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RESEARCH ARTICLE

MISCONCEPTIONS ABOUT COVID-19 AMONG HEALTH STAFF IN MAKKAH CITY, SAUDI ARABIA

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ABSTRACT

Background: Many rumors and misinformation disseminated among people due to fear associated with an explosion of COVID-19 cases. **Objectives:** To assess the level of knowledge, identify common misconceptions about COVID-19 and their demographic determinants among health staff. **Subjects and methods:** A cross-sectional study was done among a sample of healthcare workers who work in primary healthcare centers or outpatient units of general hospitals located in Makkah city, Saudi Arabia during period from February to April-2021. A structured online questionnaire was used for data collection, including sociodemographic factors and 19 questions to assess healthcare workers knowledge about COVID-19. **Results:** The study included 434 healthcare workers. Their age ranged between 23 and 60 years with an arithmetic mean (\pm) standard deviation of 30.4 ± 6.4 years. History of having any previous training to deal with situations related to COVID-19 pandemic was observed among 54.6%. The main sources of information about COVID-19 were medical literature (36.9%) and government statement (29.5%). Overall, majority of healthcare workers (82.5%) expressed adequate knowledge. Widowed healthcare workers (mean rank=363), those experienced between 5 and 10 years (mean rank=227.70), those who experienced any previous training to deal with situations related to COVID-19 pandemic (mean rank was 233.18) and those who reported medical literature as the main source of information (mean rank=256.90) were more knowledgeable compared to their peers. **Conclusion:** Majority of healthcare workers expressed adequate knowledge regarding COVID-19 pandemic. However, some misconceptions were identified. Therefore, well-organized continuous educational sessions are needed to improve the knowledge and clarify some misconceptions.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused by SARS-CoV2 has been disseminated at an exponential rate since December 2019, when it was first identified in Wuhan city, China. Till now, more than 27,500,00 people were confirmed to have SARS-CoV2 with more than 897,575 reported deaths (https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas17%22). On 11 March 2020, the World Health Organization announced COVID-19 as a global pandemic. Since then, extreme unprecedented control measures were applied by most countries in the world including strict social distancing, closure of public gathering places, travelers' quarantine, and intensive health education campaigns. Coronaviruses are responsible for three known pandemics including severe acute respiratory syndrome coronavirus (SARS-CoV) in 2003 (Organization, 2003), the Middle East respiratory syndrome coronavirus (MERS-CoV) in 2013 (de Groot, 2013), and finally the current pandemic of COVID-19.

Only 15% of the infected people showed symptoms such as fever, fatigue, headache, dry cough, myalgia, dyspnea, and anosmia. Complications occur in a small percentage of patients (4%) and death is reported in 1.0 -3.3% of the patients (Chen, 2019; Yang). In the literature, numerous studies aimed to assess the knowledge and awareness regarding COVID-19 among health workers. In China, a good level of knowledge and practices was reported among 89% of health workers, but a high level of fear was reported too (Zhou, 2020). Similarly, the results of a survey study in Pakistan showed that more than 80% of health workers have good knowledge, a positive attitude, and good practice (Saqlain, 2020). About 43% of the nurses in Iran had poor knowledge about sources, transmission, clinical features, management, and prognostic outcomes. The main sources of information were mainly the Ministry of Health, the World Health Organization, and social media (Nemati, 2020). Conceptions were so common during the COVID-19 crisis.

