Assessment of Epidemic and Pandemic Events Preparedness in Ministry of Health Hospitals, Jazan, Saudi Arabia, 2021: A Cross-Sectional Study

Ahmad Mosa Faqeeh (1), **Abdullah Ibrahim Sabai** (2)**. Mohammed Ahmed Jahlan** (3), **Ahmed Nasser Khayrat** (4)**, Hussein Ali Azyabi** (5)**, Abdullah Ibrahim Asiri** (6), **Mohammed Ali Azybi** (7), **Madi Mustafa Habkor** (8)

(1) Family Medicine Resident, Joint Program of Family Medicine, Jazan, Saudi Arabia
(2) Preventive Medicine Consultant, Department of Public Health Care, Jazan, Saudi Arabia
(3) Family Medicine Consultant, Joint Program of Family Medicine, Jazan, Saudi Arabia
(4) Epidemiology Specialist, Musliah PHC, Jazan, Saudi Arabia
(5) Family Medicine Senior Registrar, Wadi Bin Hashbal PHC, Aseer, Saudi Arabia
(6) General Physician, Wadi Bin Hashbal PHC, Aseer, Saudi Arabia
(7) Public Health Technician, Aseer Hospital, Saudi Arabia
(8) Nursing Technician, Aldarb Center for Vector Control and Common Diseases, Jazan, Saudi Arabia

Corresponding Author:
Dr. Ahmad Mosa Faqeeh
Email: alfaqeeh1405@gmail.com

Received: December 2021; Accepted: January 2022; Published: February 1, 2022.
Citation: Ahmad Mosa Faqeeh et al. Assessment of Epidemic and Pandemic Events Preparedness in Ministry of Health Hospitals, Jazan, Saudi Arabia, 2021: A Cross-Sectional Study. World Family Medicine. 2022; 20(2): 33-47.
DOI: 10.5742/MEWFM.2022.95244

Abstract

Background: Hospital preparedness planning for natural and man-made disasters has become the pressing necessity of hospitals being the principal habitat of disaster victims. One of the most critical areas of consideration is hospital preparedness for epidemic and pandemic events.
Objectives: To assess concerns, perceived impacts and preparedness of health care workers for epidemic and pandemic events in Ministry of Health (MOH) hospitals, Jazan, 2021.
Methods: An analytical cross-sectional study was conducted from May 1st, to August 31st, 2021 in three Ministry of Health hospitals in Jazan city. All health care workers (HCWs) working at the three hospitals were eligible to participate if they were direct clinical care providers. A valid questionnaire consisting of five parts was used; including demographic data, work-related concerns of health care workers, non-work related concerns of health care workers, perceived impact of health care workers on personal life and work and preparedness of health care workers for epidemic and pandemic events.
Results: The study included 307 healthcare workers. The age of 39.7% of them ranged between 31 and 40 years. Almost two-thirds (62.2%) were males. The total score of work-related concern of COVID-19 among the participants ranged between 7 and 28, out of a possible maximum of 35, with a median (IQR) of 18 (15-22). HCWs in the age group 31-40 years, master holders, and doctors expressed the highest concerns score. The total score of non-work-related concern of COVID-19 ranged between 7 and 35, out of a possible maximum of 35, with a median ("interquartile range "IQR") of 28 (22-28). HCWs who hold a master degree and doctors expressed the highest concerns. The total score of perceived impact on personal life and work health professionals ranged between 6 and 44, out of a possible maximum of 50, with a median (IQR) of 25 (21-30). HCWs in the age group 31-40, and Master holders had the highest score. The total score of preparedness for Coronavirus (COVID-19) pandemic ranged between 15 and 75, out of a possible maximum of 75, with a median (IQR) of 56 (48- 61). The highest score was observed among HCWs aged over 50 years.
Conclusion: Some work-related and non-work-related concerns of HCWs in Jazan regarding COVID-19 pandemic have been identified. Also, perceived impact of the pandemic on HCWs` work and professional life has been documented. Their preparedness as well as that of the health care system to the COVID-19 pandemic was satisfactory in most aspects.
Key words: COVID-19, concerns, preparedness, healthcare workers, Saudi Arabia

Introduction

Epidemic and pandemic events are significant challenges which pose threats to health security globally. In the past recent years, world countries have been exposed to various epidemic and pandemic events which would disrupt all economic, social and health aspects of life. Emerging infectious diseases substantially have been growing in recent years, particularly H1N1, H5N1, H7N9 and recently Middle East Respiratory Syndrome (1). During the past century, 4 influenza pandemics have occurred. In the 21st century, the first pandemic incident appeared in 2009 in Mexico where the novel strain H1N1 emerged (2).

Subsequently, it continued to spread rapidly over the world, and within a few weeks all World Health Organization (WHO) regions were affected (3). Accordingly the WHO declared a pandemic event (4). The WHO reported more than 18,449 deaths at the end of the 2009 H1N1 pandemic(5). In late December 2019, a new (novel) coronavirus was identified in China causing severe respiratory disease including pneumonia. It was originally named Novel Coronavirus. The virus causing the infection has been named “severe acute respiratory syndrome coronavirus 2” (SARS-CoV-2) [6].

During the past 20 years, a number of infectious diseases have emerged and re-emerged in Saudi Arabia, such as Rift Valley Fever (RTV) in 2000 (7), Alkumra virus infection (8), and dengue fever reported the earlier cases in the late 1990s (9). Between the period from 2004 to 2013, nearly 20,034 dengue fever cases were reported in Saudi Arabia; the majority of cases were in Jeddah city. The epidemic of dengue that occurred in 2013 was the biggest one (10). Recently, Middle East Respiratory Syndrome coronavirus (MERS-CoV) is an emerging infectious disease first reported in 2012 in Saudi Arabia (11). Excess numbers of cases of MERS-CoV infection occurred in one hospital in Jeddah city, where 20.9% of cases were medical staff and 97.3% of these cases had contact with a health care facility (12). An outbreak of 38 MERS-CoV infection cases was reported in a multi facility in Taif and 13 cases were health care workers (13). In Saudi Arabia, on 14 January 2022, there have been 604,672 confirmed cases of COVID-19 with 8,903 deaths (14). The majority of patients were related to a health care facility. This emphasizes an ill-prepared environment for epidemic events in the health care system.

