working hours. Participants were interviewed once with the entire interview duration ranging from 35 to 67 min. As data collection and transcription of the recorded interviews occurred simultaneously, it allowed the researcher to reach data saturation with no additional patterns emerging from the interviews. Data saturation was reached after recruiting the 8th participant, but the interviews continued to the 9th participant to enrich data. This research had been approved by the Health Research Ethics Committee (KEPK), Faculty of Nursing University of Jember, No. 3694/UN25.1.14/SP/2020. The researchers reassured respondents that data were confidential, so that respondents were willing to share their perspectives in a recorded interview as the basis for generating accurate transcription [21]. All participants did not receive copies of the transcripts. However, to check and clarify the participants' responses, the interviewer restated the participant's main ideas before concluding the interview. When there was any inaccuracy in the interview data, the participants were invited to revise the statements or provide additional feedback.

Data Analysis

The qualitative content analysis was used allowing researchers to identify categories from the transcripts and develop a framework representing the most important descriptions gathered from participants [22]. Each transcript was independently reviewed by two authors (NA and AZR). Two researchers (NA and AZR) organized the raw data by means of initial coding, grouping similar codes into subcategories and merging subcategories into main categories. Any discrepancies in the data analysis process were resolved through discussion and consensus [23]. Categories were generated inductively as the basis for drafting the conceptual map [24].

Trustworthiness

Rigor and trustworthiness were maintained by ensuring authenticity, credibility, criticality, and integrity [25]. The researchers checked data obtained by re-reading the transcript to promote authenticity and credibility. Different methods were used to increase the data trustworthiness. For example, data were coded and classified independently by the researchers, and a research team reviewed the extracted codes. The emerging categories from the analysis were compared with each other to maintain the criticality.

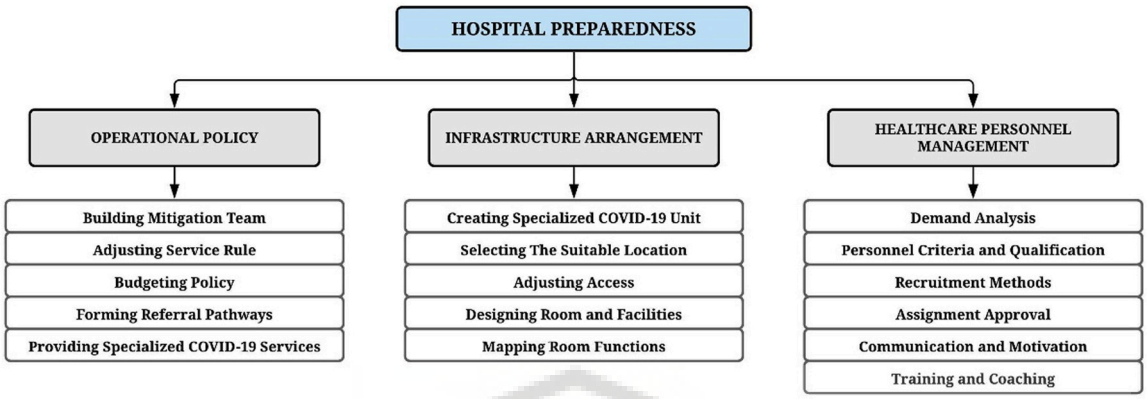

Fig. 1. Conceptual map.

Results

A total of nine participants were included in our analyses. The interview participants included five room managers and four hospital managers. All the nurse manager participants were Muslim and married. Males and females were nearly equally represented. Participants were on average 45 years old, with an average of 20 years of work experience. A total of 364 codes were generated and clustered into 16 sub-categories and three overarching categories which data presented, and findings were consistent. Fig. 1 shows three major categories that described nurse managers' experiences regarding hospital preparedness on the early COVID-19 pandemic, including (1) operational policy, (2) infrastructure arrangement, and (3) healthcare personnel management.

Operational policy

The first overarching category, operational policy, was considered fundamental for hospital preparedness in handling patients with COVID-19. Nurse managers described the importance of operational policy, as the basis to operate the healthcare institution when providing care to patients with COVID-19. This category referred to a set of principles underpinning the measures adopted by the hospital, which included building mitigation team, adjusting the care service rule, budgeting policy, forming referral pathways, and providing specialized COVID-19 services. These five subcategories of operational policy are described in the following sections.

Building mitigation team

The first subcategory of operational policy related to building a mitigation team, to create the COVID-19 mitigation system and anticipate serious adverse events by organizing an Infection Prevention Control (IPC) team and responsible for creating standard operating procedure (SOP) for handling patient and infection control.