Many rumors and misinformation disseminated among people due to fear associated with an explosion of cases and deaths (Nemati, 2020). The spread of misconceptions was accelerated by the high availability and utilization of social websites. Strict and unprecedented measures of social distancing enhance the spread and acceptability of myths and misconceptions among the public and even in a considerable proportion of health professionals (Amgain, 2020). Examples of common misconceptions about COVID-19 are including novel coronavirus only infect old people (Amgain, 2020), antibiotics can kill novel coronavirus (Amgain, 2020), people in developing countries are more immune than those in the developed countries (Roy, 2020), and COVID-19 is eventually fatal. Moreover, misconceptions about COVID-19 were so common including the 5G conspiracy theory⁽¹²⁾, use of the virus as a biological weapon by certain countries⁽¹³⁾, and involvement of Big pharma companies in virus production and dissemination to make profits by selling already available vaccine. One of the most common misconceptions, either among public or health staff, is related to wide variability in the fatality rate of COVID-19 between countries. Many thought that COVID-19 is so dangerous with a very high fatality rate (10% in Italy), while others thought that COVID-19 is harmless with a very low fatality rate (less than 0.001 in Qatar) so they believed social distancing measures and lockdown were not necessary (Amgain, 2020). Furthermore, some people believed the psychological effect and stress are the cause of death, not the virus itself. They postulated that stress is the main cause of death from COVID-19 using psychosomatic effects which affect immunity and makes the patient vulnerable to complications and death. The strangest rumor about COVID-19 is that transmission of the virus is through beard and beardless people are safe (Ali, 2020).

In Saudi Arabia, more than 322,000 thousand cases and 4,137 deaths were reported till the first week of Augustus (Meter, 2020). A study, conducted by the Faculty of Medicine, Rabigh, King Abdulaziz University (KAU), investigated the prevalence and predictors of misconception about COVID-19 among the general population. Although the level of knowledge was good, about 67% of the respondents had different misconceptions about COVID-19. This reflected the widespread of misconceptions even with a generally good level of knowledge and positive attitudes among study participants (Baig, 2020). The conduction of a successful educational campaign requires an assessment of knowledge gaps as well as an identification of common misconceptions about the disease. This study aimed to identify common misconceptions about COVID-19 among health staff in Makkah City, Saudi Arabia.

MATERIAL AND METHODS

This is a cross-sectional observational study carried out among healthcare workers (medical practitioners, nurses, pharmacists, radiology staff, laboratory specialists and dental staff), who work in primary healthcare centers or outpatient units of general hospitals located in Makkah city, Saudi Arabia during the period from February to April-2021. Managerial and financial staff who have no medical background and healthcare staff refused to sign informed consent were excluded from the study. Makkah city is the capital of the Makkah Region, and it is most known for being the holiest city of the Islamic religion. We assumed that 50% prevalence of COVID-19 misconceptions among health staff 50% as no previous studies

reported the level of knowledge in Saudi Arabia. Thus, at the confidence level of 95% and an estimation error of 0.05, the sample size is calculated as 384 participants. After adding 10% to compensate for item non-response, the final sample size was 422 participants. A convenience sample was chosen. Due to the situation of the COVID-19 pandemic, the questionnaire was distributed to the mobile phones of HCWs through an online link. After that, a link to the questionnaire was sent to their phones and the responses were collected automatically into an excel sheet. The reminders were sent to the healthcare workers to motivate them to participate. A structured online questionnaire was sent to healthcare workers. It was a self-constructed questionnaire, validated by two consultants. Elements of the questioner were based on the latest update of Ministry of Health (MOH)- COVID-19 guidelines. The questionnaire consisted of two sections:

- Section A contains questions about sociodemographic factors of the healthcare workers
- Section B contains 19 questions to assess healthcare workers knowledge about COVID-19. A score system was created for the participants' responses. A score of "1" was given to correct answer while a score of "0" was given to incorrect and don't know answers. Total score and its percentage were computed for each participant. Participants scored below 60% were considered having "inadequate knowledge" whereas those scored 60% or more were considered having "adequate knowledge. Total score itself was used for comparisons between groups of healthcare workers.

The author described the aim and objectives of the study to the participated healthcare workers and asked them to provide written consent. No names are required to assure confidentiality of data and all information were kept confidential and utilized only for this study purposes. The study protocol was approved by the IRB research committee in Makkah city. Data were entered and analyzed by the Statistical Package of Social Science SPSS, version 26. Shapiro-Wilk test of normality was applied for continuous variables. Descriptive statistics such as frequencies, percentages were calculated to summarize nominal and ordinal data, while mean and standard deviation or the range were applied to describe numerical normally distributed variables and median, interquartile range (IQR) to describe numerical abnormally distributed variables (Knowledge score). Since the total knowledge score was abnormally distributed, non-parametric statistical tests were applied for comparisons. Mann-Whitney test was applied to compare two groups and Kruskal-Wallis test to compare more than two groups. Any P-value < 0.05 was considered as an indication for a statistically significant association or difference.