Hospital preparedness planning for natural and man-made disasters has become the pressing necessity of being hospitals the principal habitat of disaster victims. One of the most critical areas is hospital preparedness for epidemic and pandemic events. An epidemic and pandemic preparedness is a critical matter in responding to an expected infectious disease outbreaks. From this standpoint, responding to the existing epidemic events and preparing for future ones requires functional planning. Accordingly, the World Health Organization (WHO) issued International Health Regulations after revision (IHR) (2005) to provide a framework for public health response to the international spread of disease.(15) WHO provides guidance of the essential elements of preparedness to helps countries in developing national pandemic preparedness plans though capacity building activities.(16)

Eight Central American countries did evaluation of their pandemic preparedness in three stages in 2008, 2010 and 2012. The United States of America provided funding and technical assistance to those eight countries. The results concluded improvements in pandemic preparedness across consecutive intervals and a positive association between preparedness outcome and donor funding (17). Six countries of the Asia-Pacific region processed a rapid situation analysis of health system preparedness for a pandemic as a part of the Asia Flu Cap project. A rapid analysis shows a strong association between a functional health system capacity and pandemic preparedness. Therefore, a pandemic preparedness plan has contributed to an improvement in health system surveillance, communications and laboratory capacity. Despite the previous preparation, low-income countries evidence an inadequate preparedness (18). Therefore, low and middle-income countries have a more fragile preparation for pandemic influenza than high-income countries. A study predicted that 96% of the expected deaths in a future pandemic would occur in low-income countries (19). During 2005–2009, national pandemic preparedness was assessed in 43 European countries. As result of this preparation, the response to the 2009 pandemic was beneficial in most planning aspects except for some troubles in communication, surveillance, response resilience, health care workers participation and vaccination (20-22).

The evolution of pandemic may be restricted by an early rapid response, non- pharmaceutical interventions and hospital surge capacity until a vaccine becomes available (23, 24). Many studies show an early alarm system, compliance with infection control practice, empowering human resources by continuous education and training, national and hospital preparedness planning and incorporating health workers into preparedness planning would prevent infection risks to healthcare workers (25, 26).

Over the past few years, humans have constantly encountered threats from many infectious pathogens. Outbreaks of severe acute respiratory syndrome (SARS), bird flu, swine flu, MERS corona and recently COVID-19 highlight the importance of hospitals and healthcare systems being prepared for potential threats and the consequences that occur when a community is not well-prepared.

Aim of Study

To assess concerns, perceived impacts and preparedness of health care workers for epidemic and pandemic events in Ministry of Health hospitals, Jazan, 2021.

Subjects and Methods

This study followed an analytical cross-sectional design during May 1st till August 31st, 2021 in two general MOH hospitals of Jazan City (i.e., King Fahad and Mohamed Bin Naser hospitals) and El-Erada Psychiatry Hospital.

The study population comprised all health care workers (HCWs) at the three study hospitals, i.e., physicians, nurses, pharmacists, laboratory technicians and other clinical support staff. The study sample was calculated using the Open Epi Info software (version 3.03a), for an α of 0.05 and a power (1-β) of 0.80, 95% confidence interval, and prevalence information from a comparable study which was 71.6% (27). The minimum sample size was estimated to be 305.

Multistage sampling was conducted to select the study sampling of health care workers. In each hospital included in this study, we selected the health care workers sampling in two stages, as follows:
• A stratified sampling technique for health care workers. The stratification was according to job titles (e.g., doctors, nurses, or clinical support staff).
• A simple random sample in each stratum.

Data collection tools
The study questionnaire was adapted from the original survey of concerns and preparedness of an avian influenza pandemic in Singapore 2006 (28). It consists of five sections, as follows:
1. Demographic data.
2. Work- related concerns of health care workers.
3. Non-work-related concerns of health care workers.
4. Perceived impact of health care workers on personal life and work.
5. Preparedness of health care workers for epidemic and pandemic events.

Data collection technique:
The hospitals' structural preparedness was assessed by a checklist interview of disaster management directors and infection control department chiefs across the MOH Jazan hospital. Participants with responsibility for emergency management particularly involved in pandemic and epidemic events preparedness planning were selected to complete the checklist from every hospital in Jazan city. Then, the investigators distributed the anonymous self-administered questionnaire sheets to participants after briefly and clearly explaining the purpose of the survey. The command-and-control center decision makers in Jazan city and disaster management directors in each hospital were interviewed based on the Core Capabilities for Pandemic Influenza Preparedness and Response checklist (29).

A pilot study was conducted to test the clarity of the study questionnaire and the time needed to fill in the questionnaire. The questionnaire contents were clear, well-understood and required about 12 minutes to be completed. Participants' data in the pilot study were not included in the final analysis.

The study data were analyzed using the Statistical Package for Social Sciences (IBM, SPSS version 26). The quantitative data were reported as a mean and standard deviation (SD), and the qualitative data were reported as frequencies and percentages. Kolmogorov–Smirnov test was applied to assess normality of data distribution. Accordingly, non- parametric statistical tests were applied, i.e., Mann-Whitney to compare two groups and Kruskal-Wallis to compare more than two groups. P-values less than 0.05 were considered as statistically significant.

This study was approved by an Ethics Review Committee. Verbal informed consent was obtained from all participants. All collected data were kept confidential and were not used except for study purposes.

