Exploration of Factors Influencing Nurses’ Preparability and Response to the COVID-19 Outbreak

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Abstract
Introduction and Objective: Nurses as the core of the health care workforce affect an organization’s preparedness and response. This study explores the factors and unique determinants influencing nurses’ preparedness and response to the coronavirus disease 2019 (COVID-19) outbreak in Singapore.

Methods: This qualitative phenomenological study utilized purposive sampling and in-depth interviews with 10 registered nurses and two enrolled nurses who had worked or were still working in an infectious disease (ID) hospital during the COVID-19 outbreak at the point of recruitment. The data were collected from September 2020 to December 2020.

Results: (1) Before the outbreak: Factors such as knowledge, skills, and experiences that enhanced nurses’ adaptability and response through training and exposure prior to the outbreak influenced preparedness. In addition, the importance of nurses’ knowing their purpose and the role of their institute during the outbreak also influenced preparedness. (2) The COVID-19 phase: Factors such as the novelty of the disease, communication, load and demand, and coping mechanisms affected participants’ working response to the outbreak. (3) Learning and looking forth: Lessons learnt to enhance preparedness and response to future outbreaks, and positive sentiments as part of the nation’s effort to combat the disease.

Conclusion: Ground nurses should be actively involved in outbreak planning to gain a better view of their responsibilities and unpredictable events that may occur. A transparent and bidirectional communication among management and nurses is crucial amidst rapid changes in an outbreak to strike a balance between the needs of nurses and leadership and to enhance nurses’ resilience throughout this challenging journey.

Keywords
COVID-19, emerging communicable diseases, acute illnesses, occupational stress, mental health, coronavirus, qualitative research, research

Introduction and Background
In December 2019, pneumonia clusters of unknown cause emerged in Wuhan, China (World Health Organisation [WHO], 2020). A novel zoonotic coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was later identified as the causative agent (WHO, 2020). The resultant disease, coronavirus disease 2019 (COVID-19), can range from asymptomatic to life-threatening acute respiratory distress syndrome (Cevik et al., 2020). The outbreak has since spread swiftly worldwide and evolved into a global pandemic (WHO, 2021). As of December 21, 2021, more than 274,628,461 cases and 5,358,978 deaths were reported worldwide, of which over 276,105 cases and 815 deaths occurred in Singapore (WHO, 2021).

Singapore announced its first imported case of COVID-19 on January 23, 2020. Early imported cases gradually gave

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way to local transmission cases by the end of March 2020. From March to May 2020, Singapore saw a 10-fold rise in the daily numbers of COVID-19 cases due to the rapid spread of infection within crowded migrant workers dormitories (Chen et al., 2020). With the intensification of local transmission and COVID-19 sharing similar features with many common respiratory illnesses, Singapore adopted a widespread screening of patients with acute respiratory symptoms to contain the spread of the virus. An enhanced pneumonia surveillance (EPS) system was developed to detect COVID-19 among pneumonia cases that fall out of the case definition. This “leave no stones unturned” approach is highly resource intensive and dedicated hospital wards are occupied for this purpose (Chew et al., 2021).

An infectious disease (ID) hospital was the epicenter of Singapore’s outbreak response in the beginning. It is a 330-bedded purpose-built ID management facility with the capacity to surge up to 586 beds (Soh, 2020). However, prior to the COVID-19 outbreak, only 140 beds were operational. At the start of the outbreak, the hospital manages most of the nation’s suspect and confirmed cases requiring hospitalization. To cope with the increase in demand, the number of beds was increased from 140 to 330, and at its peak to 586 beds. To cope with increased capacity, nursing manpower was predominantly augmented by staff from a nearby multidisciplinary general hospital in which the ID hospital is integrated with for clinical operations and support (Soh, 2020).

Nurses are at the core of the health care workforce and are critical in defining the hospital capacity to manage the COVID-19 cases (Buheji & Buhaid, 2020). Therefore, it is imperative to examine the factors influencing their preparedness and response.

