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Perceived Preparedness of Healthcare Workers to Cope with COVID-19 Pandemic in Hail Region Hospitals, Kingdom of Saudi Arabia: A Cross-Sectional Study

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Abstract

Background: All hospitals must have emergency plans because they play a crucial role in providing critical care. This study assesses the perceived hospital preparedness of healthcare workforces to cope with the COVID-19 pandemic regarding their demographic characteristics.

Methods: This study utilized a descriptive, cross-sectional design to investigate the preparedness of hospital and healthcare workers in the city of Hail, Saudi Arabia. A convenience and snowball sampling method was used. A total of 330 healthcare workers participated in the study, which utilized a Google Form survey and was adapted from the Centers for Disease Control and Prevention (CDC). Descriptive statistics, t-test, one-way ANOVA, and Kruskal-Wallis were used to analyze the data. Data collection was conducted in July and August 2020.

Results: Overall, hospital employees agreed that they and their hospital were prepared for COVID-19 (2.98). No significant difference ($p > 0.362$) was found in the perception of male and female employees. However, hospital preparedness significantly differed by profession ($p < 0.020$) and educational attainment ($p < 0.030$); the post hoc test showed that COVID-19 preparedness was high for respondents with higher educational attainment, years of experience ($p < 0.003$), and the number of training sessions attended ($p < 0.003$).

Conclusions: The healthcare workforce is prepared to combat COVID-19. Of the demographic profiles of the healthcare workers, only sex was not a factor in preparedness. Profession, educational attainment, years of experience, and the number of related training sessions were all determinants of the healthcare workers' preparedness. These demographic characteristics can serve as factors in training and retraining the staff in battling COVID-19.

Keywords: COVID-19, healthcare workers, hospital, preparedness

INTRODUCTION

The novel coronavirus (COVID-19) has exacerbated stress and put major pressure on healthcare organizations. In response to the increasing number of COVID-19 cases in many countries, on March 11, 2020, the World Health Organization (WHO) mandated that all countries start aggressive action and scale up their emergency response mechanisms.[1] The magnitude of the illness has overwhelmed the healthcare system and healthcare workers.[2] It is assumed that the services delivered will be disrupted if hospitals are not prepared. In response, hospital workforces have introduced integrated hospital-wide strategies with steps to handle the inevitable increase in hospitalized patients with COVID-19.[2] Nonetheless, although hospitals may be prepared to address the problem, the demands may not be met because of the severity of cases.[3] Likewise, hospital workforces are facing challenges in activating their mandatory functional undertakings during the pandemic.

Since hospitals play a critical role in providing mass critical care, they must have emergency plans.[4] Although it is argued that all hospitals are mandated to have action plans for managing epidemics and pandemics,[5] these plans need to be apprised, and the hospital workforces must be capacitated to use them. Specifically, straightforward cooperation between critical hospital departments is imperative. In this context, healthcare systems must be prepared to meet the demands of the population affected by the pandemic[6] and maintain the condition of the people in times of health crises. The actions of Saudi Arabia in preparing its healthcare workers and hospitals to face the pandemic are commendable. For example, the Ministry of Health (MOH) has done its part to train healthcare workers and provide sufficient infrastructure/spaces and protocols for COVID-19.[7] Also, the MOH has disseminated an immense volume of COVID-19 preventive information via social media, government blogs, and advertising.[8] Saudi Arabia's health system is funded by the government, and that of

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non-citizens is provided by their employers.[9] Thus, the government was prepared to satisfy the healthcare needs of citizens. For example, the MOH has already prepared measures to ensure that all medical supplies are available in adequate quantities to resolve this situation, including personal protection devices, monitoring agents, ventilators, and drugs. These constraints and measures played a significant role in restricting the spread of SARS-CoV-22.[10]

Activating the emergency response of a hospital means preparing the healthcare workforce. In this situation, training and retraining workers are essential. Healthcare workers and hospitals need to be prepared since they play a critical role in the preventing and controlling COVID-19.[11] It is essential to note that knowledge and preparedness in the management of COVID-19 are vital to preventing and controlling the spread of this infectious disease.[12] This is fundamental to the healthcare workers and the hospital itself. Thobaity and Alshammari[13] recommended backing up the crisis plan to sustain the frontlines and bolster the preparedness in the critical line of defense. Al Mutair *et al*.,[14] on the other hand, suggest that hospitals must integrate their strategies based on evidence and that a team-based approach is an effective strategy. Conversely, Albaqawi *et al*.[15] suggest that training is an essential aspect of preparation. As such, appropriate steps must be provided for containing, monitoring, and preventing infectious disease dissemination at work and among nurses.