> *"Team manager of the hospital held a coordination meeting in preparation mitigation system as a designated hospital" (N5). "Since the first cases were confirmed in Indonesia, IPC team were prepared continuously at hospital. This team was later known as COVID-19 IPC, and they worked together to design required SOP" (N8).*

Adjusting service rule

To minimize the infection, the hospital needed to adapt new service rules such as restriction of family companion/next of kin, prohibition of visitors and visiting hours, and obligation in using personal protective equipment (PPE).

> *"Now, there is no visiting hour for patients, which has been effective since March 2020. In addition, the number of visitors is limited, and they have to put on mask" (N4). "Patients and their families are required to wear mask, but patients with total care, their families have to wear personal protective device" (N8).*

Budgeting policy

Surges in the number of patients with COVID-19 requiring hospitalization led to depleted medical supplies. Thus, to support the operations necessary to deal with an unpredicted outbreak of COVID-19, the management had to allocate an emergency budget. To that end, they had to redirect the regular budget for supplying required PPE and converted alternative funding for hospital operations during the COVID-19 pandemic.

> *"This was what I felt during the pandemic. As a manager, I had to prepare the budgeting and everything else to anticipate future serious events. This budgeting issue had reached millions (N5). About 50% of the budget, which was initially allocated for building hospitals, has now been used to purchase PPE. This budget shift has been outstanding" (N7).*

Forming referral pathways

When hospitals faced overcapacity or any complication of COVID-19 requiring external support, the management planned to create a referral pathway (such as ambulance re-direction) to the other nearby tertiary hospitals.

> *"We issued referrals for patients tested positive or even suspected as COVID-19" (N4). "Patients with complications were taken to heart and lung clinics at hospitals where they were given intensive care. Patients with positive results, either Swab or rapid test, were all taken to referral hospitals" (N7).*

Providing specialized COVID-19 services

As COVID-19 has symptoms different to other diseases, additional care services were required, such as screening by a rapid test and patient re-assessment, when being admitted as an inpatient.

> *"Every patient has to go through repeated anamnesis (verbal assessment of the medical history of patient), in case they passed the screening in emergency unit. The patients from this unit have to undergo pre-assessment for the second time with specific parameters" (N9). "There is screening in emergency unit, so patients suspected will be directly taken to the isolation units or to the regular rooms, if the result is non-reactive" (N4).*

Infrastructure arrangement

The second overarching category for hospital preparedness was approaches to infrastructure arrangement. Nurse managers revealed the importance of arranging buildings, equipment, and mechanisms to deliver healthcare services to patients with COVID-19. It refers to the readiness of critical structures and facilities, either physical or mechanical in nature, required for managing COVID-19. The five subcategories of infrastructure arrangement include creating specialized COVID-19 units, selecting suitable locations, adjusting access, designing rooms and facilities, and mapping room functions. Those sub-categories are described as following.

Creating specialized COVID-19 unit

As patients with COVID-19 were treated separately from patients without COVID-19, the hospital managed to provide special units for caring for those patients. These units were created through building a new unit for the treatment of patients with COVID-19, changing the existing rooms into a special rooms designed for COVID-19, converting unused rooms designed for COVID-19 treatment spaces, and separating special operating theaters for COVID-19, which were temporarily separated from regular ones, in effort to minimize transmission and infection.

> *"In response of COVID-19 emergency, The Ministry of Health issued executive direction for hospital to open special ward for COVID-19' patients"* (*N4*). *"The existing rooms designed for COVID-19 patients were previously emergency unit* (*N7*). *"Unused emergency rooms were also converted into special treatment unit, this is due to an increased need for space"* (*N8*). *"We also prepared operating theater. One of these rooms was once used for COVID-19 patient"* (*N7*).

Selecting the suitable location

The selection of rooms used as a COVID-19 special unit was made by considering the location farthest from the general geographical reach.

> *"My room was chosen as COVID-19 unit because it was situated the farthest from regular patients" (N2). "Finally, particular unit was chosen because it was located at the back"* (*N3*).

Adjusting access

The hospital entrance was modified, including creating an emergency entrance for infected patients. Controlled separation between patients, visitors, and staff was based upon specific illnesses and their related level of the contagion risk.

> *"Yes, there was specific entrance to specific unit separated to other regular units"* (*N8*). *"We had to modify the access since the virus was transmitted through the air and droplet"* (*N7*).

Designing room and facilities

To better accommodate patients with COVID-19 within the hospital and prevent the transmission on infection of COVID-19, the institution designed, adapted, and adjusted the available rooms, by providing special facilities required for COVID-19 treatment.

