

## **An Evaluation of Factors Influencing Nurses' Preparedness and Response to COVID-19 with Focus on Saudi Arabia: Literature Review**

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### **KEYWORDS**

COVID-19, Nurses' Preparedness, Response, Workforce Shortage, Personal Protective Equipment, Psychological Impact, Saudi Arabia

### **ABSTRACT**

This study offers a comprehensive analysis of the preparedness and response of nurses towards the COVID-19 pandemic across selected Arabic countries, namely the United Arab Emirates, Egypt, Palestine, Yemen, and Saudi Arabia. The research elucidates the understanding, preparedness, and strategies adopted by healthcare workers in these countries, identifying significant gaps in resources, training, and psychological support. Data were derived from various cross-sectional studies and validated online questionnaires, allowing for a broad comparison of factors affecting preparedness and response across different healthcare systems. The findings demonstrate varying levels of understanding and preparedness among healthcare workers, with gaps in resources and mental health support being prevalent issues. The study also highlights the role of knowledge delivery and sufficient personal protective equipment in bolstering effective response efforts. Based on the findings, the study recommends continuous education and training initiatives for nurses, improving information dissemination channels, ensuring equitable resource allocation, enhancing psychological support, implementing comprehensive emergency preparedness plans, increasing investment in healthcare infrastructure, and promoting further research. This research underscores the necessity for swift, collaborative global action, enhanced strategies, and interventions to ensure the well-being of nurses and healthcare professionals during such crises. It provides insight into current response efforts, facilitates understanding of their effectiveness, and fosters informed decision-making for future health emergencies. The recommendations offered are integral to enhancing the resilience and readiness of healthcare systems for future health crises.

### **1. Introduction**

The COVID-19 pandemic, the most visible global health crisis of our time, has affected over 373 million individuals and resulted in approximately 5.7 million fatalities worldwide (World Health Organization [1,2]. Among the countries affected, Saudi Arabia reported its first confirmed case on March 2, 2020, in the city of Qatif (Saudi Arabian Ministry of Health [3]. By the end of 2021, the virus had reached 683,053 people in the country, resulting in 8,936 fatalities [4 ].

The primary healthcare sector plays a vital role in the global health system as it often serves as the initial point of patient access. The importance of primary healthcare, particularly in managing infectious diseases, was amplified during the early stages of the COVID-19 pandemic [1]. The response varied significantly among healthcare leaders and institutions across the world, significantly impacting how healthcare professionals, particularly nurses, coped with and adapted to the evolving situation [5, 6].

A critical aspect of managing health crises like the COVID-19 pandemic is the preparedness and response capabilities of frontline healthcare workers, especially nurses. The World Health Organization has endorsed several strategies to mitigate the pandemic's impact, including the imposition of curfews, travel restrictions, quarantine measures, cancellation of public events, and the shutdown of facilities [7]. However, effective implementation of these strategies largely depends on the readiness and abilities of healthcare professionals, particularly nurses.

Unfortunately, studies have indicated a lack of preparedness among healthcare professionals, particularly nurses, for managing crises such as the COVID-19 pandemic [8,9]. A key requirement for maintaining a high standard of care during emergency situations is the ability to effectively plan and prepare for pandemics, emphasizing the importance of institutional awareness and capabilities in emergency preparedness [10, 11].

Research in various regions suggests that nurses would benefit from specialized training in disease preparedness and response [12]. An evaluation of primary healthcare nurses' preparedness and response to the COVID-19 pandemic revealed significant gaps in training and resources [13]. Furthermore, several studies have highlighted

the knowledge deficits among nurses regarding the utilization of personal protective equipment (PPE) and adherence to hygiene practices, essential components in preventing the spread of infectious diseases [9].

The stress and challenges faced by frontline healthcare professionals, specifically nurses, during the pandemic have been exacerbated due to inadequate preparation, lack of PPE, decision-making capacity, and insufficient communication regarding changes in protocols [14, 15]. Nurses' confidence and ability to work efficiently during an epidemic can be severely impacted by factors such as the severity of the disease, the amount of information available about the disease and its transmission, and the public's response to the outbreak [16].