This study assesses the perceived preparedness of healthcare workforces to cope with the COVID-19 pandemic regarding their demographic characteristics. It is vital to facilitate accomplishing the ultimate objectives of hospital preparedness. Exploring hospital workforce preparedness identifies the problems that can be addressed on point, thereby preventing confusion during an epidemic or pandemic. Moreover, the preparedness of a hospital and its workforce will maintain the provision of care on time and without delay during and at the time of a pandemic.

METHODS

This study utilized an analytical cross-sectional design to investigate hospital workforce preparedness related to the demographic characteristics of healthcare workers in the Hail Region, Saudi Arabia. The researchers used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) to guide the reporting of observational studies in this research.

All hospitals in the city of Hail were included in this study (Hail General Hospital, King Salman Specialist Hospital, Maternity Hospital, Saudi German, and King Khalid Hospital). Compared with other regions, these hospitals had the densest populations regarding the number of patients and ≥300-bed capacities. Moreover, most hospitals (e.g., King Khalid Hospital, King Salman Specialist Hospital, and Hail General Hospital) were the main reference hospitals in Hail and neighboring regions. The hospital workforce considered in this study included nurses, medical doctors, pharmacists, and medical technologists. Convenience and snowball sampling were used, resulting in 330 healthcare workers serving as study participants. The following were the inclusion criteria: (a) full-time employees of participating hospitals, (b) willing to participate, and (c) those who participated in preparation training sessions conducted by the hospitals. Exclusion criteria were those who were recruited as employees while conducting the study.

The study used a Google Form survey questionnaire. A link for the questionnaire was given to the key persons of the hospital, and they were requested to send it to their staff within their unit. The contact information of the researcher(s) was included instead of participants' clarifications. The participants were fully informed that the study would be used only for specific purposes. Their participation was not mandatory. They could withdraw should they consider the information too personal. Data collection was done in July and August 2020.

The researchers secured the requisite documents for data gathering and sought approval from the Ethics Review Board of the University of Hail preceding the online dissemination of the survey questionnaire. The purpose and procedures of this study were explained in the informed consent. Informed consent was obtained from participants before data collection.

The researchers utilized the Comprehensive Hospital Preparedness Checklist for Coronavirus Disease 2019 (COVID-19) developed by the Centers for Disease Control and Prevention.[16] It was in a checklist where slight modifications were made to suit the local context. Instead of depicting mandatory requirements, this tool emphasizes significant areas to assess hospital preparedness, highlighting the essential scope of health facility guidelines.

The questionnaire was divided into two parts. Part 1 concerned demographic characteristics: Sex, profession, educational attainment, years of service, and the number of related training sessions attended. Part II highlighted the basic dimensions of the health institutions' assessment of the preparation of suspected COVID-19 patients upon admission. This preparation included essential dimensions, such as policies on infection prevention and control and the training for staff personnel (2 items), the steps for promptly recognizing and putting the diagnosed or suspected COVID-19 patients into isolation (12 items), the placement of patients (7 items), precautionary measures based on

transmission (4 items), the movement of patients whether diagnosed or suspected within the facility (4 items), hand hygiene (2 items), environmental cleaning (5 items), monitoring and managing healthcare personnel (3 items), and visitor access and movement within the facility (4 items). The instrument was answered with a four-point Likert scale (1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree). The researchers calculated the percentage of respondents who achieved the ceiling and floor effects, with 15% reaching the ceiling or floor scores. This implies the reproducibility and responsiveness of the questionnaire.

Meanwhile, the validity and reliability were conducted. The instrument obtained an overall content validity index score of 0.79 for relevance and 0.78 for clarity, affirming high content validity. Internal consistency was tested with Cronbach's alpha, which was 0.79 in this study.

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) software version 23. The demographic variables were treated and presented as frequencies and percentages, whereas descriptive statistics were expressed using means and standard deviations. Levene's test was used for the comparative part of the study for equality of variances, the independent *t*-test was used for equality of means, and the one-way ANOVA was used for multiple variables. The Kruskal-Wallis rank-sum test was used to measure significant differences and identify correlations, and the Kruskal-Wallis test was used as a post hoc test. The researchers set the statistical significance at $p < 0.05$.

RESULTS

Table 1 presents the demographic information of Hail hospital employees. Most participants were females (73.9%). Nurses (88.2%) had the highest percentage, and most had a bachelor's degree (76.4%). The participants were nearly equally distributed regarding their years of experience with 1 to 5 years of experience (31.5%), 6 to 10 years (34.2%), and 11 and above (34.2%) years. The number of training sessions attended varied, with 1 to 3 related training sessions attended (56.7%), no training sessions attended (23.3%), and 4 or more training sessions attended (20%).