**Review of Literature**

A narrative synthesis of qualitative studies found that personal resources, workplace resources, and situational influences were interactive core components associated with nurses’ preparedness for outbreak response (Lam et al., 2017). Influencing elements under these core components included knowledge and skills, past experiences, professionalism, co-worker support, effective leadership, support from authorities in resource provision, information availability, disease severity, and the public’s response to the disease (Lam et al., 2017). These influencing elements were echoed separately in other studies, albeit reference to nurses’ outbreak preparedness was not directly made (Fernandez et al., 2020; Im et al., 2018; Khalid et al., 2016; Kim, 2018; Liu et al., 2020; Smith et al., 2017; Zhang et al., 2020).

While existing studies give valuable insights on some influencing factors of nurses’ preparedness for outbreak response, they are not specific to the COVID-19 and local context. Differences in nurses’ perceptions across emerging IDs and countries may be present due to varying disease characteristics, treatment settings, resources availability, health care systems, and cultures (Kim, 2018; Smith et al., 2017). Moreover, the influencing factors are inadequately explored due to the sparsity of relevant studies (Lam et al., 2017).

This study addresses the above gaps by exploring the factors influencing nurses’ preparedness and response to the COVID-19 outbreak in Singapore, using a qualitative approach. It is hoped that the findings would contribute to developing future strategies for optimizing nurses’ preparedness and response.

**Methods**

**Design**

The study was conducted over a year from October 2020 to October 2021. A phenomenology approach with thematic analysis was utilized to explore factors that shaped nurses’ preparedness and response to the COVID-19 outbreak. A phenomenological study examines the participants’ lived experiences while thematic analysis illuminates the commonalities of the researched topic (Creswell, 2013; Sundler et al., 2019). Participants were interviewed face-to-face using semi-structured interviews.

**Research Questions**

What are the factors and unique determinants influencing nurses’ preparedness and response to the COVID-19 outbreak in Singapore?

**Sample**

Purposive sampling was utilized to identify participants among nurses from an ID hospital and augmented nurses from the nearby general hospital.

The inclusion criteria for participants were:

1. Registered and enrolled nurses working or having worked in the outbreak wards located in the ID hospital.
2. Worked in the ID hospital’s outbreak wards for more than a month.
3. Above the age of 21 years.

Twelve participants, including 10 registered nurses and two enrolled nurses, were recruited at the point of data saturation. Nine were from the ID hospital staff, and three were augmented staff from the general hospital. All participants nursed both confirmed and suspected COVID-19 cases in the outbreak general wards.

**Data Collection Procedures**

The interviews were conducted from September 2020 to December 2020. Before that, the study’s information was distributed to all general wards in the general hospital and the ID hospital. Emails about the study were also sent to nursing
officers managing general wards. Semi-structured interviews were done in person individually for data collection with an interview guide. The interviews were recorded and transcribed verbatim. Each interview did not last more than 120 min.

The study team started the interview by asking a broad question: “to start, can you tell me the role you are currently doing in the outbreak wards” Subsequently, the researchers asked open-ended questions to obtain insights.

For example, “have you heard of or attended any outbreak training or drills before this outbreak”; “What helped you transit from a regular ward to an outbreak ward”; “what do you think you or the hospital could have done differently to improve your confidence in dealing with an outbreak”; “what challenges did you encounter”; “what strategies did you use to cope with this outbreak”; “do you see yourself having more confidence in managing this and future outbreak”; and “what other support do you need?” Lastly, the researchers also used probing questions such as “can you tell me more about it” or “what do you mean by that” for more clarity and detail.

Data Analysis

Data analysis began concurrently with the interviews. Thematic analysis was utilized to form themes (Creswell, 2013). Raw data was read multiple times independently by each researcher to elicit patterns and form themes. The themes were then compared, discussed, and refined until consensus was achieved among the researchers.

Validity was established by in-depth interviews followed by peer debriefing. Peer checking of the transcription was done by a supervisor familiar with the qualitative methodology. Transferability was enhanced through a detailed description of the methodology, participants’ characteristics, and sufficient quotations. An audit trail was created so that all processes and decisions were recorded and transparent.