RESULTS

The study included 434 healthcare workers. Their age ranged between 23 and 60 years with an arithmetic mean of 30.4 years and standard deviation of (\pm) 6.4 years. The remaining personal characteristics are presented in Table 1. Almost two-thirds (69.6%) were females and about one half (48.9%) were singles. Majority of the respondents (89.9%) were Saudi nationals and 60% has experience ranged between one and four years. Concerning their profession, medical practitioners represented 71.4% whereas 11.1% and 6.9% were nurses and laboratory technicians, staff.

Table 1. Personal characteristics of the participants (n=434)

Personal characteristics	Categories	Frequency	Percentage
Gender	Male	132	30.4
	Female	302	69.6
Marital status	Single	212	48.9
	Married	202	46.5
	Divorced	16	3.7
	Widowed	4	0.9
Nationality	Saudi	390	89.9
	Non-Saudi	44	10.1
Years of experience	<1	44	10.1
	1-4	260	60.0
	5-10	90	20.7
	>10	40	9.2
Profession	Medical practitioner	310	71.4
	Nurse	48	11.1
	Pharmacist	12	2.8
	Radiology staff	16	2.7
	Laboratory staff	30	6.9
	Dental staff	18	4.1

Table 2. Responses of the participants to knowledge statements about COVID-19 (n=434)

Knowledge statements	Right answers	
	No.	%
Coronaviruses (CoV) are a large family of DNA viruses that cause illnesses ranging from the common cold to more severe diseases (False)	158	36.4
Some people may transmit the virus despite being asymptomatic (True)	406	93.5
Working together in proximity or sharing the same classroom environment with COVID-19 patient consider as close contact (true)	388	89.4
Pneumatic-tube systems can be used to transport specimens from patients with suspected/confirmed COVID-19 (False)	298	68.7
As infection Control measures if x-ray needed portable x-ray machine should be used to limit transportation of a patient with suspected/confirmed COVID-19 (True)	308	71.0
Suspected COVID-19 patients should be placed in an area separate from other patients, and additional Infection Prevention and Control should be applied (True)	402	92.6
Surfaces cleaning with water and detergent only can ensure proper disinfection (False)	260	59.9
Respiratory hygiene measures applies that a surgical mask should only be worn by suspected COVID-19 patients (False)	316	72.8
Patients should be asked to wear a surgical mask throughout their hospitalization period, only remove it when they eat or sleep (True)	262	60.4
During transportation of suspected/confirmed COVID-19 by an ambulance, patient should be distant between ambulance staff by at least 1 meter (False)	208	47.9
To prevent the spreading of infection between patients, health care workers should be adherent to hand hygiene, new gloves between patients, wearing a new set of personal protective equipment (True)	398	91.7
Confirmed COVID-19 patients can end their home isolation after 7 days of the last positive swap if there are no active symptoms (False)	266	61.3
All health care workers should wear N95 as protective measures against COVID-19 (False)	280	64.5
Most common Clinical presentation of COVID 19 includes: (Fever and sore throat)	298	68.7
The risk of infection of COVID-19 increases in (Elderly and chronic disease patients)	360	82.9
COVID-19 transmitted via: (Respiratory droplet)	406	93.5
For children (<12 years old) the first choice when collecting samples is: (Oropharyngeal swap)	284	65.4
For patients (>12 years old) the first choice when collecting samples is: (Nasopharyngeal swap)	376	86.6
In COVID-19 we can discontinue hospital isolation precaution: (After Two negative samples 24 hours apart)	248	57.1

Table 3. Association between healthcare workers' sociodemographic characteristics and knowledge level about COVID-19