Moreover, the pandemic has brought additional challenges to oncology nurses, including increased burnout, compassion fatigue, and personal concerns [17, 18]. Despite the considerable number of COVID-19 cases in Saudi Arabia, no significant research has been conducted to assess the preparedness of nurses to handle the crisis. In light of these issues, this study aims to evaluate the preparedness and response of primary healthcare nurses to the COVID-19 pandemic in primary healthcare centers in Makkah, Saudi Arabia.

## **2. Aim and Objectives**

The overarching aim of this literature review is to critically evaluate the state of readiness and the reactive measures taken by primary healthcare nurses during the COVID-19 pandemic within primary healthcare centers situated in Makkah, Saudi Arabia.

Objectives:

1. To scrutinize the existing literature for insights into the preparedness levels of primary healthcare nurses in response to the COVID-19 outbreak.
2. To analyze the strategic actions undertaken by primary healthcare nurses in these centers during the pandemic.
3. To identify the strengths, weaknesses, and gaps in the current pandemic response strategies adopted by primary healthcare nurses.
4. To offer evidence-based recommendations for enhancing future preparedness and response measures in primary healthcare settings.

## **3. Methods and Procedures**

### **3.1. Search Strategy**

The systematic literature review was executed using an established search strategy across several databases, including PubMed, Ovid OLDMEDLINE, Embase Classic + EMBASE (Ovid), The Web of Science (Thomson Reuters), The Cochrane Library (Wiley), and CINAHL Plus (EBSCOhost).

Key terms used in the search included "nurses," "readiness," "response," "COVID-19," "Coronavirus," "assessment," "evaluation," "knowledge," and "practices." The search strategy was developed with a keen focus on obtaining as much relevant literature as possible while ensuring specificity to our study's context and objectives.

### **Inclusion and Exclusion Criteria**

Studies eligible for inclusion in this review were those conducted in clinical settings that emphasized COVID-19 and disaster preparedness. Additionally, the analysis focused on literature published in peer-reviewed international and national journals, reinforcing the validity and reliability of our sources.

The specific study designs considered for this review encompassed both descriptive and cross-sectional studies. The publication timeline was defined to include studies published between 2017 and 2022, ensuring that we capture the most recent, relevant, and comprehensive data pertaining to our study's scope.

Studies not fitting the above criteria were excluded from the review. The aim was to maintain a concentrated and precise body of evidence that would provide valuable insight into nurses' preparedness and response to COVID-19 in primary healthcare centers in Makkah, Saudi Arabia.

### **3.2. Data Extraction and Analysis**

The identified studies were screened based on the title and abstract to verify their relevance to the research

objectives. The selected papers were then fully reviewed and key information was extracted. The extracted data was then analyzed to identify trends, commonalities, and differences in findings across the studies.

All data were handled and processed with utmost accuracy and integrity, ensuring that the findings drawn from this systematic literature review are reliable and applicable to our research aims and objectives.

**Table 1. Systematic Search Process results**

No.	Keywords	Database		
		PubMed	Scopus	Nursing and allied health database
1	Preparedness	12,1254	12,124	930
2	Response	11,154	11,120	870
3	Nurses' preparedness and response	11,121	11,025	750
4	Primary healthcare	10,124	10,124	450
5	Community health	9,157	9,101	420
6	Nurses' preparedness in healthcare	8,169	8,120	320
7	Nurses' preparedness in primary healthcare	7,877	7,010	245
8	Nurses' preparedness and response	4,457	4,141	210
9	Preparedness for emergency	3,210	3,121	189
10	Nurses' preparedness for disasters	1,210	1,200	170
11	COVID-19	1,150	1,012	161
12	Nurses' preparedness for COVID-19	950	850	120
13	Nurses' preparedness and response for corona virus	540	640	84
14	1, 2 and 3	140	220	41
15	7 and 8	60	70	22
16	7, 8 and 13	45	32	10