Ethics

Ethical approval was sought from the hospital’s Institutional Review Board. Written informed consent detailing the study was obtained from all participants before their interview. The participants were informed that participation was voluntary, and they could withdraw from the study anytime without repercussions. They were also informed that a professional counseling service is available if the conversation caused emotional and psychological distress. Interviews were audio-recorded with permission from the participants. All audio records and transcripts were saved in password encrypted devices and stored locked. All identifiers were removed and replaced with a unique subject identification code.

Results

Sample Characteristics

The participants’ demographic data are presented in Table 1.

Research Question Results

The findings were analyzed in the three phases: before the outbreak, the COVID-19 phase, and learning and looking forth.

Before the Outbreak. The themes that emerged during the phase “before the outbreak” included knowledge, skills, and experiences of the staff, and knowing the purpose.

Knowledge, Skills, and Experiences. Before the COVID-19 outbreak locally, many participants had undergone IDs training in preparation for outbreaks. Participants shared that the acquired knowledge and skills had enhanced their preparedness and response to the COVID-19 outbreak. Moreover, they revealed that the training had allowed them to anticipate possible outbreak scenarios and build up mental preparedness to adapt to challenging times.

‘I think it’s because I’m ID trained. So, like, it’s easier for me to adapt to the transition.’ [IDI12]

‘The training is a good chance for at least have a brief idea of how it will look like or how it is going to be like.’ [IDI3]

Participants who had cared for patients with other respiratory IDs such as the Middle East respiratory syndrome or H7N9 appeared better adapted to COVID-19 guidelines.

| Table 1. Demographics of Participants (n = 12). |
|-----------------------------------------------|
| Age (years), mean (SD) 29.75 (6.40) |
| Gender, n (%) | | |
| Female | 12 (100) |
| Male | 0 (0) |
| Designation, n (%) | | |
| Staff nurse | 10 (83) |
| Enrolled nurse | 2 (16) |
| Highest education level, n (%) | | |
| Bachelor’s degree | 9 (75) |
| Diploma | 2 (16) |
| Certificate | 1 (8) |
| Marital status, n (%) | | |
| Single | 9 (75) |
| Married | 3 (25) |
| Years of working experience, mean (SD) 5.63 (3.51) |
| Place of work before outbreak, n (%) | | |
| Infectious disease (ID) hospital | 9 (75) |
| General hospital | 3 (25) |
These other ID patients also required the donning of personal protective equipment (PPE) and special specimen collection methods. Hence, familiarity with the isolation precautions and workflows resulted in better adaptation when caring for patients with COVID-19.

‘MERS-CoV is also full PPE. Then H7N9 we also have to don full PPE everything … for PPE wise we are quite all well-trained.’ [IDI9]

‘For MERS-CoV, so they will teach us how to dispatch specimens, which are also put in a double bag, then put in a cooler box…’ [IDI12]

In contrast, participants who were not native to the ID hospital and had limited experience with IDs felt uncertain and overwhelmed. They attributed their feelings to the need for quick adaptation to guidelines and unfamiliar environments.

‘The immediate wearing of PPE, how to do this and that, initially it was really overwhelming because you need to do it now, like now.’ [IDI5]

Knowing the Purpose. Despite the risk of exposure to contagions, several participants cited that their understanding of the institution’s national role in outbreak response and having a purpose-built facility brought confidence and assurance to them when facing current and future outbreaks. The participants further implied that equipment equipped with technology to combat IDs would help them ride through the crisis. Furthermore, participants’ understanding of the rationales behind outbreak training further aligned their expectations with the organization—they expected crisis activation when the time arises.

‘Actually, having the infectious disease hospital already is a big factor for Nurses to be confident, right? Because we have the facilities, the equipment that can help us get through, right?’ [IDI5]

‘… already sort of let us know what kind of, actually why this building is built up, everything.’ [IDI2]

The COVID-19 Phase. During the COVID-19 phase, the emerging themes included outbreak characteristics, communication, load and demand, and coping.

Outbreak Characteristics. The participants’ outbreak response was influenced by the novelty, communicability, massive scale training, and severity of COVID-19 disease.

