

Coronavirus Pandemic

Knowledge and attitude among healthcare workers towards COVID-19: a cross sectional study from Jeddah city, Saudi Arabia

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Abstract

Introduction: The emergence of the new Coronavirus disease 2019 (COVID-19) has caused a major impact on global health system. This cross-sectional study was designed to appraise the knowledge and attitude of healthcare workers towards COVID-19 and find out their understanding about clinical aspects of the infection.

Methodology: A total number of 1023 of healthcare workers responded to an online questionnaire and provided their data between February and March, 2020 in Jeddah city, Western province, Saudi Arabia. The questionnaire was distributed to physicians, nurses, pharmacists, technical staff and administrative staff working in clinical settings.

Results: Results revealed that mean scores for knowledge and attitude were 20.793 ± 2.436 and 4.744 ± 0.297 respectively. More than 88% of participants displayed positive knowledge and attitude towards COVID-19. Knowledge data showed that social media and the workplace, were the main sources of information for the majority of respondents. Approximately 99.12% of respondents were aware of the viral pandemic, and the causative agent. Statistically significant association was found when compared the demographic characteristics with the mean knowledge while no statistical significance was observed when compared demographic characteristics with the mean attitude score except with marital status.

Conclusion: This study showed that healthcare workers had sufficient knowledge and positive attitude towards COVID-19. However, hospital staff should be periodically given sufficient training to effectively cope with such outbreaks in the future.

Key words: COVID-19; SARS-CoV-2; knowledge; attitude; healthcare workers.

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Introduction

The rapid spread of coronavirus disease, also known as COVID-19, has resulted in massive health challenges and difficulties across the globe. In early December 2019, a viral outbreak in people working in Huanan seafood market, was reported in Wuhan City, Hubei Province of China. Within three months, the infection has spread 114 countries, and resulted in more than 4000 deaths. By this time, the World Health Organization (WHO) had announced a pandemic [1]. As of August 2020, the latest data points to 21 million global COVID-19 cases, with more than 760,000 deaths since the start of the outbreak [2]. This has caused a major impact on human life, including health systems, economies and social activities.

COVID-19 is a viral infection, believed to originate from an animal source. Early cases experienced acute respiratory syndrome of an unknown cause [3]. The infection is highly contagious; the disease has rapidly spread to many parts of the world, resulting in increased

geographical distribution, unequivocally due to human movement and travel [4]. COVID-19 is caused by a novel strain of Beta-coronavirus, recently called Severe Acute Respiratory Syndrome Coronavirus -2 (SARS-CoV-2). Phylogenetic investigations have revealed similarities between SARS-Cov-2 and two other coronaviruses linked to severe human diseases, i.e. SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV), with nucleotide identities of 79% and 51%, reported respectively [5, 6]. In early March 2020, Saudi Arabia recorded its first COVID-19 case in a traveler from Iran. Subsequently, cases rapidly increased, and by May 2020, 58,261 confirmed cases and 503 deaths had been recorded [7]. Active cases and fatality rates differ between countries. For instance, initial cases in Italy were more and more aggressive than those in Turkey and Germany. This may have been due to several reasons other than travel, i.e. health personnel and elderly populations [8]. The main mode of transmission is person to person, via air droplets from

infected individuals through coughing or sneezing [9,10]. There is also evidence to suggest transmission through the oral-fecal route [11]. Viral replication occurs in ciliated epithelial cells, causing inflammation and cell damage [10]. A recent study in healthcare workers (HCWs) in a large referral hospital in Barcelona, Spain, estimated antibody seroprevalence against SARS-CoV-2 and associated factors, and showed that 6.7% of HCWs had been diagnosed with COVID-19, indicating HCWs are high risk populations [12]. Patients with COVID-19 show variable symptoms that vary from mild to severe, with a commonality of observation of symptoms including fever, cough, dyspnea, myalgia and fatigue [13,14]. Beside the respiratory system, other systems implicated in the clinical course of COVID-19 such as cardiovascular, digestive and endocrine systems [14]. Since COVID-19 is easily spread amongst the general public, stringent precautions must be taken, particularly in those directly exposed to infection, including front line HCWs. The WHO has generated clear guidelines and recommendations for the rational use of personal protective equipment in healthcare and community settings, to protect HCWs from infection [15]. Globally, all countries have initiated prevention and control programs to minimize the spread of COVID-19. HCWs awareness and compliance in disease prevention and control are vital elements for effective prevention. These approaches provide valuable information for health authorities in measuring the impact of ongoing awareness and prevention programs. Clear guidelines can be formulated for further interventions to establish plans and responses for future infection outbreaks/second waves [16]. Additionally, HCWs may act as transmission vehicles/sources for patient to patient infections in the clinical setting. Therefore, to warrant effective control measures, HCWs must receive regular training, and acquire sufficient knowledge on viral agents and microbes during infectious outbreaks [17]. Thus, the aim of this cross-sectional study was to assess HCWs knowledge and attitude towards COVID-19 in Jeddah city, western Saudi Arabia, in the current pandemic environment.