Results

Demographic characteristics
Table 1 presents participants' demographic characteristics. The age of 39.7% ranged between 31 and 40 years whereas that of 8.8% exceeded 50 years. Almost two-thirds (62.2%) were males and most of them (72.6%) were married. More than half of them (53.7%) were Bachelor Degree holders whereas 24.5% were postgraduates. Physicians and nurses represented 39.7% and 21.9% of the respondents, respectively.

Work- related concerns
Table 2 shows that most HCWs (72%) either agreed or strongly agreed that they are confident that their employer would look after their medical needs if they were to fall ill with Covid-19 and the risk of contracting COVID-19 is part of their job (67.5%) while only 13.3% either agreed or strongly agreed that they would consider it acceptable if their colleagues resign because of their fear of COVID-19; they might look for another job or consider resigning because of the risk of contracting COVID-19 (6.6%) and they feel that they should not be looking after patients with COVID-19 (8.1%).

The total score of work-related concern of Covid-19 among the participants ranged between 7 and 28, out of a possible maximum of 35, with a mean ±SD of 18.3±4.6 and median (IQR) of 18 (15-22). Regarding education, the highest work-related concerns score was reported among master holders (mean rank=172.45), while the lowest was reported among Diploma holders (mean rank=90.95), $p<0.001$. Concerning job title, doctors expressed the highest concerns (mean rank=141.58), whereas pharmacists expressed the lowest concerns (mean rank=93.90), $p=0.029$, as shown in Table (3).

Non-work-related concerns
The majority of the HCWs either agreed or strongly agreed that they would be most concerned about themselves (85.7%), their families (81.7%), close friends (81.4%), and work colleagues (62.5%). More than half of them (57%) either agreed or strongly agreed that people close to them would be worried for their health while 30% either agreed or strongly agreed that people close to them would be worried as they may get infected by them (Table 4).

The total score of non-work-related concern of COVID-19 among the participants ranged between 7 and 35, out of a possible maximum of 35, with a mean±SD of 25.1±4.9 and median (IQR) of 28 (22-28). The highest non-work-related concern score was observed among HCWs who hold master degrees (mean rank=162.92) while the lowest was reported among Diploma holders (mean rank=113.75), p=0.009. Concerning job title, doctors expressed the highest concerns (mean rank=142.98) whereas pharmacists expressed the lowest concerns (mean rank=82.24), p=0.003, as shown in Table 5.

Perceived impact on personal life and work health professional

More than half of HCWs either agreed (43.6%) or strongly agreed (8.5%) that there would be adequate staff at their workplace to handle the increased demand as a result of covid-19 pandemic, 41.7% would have to work overtime, 36.1% said I would have an increase in workload whereas 30% would be afraid of telling their family about the risk they are exposed to. On the other hand, only 13.7 of HCW either agreed or strongly agreed that people would avoid their family members because of his/her job and 12% of them would avoid telling other people about the nature of their job, as shown in Table 6.

The total score of perceived impact on personal life and work health professional among the participants ranged between 6 and 44, out of a possible maximum of 50, with a mean ±SD of 25.2±7.3 and median (IQR) of 25 (21-30). The highest score of perceived impact of covid-19 on personal life and work health professional was observed among HCWs in the age group 31-40 (mean rank=162.55) while the lowest was reported among those aged over 50 years (mean rank=90.08), p=0.001. Regarding education, the highest score of perceived impact of covid-19 on personal life and work health professional was reported among master holders (mean rank=189.87) while the lowest was reported among Diploma holders (mean rank=120.59), p<0.001, as shown in Table 7.

Preparedness for Coronavirus (COVID-19) pandemic

The majority of healthcare workers either agreed or strongly agreed regarding the statements of “Over the last 6 months, I bought masks” (92.5%), “I have been recommended by my clinic to receive coronavirus vaccination” (90.5%), “Over the last 6 months, I have received coronavirus vaccination “ (87.2%), “I received adequate personal protective equipment training” (86.9%), “I have received training for infection control at my clinic” (82.1%), “I have seen the plan to combat COVID-19 infection in my hospital” (76.9%), “I am personally prepared for COVID-19 outbreak” (75.8%), “I have someone to turn to if unsure of use of personal protective equipment” (74.2%) and “My clinic has a preparedness plan for COVID-19 outbreak” (73.3%), as shown in Table 8.

The total score of preparedness for COVID-19 pandemic among health professionals ranged between 15 and 75, out of a possible maximum of 75, with a mean ±SD of 53.7±11.1 and median (IQR) of 56 (48-61). The highest score of hospital and HCWs preparedness for COVID-19 pandemic was observed among HCWs aged over 50 years (mean rank=213.81) while the lowest was reported among those aged between 31 and 40 years (mean rank=141.13), p<0.001, as shown in Table 9.

Table 1: Demographic characteristics of the participants (n=307)

Characteristics	No.	%
Age (years)		
• ≤30	103	33.6
• 31-40	122	39.7
• 41-50	55	17.9
• >50	27	8.8
Sex		
• Male	191	62.2
• Female	116	37.8
Marital status		
• Single	69	22.5
• Married	223	72.6
• Divorced/Widow	15	4.9
Educational level		
• Diploma	67	21.8
• Bachelor	165	53.7
• Master	49	16.0
• PhD/MD/Fellowship	26	8.5
Job title		
• Doctor	122	39.7
• Nurse	67	21.9
• Laboratory personnel	30	9.8
• Pharmacist	28	9.1
• Other	60	19.5