	Total COVID-19 knowledge score			p-value
	Median	IQR	Mean rank	
Gender				
Male	13	12-15	210.21	0.419*
Female	14	12-15	220.69	
Marital status				
Single	13	12-15	218.55	0.019**
Married	14	12-15	218.69	
Divorced	12	11-14.5	152.25	
Widowed	16.5	15-18	363.0	
Nationality				
Saudi	14	12-15	218.79	0.521*
Non-Saudi	14	12-15	206.09	
Years of experience				
<1	13	12-16	218.59	0.009**
1-4	14	12-15	223.50	
5-10	14	12-16	227.70	
>10	12	6.25-14.75	154.35	
Profession				
Medical practitioner	14	12-16	223.90	0.287**
Nurse	14	12-14	189.50	
Pharmacist	13	11-16	205.67	
Radiology staff	13	11-15	177.50	
Laboratory staff	14	13-15	235.37	
Dental staff	12	11.5-15.25	195.61	

* Mann-Whitney test**Kruskal-Wallis test

Table 5. Association between source of information about COVID-19 and knowledge level about it among the participants

source of information about COVID-19	Total COVID-19 knowledge score			p-value*
	Median	IQR	Mean rank	
Government statement	13	12-15	201.67	<0.001
Public media	12	10-13	125.83	
Social media	12	10.25-15	167.68	
Websites	14	13-15	225.32	
Medical literature	15	13-16	256.90	

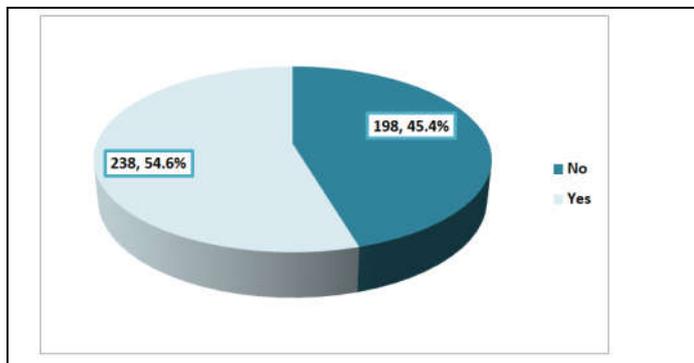


Figure 1. History of having any previous training to deal with situations related to COVID-19 pandemic among the participants

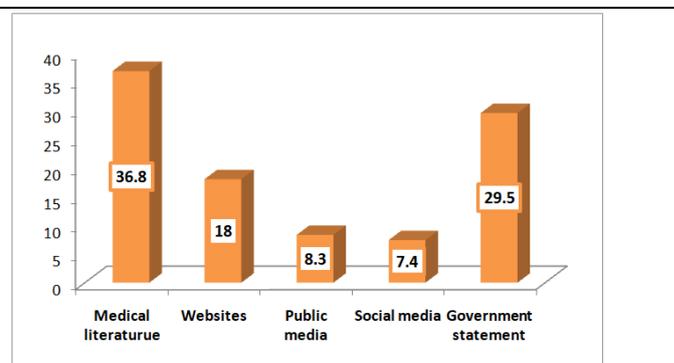


Figure 2. Source of information about COVID-19 among the participants

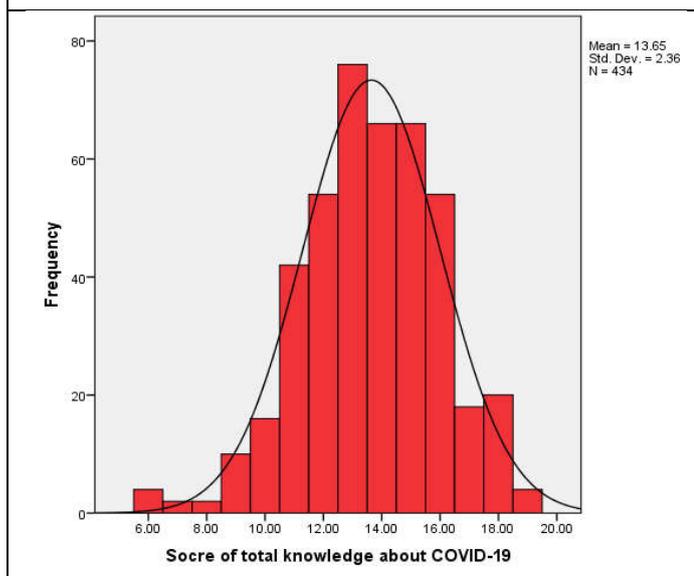


Figure 3. Distribution of the total score of knowledge about COVID-19 among the participants