Table 2 shows the perceived hospital preparedness among employees of Hail hospitals. Most hospital employees perceived hand hygiene (3.09) as the most prepared dimension, with the movement of patients with confirmed or suspected COVID-19 within the facility as 3.04. Overall, hospital employees agreed that their hospital was prepared for COVID-19.

Table 3 shows the differences in hospital preparedness along with demographics of hospital employees. Although

TABLE 1. Demographic information (N = 330)

Variables	Frequency (N)	Percentage (%)
Sex		
Male	86	26.1
Female	244	73.9
Profession		
Nurse	291	88.2
Doctor	18	5.5
Pharmacist	6	1.8
Medical technologist	15	4.5
Educational attainment		
Bachelor	252	76.4
Diploma	50	15.1
MA	22	6.7
Doctorate	6	1.8
Years of experience		
1–5	104	31.5
6–10	113	34.2
≥11	113	34.2
Number of related training sessions attended		
0	77	23.3
1–3	187	56.7
≥4	66	20.0

TABLE 2. Perceived hospital preparedness

Hospital Preparedness on the Following Dimensions	Mean	Standard Deviations (SD)
Infection prevention and control policies and training for healthcare personnel (HCP)	2.91	0.70
The facility provides education and job-specific training to HCP regarding COVID-19	2.98	0.68
Patient placement	2.95	0.66
Transmission-based precautions (use standard, contact, airborne precautions plus eye protection for patients with confirmed or suspected COVID-19 cases)	2.93	0.69
Movement of patients with confirmed or suspected COVID-19 within the facility	3.04	0.61
Hand hygiene	3.09	0.61
Environment cleaning	3.00	0.62
Monitoring and managing HCP	2.94	0.65
Visitor access and movement within the facility	2.98	0.67
Overall preparedness	2.98	0.51

3.27–4.00: Strongly Agree; 2.52–3.26: Agree; 1.76–2.51: Disagree; 1.00–1.75: Strongly Disagree

no significant difference was found in the perceptions of male and female employees ($p > 0.362$), the hospital preparedness significantly differed by profession ($p < 0.020$). The post hoc test revealed that pharmacists had the highest rating for preparedness and nurses had the lowest, as indicated by the mean rank of 266 and 171, respectively.

Coronavirus disease 2019 (COVID-19) preparedness also significantly differed by educational attainment ($p < 0.03$). The post hoc test showed that COVID-19 preparedness was high for respondents with higher educational attainment.

It is noteworthy that coronavirus disease 2019 (COVID-19) preparedness significantly differed by years of experience ($p < 0.003$). Respondents with at least 11 years of experience had a higher level of COVID-19 preparedness than those with experience between 6 and 10 years and 1 and 5 years.

Further, COVID-19 preparedness significantly differed by the number of training sessions attended. The post hoc test revealed that the level of COVID-19 preparedness was higher for those with 1 to 3 training sessions attended than those without training. Also, it was higher for those with at least four training sessions compared with those without training. However, the preparedness did not differ for those who attended between 1 and 3 training sessions and more than 4 training sessions.

TABLE 3. Differences in hospital preparedness along with demographics of hospital employees

Variable	Mean/Rank	*SD*	*p*
Sex			0.362
Male	2.93	0.70	
Female	3.00	0.43	
Profession			0.020*
Nurse	160	4.82	
Doctor	199	0.68	
Pharmacist	266	6.15	
Administrators	171	3.54	
Educational attainment			0.030*
Bachelor	160	1.50	
Diploma	164	1.38	
Masters	219	0.48	
Doctorate	204	0.89	
Years of experience			0.003*
1–5	2.98	0.60	
6–10	3.03	0.41	
≥11	3.09	0.46	
Number of related training sessions			0.003*
0	2.98	0.66	
1–3	2.69	0.56	
≥4	3.03	0.45	

**Significant at 0.05*

DISCUSSION

This study assessed the preparedness of the healthcare workforce in relation to their demographic characteristics. Overall, healthcare workers believed that they were prepared to combat COVID-19. This may be due to the remarkable experience of Saudi Arabia in managing the previous outbreak of MERS-CoV in 2012. In addition to the preparedness of healthcare workers, the WHO has made a tremendous effort to spearhead online training for healthcare workers. The WHO's goal is to train and prepare healthcare workers, and their resources are available in different languages.[17] Nonetheless, a study by Al-Ashwal *et al*.[18] maintains that, even though most healthcare workers demonstrated good knowledge about the virus, they were not optimally prepared for dealing with COVID-19.