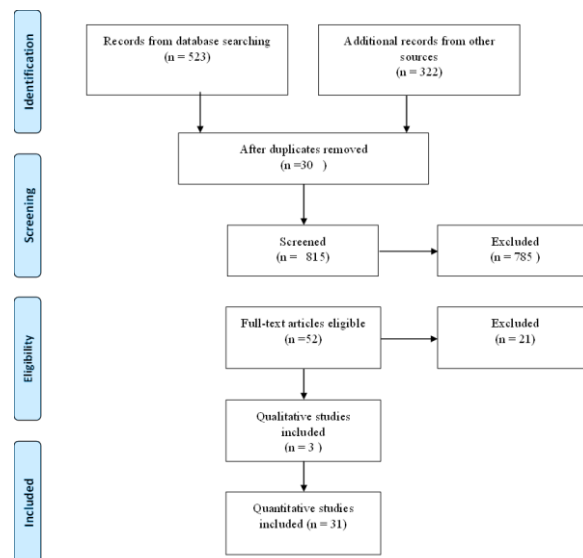


Figure 1. Flow diagram of the process of identifying and including references

## 4. Results

### 4.1. Definition of Preparedness and Response

The concept of "emergency preparedness" encompasses both the anticipation and response to disasters. When an unforeseen event yields an impact of such magnitude that it overwhelms the local healthcare system, necessitating the mobilization of external resources, it is classified as a disaster by the World Health Organization (WHO). A catastrophe is characterized as an occurrence that fulfills certain criteria [19].

The primary objective in reacting to a disaster should be the implementation of the disaster plan. Emergency planning takes place not only at the institutional level but extends to regional and national levels as well. The initial phase prioritizes the provision of humanitarian aid and strives to minimize casualties as far as possible. The type of medical response required is ultimately determined by the specifics of the disaster at hand.

One of the principal challenges encountered during the response phase involves the coordination of institutional

response activities with regional response operations. This proves especially demanding when the demand surpasses the capacity of the facility [19].

#### 4.2. Nurses' Education about Preparedness for Disasters and COVID-19

Considering the unprecedented nature of this pandemic, it is likely that current nursing curricula may not encompass pandemic preparedness in its entirety. Past pandemics, including MERS and SARS, did not manifest a comparable global extent. Although crisis management is addressed in all postgraduate nursing programs at Stellenbosch University, it has been found that existing fundamental principles and curriculum elements do not provide comprehensive or explicit guidelines for safeguarding healthcare personnel during a pandemic [20] (Huh, 2020).

Additional education targeted towards COVID-19 services for nurses is necessitated. Nevertheless, clear evidence outlining specific skills and knowledge imperative for nurses during pandemics is not readily available. The required competencies may also vary depending on the circumstances and the type of services being rendered [21].

#### 4.3. Nurses' Preparedness and Response for the COVID-19 Pandemic

Throughout the COVID-19 pandemic, it was imperative that nurses were adequately prepared to deliver appropriate patient care and community support. The mitigation of the severity of medical crises, such as this pandemic, can largely be attributed to the efforts of nurses [22].

Anecdotal evidence has suggested that the pandemic exerted adverse impacts on front-line healthcare workers, including a perceived lack of preparedness for the outbreak, insufficient personal protective equipment (PPE), limited authority in workflow decision-making, inadequate staffing and resource allocation, and poor communication between hospital administration and front-line staff regarding implemented changes [14, 15].

Results from a recent survey revealed that 87 percent of nurses felt apprehensive about going to work, while 36 percent reported not having suitable PPE when caring for an infectious patient. Furthermore, only 11 percent felt confident in their ability to care for COVID-19 positive patients [23].

Nurses and midwives constitute the majority of the healthcare workforce, and as the key front-line health professionals, they provide treatment, prevent disease complications, and save lives around the clock [24]. The roles of nursing and midwifery, which necessitate 24/7 availability, represent the highest risk of disease transmission in the event of a pandemic [25].

A diverse range of healthcare professionals is required to effectively combat this highly infectious disease. Nurses, being in regular contact with COVID-19 patients, were likely to constitute a significant link in the virus transmission chain [26]. Delays in diagnosis and increased risk have been associated with misunderstandings and insufficient knowledge about the virus, as well as inadequate infection control measures among healthcare staff. Hence, it was inferred that individuals could potentially disrupt the transmission cycle by enhancing their understanding of COVID-19 and the protective and preventative measures undertaken [27].

The rapid spread and sudden emergence of the novel virus SARS-CoV-2 (COVID-19) induced widespread anxiety and fear among the general population. Such a state of anxiety and paranoia created an environment ripe for disdain and social isolation, which in turn could result in trauma, potentially jeopardizing the health of doctors, nurses, and other medical personnel [28, 29].