Methodology

Study population

This cross-sectional study was conducted among HCWs in Jeddah city, Western province, Saudi Arabia, between February and March 2020, using an online questionnaire. Inclusion criteria included physicians, nurses, pharmacists, technical staff and administrative staff in clinical settings. The sample size was calculated

based on a 95% confidence level, and a margin of error of 5%. In total, 1023 respondents answered the questionnaire which was sufficient to draw a general conclusion on HCW knowledge and attitudes towards COVID-19. Ethical approval was obtained from the Faculty of Medical Rehabilitation Sciences at King Abdulaziz University with a reference letter number (FMRS-EC2020-02-003).

Study design and data collection

As the study assessed HCW knowledge and approaches to COVID-19, a standard questionnaire, based on the SARS, MERs CoV and COVID-19 literature was prepared [18-20]. The questionnaire consisted of 35 major questions relating to understanding, personal hygiene, information sources, public health and management of the disease was designed and validated to cover the study aim. Questions based proforma was designed in Google forms and provided both in English and Arabic languages to offer preferable language for all study population and to get the highest rate of response. The questionnaire was sent and distributed online using specific link where all responses are stored in the author's google drive. Participants data were kept anonymously to ensure participants confidentiality.

Data analysis

There were 25 closed-ended questions (items) to construct the knowledge variables related to COVID19. Each question equaled 1 point if it had a valid answer otherwise 0. Knowledge variables and scores were constructed by adding the points from these 25 questions; thus, the scores ranged between 0 (no valid answer) and 25 (all valid answers). The attitude variable comprised 10 statements, with each measured on 5-point Likert scale, where 1 reflected "strongly agree", while 5 reflected "strongly disagree". A simple average was taken to calculate this variable. A positive attitude was considered when a score was ≥ 4 , while a negative attitude was considered when the score ≤ 3 . Statistical analyses were performed using Stata 14.1 software. Data description was based on using frequency and mean tables. Analysis of variance (ANOVA) was conducted by considering knowledge and attitude as dependent variables while demographic characteristics were taken as independent variables. Further, correlation analysis was carried out to check the linear association between knowledge and attitude score of the respondents.

Results

Study Demographics

A total number of 1023 HCWs completed the questionnaire (Table 1). Of these, 55.62% (n = 569) were male and 44.38% (n = 454) were female. The 30–39 age category accounted for approximately half of respondents i.e. 49.95% (n = 511), whereas, the 20-29 and ≥ 40 year category accounted for 26.69 and 23.26% respectively. The following work groups contributed to the questionnaire; 104 physicians (10.17%), 37 pharmacists (3.62%), 103 nurses (10.07%), 58 administrative staff members (5.67%) and 721 (70.48%) technical staff, including technologists and technicians. The status of respondents was; 69.21% married (n = 708), 26.88% single (n = 275), 3.52% divorced (n = 36) and 0.39% widows (n = 4) (Table 1).

Source of COVID-19 information

Approximately 39.78% (n = 407) participants had heard about COVID-19 through social media, followed by 33.24% (n = 340) in the workplace. Other sources of information included TV and radio at 26.30% (n = 269), whereas 0.68% (n = 7) did not hear about COVID-19 from these sources (Table 1).

Participant knowledge towards COVID-19 is summarized in Table 2. Among participants, 99.12% were aware of the viral pandemic, and a significant number, i.e. 99.51% (1018/1023) were well-informed on the causative agent, i.e. the SARS-CoV-2 virus. Information on the mode of transmission was variable, but overall, it was sufficient and appreciable. According to 54.25% of respondents, SARS-CoV-2 is transferred by water; this was incorrect as there is no evidence for this. However, knowledge of other transmission modes was encouraging. For instance, 96.38% stated the virus is transmitted via handshaking with infected individuals, whereas, 84.07% stated that sharing clothing may also transmit the virus. Likewise, respiratory droplets generated during coughing was cited as a major mode of transmission by 97.46% participants.