> "*At the moment, the existing rooms were managed by applying both positive and negative pressures. Twelve rooms were equipped with HEPA filter and given negative pressure. In the staff room and changing room, we applied positive pressure, so the negative pressure remained in the patients' rooms"* (*N2*). *"Yesterday, we renovated our unit to apply negative pressure in the area"* (*N3*).

Mapping room functions

The existing rooms were mapped to consider the patient placement, particularly by considering their individual severity and symptoms.

> *"At the moment, we divided COVID-19 units and non-COVID-19 units. The same applied to COVID-19 isolation and non-COVID-19 isolation"* (*N2*). *Since we had three isolation rooms, we isolated patients with serious symptoms and confirmed infection in one room, while those with mild cases of COVID-19 were treated in two other rooms"* (*N6*).

Healthcare personnel management

Healthcare personnel management was the third overarching category. Nurse managers described the essential roles of healthcare personnel to support the institutional preparedness during the COVID-19 pandemic. This category refers to the managerial activities to make sure that the personnel were ready on care delivery. This category consisted of six subcategories such as demand analysis, personnel criteria and qualification, recruitment methods, assignment approval, communication and motivation, and training, as well as coaching.

Demand analysis

To work in the COVID-19 unit, hospitals prepared all the nursing staff.

> "*Since the first cases were confirmed, the IPC team was prepared. As the number of cases rose in Indonesia, most hospitals started organizing special teams"* (*N8*). *"These teams collaborated with all heads of divisions. Some of the heads of divisions were recommended to serve in COVID-19 units. After that, we sent this recommendation to the head of management and nursing division, so we eventually came up with the assignment of special teams for treating COVID-19* (*N6*).

Personnel criteria and qualification

One of the most important aspects in assigning nursing staff to the COVID-19 unit was consideration of each individual nurse against specific criteria. This included the age, health record, skills and expertize, achievement, and nursing qualifications.

> *"As of March 17, specific assignment letter for COVID-19 team was issued. After that, we ran a selection to find out whether the personnel had previous illness which might potentially indicate comorbid. We did not assign them in high-risk units"* (*N6*). *"To mobilize the staffs, we opted for young age. We also chose those with satisfactory achievement. "What is more, we selected individuals accustomed to emergency situations and capable of operating ventilator in specific units, such as ICU, ICCU"* (*N5*).

Recruitment methods

To address the nursing staff workforce requirements, nurse managers mobilized existing workforce and recruited additional workforce external to the organization.

> *"At this point, we needed to manage our human resources. We did not recruit new individuals, so we simply selected existing personnel from some units"* (*N5*). *"After one or two months, we recruited more people through outsourcing, because we need more supports. The human resource department did the recruitment and finally recruited external personnel to deal with COVID-19"* (*N7*).

Assignment approval

One of the subsequent phases on managing the human resources was gaining the consent from the nurses. This was necessary for those who would be assigned and had met the required criteria.

> *"Our colleagues recommended for the task were invited to a meeting, where we gave instruction and they gave consent"* (*N7*). *"Some volunteered to take part, and some others even volunteered to work in COVID-19 unit"* (*N6*).

Communication and motivation

Motivation and communication were continuously maintained for eligible nurses who would be assigned to COVID-19 units.

> "*Before the assignment was given, we gathered the personnel and motivated them. Thank God, they understood what we pointed out. We explained that everything related to the disease was very different"* (*N5*) *"We gave examples to our colleagues, showing that as the forefront we needed to be ready"* (*N10*).

Training and coaching

As COVID-19 was a relatively new disease where little information was known, to prepare specific competencies of our nurses to treat patients, we provided specific training related to COVID-19 through in-house training and education.

> "*The special training for dealing with COVID-19 is only a form of socialization from the hospital's COVID team. There is some sort of preparation"* (*N6*). *"Another special training is also provided by IPCN. The trainers at the hospital are the doctors assigned to treat COVID-19. These are internal medicine doctors. We have briefing and tutorial. In short, we receive short-term training in which we learn how to care COVID-19 patients, required PPEs, measures, and the equipment we have to use"* (*N2*).

Discussion

Through the lens of nurse's managers, this study explored hospital preparedness to handle COVID-19, at the onset of the outbreak at two designated public hospitals located in different regions in East Java, Indonesia. This study recruited a cohort of nurse managers to explore their first-hand perspectives, when tasked to manage COVID-19 in a public health facility in Indonesia during the first fourth months of the pandemic. The research findings revealed three categories namely operational policy, infrastructure arrangement, and healthcare personnel management. The findings imply that institutional preparedness on the early phase of a COVID-19 outbreak relies on building operational policy, supporting personnel and structural components of readiness. These efforts helped to prevent the nosocomial outbreak and ensure that hospitals ensure the safety when delivering healthcare during the COVID-19 pandemic [14].