In this current study, no significant difference was found in the perceptions of the male and female employees. This indicates that gender is not a critical predictor at the hospital and healthcare worker preparedness levels in this COVID-19 event. However, in comparison, the Al-Ashwal *et al*.[18] study found that females were not as prepared as their male counterparts in defeating COVID-19. According to the WHO,[17] pandemics have various effects on gender, and individual experiences are likely to vary. Therefore, strong gender analysis may be used with prudence to achieve more effective COVID-19 preparedness. Such a result contributes to the understanding of hospital administrators in customizing preparation strategies in dealing with COVID-19.

Conversely, hospital preparedness significantly differed by profession. Specifically, pharmacists had the highest rating, and nurses had the lowest. This result implies that job responsibilities may vary between professions and that those with more job functions can overwhelm the preparedness. Pharmacists, for example, are confined mainly within the walls of the pharmacy, providing more time to prepare combating COVID-19. In comparison, nurses have more responsibilities, allowing less time due to the demands of their work. The job of a pharmacist is pharmacist-centric, whereas nurses are the ultimate nexus between patients and other healthcare teams. Along with their unwavering care, nurses are continuously linked to patients in their respective critical functions against COVID-19.[13,19] This connection makes the input of nurses an invaluable contribution to hospital administrators for updating their knowledge and skills to improve their preparations for combating COVID-19.

Healthcare workers who have higher education are more prepared than those with a lower educational status. This result may be because healthcare workers who have attended higher education are more theoretically ready

and updated. Therefore, their educational status helped them to be more prepared for facing the disease. Such a result agrees with the study of Tripathi and colleagues,[20] where more healthcare workers with higher educational backgrounds were more aware of disease symptoms. The theories of knowledge that they have acquired could have helped them understand the nature of COVID-19. To Tripathi *et al*.,[20] such knowledge can be deciphered with the healthcare providers' preparedness and explained in improved practices toward COVID-19 prevention.

The preparedness of the hospital workforce on COVID-19 differs significantly by years of experience. This demonstrates that healthcare workers who have more years of experience are more prepared than their counterparts. This can be explained by more years of experience are profitable to healthcare workers. The study by Pasay-an,[21] for example, mentioned that nurses who have more experienced at work have better control in the workplace and stronger control of the situation. Moreover, to Al-Dossary *et al*.,[22] more work experience can improve the realization, views, and precautionary practices, leading to better practice of the profession. Albeit good outcomes regarding the years of experience, Alsaqri *et al*.[23] claimed that years of experience might not be a determinant for workers to advance the work in the organization. While healthcare workers with more experience demonstrate better preparedness than those with less, additional training program focus will be channeled to those who have less experience.

Further, COVID-19 preparedness differs significantly by the number of training sessions attended. This suggests that the more training, the more prepared the healthcare workers are to combat COVID-19. Loutfy and colleagues[4] recommended the need for hospitals to be prepared through departmental and train-the-trainer training in advance of an outbreak. It is indubitably expected that healthcare workers must have access to and training on infection control protocols.[24] Numerous training sessions have been conducted to prepare healthcare workers in response to the growing number of COVID-19 cases. One such example is simulation training on the scenario, which most hospitals in Saudi Arabia are conducting.[25] Dieckmann and associates[26] suggest that simulation as part of the training of the healthcare workers demonstrates advancement in addressing the pandemic, and it is advantageous in combating future pandemics. However, it is unfortunate that, with the expected positive outcomes of training, some studies claimed that training and education such as COVID-19 are limited to less than 40% of healthcare workers.[27] As such, one consideration should be to teach new personnel and nurses who are less skilled should patient numbers exceed the disaster plan capacity[28] since there is a nursing staff shortage at the time of a pandemic.[29] Overall, nurses should be trained on how to deal with the situation regularly through the support of hospital administrators.[30]

The researchers acknowledged some of the limitations of this study. While the researchers acknowledge that cultural adaptation is essential in using current tools in different cultural and linguistic contexts, this has not been considered. Moreover, the surveys used are self-administered and are prone to biases. Also, their use of non-probability sampling may preclude generalization of the findings. These limitations can be addressed in future investigations, where using mixed methods and probability sampling are recommended.

CONCLUSIONS

The healthcare workers in this study believed that they were prepared to combat COVID-19. While there was no difference regarding the sex of healthcare workers, their profession, educational attainment, years of experience, and the number of related training sessions were determinants of their preparedness. These demographic characteristics can serve as factors in training and retraining the staff in battling COVID-19.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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