In terms of virus incubation period, 96.19 % (984/1023) correctly responded. Furthermore, the majority of participants were aware of signs and symptoms, including fever (99.32%), cough (97.07%), dyspnea (99.02%), fatigue (89.35%), whereas, myalgia was answered by 74.88% of participants (Table 2). When asked about current treatment approaches, 74.10% (758/1023) believed that supportive therapy was the most vital and essential element of these approaches. Approximately, 91.50% acknowledged no Food and Drugs Agency (FDA) clinically approved

Table 1. Distribution of healthcare workers according to their characteristics.

Characteristics	Healthcare workers, n (%)
Gender	
Male	569 (55.62)
Female	454 (44.38)
Age in years	
20-29	273 (26.69)
30-39	511 (49.95)
40 and above	239 (23.36)
Occupation	
Physician	104 (10.17)
Pharmacist	37 (3.62)
Nurse	103 (10.7)
Administrative staff	58 (5.67)
Technical Staff	721 (70.48)
Marital status	
Divorced	36 (3.25)
Married	708 (69.21)
Single	275 (26.88)
Widow	4 (0.39)
Source of information about COVID-19	
Social media	407 (39.78)
TV/radio	269 (26.3)
Workplace	340 (33.24)
Haven't heard about it	7 (0.68)

vaccine against SARS-CoV-2. Similarly, they believed there were no vaccine and anti-viral drugs available to prevent and treat SARS-CoV-2, and that current therapies are limited to symptomatic relief only. Additionally, 96.48% of HCWs knew the old age was a high risk factor for infection. Approximately 86.61% of HCWs believe they were at risk whilst performing their duties in clinical settings, if sufficient precautionary measures were not adopted. Likewise, a high proportion of participants (98.83%) believed that travelling and working in crowds (98.34%) could increase the chances of infection. COVID-19 induced co-morbidities was another high risk factor identified by 88.56% of participants. Approximately 91.98% of participants believed that pneumonia was an infection complication, and that bronchitis as a symptom of disease, was accurately identified by 78.30%. Moreover, difficulties in breathing and multi-organ failure, as infection complications, were accurately identified by 97.26% and 62.07% HCWs respectively. Furthermore, around more than half of HCWs (54.84%) believed that animals could potentially transmit the disease to humans.

Table 2. Knowledge of healthcare workers about COVID-19.

Question	Correct answer	Correct answer, n (%)
Have you heard about COVID-19?	(Yes)	1014, (99.12)
The causative agent of COVID-19 is:	(Virus)	1018, (99.51)
COVID-19 is transmitted by Water	(No)	555, (54.25)
COVID-19 is transmitted by Shaking hand of infected patients	(Yes)	986, (96.38)
COVID-19 is transmitted by sharing Cloths towels	(Yes)	860, (84.07)
COVID-19 is transmitted by Air droplet after coughing or sneezing of affected individuals	(Yes)	997, (97.46)
The incubation period of the virus	(1-14 days)	984, (96.19)
Fever is a typical symptom	(Yes)	1016, (99.32)
Cough is a typical symptom	(Yes)	993, (97.07)
Dyspnea is a common symptom	(Yes)	1013, (99.02)
Fatigue is a common symptom	(Yes)	914, (89.35)
Myalgia is a common symptom	(Yes)	766, (74.88)
Current available treatment depends on	Supportive therapy	758, (74.10)
There is an effective vaccine against COVID-19	(No)	936, (91.50)
Immunosuppressed individuals are at increased risk of COVID-19	(Yes)	991, (96.87)
Healthcare workers are at increased risk of COVID-19	(Yes)	886, (86.61)
Elder people of 65 year and above are at increased risk of COVID-19	(Yes)	987, (96.48)
Travelers are at increased risk of COVID-19	(Yes)	1011, (98.83)
People at crowded places are at increased risk of COVID-19	(Yes)	1006, (98.34)
Chronic disease patients (such as diabetes and high blood pressure) are at increased risk of COVID-19	(Yes)	906, (88.56)
Pneumonia is one of the complications of COVID-19	(Yes)	941, (91.98)
Bronchitis is one of the complications of COVID-19	(Yes)	801, (78.30)
Difficulty in Breathing is one of the complications of COVID-19	(Yes)	995, (97.26)
Multi-organs failure is one of the complications of COVID-19	(Yes)	635, (62.07)
Avoid close contact with animals can prevent COVID-19	(Yes)	561, (54.84)

Table 3. Attitude of healthcare workers towards COVID-19.