Preventing the transmission of COVID-19 required careful attention to droplet and contact precautions, environmental cleanliness, and basic infection control. According to workplace preparation guidelines, healthcare workers exposed to suspected or confirmed COVID-19 cases were considered at high exposure risk (The Department of Employment and Labor Workplace Preparedness, 2020). Healthcare staff was thus urged to conduct personal risk assessments, closely monitor themselves, and promptly report any symptoms. Those who presented an unacceptable risk for other reasons were required to be relocated. Strict adherence to all standards and protocols was crucial to ensuring the health and safety of healthcare staff [30].

#### 4.4. Nurses' Preparedness and Response for the COVID-19 Pandemic Internationally Africa

A qualitative exploratory descriptive approach was utilized to examine and articulate the perspectives of nurses in Ghana regarding their preparedness to combat COVID-19 [12]. Data saturation was achieved via telephone interviews conducted with twenty-nine nurses, using a semi-structured interview guide. Key themes emerged,

including the preparation of health facilities and nurses for COVID-19, with subthemes of specialized education, sourcing of information, and information exchange. Preparations for COVID-19 among Ghanaian nurses incorporated demonstrations and simulations related to infection prevention and control, and case management. Nurses with extensive experience in Ghana voluntarily lent their support to the effort. Dissemination of information about the virus and countermeasures was deemed critical. The study concluded that registered nurses in Ghana required further specialized training in public health diseases.

Crowley et al. [13] collected data via an online questionnaire, which incorporated both closed-ended and open-ended questions, to survey primary care (PC) nurses in the Western Cape on their readiness for COVID-19. The findings revealed that 43.3% of respondents felt confident in their infection prevention and control (IPC) training, and 56.7% were prepared to offer direct care to suspected COVID-19 cases. Both percentages were above the national averages. More comfort was expressed by primary care nurses in triaging patients (78.3%) than in handling patients with COVID-19 (42.2%). Personal protective equipment (PPE) was more available to respondents than adequate infrastructure (30.1%). The majority of primary care nurses (57.8%) reported having no access to mental health resources when needed to cope with stress. The study concluded that primary care nurses were not adequately prepared for the COVID-19 pandemic, identifying issues such as the provision of adequate training and infrastructure, the availability of PPE, COVID-19 testing for healthcare professionals, and managerial support. It was emphasized that comprehensive assistance to primary care nurses in managing stress and anxiety could prove highly beneficial.

Chanie et al. [31] conducted a cross-sectional study among 207 healthcare providers at South Gondar public hospital in Ethiopia to assess the level of COVID-19 preparedness and associated variables among frontline healthcare workers. The overall level of COVID-19 preparedness among healthcare professionals was found to be 41.3%. Only 40.1% of healthcare professionals, including doctors and nurses, could ascertain their own COVID-19 infection status. More than two-thirds of healthcare staff did not have access to alcohol-based hand sanitizer in every patient room. A lower degree of preparedness was associated with being male, unmarried, and having less than five years of work experience.

#### The United States

According to Chanie et al. [13], a notably low level of preparedness for COVID-19 was displayed by frontline healthcare professionals. It is suggested that mitigation of future COVID-19 outbreaks may be facilitated by targeted education for medical professionals who are male, unmarried, and have accumulated less than five years of professional experience.

A descriptive and qualitative method was employed in a study examining the perceptions of oncology healthcare workers in Florida regarding the state's response to the COVID-19 pandemic through semi-structured interviews. Three emergent themes were identified: (1) the ability to adapt and operationalize disaster planning; (2) COVID-19 task forces and professional organizations; and (3) recommendations for future pandemic emergency preparedness and planning (with a subtheme of reactive vs. proactive approach to Emergency Preparedness). The findings suggested that while oncology organizations did respond to the pandemic, the implemented policies and procedures were perceived as being more reactive than proactive [32].

##### 4.4.1. Romania

Stoichitoiu and Baicus [33] performed a qualitative study exploring healthcare professionals' perceptions of the preparedness period for the COVID-19 pandemic, aiming to identify perceived weaknesses and strengths among senior physicians, residents, and nurses. Four main themes and subthemes were revealed: coping with uncertainty, human versus physician, a sense of powerlessness, and a bridge to heaven. These themes and subthemes encompassed how healthcare staff members dealt with information gaps, internal conflicts, and the discontent engendered by authorities and colleagues, and what factors contributed to their overall wellbeing. The study concluded that there is a pressing need for more precise care standards to enable medical professionals to better balance patient safety and self-care. Qualitative research conducted with healthcare workers (HCWs) during pandemic periods could potentially inform more critical policy decisions.