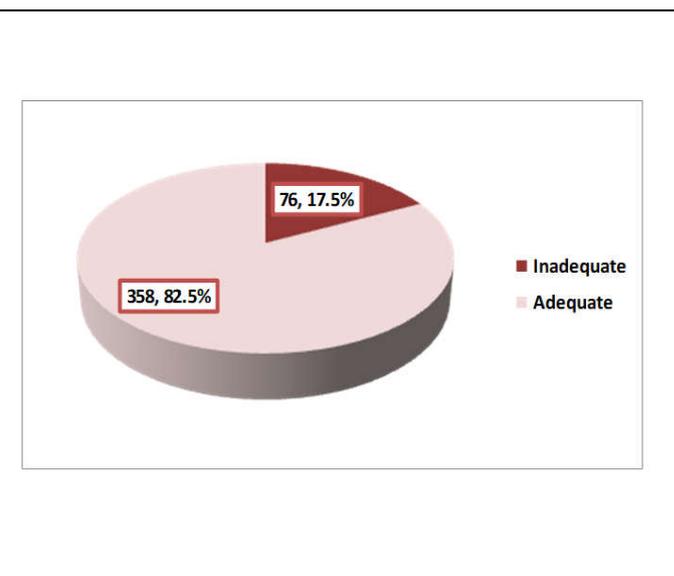


Figure 4. Overall level of knowledge of healthcare workers in Makkah city about COVID-19

History of having any previous training to deal with situations related to COVID-19 pandemic was observed among 54.6% of the participants as clear from Figure 1. Figure 2 shows that the main sources of information about COVID-19 among the participants were medical literature (36.9%) and government statement (29.5%), followed by websites (18%).

Knowledge about COVID-19: Table 2 summarizes the response of the participants regarding their knowledge about different aspects of COVID-10. Majority of them knew correctly that some people may transmit the virus despite being asymptomatic (93.5%), COVID-19 transmitted via respiratory droplet (93.5%), suspected COVID-19 patients should be placed in an area separate from other patients, and additional infection prevention and control should be applied (92.6%), to prevent the spreading of infection between patients, health care workers should be adherent to hand hygiene, new gloves

between patients, wearing a new set of personal protective equipment (91.7%), working together in proximity or sharing the same classroom environment with COVID-19 patient consider as close contact (89.4%), for patients (>12 years old) the first choice when collecting samples is: nasopharyngeal swap (86.6%) and the risk of infection of COVID-19 increases in elderly and chronic disease patients (82.9%). On the other hand, less than half of the participants could recognize that during transportation of suspected/confirmed COVID-19 by an ambulance, patient should not be distant between ambulance staff by at least 1 meter (47.9%) and Coronaviruses (CoV) are a large family of RNA viruses that cause illnesses ranging from the common cold to more severe diseases (36.4%). The total knowledge score was abnormally distributed as shown by significant Shapiro-Wilk test, $p < 0.001$. The score ranged between 6 and 19 with a mean \pm standard deviation (SD) of