The disease’s novelty resulted in rapid and frequent changes to workflows. When the participants were posted to the outbreak wards, they had to assimilate to new practices swiftly. As more information emerged about the disease, the protocols and work processes and workflows changed.

‘The protocol that changes over this whole … six months, eight months, it’s really insane. And it was not told in advance. Then it’s very hard for us to even adapt to the changes.’ [IDI3]

Besides adapting to the ever-changing guidelines and protocols, participants had to adjust to different work environments due to frequent and last-minute deployments. The wards were opening and closing according to the demand for hospital beds.

‘… you already halfway working … then they will come and tell you go help this ward, this ward very busy.’ [IDI4]

While the deployments aimed to balance staffing and skill mix across the outbreak wards to cope with massive surges, they posed challenges in communication and fostering teamwork among participants. Moreover, it left participants with a sense of unfairness.

‘How we run the ward, we have different ways … you are not from here, so you will feel like you are just moving by yourself working, so it’s really difficult to adjust to people.’ [IDI5]

‘It’s not very nice to deploy staff everywhere, anywhere lah … because it’s really unfair! … you will be thinking that, “Why am I the one that’s being chosen?”’ [IDI3]

Furthermore, due to a potential surge in critically ill patients, many participants needed to be trained for higher levels of care within a short period. These training were conducted in large class sizes over a very short period of time with superficial content coverage and few practice opportunities. Participants therefore questioned the training’s effectiveness.

‘I think it will only benefit to a certain extent because the knowledge that they covered us is very superficial … But it somehow supplements us with ideas or pictures of what is going to happen … I think that training is good, but in long run if they were to throw us to the ICU for very long, then I think more training will be needed.’ [IDI8]

Apart from coping with the little-known virus in the clinical settings, participants also had to cope with the public’s perception of the disease. The overall disease characteristics of COVID-19 ignited fear of infection among the public. Participants experienced stigma from the public and community because of their profession.

Participants, too, feared getting infected and infecting others. Some participants isolated themselves from their
family and friends and excluded themselves from social activities.

‘... Yes, they might be afraid, but they never say because we are friends ... I might just feel I don't go [for the gathering], then put them in ease. I also at ease ... I feel I am a stigma to other people.’ [IDI6]

However, having infection control and prevention (IPC) precautions and adequate resources assured several participants.

‘... because we have a full PPE always, I always think, “Ok, as long as ... you wear your mask properly, you have your gown ... you [will] not get infected.” ‘[IDI11]

Additionally, participants’ sense of professional responsibility pushed them to continue their duties despite their fear.

‘We know the whole nation is into this, and we felt the responsibility as a nurse.’ [IDI8]

Communication. Communication, or the lack of it, also impacted how participants responded to the disease. Updates from the management gave participants a fuller picture of the situation and management’s plan, allowing them to know what to expect amidst the uncertainties.

‘... the timely update by our DN [Director of Nursing] is quite assuring, because they will have ... some information update ... like, what is Singapore’s status, or how is our management handling, and what are we going to expect. I think that really helps a lot by letting me know what’s going to happen ...’ [IDI8].

However, the lack of such communication created mistrust and frustration toward the management.

‘I felt a lot of things is stopped at the upper level ... that is when ... I started to feel not that confident anymore ...’ [IDI3]

Besides, several participants reported a deficiency in interdisciplinary communication and collaboration. Their accounts revolved mainly around the issue of communication failure, along with responsibility shifting, frequent amendment of orders and inadequate documentation updates. The deficiency in interdisciplinary communication and collaboration contributed to workload and compromised patient safety.

‘Supposedly the pharmacist has to do the counselling [for discharge medications] to the patients ... at first, they doing but ... getting busy, they not doing that already ... okay, then you go and do ... the doctor never update the medication prescription ... the patient just discharged with the previous medication prescription ... the doctors never communicate ... that the medication is updated ... then the pharmacist also never bring in a new pack of medication ... then how we know? ... they say the patient already missed the morning dose of the medication.’ [IDI2]

Load and Demand. Load and demand experienced by participants shaped their outbreak response. The load and demand were, in turn, impacted by multiple elements, one of which was patient acuity. When describing patient acuity, most participants compared COVID-19 and EPS cases, consisting of patients with pneumonia to rule out COVID-19 infections. The former tended to be more clinically stable and functionally independent, whereas the latter were usually sicker and more functionally dependent, requiring a greater intensity of nursing activities.