Statements	Participants' responses* n (%)				
	SA	A	U	D	SD
Avoid close contact with people can prevent COVID-19	988 (96.58)	24 (2.35)	6 (0.59)	1 (0.097)	4 (0.39)
Individuals with suspected symptoms should be isolated	961 (93.94)	49 (4.79)	9 (0.89)	1 (0.1)	3 (0.29)
Washing hands with soap and water or with sanitizers can prevent COVID-19	946 (92.48)	65 (6.35)	8 (0.78)	1 (0.1)	3 (0.29)
Practice respiratory hygiene (Wearing a face mask, cover mouth and nose when coughing or sneezing) can prevent COVID-19	947 (92.57)	57 (5.57)	14 (1.37)	2 (0.20)	3 (0.29)
If suspicious symptoms appear, avoid normal activities such as going to work	911 (89.05)	81 (7.92)	21 (2.05)	5(0.49)	5 (0.49)
Feeling fearful of getting infection to my family members due to my job	815 (79.67)	154 (15.05)	35 (3.42)	15 (1.47)	4 (0.39)
Personal Protective Equipment should be worn when dealing with COVID-19 patients	970 (94.82)	35 (3.42)	11 (1.08)	4 (0.39)	3 (0.29)
Medical checkup (measurement of temperature) for HCWs should be carried out daily for early detection	894 (87.39)	96 (9.38)	24 (2.35)	3 (0.29)	6 (0.59)
It is important to change the medical uniform (scrub) after work duty	914 (89.35)	85 (8.31)	12 (1.17)	5 (0.49)	7 (0.68)
HCWs may experience family or community avoidance due to their nature of work	704 (68.82)	193 (18.87)	85 (8.31)	33 (3.23)	8 (0.78)

SA (Strongly Agree), A (Agree), U (Undecided), D (Disagree), SD (Strongly Disagree).

HCWs attitude towards COVID-19 is summarized in Table 3. The majority of participants (96.58%, 988/1023) strongly believed that close contact must be avoided to prevent disease spread. More importantly, 93.94% suggested that suspected infection cases must be isolated, and 92.48% strongly agreed that hand sanitizers could limit spread of infection. 92.57% of HCWs strongly agreed that respiratory hygiene was extremely important, and suspected cases must avoid normal working activities to avoid disease spread. A significant number of HCWs (79.67%) were worried about their jobs and if a family member became infected. Similarly, 94.82% of HCWs accepted that personal protective equipment was necessary in hospitals during a pandemic, and similarly, 87.39% of HCWs emphasized that regular personal infection checks were necessary for their health and that of their families. End of day procedures such as the changing of scrubs and uniforms were essential according to 89.35 % of HCWs (Table 3).

Demographic associations with various mean scores of knowledge and attitude are shown in Table 4. All demographic characteristics including age, gender, marital status, information sources and occupation, showed significant associations with mean knowledge score. In contrast, with the exception of marital status and information sources, the remaining demographic characteristics revealed not significant statistical associations with mean attitude score.

Discussion

Following the global spread of COVID-19 from china, most countries, including Saudi Arabia have prohibited essential travel to China and other high risk countries [21]. Preventive measures, based on appropriate knowledge, are essential for coronavirus awareness [22], hence this study is timely and appropriate in appraising HVWs knowledge and attitude towards COVID-19. As HCWs are on the front line, their safety and protection are paramount, hence they must be aware of precautions and preventive measures. This study observed that social media and workplaces were highly effective in delivering COVID-19 pandemic news, constituting together around two thirds of the total respondents with 39.78% and 33.24% respectively. This was similar to a recent health professionals' study in the Punjab province, Pakistan, which evaluated knowledge, attitude and preventive practices related to COVID-19. Here, social media was the major source (65%) of COVID-19 information [23]. The observation of this study also agreed with a recent study on HCWs, which focused on knowledge and attitude toward MERS-CoV; seminars and workshops in hospitals and social media were identified as main sources of MERS information [24]. Indeed, another recent study showed that hospitals and ministry of health websites were also major sources of information [25]. Thus, seminars and workshops remained a major source of information; however, as the viral infection is recently emerged, more seminars and conferences are

Table 4. Results of Distribution analysis based on knowledge and attitude mean scores among healthcare workers.