13.65±2.36 and median (interquartile range “IQR”) of 14 (12-15). Figure 3

Overall, majority of healthcare workers (82.5%) expressed adequate knowledge regarding COVID-19 pandemic as clear from Figure 4. Regarding participants' marital status, the highest knowledge score about COVID-19 was observed among widowed healthcare workers (mean rank=363) whereas the lowest level was reported among divorced group (mean rank=152.25), $p=0.019$. Concerning the experience of the participants, the lowest level of knowledge was observed among the highest experienced group (mean rank=154.35) while the highest score was reported among those experienced between 5 and 10 years (mean rank=227.70), $p=0.009$. Other studied sociodemographic factors (gender, nationality and profession) were not significantly associated with the level of knowledge about COVID-19. Table 3. There was no statistically significant correlation between healthcare workers' age and their knowledge level about COVID-19 ($r=-0.030$, $p=0.538$) as illustrated in Figure 5. Health care workers who experienced any previous training to deal with situations related to COVID-19 pandemic were more knowledgeable than their peers about COVID-19 pandemic (mean ranks were 233.18 and 198.46, respectively), $p=0.004$ Table 4. Concerning main source of information about COVID 19, the highest knowledge score was observed among healthcare workers reported medical literature as the main source (mean rank=256.90), followed by websites (mean rank=225.32) while the lowest level of knowledge was observed among those whose main source was public media (mean rank=125.83), $p<0.001$. Table 5

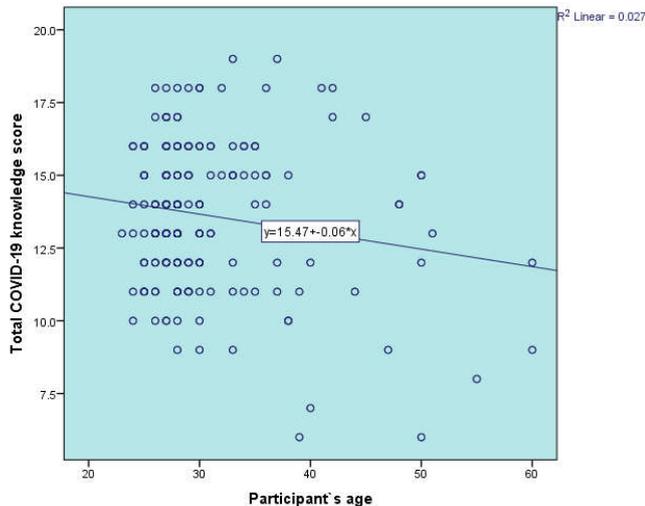


Figure 5. Correlation between healthcare workers' age and total COVID-19 knowledge score

DISCUSSION

Despite healthcare workers (HCWs) are at the frontline in facing COVID-19 pandemic (Zhong, 2020; Tariq, 2020), little in the literature explored their knowledge and common misconception regarding the pandemic. Also, as a result of availability of plenty of information about COVID pandemic in different media, it is confusing to discriminate true from false information, even among healthcare workers. The present study is one the few studies worldwide, up to our knowledge assessed the knowledge and explored the common misconceptions regarding COVID-19 among healthcare workers.

During COVID-19 pandemic, healthcare workers are responsible for taking care not infecting themselves, their friends, families and other people, which in turn affect their mental health adversely (Shanafelt, 2020; Roy, 2020). Although, healthcare workers in the frontline are using personal protective equipments and utilizing other precautions to protect themselves from infection, there is an increasing morbidity and mortality frequencies among them⁽²¹⁻²³⁾. In the current study, most of healthcare workers (82.5%) expressed adequate level of knowledge about COVID-19 pandemic. The same has been observed with different degrees in other studies carried out by others. Tariq, et al in a global cross-sectional survey revealed that 71.6% of healthcare workers had adequate level of knowledge (Tariq, 2020). Also, in China, Zhan, et al reported that 93.2% of healthcare workers showed good level of knowledge regarding COVID-19 (Zhan, 2020).

The present study revealed that the level of knowledge about COVID-19 was lowest among highest experienced healthcare workers. However, it was higher among those who experienced any previous training to deal with situations related to COVID-19 pandemic. Therefore, training is more important than experience in this situation as evidenced from our findings. Quite similar findings were observed in a study carried out on global level where postgraduate trainee and allied healthcare professionals were more knowledgeable than consultants, although insignificant (Tariq, 2020). Therefore, there is a need for regular continuous training of healthcare workers regarding the COVID-19. Majority of the health care workers (91.7%) in the current study knew that to prevent the spreading of infection between patients, they should be adherent to hand hygiene, new gloves between patients, wearing a new set of personal protective equipment. Additionally, 64.5% of HCWs knew that it is not mandatory that all health care workers should wear N95 as protective measures against COVID-19. In another similar global study, 89% of HCWs reported that the N95 respirator was the best PPE, followed by face shield (68%) and surgical mask (60%) (Tariq, 2020). The effectiveness of both N95 respirators, surgical masks and face shield for reducing inhalation exposure is well-documented (Perencevich, 2020).