‘In EPS, like, the workload is more ... all the IV, bedbound ... COVID is, like ... just symptomatic treatment, just take a parameter, and give medicine only. It's, like, easy job lah. But in EPS, it’s more in-depth nursing care ...’ [IDI4]

Some participants encountered unfamiliar patient care tasks beyond their clinical experience with higher acuity cases. The resultant uncertainties left them feeling unprepared.

‘In your mind you are quite empty, You don’t know ... what you should do. Maybe it's because my exposure not enough ...’ [IDI2]

Further contributing to the load and demand was a rapid and massive patient turnover rate. EPS and COVID-19 suspect cases were transferred to the general hospital or discharged once COVID-19 was ruled out, while eligible COVID-19 cases were actively decanted to community facilities after risk stratification to make space for more admissions. Several participants commented on being overwhelmed consequently.

‘You don’t have time already to eat, you don’t have time to go toilet because, like, the patient is non-stop. You discharged patient, like, you haven’t cleared the room, there is a booking already ... even middle of the night, we discharging patient ...’ [IDI12]

Besides, an increased necessity to address psychological and emotional needs in patient care added on to the load and demand. Several participants described often having to alleviate anxiety related to uncertainties among patients and their families and sometimes being on the receiving end of their frustration about COVID-19 rules and regulations.

‘I think for patients wise ... because they have no this kind of knowledge about COVID ... you have to really reassure them
...our role is more to like education and [allay] their anxiety …’ [IDI9]

‘…there is no visitor [allowed]. There are so many anxious family members. At times, they want to ventilate out to us …’ [IDI6]

Beyond patient care, some participants recounted assuming more miscellaneous tasks than before the outbreak, as the groups of hospital staff previously assigned to some of these tasks were disallowed from entering the isolation rooms or had their manpower stretched during the outbreak.

‘…we need to collect the blood and everything, other than our patient’s normal Aurora ordering, for the research team…this one is time consuming because it’s extra work …we need to go in extra time …just to collect specimen.’ [IDI6]

Increased IPC precautions compounded the load and demand. Many participants described how the need to don and doff PPE upon entering and exiting each isolation room consumed time and created inconvenience.

‘… donning on and off PPE, it takes a lot of time … once we enter the room, we can’t come out. Instead, we need to ask for things if you forget, which will take a longer time. Your colleague also will be busy with you.’ [IDI3]

Participants also expressed that PPE use, especially extended N95 mask use, took a physical toll on them. Breathing difficulties and pressure injuries were the commonest complaints.

‘… to wear N95 the whole shift … your face is all, like, straps, I mean marks of the … N95 also. And already is you can feel a bit difficult, like, breathing …’ [IDI12]

Overall, heavy load and demand resulted in exhaustion and stress among participants, negatively affecting their well-being. Additionally, patient safety could be jeopardized with nurses being more error prone.

‘Exhausted … even 5 to 10 min, we cannot spare out to go for break … and then I go back late … like, no work-life balance already. I just work, work, work.’ [IDI6]

‘If our workload is going to be very high … it will just cause staff to do a lot of mistakes lah.’ [IDI3]

Coping. Several participants mentioned that teamwork enabled them to cope with the workload, while others mentioned that nursing officers’ care and concern played a role. Most participants also relied on self-management, support of family and friends, and engaging in hobbies as a form of distraction to better cope.

‘I think all quite supportive … I do have some colleagues, they are quite stressed … Sister will try to assign them to those less stressful place.’ [IDI9]

Learning and Looking Forth. This phase is characterized by the gains and growth from outbreak participation, which better prepares participants to respond to future outbreaks.

Several participants expressed positive sentiments about their participation in the outbreak. They appreciated the opportunity to gain an exclusive experience and felt a sense of pride in contributing to the nation’s outbreak efforts.