##### 4.4.2. Australia

The COVID-19 pandemic in Australia triggered a cross-sectional study to explore the experiences of nurses working in primary healthcare. The study unveiled precarious job security for registered nurses in primary



healthcare and a lack of easy access to personal protective equipment. The study identified a pressing need for further research on the hypothesis that the pandemic has led to a decline in the standard of care provided to patients suffering from chronic conditions, with the aim of better supporting these patients in maintaining and improving their health [34].

#### 4.4.3. Canada

A cross-sectional examination was conducted to glean the clinicians' perspectives on the preparedness and engagement of the Canadian long-term care (LTC) sector during the COVID-19 outbreak. Findings from the study suggested that ideas for the LTC sector in Ontario were propagated and implemented, even amidst some skepticism regarding the viability of these recommendations. Enhanced communication with LTC administrators was identified as a key element for an effectively coordinated response to the pandemic by participating LTC professionals [35].

#### 4.4.4. Malaysia

A cross-sectional study was performed during the COVID-19 outbreak in Malaysia to assess the preparedness and readiness levels of the nursing workforce. It was discovered that nurses generally dealt with COVID-19 care responsibilities satisfactorily. None of the three distinguishing characteristics (age, job experience, and previous disaster experience) emerged as significant predictors of nurses' ability to manage COVID-19 preparedness. The study revealed that only two aspects of preparedness—knowledge of epidemiology and surveillance, and awareness of psychological issues—were significant predictors of nurses' anxiety levels [22].

#### 4.4.5. Overall in 57 Different Countries

Huy et al. [36] conducted a multinational, multicenter, cross-sectional study among hospital healthcare workers (HCWs) during the first wave of the pandemic. The median scores on the COVID-19 awareness and preparedness scales were found to be 29.6 and 11.0, respectively. The preparedness and awareness levels among healthcare professionals in COVID-19 designated facilities were significantly elevated by prior pandemic experience or training on SARS-CoV-2. The analysis suggested that nurses and doctors who received COVID-19 training had higher confidence levels in their ability to care for COVID-19 patients. Male participants and nurses had higher preparedness scores than female participants and doctors, respectively. The study concluded that healthcare workers who had attended COVID-19 training workshops displayed high levels of awareness and preparedness. However, a discrepancy was observed with respect to the gender and type of HCWs. The question was raised whether this early identified preparedness disparity might have resulted in a disproportionate SARS-CoV-2 disease burden according to gender or type of HCW.

### 4.5. Nurses' Preparedness and Response for COVID-19 in Arabic Countries

#### 4.5.1. United Arab Emirates

A cross-sectional study was conducted in the United Arab Emirates (UAE) aiming to gauge the healthcare workers' overall understanding of the health risks associated with COVID-19 and their preparedness to protect themselves and others from the disease. A web-based questionnaire was established on the UAE government's electronic survey site, to which 941 healthcare professionals, from various general and specialty hospitals in the UAE, responded to an invitation to participate.

The study found that the majority of healthcare professionals possessed current knowledge regarding the transmission routes, contamination hazards, high-risk categories, and potential implications of COVID-19. The chi-square test results revealed that the healthcare workers' confidence and their cognizance of COVID-19 hazards were significantly enhanced by experience, infection control training, and/or instruction about COVID-19. These findings imply that healthcare workers possess a strong understanding of the risks they face in a hospital environment. It was concluded that healthcare workers who receive specialized infection control training and are updated on official COVID-19 information are more likely to maintain vigilance and minimize risk for both themselves and their patients. However, caution was advised when generalizing these findings to healthcare practitioners in the UAE or other countries who received the same COVID-19 training [37].

Additionally, a cross-sectional study was undertaken in Dubai involving nurses from four primary healthcare institutions, utilizing a self-administered online survey. The objective was to ascertain the nurses' level of knowledge about COVID-19, their attitudes towards it, and behaviors in light of the virus's characteristics. A majority (57.3%) of the participants reported that they had adequate knowledge to respond effectively.

Participants generally demonstrated an appropriate level of understanding of the symptoms and risk categories. Over two-thirds correctly identified their sources of knowledge about the virus, testing, transmission, and isolation of contacts with positive patients. Survey results indicated that 50% were worried about contracting the disease, 63.6% were apprehensive about transmission to family members, and 40.9% expressed concern about receiving the COVID-19 vaccine when it became available [38].