Table 2: Work related concerns of the participants regarding COVID-19 pandemic

Work-related Concerns	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Not applicable
My job would put me at great risk of exposure to COVID-19	73 (23.8)	66 (21.5)	26 (8.5)	79 (25.6)	57 (18.6)	6 (2.0)
I am afraid of falling ill with COVID-19	72 (23.5)	64 (20.8)	34 (11.1)	95 (30.9)	24 (7.8)	18 (5.9)
I should not be looking after patients with COVID-19	150 (48.9)	97 (31.6)	24 (7.8)	16 (5.2)	9 (2.9)	11 (3.6)
I accept the risk of contracting COVID-19 as part of my job	39 (12.7)	25 (8.1)	24 (7.8)	134 (43.7)	73 (23.8)	12 (3.9)
I might look for another job or consider resigning because of the risk of contracting COVID-19	177 (57.6)	81 (26.3)	22 (7.2)	14 (4.6)	6 (2.0)	7 (2.3)
I would consider it acceptable if my colleagues resign because of their fear of COVID-19	136 (44.3)	78 (25.4)	42 (13.7)	40 (13.0)	1 (0.3)	10 (3.3)
I am confident that my employer would look after my medical needs if I were to fall ill with COVID-19	20 (6.5)	12 (3.9)	42 (13.7)	154 (50.2)	67 (21.8)	12 (3.9)

Table 3: Factors associated with work-related concerns of healthcare workers about COVID-19 pandemic

Personal characteristics	Score of work-related concerns of COVID-19			P-value
	Median	Interquartile Range	Mean rank	
Age (years)				
• ≤30 (n=87)	18	15-21	121.90	
• 31-40 (n=97)	20	17-23	146.61	
• 41-50 (n=45)	17	14-19.5	104.88	
• >50 (n=21)	14	11.5-21.5	87.07	<0.001‡
Sex				
• Male (n=152)	19	15-22	130.97	
• Female (n=98)	18	15-21	117.01	0.135†
Marital status				
• Single (n=52)	19.5	16-22.75	140.47	
• Married (n=185)	18	15-22	122.17	
• Divorced/Widow (n=13)	18	14.5-21.5	113.0	0.221‡
Educational level				
• Diploma (n=50)	15.5	11-19.5	90.95	
• Bachelor (n=142)	18	15-21	121.61	
• Master/equivalent (n=38)	22	17.75-24	172.45	
• PhD/Equivalent (n=20)	21	17.25-22	150.33	<0.001‡
Job title				
• Doctor (n=98)	20	16-23	141.58	
• Nurse (n=53)	18	15-21	118.12	
• Laboratory personnel (n=26)	18	16-20.25	118.33	
• Pharmacist (n=26)	16	14.75-19.25	93.90	
• Other (n=47)	18	14-22	121.73	0.029‡

†Mann-Whitney test ‡Kruskal Wallis test

Table 4: Non-work-related concerns of the participants regarding COVID-19 pandemic

Work related concerns Health Professional	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Not applicable
People close to me would be at high risk of getting COVID-19 because of my job	20 (6.5)	63 (20.5)	51 (16.6)	106 (34.5)	57 (18.6)	10 (3.3)
I would be most concerned for myself	5 (1.6)	15 (4.9)	21 (6.8)	163 (53.1)	100 (32.6)	3 (1.0)
My family	8 (2.6)	19 (6.2)	27 (8.8)	183 (59.6)	68 (22.1)	2 (0.7)
My close friends	9 (2.9)	19 (6.2)	23 (7.5)	181 (58.9)	69 (22.5)	6 (2.0)
My work colleagues	6 (2.0)	27 (8.8)	74 (24.1)	139 (45.2)	53 (17.3)	8 (2.6)
People close to me would be worried for my Health	5 (1.6)	45 (14.7)	73 (23.8)	141 (45.9)	34 (11.1)	9 (2.9)
People close to me would be worried as they may get infected by me	55 (17.9)	100 (32.6)	32 (10.4)	77 (25.1)	15 (4.9)	28 (9.1)

Table 5: Factors associated with non-work-related concerns of healthcare workers about COVID-19 pandemic

Personal characteristics	Score of non-work-related concerns of COVID-19			P value
	Median	Interquartile Range	Mean rank	
Age (years)				
• ≤30 (n=87)	25	22-28	127.59	
• 31-40 (n=97)	26	22-28.25	135.34	
• 41-50 (n=45)	25	21-27	113.24	
• >50 (n=21)	26	22.75-28.5	138.08	0.392‡
Sex				
• Male (n=152)	26	22-29	135.81	
• Female (n=98)	25	21-28	118.65	0.069†
Marital status				
• Single (n=52)	26	22-28.25	136.05	
• Married (n=185)	26	22-28	129.31	
• Divorced/Widow (n=13)	24	21-25.5	93.08	0.167‡
Educational level				
• Diploma (n=50)	25	21-27	113.75	
• Bachelor (n=142)	25	22-28	124.08	
• Master/equivalent (n=38)	27	25-30	162.92	
• PhD/equivalent (n=20)	26	21.5-29	130.91	0.009‡
Job title				
• Doctor (n=98)	26	23.25-29	142.98	
• Nurse (n=53)	26	22-28	138.13	
• Laboratory personnel (n=26)	25.5	21-27.25	118.21	
• Pharmacist (n=26)	22	20-25	82.24	
• Other (n=47)	25	21-28	119.04	0.003‡

†Mann-Whitney test ‡Kruskal Wallis test

Table 6: Perceived impact of COVID-19 pandemic on personal life and work health professional of healthcare workers