Characteristic	Knowledge					Attitude					
	Mean	SD	Freq.	F	p-value	Mean	SD	Freq.	F	p-value	
Age	20 - 29	20.993	4.582	273	11.362	0.000	4.839	0.273	273	2.709	0.067
	30 - 39	21.380	4.624	511			4.816	0.385	511		
	40 and above	21.933	4.683	239			4.875	0.228	239		
Gender	Female	21.209	2.226	454	T test (2.494)	0.006	4.835	0.343	454	T test (0.385)	0.350
	Male	21.562	2.270	569			4.826	0.356	569		
Marital status	Divorced	20.639	3.788	36	3.545	0.014	4.731	0.493	36	2.791	0.039
	Married	21.550	2.272	708			4.847	0.317	708		
	Single	21.152	1.897	275			4.827	0.311	275		
	Widow	21.400	1.673	4			4.560	0.716	4		
Source of information about COVID-19	Haven't heard	11.143	9.477	7	69.178	0.000	3.588	0.493	7	45.141	0.000
	Social Media	21.305	1.915	407			4.837	0.317	407		
	TV/Radio	21.372	2.003	269			4.835	0.311	269		
	Workplace	21.832	1.575	340			4.865	0.716	340		
Occupation	Administrative staff	20.797	3.279	58	4.065	0.003	4.834	0.285	58	0.608	0.657
	Nurse	20.990	2.881	103			4.840	0.371	103		
	Pharmacist	21.553	1.781	37			4.755	0.406	37		
	Physician	22.029	1.559	104			4.841	0.244	104		
	Technical Staff	21.426	2.308	721			4.839	0.328	721		

required [24]. It was noteworthy that the majority of social media information was not shared from referenced sources, and that sometimes misleading information was shared. Therefore, governments must strategically use this platform to establish standards and reliable information sources [26,27]. To effectively tackle the COVID-19 pandemic, a balanced and integrated approach is essential to convey highly reliable information, to avoid widespread panic. During the early stages of infection, China's authoritative approach was instrumental and timely in informing the public of lockdown and preventive measures [28].

In terms of knowledge, the majority of HCWs displayed sufficient awareness of causative agent (99.51%), virus transmission mode, i.e. droplets emitted during coughing (97.46%), physical contact with infected individuals (96.38%), and sharing clothing/towels (84.07%). However, their awareness of water as a source of COVID-19 transmission was inaccurate, in majority of the cases and only 54.25% participants responded accurately. Likewise, HCWs knowledge of disease symptomology and incubation period was encouraging, but exceptions were recorded. Approximately 96.19% of HCWs indicated that the incubation period of virus is 1-14 days. This time period was very important in preventing disease spread, and suspected individuals must quarantine for 14 days until symptom appearance or arrival of laboratory reports. In terms of disease symptoms, HCWs were highly aware of typical disease symptoms such as fever (99.32%), cough (97.07%), dyspnea (89.35%) and myalgia (74.88%). HCWs exhibited an increased awareness of transmission mode and clinical signs, than previous studies [25,29,30]. One reason for this may be related to their prior knowledge and understanding of COVID-19.

In terms of preventive and therapeutic strategies, only 74.10% of HCWs were aware that current available treatments depended primarily on supportive therapy. Knowledge and awareness of COVID-19 supportive therapies must be improved via effective communication strategies including posters in hospitals and public places, and seminars and webinars. However, the majority of HCWs provided accurate information on the following; no effective vaccine is available for the prevention (91.50%), immune-compromised individuals are at increased risk (96.87%) and HCWs without appropriate measures are at higher risk (86.61%). These data agreed with findings of other previous studies [31,32]. Furthermore, an increased risk for older people was identified by 96.48%, and travelling associated risks were identified by 98.83%

participants. Moreover, 62.07% of HCWs identified that multiple organ failure is associated with COVID-19, and 78.30% believed that bronchitis is a disease complication. The results of this study were more encouraging than previous reports on SARS and MERS outbreaks [29,33].

In terms of HCWs attitude towards COVID-19, a high percentage replied positively towards the disease. This was observed in more than 90% of respondents who strongly agreed with almost all the statements. This agreed with previous studies, and other professional categories, where participants demonstrated positive attitudes towards the disease [24,29,34,35]. However, because of their duties, 79.67% of HCWs were worried about their families becoming infected, suggesting the pandemic has psychologically impacted people's life [36]. Governments must also enact policies and strategies to minimize psychological effects associated with such diseases.

By investigating associations between demographic characteristics with knowledge and attitude of the participated HCWs as shown in Table 4, it was found that age, marital status, source of information and occupation are related to knowledge implying that respondents who are physicians showed higher level of knowledge and attitude. This observation was similar to a report by Salman *et al.*, where physicians had increased knowledge scores when compared with other health professionals [24]. In comparisons to similar notions, a previous study assessing HCWs knowledge and attitude towards MERS-CoV infection at Makkah hospitals in Saudi Arabia, observed that age, specialty and experience were significantly associated with mean knowledge score [37]. On the other hand, HCWs-based study on MERS-CoV in multispecialty hospitals in Qassim, Saudi Arabia found that gender and experience were significantly associated with mean scores of knowledge and attitude [29].

Conclusion

Though, the findings of the current study are encouraging in terms of HCWs knowledge and attitude towards the ongoing pandemic. However, hospital staff should have periodic and sufficient training to effectively cope with such diseases in the future.

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