#### 4.5.2. Egypt

In Egypt, a study was conducted employing a questionnaire to assess nurses' baseline characteristics, their sources of information, their knowledge, concerns, perceived impacts, and preparedness regarding the 2013 COVID-19 pandemic. The websites and official pages of the Ministry of Health and the World Health Organization were identified by 51.2% of the surveyed nurses as their primary sources of information. The study revealed that over eighty percent of the nurses were knowledgeable about the virus's characteristics, with 83% acknowledging their work-related risk of COVID-19 contraction. Nonetheless, 72% of nurses expressed confidence in their preparedness to face the pandemic. The research identified an appropriate level of COVID-19 knowledge among the majority of nurses. It emphasized the critical need for advancing the investigation of psychological interventions prior to any pandemic onset [39].

#### 4.5.3. Palestine

A further investigation utilized a validated online questionnaire to examine the level of preparedness among healthcare workers in Palestine, specifically concerning the availability of personal protective equipment (PPE). It was found that only 27.5% of healthcare workers (HCWs) consistently had access to face masks, and a mere 10.9% of HCWs always had isolation gowns available. The majority of HCWs lacked regular access to protective equipment such as face shields, eye protection, or N95 respirators. In contrast, HCWs in the West Bank were found to have a greater access to gloves and alcohol-based hand sanitizers than their counterparts in the Gaza Strip. Government-operated hospitals, on average, were less equipped with necessary PPE. Only 11.6% of the respondents expressed confidence in their ability to manage a COVID-19 case, 41.3% reported receiving training on COVID-19, and an equal percentage lacked a local hospital protocol for handling COVID-19 patients [40].

#### 4.5.4. Yemen

In Yemen, a cross-sectional study was conducted to assess healthcare workers' understanding of COVID-19, their level of preparedness, and their approach to advising patients. Notably, the study found that healthcare workers in Yemen were aware of, prepared for, and counseling patients about COVID-19 prior to the pandemic, despite the high number of perceived barriers to care. However, it emphasized the urgent need for swift interventions to ensure healthcare workers are equipped for managing COVID-19 [41].

#### 4.6. Nurses' Preparedness and Response for COVID-19 in Saudi Arabia

In Saudi Arabia, a descriptive cross-sectional survey was executed to ascertain the readiness and response of nurses, employed at Ministry of Health facilities, towards the Coronary Virus Disease (CVD). The administered questionnaire, segmented into five parts, collected basic information from the nurses and employed yes-no questions to gauge their awareness of COVID-19 preparedness, readiness of facilities and responses, and preparedness concerning personal protective equipment. Ethical clearance for the study was granted by the Institutional Review Board (IRB). The data was analyzed using a combination of descriptive and inferential statistical methodologies.

The findings of the study revealed an adequate level of understanding of COVID-19 preparedness among the participants. However, the preparedness in relation to personal protective equipment was evaluated as moderate. Only 76.8 percent of the nursing staff exhibited familiarity with emergency planning, though 92.4 percent of the institutions demonstrated preparedness, and a mere 87.3 percent of personnel had access to sufficient personal protective equipment (PPE). It was concluded from the study that registered nurses maintain a robust comprehension of how to respond and prepare for instances of coronavirus infection [6].

A study conducted by Alakeely et al. [42] in Saudi Arabia aimed to investigate the preparedness of frontline leaders of primary healthcare (PHC) institutions to handle the COVID-19 pandemic. While initial preparedness was found lacking at the onset of the pandemic, multiple measures were implemented over the course of the pandemic to ensure smooth operations and continuous patient care.

#### 4.7. Factors Influencing Nurses' Preparedness and Response for COVID-19

The burgeoning prevalence of coronavirus diagnosis significantly outweighs the availability of competent nurses for patient treatment. This conundrum isn't solely limited to a dearth of proficient nurses capable of rendering comprehensive care to COVID-19 infected patients in isolation or intensive care units. It extends to the scarcity of nurses willing to operate in such units. When juxtaposed with other issues like crises and disasters, the enormity of this dilemma becomes starkly apparent. Daily behavioral patterns may also illuminate the gravity of the issue. If the suggested strategy for amplifying the contingent of qualified health professionals to treat COVID-19 patients is enacted, a call could be issued for all experts, be they active or retired, possessing the requisite knowledge, skills, and attitudes [43].