Perceived impact on personal life and work health professionals	Strongly disagree	Disagree	Not Sure	Agree	Strongly agree	Not applicable
I would be afraid of telling my family about the risk I am exposed to	55 (17.9)	100 (32.6)	32 (10.4)	77 (25.1)	15 (4.9)	28 (9.1)
People would avoid me because of my job	57 (18.6)	72 (23.5)	94 (30.6)	56 (18.2)	3 (1.0)	25 (8.1)
People would avoid my family members because of my job	72 (23.5)	82 (26.7)	90 (29.3)	36 (11.7)	6 (2.0)	21 (6.8)
I would avoid telling other people about the nature of my job	99 (32.2)	110 (35.8)	34 (11.1)	32 (10.4)	5 (1.6)	27 (8.8)
There would be adequate staff at my workplace to handle the increased demand	28 (9.1)	28 (9.1)	74 (24.1)	134 (43.6)	26 (8.5)	17 (5.5)
There would be more conflict amongst colleagues at work	30 (9.8)	95 (30.9)	79 (25.7)	56 (18.2)	6 (2.0)	41 (13.4)
I would feel more stressed at work	26 (8.5)	131 (42.7)	51 (16.6)	64 (20.8)	20 (6.5)	15 (4.9)
I would have an increase in workload	26 (8.5)	107 (34.8)	41 (13.4)	85 (27.6)	26 (8.5)	22 (7.2)
I would have to work Overtime	44 (14.3)	74 (24.1)	47 (15.3)	111 (36.2)	17 (5.5)	14 (4.6)
I would have to do work not normally done by me	52 (16.9)	103 (33.7)	63 (20.5)	68 (22.1)	16 (5.2)	5 (1.6)

Table 7: Factors associated with perceived impact of COVID-19 on personal life and work health professional of healthcare workers

Personal characteristics	Score of perceived impact of Covid-19 on personal life and work health professional			P value
	Median	Interquartile Range	Mean rank	
Age (years)				
• ≤30 (n=87)	26.5	22-30	161.81	
• 31-40 (n=97)	26	21.5-31	162.55	
• 41-50 (n=45)	24	21-29	139.65	
• >50 (n=21)	18	13.75-25.5	90.08	0.001‡
Sex				
• Male (n=152)	25	20-30	149.68	
• Female (n=98)	26	21-29.25	155.85	0.553†
Marital status				
• Single (n=52)	27	21-31.75	166.74	
• Married (n=185)	25	21-29	147.83	
• Divorced/Widow (n=13)	25.5	19-29	146.32	0.288‡
Educational level				
• Diploma (n=50)	22	15-28.75	120.59	
• Bachelor (n=142)	25	21-28.75	148.36	
• Master/equivalent (n=38)	29	24.5-32.5	189.87	
• PhD/equivalent (n=20)	26.5	23.75-33	180.90	<0.001‡
Job title				
• Doctor (n=98)	26	22-30	156.86	
• Nurse (n=53)	26	21-34.5	166.50	
• Laboratory personnel (n=26	25.5	22-27	138.73	
• Pharmacist (n=26)	23.5	19.5-27	126.95	
• Other (n=47)	25	17.75-29.75	144.28	0.234‡

†Mann-Whitney test ‡Kruskal Wallis test

Table 8: Hospital and healthcare workers preparedness for COVID-19 among health professionals

Preparedness for COVID-19 pandemic health professionals	Strongly disagree	Disagree	Not Sure	Agree	Strongly agree	Not applicable
There is an infection control committee in my clinic	15 (4.9)	45 (14.7)	23 (7.5)	139 (45.2)	41 (13.4)	44 (14.3)
I have received training for infection control at my clinic	6 (2.0)	13 (4.2)	25 (8.1)	187 (60.9)	65 (21.2)	11 (3.6)
I received adequate personal protective equipment training	8 (2.6)	6 (2.0)	19 (6.2)	173 (56.3)	94 (30.6)	7 (2.3)
I have someone to turn to if unsure of use of personal protective equipment	9 (2.9)	14 (4.6)	45 (14.7)	175 (56.9)	53 (17.3)	11 (3.6)
I have been recommended by my clinic to receive coronavirus vaccination	7 (2.3)	3 (1.0)	14 (4.6)	138 (45.0)	140 (45.5)	5 (1.6)
There is infection control staff in my clinic	12 (3.9)	51 (16.6)	22 (7.2)	130 (42.4)	52 (16.9)	40 (13.0)
My clinic has a preparedness plan for COVID-19 outbreak	15 (4.9)	5 (1.6)	40 (13.0)	141 (45.9)	84 (27.4)	22 (7.2)
I have seen the plan to combat COVID-19 infection in my hospital	15 (4.9)	13 (4.2)	29 (9.4)	156 (50.8)	80 (26.1)	14 (4.6)
I am personally prepared for COVID-19 outbreak	20 (6.5)	10 (3.3)	37 (12.1)	138 (44.9)	95 (30.9)	7 (2.3)
Over the last 6 months, I have attended infection control training sessions	18 (5.9)	27 (8.8)	22 (7.2)	171 (55.6)	30 (9.8)	39 (12.7)
Over the last 6 months, I have participated in infection control audits	17 (5.5)	56 (18.2)	34 (11.1)	132 (43.0)	19 (6.2)	49 (16.0)
Over the last 6 months, I have attended infection control related meetings	21 (6.8)	30 (9.8)	22 (7.2)	167 (54.3)	30 (9.8)	37 (12.1)
Over the last 6 months, I have received coronavirus vaccination	10 (3.3)	16 (5.2)	10 (3.3)	130 (42.2)	138 (45.0)	3 (1.0)
Over the last 6 months, I bought anti-COVID-19 medication	41 (13.4)	96 (31.3)	27 (8.8)	100 (32.5)	24 (7.8)	19 (6.2)
Over the last 6 months, I bought masks	4 (1.3)	5 (1.6)	11 (3.6)	108 (35.2)	176 (57.3)	3 (1.0)

Table 9: Factors associated with preparedness of hospital and healthcare workers for COVID-19 pandemic