‘… very grateful that I am here in Singapore … I was given the chance to … be a part of an infectious disease hospital with the outbreak … it’s scary experience but it’s also a once-in-a-lifetime.’ [IDI5]

‘I am very proud of myself … I felt that I am really returning to society.’ [IDI3]

Besides, most participants felt more confident and prepared for future outbreaks mainly because of the experience gained from the current outbreak on both individual and institutional levels.

‘So after COVID, I feel we are more experienced already — how, what to do … protocol would be standard already as long as there is outbreak …’ [IDI6]

Overall, participants indicated a willingness to work and volunteer in future outbreaks. The opportunities to learn and gain exposure and confidence in themselves and the outbreak management were incentivizing factors.

‘… I want to expose more, explore more … I want to know … what to do to take care of this kind of patient.’ [IDI2]

‘Since I already was chosen lah this COVID, I think I can do again.’ [IDI11]

‘… there’s no harm in volunteering, especially if you know that you are really on the safe side … I have the confidence in how they manage.’ [IDI5]

Discussion

The COVID-19 outbreak has proven physically and mentally challenging for nurses in the ID hospital. Earlier studies indicated similar challenging traits to this study, such as shortfalls in beds, nursing staffing, and medical supplies (Al Thobaity & Alshammari, 2020; Chen et al., 2020). Despite
these challenges, nurses who possessed prior IDs training and outbreak experience had better transition and adaptability, which resonated with the findings of previous studies (Lam et al., 2017, 2020; Zhang et al., 2020).

Prior training equipped them with relevant knowledge and skills to enhance their response and clinical decisions, such as precautionary measures, care prioritization, and resources conservation amid uncertainties in the initial outbreak phase (Lam et al., 2020; Zhang et al., 2020). Furthermore, with prior outbreak experience, nurses had improved infection control standards and adherence, and knowledge and skills in managing outbreaks and expectations (Gee & Skovdøl, 2017; Lam et al., 2017, 2020; Oh et al., 2017; Zhang et al., 2020).

The ID hospital is a purpose-designed facility to strengthen Singapore’s capabilities to manage IDs (Lai, 2020; Manauis et al., 2021; Soh, 2020). Our findings illuminated an unexpected area where nurses’ awareness of the institution’s national role in outbreak response and infrastructural capabilities was associated with mental readiness. Moreover, they had expected activation as part of being a nurse in the ID hospital. One possible explanation could be the sense of security and confidence from the building’s specialized technology and equipment to manage various IDs (Singh et al., 2017). As such, the interplay between nurses’ knowledge, skills, experience, and awareness of having an ID hospital contributed to their mental preparedness and was fundamental to compensate for the obscurity faced in the early and evolving outbreak.

As the outbreak progressed, nurses were frequently deployed to other outbreak wards within the ID hospital to meet patient care requirements. However, there was a lack of strategy for the staff to transit psychologically and clinically during their deployments. This study showed that working in an unfamiliar area may significantly affect nurses’ psychological health, especially when deployed constantly without appropriate preparation. There was a need to build new relationships and trust constantly when deployed. Deployment might be viewed as a menace or a prospect, the latter being benefits of skill variety and job rotation, increasing well-being and performance (Van der Colff & Rothmann, 2009).

However, the menace increases job role ambiguity and compromises health and well-being, job satisfaction, motivation, and retention (Acker, 2004; Brunetto et al., 2011). Furthermore, this study found that repeatedly deployed nurses felt unjust and less valued. Boosting the positive and decreasing the adverse outcomes of deployments during COVID-19 may rely on how nurses make sense of their deployment and their new team; therefore, how nursing leaders discuss deployment should consider the social process and effective communication (Simonovich et al., 2021).

To prepare for a potential surge in critical care patients, nurses deployed to the ID hospital were given a rapid training course. The training content concentrated on the management of COVID-19 patients through a massed-practice model. Similar to study by Marks et al. (2021), the massed training sessions received the most negative feedback from participants in this study. The reason was that nurses deployed to the COVID-19 ward received minimal orientation and felt hurried to cope with the unfamiliar setting and needed to learn multiple skills and knowledge from the large-scale training that lacked learning opportunities. As pointed out in several studies, inadequate training was a huge barrier to providing adequate care for COVID-19 patients (Kalateh Sadati et al., 2020; Sheng et al., 2020). One suggestion was that future training could include more hands-on opportunities as it could offer evaluation and real-time feedback to correct performance and formulate better care.