With an amplified supply of nurses, medical facilities could accommodate a larger patient volume. Volunteering could present a suitable avenue for nursing students and interns enthused about gaining clinical exposure, given they possess prior experience. It is vital for the roles and tasks of volunteers to be clearly delineated by nursing management, facilitating adequate supervision and monitoring [44].

Moreover, the engagement of nursing specialists experienced in disaster management and emergency situations could aid in identifying potential threats associated with this pandemic and formulating strategies to mitigate these threats. Particularly in developing nations, a dearth of nursing expertise across all specializations, especially in emergency and critical care nursing, is observed in hospitals globally [45].

Nurses, being front-line warriors, may succumb to conditions like infections owing to the heightened fear of contagion and stress resulting from the increased workload associated with COVID-19 patients. Their anxiety for their families and children further heightens the risk of depression [46]. Regular updates and assurance of personal protective equipment (PPE) availability may alleviate the anxiety and apprehensions concerning COVID-19, offering some respite to nurses [47].

The shortage of vital resources such as PPE and intensive care beds may compromise the safety of healthcare personnel [48, 49]. As a remedy, medical literature advocates critical care triage, patient relocation to accommodate COVID-19 patients, and field hospital setup while addressing ethical considerations, thus ensuring the highest level of intensive care [50]. The Swiss Academy of Medical Sciences (2020) devised significant methodologies for determining patient admission to critical care units based on bed availability and admission necessity. Such enhancements could offer healthcare workers, including nurses, a conducive work environment and enable superior patient care. Furthermore, the provision of personal protective equipment (PPE) such as face masks, gloves, and air purifying respirators is recommended, facilitating improved and professional discharge of duties by nurses [51].

The lack of personal protective equipment (PPE) and medical supplies escalates the risk of contagion for nurses, a fact underscored in literature given the extensive impact on the nursing community. The deaths of numerous Italian doctors and nurses [52] and the suicide of a physician diagnosed with the coronavirus [53] testify to the endangerment faced by all medical personnel. Lack of protective gear can detrimentally impact healthcare workers' mental health and personal lives. The fear of contagion, fueled by a shortage of personal protective equipment and medical supplies, may lead to psychological issues and even burnout [54].

### 5. Discussion

The COVID-19 pandemic has undeniably resulted in widespread healthcare challenges, particularly for nurses who are on the frontline, as is evident in various countries. As gleaned from the research across different nations, several common and unique issues have been unearthed concerning the readiness, knowledge, and resources available to nurses during the pandemic.

In the case of Egypt, an appreciable level of COVID-19 knowledge among the majority of nurses was noted [39]. This underscores the pivotal role of appropriate and timely knowledge dissemination in enabling nurses to respond effectively to such crises. However, an over-reliance on governmental and international health organization websites as the primary information sources may limit the comprehensiveness of the knowledge acquired. This highlights the need for more diverse, reliable sources to deliver complete, up-to-date information about evolving health crises.

In Palestine, the availability of personal protective equipment (PPE) was a significant issue among healthcare workers, with lower rates of accessibility observed in certain regions and governmental hospitals [40]. The



disparity in resource allocation underscores the necessity for equitable distribution of protective gear and other resources, which is fundamental for healthcare worker protection and the effective containment of the virus.

Similar findings were reflected in Yemen, where healthcare professionals were knowledgeable about the disease and proactive in counseling, but also perceived significant barriers to care delivery [41]. This suggests the need for swift actions and interventions to improve readiness for managing such pandemics.

The situation in Saudi Arabia indicated a moderate level of preparedness among nursing staff in terms of PPE readiness, despite a generally satisfactory level of knowledge regarding COVID-19 preparedness [6]. This reinforces the need to address gaps in emergency planning awareness and the availability of adequate protective equipment.

Various factors affecting nurses' preparedness and response to COVID-19 were also discussed. Prominent among these were the scarcity of skilled nurses, the psychological impacts of the pandemic on healthcare workers, and the critical shortage of PPE and intensive care beds. This leads to the conclusion that a holistic approach addressing both the tangible resource constraints and the mental health concerns of healthcare workers is necessary to enhance their readiness and response capabilities.