Personal characteristics	Score of preparedness for COVID-19 pandemic			P Value
	Median	Interquartile Range	Mean rank	
Age (years)				
• ≤30 (n=87)	56	47-60	150.03	
• 31-40 (n=97)	54	45-60.25	141.13	
• 41-50 (n=45)	58	50-62	160.62	
• >50 (n=21)	62	56-64	213.81	<0.001‡
Sex				
• Male (n=152)	56	47-61	152.0	
• Female (n=98)	57	48-62	157.29	0.613†
Marital status				
• Single (n=52)	54	44.5-60	136.20	
• Married (n=185)	57	50-62	159.02	
• Divorced/Widow (n=13)	56	44-66	161.23	0.166‡
Educational level				
• Diploma (n=50)	56	45-62	152.58	
• Bachelor (n=142)	57	49.5-62	164.30	
• Master/equivalent (n=38)	56	45-60	138.96	
• PhD/equivalent (n=20)	53	50-56.25	120.62	0.062‡
Job title				
• Doctor (n=98)	56.5	47-62	155.69	
• Nurse (n=53)	57	48-62	157.05	
• Laboratory personnel (n=26)	54	49.5-60.25	149.12	
• Pharmacist (n=26)	55.5	50.25-60.75	150.63	
• Other (n=47)	57	45-61	151.17	0.989‡

†Mann-Whitney test ‡Kruskal Wallis test

Discussion

Since the time of declaring COVID-19 outbreak as a pandemic, by the World Health Organization (WHO), authorities in many countries all over the world, including Saudi Arabia considered it as a serious concern for both public and health care workers (64). Health care workers (HCWs) work closely in contact with infected individuals which put them under higher risk of infection.(65, 66). Additionally, the preparedness of the health care systems to the covid-19 pandemic on a national level has become essential in evaluating risks, and after that monitoring and limiting the viral spread (65). Therefore, the present study was carried out mainly to assess concerns, perceived impacts and preparedness of health care workers for epidemic and pandemic events in MOH hospitals in Jazan, Southern Saudi Arabia.

In the current survey, most of the HCWs were confident that their employer would look after their medical needs if they were to fall ill with COVID-19 and they agreed that the risk of contracting COVID-19 is part of their job. On the other hand, only a minority of them (13.3%) agreed that they would consider it acceptable if their colleagues resign because of their fear of COVID-19 and only 6.6% might look for another job or consider resigning because of the risk of contracting COVID-19 and 8.1% feel that they should not be looking after patients with COVID-19. In a recent study carried out in Italy (67), half of the HCWs were extremely worried about being infected with COVID-19.

Also, over 50% of HCWs in other places were afraid of being infected during the current pandemic (68, 69). A previous study reported that concerns of HCWs about being infected were a vital factor associated their unavailability to work during an epidemic(70). In the present study, only 13.7% of HCWs were afraid of falling ill with COVID-19. This could be attributed to receiving sufficient training. Furthermore, Muller et al reported that concerns of HCWs about being infected were among the commonest factors associated with higher risk of psychological health problems among them(71).

Regarding non-work related concerns, the majority of the HCWs in the present study (>80%) would be most concerned about themselves, their families, close friends, and to a lesser degree work colleagues. Additionally,

more than half of them agreed that people close to them would be worried for their health while 30% agreed that people close to them would be worried as they may get infected by them. In Italy (67), over 60% of the HCWs were concerned about infecting their family, friends and patients. The higher concern among our population could reflect a cultural difference between Saudi Arabia and Italy in this regards. Other studies carried out on the SARS and Avian flu outbreaks reported quite similar findings (72, 73).

Therefore, the quarantine of HCWs who deal with COVID-19 patients is mandatory to assure a safety sense for the HCWs and their families.

In the present study, relatively younger HCWs (31-40), and Master holders were more concerned about COVID-19. This might be explained by their lesser experience. Concerning job title, doctors expressed the highest concerns whereas pharmacists expressed the lowest concerns. This is quite logical as a result of the nature of their job in dealing directly and closely with infected patients. About half of HCWs reported that there would be adequate staff at their workplace to handle the increased demand as a result of the COVID-19 pandemic. Almost one-third of them would be afraid of telling their family about the risk they are exposed to. On the other hand, only 13.7% saw that people would avoid their family members because of their job and 12% would avoid telling other people about the nature of their job. In Italy (67) , “social ostracism” for HCWs and their families was reported by about 10% of HCWs. On the other hand, over 60% of HCWs during SARS epidemic reported “social ostracism” (74, 75). In another Italian study, discrimination was reported by almost a quarter of HCWs (76). This discrepancy between studies could be explained by the fact that the Italian study was carried out early in the pandemic (first wave) and in our community, we did not face an outbreak as happened in Italy, while in other communities, the studies were carried out during the later waves of the epidemic where the fear and concerns of people towards HCWs increased.

In the current study, a considerable proportion of HCWs (between 27.3% and 41.7%) would feel more stressed at work, have an increase in workload, have to work overtime, and have to do work not normally done by them. Other studies reported that about half of HCWs had to change their job demands and duties and increase workload during pandemics (67, 74, 77).

In the present study, it seems that on a personal level, HCWs were sufficiently prepared for the COVID-19 pandemic as above 80% of them bought masks and have received coronavirus vaccination, and had adequate personal protective equipment training and training for infection control at their clinics. Furthermore, about three-quarters of them have seen the plan to combat COVID-19 infection in their hospitals, have personally prepared for COVID-19 outbreak, had someone to turn to if unsure of use of personal protective equipment, and their clinic has a preparedness plan for COVID-19 outbreak.

These findings are not in line with those reported from a similar study carried out in Italy as 90% of the HCWs claimed that they were not prepared well from a professional point of view for this pandemic and above 80% of them described the training regarding COVID-19 and the use of PPE as inadequate (67). In Japan (78), hospital preparedness in the early phase of the pandemic was inadequate.