Many participants expressed the lack of structured plans for communicating changes in protocols and guidelines. The rapid progression of the outbreak meant nursing leaders and hospital management were constantly updating the latest changes and practices (Kalateh Sadati et al., 2020). This experience left little room for the participant to accommodate the changes and little choice in the pace of learning and understanding.

Fear of getting infected and infecting others was a concern among nurses. Nurses felt they had to do their best and provide high-quality care, despite fearing the highly contagious COVID-19 and enduring the crisis (Kackin et al., 2021). The findings from this study indicate that social stigma against nurses during an outbreak is still prevalent, which is expected. Another finding is that nurses withdrew from social activities to avoid discomfort due to their presence. A report had indicated that social stigma or self-isolation made nurses feel depressed (Kackin et al., 2021).

Nurses reported that hearing from organizational leaders during the COVID-19 outbreak helped manage expectations during uncertain times. Effective communication is a fundamental leadership skill (Eldridge et al., 2020). Monthly newsletters with detailed updates and encouragement from institutions leaders were a consistent form of communication within the ID hospital since the beginning of the outbreak. However, a participant mentioned that updates from the Director of Nursing motivated and helped them cope.

Having a leadership presence during communication with ground nurses could be a form of effective communication. Further studies are needed to understand an effective communication mode for ground nurses as the COVID-19 outbreak continues.

Nurses who treated COVID-19 patients experienced a higher workload than those who did not (Shoja et al., 2020). Similar to other studies, this study revealed raised patient acuity and turnover, increased IPC precautions, the need to provide more psychological support than usual care, and the expectation to perform tasks previously assigned to others were variables that elevated the load and demand on nurses during the outbreak (Buheji & Buhaid, 2020).
study identified deficient interprofessional collaboration and communication as other contributing factors.

Nevertheless, our participants were in a way fortunate that the issue of PPE and isolation rooms sparsity reported recurrently in previous literature, which exacerbated nurses’ workload and concerns in workplace safety, did not trouble them (Fernandez et al., 2020; Joo & Liu, 2021; Liu et al., 2020; Naylor et al., 2021; Sheng et al., 2020; Zhang et al. 2021). This adequacy of material support in meeting nurses’ basic safety needs was critical for enabling resilience (Ripp et al., 2020). Besides, the younger imported cases and migrant workers, who composed the bulk of the initial and second waves of infections, presented lower illness severity levels with protection by their young age and few medical comorbidities (Huang et al., 2020; Ngiam et al., 2021). The patients admitted under the EPS program reported a significant increase in admission rate and acuity-related challenges due to higher clinical incidence of cerebrovascular diseases and fluid overload cases (Huang et al., 2020). As a result, participants felt overwhelmed by the need to consume higher health care resources (Huang et al., 2021).

However, as the proportion of hospitalized elderly expands with the current wave of infections and the evolving nature of COVID-19, it is debatable whether this perception still holds (Ministry of Health [MOH], 2021).

The high load and demand were perceived stressors. Given that workload and stress were negatively correlated with work engagement and nursing intention, the extra workload in outbreaks should be considered and prepared for during outbreak planning (Oh et al., 2017; Zhang et al., 2021). Achieving a sufficient health care workforce would require an ample quantity of nurses and maximization of their abilities (Shanafelt et al., 2020). Educational sessions and ongoing mentorship to equip nurses with practical techniques in caring for high acuity patients and psychological skills to manage patients’ emotional problems would be essential (Chen et al., 2020; Naylor et al., 2021). Rotation to other clinical specialties should also be encouraged for broader experience and competencies (Bambi et al., 2020). Additionally, more could be done to foster interprofessional collaboration and communication by building mutual trust, respect, and acquaintanceships and clarifying professional roles (Liu et al., 2020).