Overall, these findings underscore the critical need for comprehensive emergency preparedness plans that encompass information dissemination, equitable resource allocation, psychological support, and training for healthcare workers. Such measures can enhance the resilience of healthcare systems and the ability of nurses and other healthcare professionals to respond effectively to health crises such as the COVID-19 pandemic. Further research is required to inform the development of strategies and interventions aimed at improving nurses' preparedness and response capabilities in the face of pandemics.

## **6. Conclusion**

This study provides a comprehensive understanding of nurses' preparedness, knowledge, and response to the COVID-19 pandemic in different regions, highlighting the significant challenges and gaps in resource allocation, information dissemination, and psychological support. The findings from Egypt, Palestine, Yemen, and Saudi Arabia accentuate the importance of a holistic approach in emergency planning, emphasizing not only on the need for appropriate training and sufficient protective resources but also on the significance of mental health considerations.

The disparities in preparedness and resource availability, as identified in Palestine and Saudi Arabia, emphasize the urgent requirement for equitable resource distribution to ensure all healthcare professionals can provide and sustain a high level of care. Furthermore, the role of comprehensive, accurate, and timely knowledge delivery in bolstering effective response efforts was underscored through the experience of healthcare workers in Egypt and Yemen.

The concerns regarding the potential psychological toll of the pandemic on healthcare workers, the fear of infection due to inadequate protective measures, and the imbalance between the escalating patient numbers and available skilled nursing staff underline the necessity for enhanced strategies and interventions.

In conclusion, the challenges presented by the COVID-19 pandemic necessitate a swift, collaborative global response to ensure the well-being of healthcare workers, particularly nurses on the frontline. The lessons learned from this pandemic should guide future actions and policies to enhance healthcare systems' resilience and readiness for future health emergencies. Continued research and evaluation are necessary to monitor these efforts' effectiveness and make necessary adjustments to our strategies. The global healthcare community must rise to this challenge, ensuring that our nurses and healthcare professionals are well-equipped and well-supported to face such crises in the future.

## **7. Recommendations**

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance the preparedness, knowledge, and response of nurses during health crises such as the COVID-19 pandemic:

1. **Invest in Education and Training:** Continuous education and training initiatives should be developed and implemented to equip nurses with the necessary knowledge and skills to effectively respond to health crises. The training should cover understanding transmission routes, recognizing high-risk categories, and understanding the potential implications of viruses like COVID-19. It should also include how to advise and

counsel patients appropriately.

2. **Improve Information Dissemination:** Diversify the sources of health information to encompass not only governmental and international health organization websites but also scholarly articles, expert panels, and other reliable sources. This will ensure that nurses receive comprehensive and up-to-date information about evolving health crises.

3. **Ensure Equitable Resource Allocation:** Policies should be put in place to guarantee equitable distribution of personal protective equipment (PPE) and other resources across all healthcare facilities, regardless of their location or whether they are government or privately run. This will ensure all nurses have the necessary protective gear, regardless of where they work.

4. **Enhance Psychological Support:** The psychological impacts of working on the frontlines during a health crisis should not be underestimated. Dedicated mental health support services should be made available to all healthcare workers to help manage the stress and anxiety associated with their roles. This can include counseling services, mental health hotlines, and peer support groups.

5. **Implement Comprehensive Emergency Preparedness Plans:** Comprehensive emergency preparedness plans should be established at the institutional, regional, and national levels. These plans should encompass information dissemination, resource allocation, psychological support, and training for healthcare workers. The goal should be to enhance the resilience of healthcare systems and the ability of nurses and other healthcare professionals to respond effectively to health crises.

6. **Increase Investment in Healthcare Infrastructure:** Policymakers should allocate more funding towards healthcare infrastructure, including the establishment of more intensive care units and procurement of necessary medical supplies and equipment. This will not only improve the readiness of healthcare facilities but also enhance the safety and effectiveness of healthcare professionals in their roles.

7. **Promote Research:** Encourage ongoing research to better understand the challenges healthcare professionals face during health crises and to develop effective strategies to address these challenges. It is essential to evaluate the effectiveness of implemented strategies and make necessary adjustments.

The implementation of these recommendations requires the active participation of all stakeholders, including healthcare workers, hospital administrators, policymakers, and the community at large. Only through collective effort can we ensure that our healthcare system is prepared to effectively respond to future health crises.

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