This difference could be due to the fact that the pandemic exploded extensively first in Italy and Japan, while other countries, including Saudi Arabia prepared themselves much better for the pandemic. Sufficient training and PPE availability with proper training on its utilization play an essential role in perception of safety at workplace. It has been shown previously that training and the provision of PPE were the two most important factors associated with preparedness of HCWs to work during pandemics (70).

The present study has some few limitations. Causal association between dependent and independent variables cannot be assured due to the cross-sectional nature of the study design. Self-administered nature of the study tool is subjected to bias in trying of the participants to over- or under-estimate the situation. Despite those limitations, the study could have important implications in exploring the concerns of physicians regarding the COVID-19 pandemic as well as to investigate their preparedness and the whole healthcare system in facing such pandemics.

Conclusion

Some work-related and non-work-related concerns of HCWs in Jazan regarding COVID-19 pandemic have been identified. Also, perceived impact of the pandemic on HCWs` work and professional life has been documented. Younger HCWs (31-40), and Master holders were more concerned about COVID-19. Regarding job title, doctors expressed the highest concerns whereas pharmacists expressed the lowest concerns. Their preparedness as well as the preparedness of the health care system to the COVID-19 pandemic was satisfactory in most aspects. Older HCWs were more satisfied with preparedness of hospitals to face the pandemic.

Therefore, to reduce the HCWs` concerns of epidemics and pandemics, stress management courses should be applied to them. Providing psychological support to HCWs during epidemics and pandemics is essential to help them in facing such situations. Improvement of preparedness of both HCWs and healthcare settings to epidemics and pandemics through more training and provision of PPE and organizing plans to face these situations efficiently will assist.

References

1. Otter JA, Donskey C, Yezli S, Douthwaite S, Goldenberg SD, Weber DJ. Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. The Journal of hospital infection. 2015 Nov 5;
2. Fineberg HV. Pandemic preparedness and response--lessons from the H1N1 influenza of 2009. N Engl J Med. 2014 Apr 4;370(14):1335–42.
3. Lin L, Savoia E, Agboola F, Viswanath K. What have we learned about communication inequalities during the H1N1 pandemic: a systematic review of the literature. BMC Public Health. 2014;14:484.
4. Who.int. WHO | Pandemic (H1N1) 2009 - update 112 [Internet]. 2016. Available from: http://www.who.int/csr/don/2010_08_06/en/index.html
5. Who.int. WHO | World now at the start of 2009 influenza pandemic [Internet]. 2016. Available from: http://www.who.int/mediacentre/news/statements/2009/h1n1_pandemic_phase6_20090611/en
6. www. https://icmanaesthesiacovid-19.org/background
7. Madani TA, Al-Mazrou YY, Al-Jeffri MH, Mishkhas AA, Al-Rabeah AM, Turkistani AM, et al. Rift Valley fever epidemic in Saudi Arabia: epidemiological, clinical, and laboratory characteristics. Clin Infect Dis. 2003; 37(8):1084–92.
8. Madani TA. Alkhumra virus infection, a new viral hemorrhagic fever in Saudi Arabia. J Infect 2005;51(2):91–7.
9. Aziz AT, Al-Shami SA, Mahyoub JA, Hatabbi M, Ahmad AH, Rawi CS. An update on the incidence of dengue gaining strength in Saudi Arabia and current control approaches for its vector mosquito. Parasit Vectors. 2014;7:258.
10. Jamjoom GA, Azhar EI, Kao MA, Radadi RM. Seroepidemiology of Asymptomatic Dengue Virus Infection in Jeddah, Saudi Arabia. Virology (Auckl). 2016; 7:1–7.
11. Assiri A, McGeer A, Perl TM, Price CS, Al Rabeeah AA, Cummings DA, et al. Hospital outbreak of Middle East respiratory syndrome coronavirus. N Engl J Med. 2013; 369(5):407–16.
12. Oboho IK, Tomczyk SM, Al-Asmari AM, Banjar AA, Al-Mugti H, Aloraini MS, et al. 2014 MERS-CoV outbreak in Jeddah - a link to health care facilities. N Engl J Med. 2015; 372(9):846–54.
13. Assiri A, Abedi GR, Saeed AA, Abdalla MA, Al-Masry M, Choudhry AJ, et al. Multifacility Outbreak of Middle East Respiratory Syndrome in Taif, Saudi Arabia. Emerging Infect Dis. 2016 Jan 5;22(1):32–40.
14. Worldometer. Covid-19 coronavirus pandemic-Saudi Arabia. Saudi Arabia COVID - Coronavirus Statistics - Worldometer (worldometers.info). Last accessed on: January 14th, 2022.
15. Who.int. WHO | International Health Regulations (2005) [Internet]. 2016. Available from: http://www.who.int/ihr/9789241596664/en/
16. Who.int. WHO | Pandemic preparedness [Internet]. 2016 Available from: http://www.who.int/influenza/preparedness/pandemic/en/
17. Johnson LE, Clará W, Gambhir M, Chacón-Fuentes R, Marín-Correa C, Jara J, et al. Improvements in pandemic preparedness in 8 Central American countries, 2008-2012. BMC Health Serv Res. 2014; 14:209.
18. Hanvoravongchai P, Adisasmito W, Chau PN, Conseil A, de Sa J, Krumkamp R, et al. Pandemic influenza preparedness and health systems challenges in Asia: results from rapid analyses in 6 Asian countries. BMC Public Health. 2010;10:322.
19. Oshitani H, Kamigaki T, Suzuki A. Major issues and challenges of influenza pandemic preparedness in developing countries. Emerging Infect Dis. 2008;14(6):875–80.
20. Nicoll A, Brown C, Karcher F, Penttinen P, Hegermann-Lindencrone M, Villanueva S, et al. Developing pandemic preparedness in Europe in the 21st century: experience, evolution and next steps. Bull World Health Organ. 2012;90(4):311–7.
21. Hashim A, Jean-Gilles L, Hegermann-Lindencrone M, Shaw I, Brown C, Nguyen-Van-Tam J. Did pandemic preparedness aid the response to pandemic (H1N1) 2009? A qualitative analysis in seven countries within the WHO European Region. J Infect Public Health. 2012; 5(4):286–96.
22. Meeyai A, Cooper BS, Coker R. Analysis of 2009 pandemic influenza A/H1N1 outcomes in 19 European countries: association with completeness of national strategic plans. BMJ Open. 2013;3(3).
23. Holloway R, Rasmussen SA, Zaza S, Cox NJ, Jernigan DB. Updated preparedness and response framework for influenza pandemics. MMWR Recomm Rep. 2014;63(RR-06):1–18.
24. Gibson PJ, Theadore F, Jellison JB. The common ground preparedness framework: a comprehensive description of public health emergency preparedness. Am J Public Health. 2012; 102(4):633–42.
25. Suwantarat N, Apisarnthanarak A. Risks to healthcare workers with emerging diseases: lessons from MERS-CoV, Ebola, SARS, and avian flu. Curr Opin Infect Dis. 2015; 28(4):349–61.
26. Dewar B, Barr I, Robinson P. Hospital capacity and management preparedness for pandemic influenza in Victoria. Aust N Z J Public Health. 2014;38(2):184–90.
27. Abolfotouh MA, Almutairi AF, Bani Mustafa AA, Hussein MA. Perception and attitude of healthcare workers in Saudi Arabia with regard to Covid-19 pandemic and potential associated predictors. BMC Infect Dis 2020; 20:719.
28. Goh KT, Cutter J, Heng BH, Ma S, Koh BK, Kwok C, Toh CM, Chew SK. Epidemiology and control of SARS in Singapore. Ann Acad Med Singapore 2006; 35, 301-16.
29. Malik MR, Ul-Haq Z, Saeed Q, Riley R¸ Khan WM. Distressed setting and profound challenges: Pandemic influenza preparedness plans in the Eastern Mediterranean Region. Journal of Infection and Public Health 2018; 11(3): 352-356.
30. World Health Organization. WHO director-general's opening remarks at the media briefing on COVID-19. Available from: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-atthe-media-briefing-on-covid-19—11-march-2020
31. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health. Interim Guidance. Cited August 10, 2020.