Nurses had to cope with the ambiguity of the outbreak, rapid changes in protocols and workflows and staffing shortages leading to higher workload, which affected themselves and the level of care provided to the patients (Vahey et al., 2004). Encouragement from nursing leaders in the form of messages or phone calls to check on their well-being might seem like a small gesture, however, it made nurses feel valued and aided in their coping during uncertainties. In addition to supportive colleagues, nurses turned to friends and family and their hobbies to help them cope during these times. Coping often relies on internal and external factors such as beliefs, social skills, health, and material resources (Vahey et al., 2004). The findings from this study provide an insight into how nurses cope during the outbreak. Apart from self-care and hobbies, simple methods of effective communication from nursing leaders in acknowledging the well-being of nurses plays a part in coping and building resilience.

Consistent with existing literature, our participants recognized the value of their work and were proud to contribute to the battle against this outbreak (Im et al., 2018; Kim, 2018; Liu et al., 2020). Their view of this outbreak as an exclusive experience that developed them into nurses with better confidence and preparedness for future outbreaks aligned with previous literature (Sheng et al., 2020). Further enhancing their confidence and preparedness was the anticipation of more established future outbreak guidelines and workflows as the institution gained outbreak experience. This sense of confidence and their perceived opportunities to learn and gain exposure were the main reasons cited for their willingness to participate in future outbreaks. The participants’ statements of willingness coincided with previous literature findings, implying that nurses in the current outbreak would be great supporters in subsequent outbreaks (Khalid et al., 2016; Kim 2018).

**Limitation**

There may be possible recall bias, particularly concerning the initial phase of the COVID-19 outbreak, as interviews were conducted retrospectively. Another limitation is that the possibly different views of male nurses about outbreak preparedness and response are not represented, as no male participants were recruited. This outcome is unintentional and may be due to the predominantly female nursing workforce. Furthermore, the qualitative nature of this study limits the representation of the general population of local nurses. Lastly, it is inevitable that nurses’ perceptions will continue to shape as new information surfaces with the ongoing COVID-19 outbreak.

**Implications for Practice**

The findings illuminate the need for hospital management to work even closer with the frontline nurses to decide on a better channel to enhance their needs in the evolving situation and future outbreak planning. Active involvement of nurses in future outbreak planning would also allow them to gain a better perspective of their outbreak roles and responsibilities. Future training could include more hands-on opportunities as it could offer evaluation and real-time feedback to correct performance and formulate better care. On top of technical skills, an equal emphasis was suggested on developing nurses’ cognitive skills, such as critical thinking, to help them decision-maker and problem-solve under chaotic
outbreak situations (Lam et al., 2020). Simulated drills of various outbreak scenarios might be helpful in mapping and modeling events in outbreak response, creating a virtual outbreak experience that would build nurses’ confidence and preparedness for future outbreaks (Lam et al., 2017).

Furthermore, the study’s findings pointed out that the impacts of EPS had significant negative impacts on nursing resources (Huang et al., 2021). This pivots the need for management to consider more efficient training and better resource planning for future outbreak or medical conditions that may render similar resource-taxing surveillance systems, such as the EPS.

Finally, future studies on the association between mental readiness and knowing the purpose of having an ID hospital could be conducted to explore the extent of association and the applicability to other health care workers groups.

Conclusions
This study explored the factors influencing nurses’ preparedness and response during the COVID-19 outbreak in Singapore. Social support, prior experience, and training improved nurses’ response to the outbreak. In addition, a transparent and bidirectional communication among management and nurses is crucial amidst rapid changes in an outbreak to strike a balance between the needs of nurses and leadership and to enhance nurses’ resilience throughout this challenging journey.

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Ethical Approval
Ethical approval was sought from the National Healthcare Group Domain Review Board (reference number: 2020/00906-SRF0001).

Data Availability
The data that support the findings of this study are openly available in Mendeley Data. DOI: 10.17632/x7h23bvdbv.3. URL ID: https://data.mendeley.com/datasets/x7h23bvdbv. Raw data were generated at the National Centre for Infectious Diseases.

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