The outset of an outbreak presents challenges when the disease first appeared. Population susceptibility, rates of infection, and severity of illness and its symptoms were problematic. Taking immediate measures and establishing rapid policy schemes were crucial [26]. At the outset of the COVID-19 pandemic in Indonesia, hospitals served as an interconnected structural place, which provided a framework supporting an entire development of emergency responses. During this situation, nurse managers have played an important role in health services, especially in the hospital setting, because these professionals were responsible for managing nursing services and taking measures to deliver quality care [27].

The research findings that related to operational policy implied that to date, the hospital had been prepared to prevent and control the outbreak of COVID-19. The majority of Indonesian hospitals have strived to follow the policies and guidelines issued by the WHO and the ministry of health's regulations in response to COVID-19. The findings further show that hospital preparedness was congruent with the immediate measures taken by the Indonesian government to deal with COVID-19. These guidelines and policies need to be operationalized properly to ensure satisfactory protection for healthcare staffs, patients, and visitors.

In response to the pandemic, existing buildings required reconfiguration to meet the required healthcare environment for patients with COVID-19. Hospitals took action to convert non-clinical spaces into clinical spaces. This was achieved through converting unoccupied rooms, reorganizing healthcare facilities, and redeveloping non-health areas within hospitals, which were either underused, unoccupied, or abandoned. Our study highlighted that the backyard of the hospital was generally selected for temporary treatment spaces. Enhancing their creativity and innovation, hospitals played multiple roles to react to a variety of crises. To better accommodate patients with COVID-19 at a hospital, spatial and organizational adaptations were implemented, including the reorganization of internal 'foot traffic' routes and flows to separate those infected by coronavirus from those without the virus.

Our findings on infrastructure arrangement suggested that a key element of preparedness is the hospital ability to retrofit, or reallocate parts of their facilities, even those generally unused [28]. Infrastructure was a key pillar for supporting the fundamental aim of promoting improved standards of care and wellbeing for all patients, coupled with a good experience of the healthcare system [29]. Our findings support the 6th section of the assessment regarding "Infection prevention and control healthcare facility response for COVID-19″ monitoring tool that was designed to assess infection prevention and control capacities in response to COVID-19 by arranging suitable environment, building infrastructure, and providing supplies [30].

Our findings on the preparedness of human resources indicate that the management in critical situations required flexible and situational management principles to recruit, arrange, and retain workforce and also to compensate for the lack of human resources. Current health crises demands that available resources must remain at the forefront of providing the highest standard of healthcare for all patients [31]. Healthcare workers play an essential role at the frontlines, providing care for patients. In the context of COVID-19 and during routine health services, they provide critical care to patients and ensure that infection prevention and control (IPC) measures are implemented and maintained in healthcare facilities to limit healthcare-associated infections [32]. Qualitative research does not provide generalizability. The information presented is descriptive and provides rich and valuable insights into the experiences and perspectives of nurse managers. Although the number of participants was small, data saturation was achieved.

Conclusion

This study reported nurse managers' perspectives on hospital readiness in handling COVID-19 at the onset of the COVID-19 pandemic in Indonesia, which was manifested in the implementation of operational policy, building and resource preparedness, and allocating as well as managing human resources. The Indonesian healthcare system has made responsive adjustments to handle COVID-19 by increasing the flexibility and adaptability of institutional physical structures, services, and human resources during the COVID-19 pandemic, each of which was essential for hospital preparedness. The institutional ability to modify, redesign, reorganize, redevelop, and reallocate alternate spaces is pivotal for infrastructures preparedness in handling COVID-19. The findings can help health services to support management, administrators, and nursing leaders to scrutinize the strengths and weaknesses of hospital preparedness for caring patients with COVID-19. These are crucial to

support nurses because they contribute heavily in the fight against the COVID-19 pandemic.

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CRediT authorship contribution statement

All authors contributed to the study. **NA:** Conceptualization, interview, Data analysis, and drafting of the manuscript, Formal analysis, Methodology, Investigation, Writing – original draft. **CF:** Supervision, Validation, Critical review, and editing, Writing – review & editing. **AZR:** Ethical clearance, Data analysis, and Data translation, Data curation, Project administration, Writing – review & editing. **DK:** Acquisition of data and fieldwork, Resources, Project administration. All the authors contributed and approved the final manuscript.

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Conflict of interest

The authors certify that they have no conflict of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.auec.2022.02.002.

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