https://www.who.int/ publications-detail/coronavirus-disease-(covid-19)-outbreakrights-roles-and-responsibilities-of-health-workers-including-key-considerations-for-occupational-safety-and-health
32. Sahu AK, Amrithanand VT, Mathew R, Aggarwal P, Nayer J, Bhoi S. COVID-19 in health care workers - a systematic review and meta-analysis. Am J Emerg Med. 2020;38(9):1727-1731.
33. Portoghese I, Meloni F, Galletta M, Piras I, D'Aloja E, Finco G, et al. Concerns, perceived impact, preparedness in Coronavirus disease (COVID-19) pandemic and health outcomes among Italian physicians: A cross-sectional study. Journal of Primary Care & Community Health 2021;12: 1–11. doi: 10.1177/21501327211000245.
34. Fu C, Wei Z, Pei S, Li S, Sun X, Liu P. Acceptance and preference for COVID-19 vaccination in health-care workers (HCWs). medRxiv. Published online April 14, 2020. doi:10.1101/2020.04.09.20060103.
35. Kramer V, Papazova I, Thoma A, et al. Subjective burden and perspectives of German healthcare workers during the COVID-19 pandemic. Eur Arch Psychiatry Clin Neurosci. 2020:1–11. Published online August 19, 2020. doi:10.1007/s00406-020-01183-2
36. Devnani M. Factors associated with the willingness of health care personnel to work during an influenza public health emergency: an integrative review. Prehosp Disaster Med. 2012;27(6):551-566.
37. Muller AE, Hafstad EV, Himmels JPW, et al. The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: A rapid systematic review. Psychiatry Res. 2020; 293:113441.
38. Tiong WW, Koh GCH. Ethical considerations in the review of Singapore's H1N1 pandemic response framework in 2009. Ann Acad Med Singapore. 2013;42(5):246-250.
39. Cheong SK, Wong TY, Lee HY, Fong YT, Tan BY, Koh GC, et al. Concerns and preparedness for an avian influenza pandemic: a comparison between community hospital and tertiary hospital healthcare workers. Ind Health. 2007 Oct;45(5):653-61. doi: 10.2486/indhealth.45.653.
40. Wong TY, Koh GC, Cheong SK, Lee HY, Fong YT, Sundram M, et al. Concerns, perceived impact and preparedness in an avian influenza pandemic–a comparative study between healthcare workers in primary and tertiary care. Ann Acad Med Singapore. 2008;37(2):96-102.
41. Khee KS, Lee LB, Chai OT, Loong CK, Ming CW, Kheng TH. The psychological impact of SARS on health care providers. Crit Care Shock. 2004;7(2):99-106.
42. Cabrini L, Grasselli G, Cecconi M; COVID-19 Lombardy ICU Network. Yesterday heroes, today plague doctors: the dark side of celebration. Intensive Care Med. 2020; 46(9):1790-1791.
43. Wong ELY, Wong SYS, Lee N, Cheung A, Griffiths S. Healthcare workers' duty concerns of working in the isolation ward during the novel H1N1 pandemic. J Clin Nurs. 2012; 21(9-10):1466-1475.
44. Tagashira Y, Takamatsu A, Hasegawa S, Uenoyama Y, Honda H. A survey of preparedness against coronavirus disease 2019 (COVID-19) in hospitals in Tokyo, Japan, with healthcare personnel with COVID-19 and in-facility transmission. Infect Control Hosp Epidemiol. 2020:1-5.