Majority of HCWE in the current study (82.9%) could recognize that the risk of infection of COVID-19 increases in elderly and chronic disease patients. Literature confirmed that acquired COVID-19 infection is more fatal in geriatric individuals, particularly those with co-morbidities (Lloyd-Sherlock, 2020; Geldsetzer, 2020). In the current study, health care workers of moderate experience (5-10 years) were more knowledgeable about COVID-19 pandemic than others of lower or higher experience. Therefore, more attention should be directed to junior as well as senior healthcare workers in improving their knowledge and correcting their misconception regarding Covid-19 pandemic. Concerning main source of information about COVID 19, the highest knowledge score was observed among healthcare workers reported medical literature as the main source, followed by websites while the lowest level of knowledge was observed among those whose main source was public media. This finding highlights the importance of depending of the HCWs on medical literature in getting accurate information regarding the pandemic. Although, a global cross-sectional study reported that female HCWs were more knowledgeable and more updated regarding COVID-19 compared to males (Tariq, 2020), the present study did not find a gender difference.

Also, in accordance with others, there was no association between health care workers' age and level of knowledge about COVID-19 (Tariq, 2020; Nemati, 2020). Misconceptions have been associated with COVID-19 pandemic, and procedures must be taken from higher authorities to inform the general public as well as the healthcare workers about the true and updated facts about the virus and its outcomes. In the present study, majority of the health care workers could recognize that COVID-19 is transmitted via respiratory droplet. Researchers showed that viral RNA does not exist in air samples from surroundings of symptomatic patients. Therefore, there is no fear that COVID-19 is transmitted through an air-borne way (Ong, 2020; Cheng). In another study, 51.4% of healthcare workers believed that COVID-19 infection is airborne and 5.4% believed that the virus could be transmitted through mosquitoes (Tariq, 2020). The WHO (WHO, 2020) has declared that mosquitoes can not spread the virus between humans and the main transmission being through respiratory droplets from human-to-human.

Study limitations: Collection of data through an online way is considered a limitation as HCWS who had no online access or not interesting in using online access were not included in the sample, which consequently lead to selection bias. Conduction of the study while the pandemic is still going on is a limitation as updated information are added every now and then in many aspects of the disease. Finally, the study was carried out in only one city in the Kingdom of Saudi Arabia, so generalizability of results over other places should be taken with caution. Despite those important limitations, the study explored the knowledge and misconceptions concerning this pandemic problem in the Kingdom of Saudi Arabia.

CONCLUSION

Majority of healthcare workers who work in primary healthcare centers or outpatient units of general hospitals located in Makkah city, Saudi Arabia expressed adequate knowledge regarding COVID-19 pandemic. About half of them have attended training activities to deal with situations related to COVID-19 pandemic. Their main sources of information about COVID-19 were medical literature and government statement. Divorced, higher experienced, those who had no any previous training to deal with situations related to COVID-19 pandemic and those reported public media as the main source of information were less knowledgeable than their peers about COVID-19 pandemic. Based on study's results, we recommended the following:

- Well-organized continuous educational sessions are needed to improve the knowledge about Covid-19 pandemic and clarify some misconceptions related to the disease among healthcare workers, particularly more experienced ones.
- As the main sources of information about Covid-19 were medical literature and government statement and they were associated with better knowledge, encouraging of HCW who did not use these sources to use them is highly recommended.
- Encouraging healthcare workers to practice and continue practicing the safety precautions to control the spread of infection, particularly using hand washing between patients and using personal protective equipments.

- Future studies are needed to include more representative HCWs from different places of the KSA.

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