Knowledge towards COVID-19 among healthcare students in the central region of Saudi Arabia: a cross-sectional observational study

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ABSTRACT

Study Purpose Coronavirus disease 2019 (COVID-19) is an infectious illness of high public concern. Healthcare students are directly or indirectly exposed to this disease. This study aimed to evaluate the knowledge of healthcare students in the central region of Saudi Arabia.

Study Design A cross-sectional survey was planned to collect information from healthcare students living in the central region of Saudi Arabia. A questionnaire was formulated to evaluate the healthcare student's knowledge towards COVID-19 pandemic. The collected data were analysed by using frequencies of correct knowledge answers.

Results A total of 612 students were analysed for the study. The overall knowledge score of healthcare students was 65.7%. The regression analysis showed a significant association between academic year and knowledge score p<0.001.

Conclusions Our analysis demonstrates satisfactory student's knowledge but lacks awareness about background and mode of transmission of this disease; therefore, there is a strong need for further education and training programmes.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a rapidly progressive respiratory disease worldwide. First, it was discovered in December 2019 in Wuhan, China. Previously, humans have been affected by strains of coronavirus like severe acute respiratory syndrome-coronavirus (SARS-CoV) and the Middle East respiratory syndrome-coronavirus (MERS-CoV).[1] COVID-19 appears as a crown-like structure under an electron microscope. It is a single-stranded nucleocapsid RNA virus with an approximate diameter of 60–140 nm. Like the other coronavirus, it is also sensitive to heat and ultraviolet rays. The virus can be eliminated and inactivated by using more than 70% ethanol- and chlorine-containing disinfectants.[2]

The mechanism of transmission of COVID-19 was directly linked to Hunan Seafood Wholesale Market of Wuhan, where the animal to human transfer was considered the first case of this disease. Nevertheless, later cases were not associated with this exposure mechanism. Hence, it was determined that the virus can transfer from human-to-human.[2] The mode of transmission of this virus is by coughing and sneezing which results in inhalation of respiratory droplets via oral-nasal and mucous membrane of eye. The virus can be spread by touching contaminated surfaces and close personal contact with the infected person.[3 4] It is a highly contagious disease, the common clinical symptoms are fever, dry cough and shortness of breath; however, asymptomatic patients are the most potent carrier of this disease.[5 6]

COVID-19 was declared pandemic on 12 March 2020 by WHO due to its significance.[7] The spread of COVID-19 is so fast, and by 29 April 2020, the virus had extended to 210 countries, resulting in 3 162 438 positive cases and 219 287 deaths, around the world.[8]

The battle against COVID-19 is still going on around the world. Saudi Arabia has 21 402 confirmed cases and 157 death due to COVID-19. As there is continuous rise in cases, the government has taken strict measures to control the disease by implementing lockdown in all over the country. The closing of public places was required to observe social distancing and instruct the people to stay home to avoid contact with each other. In addition, health authorities have made substantial efforts to control the disease by taking care of suspected and infected cases in providing proper isolation and care.[9]

The highly contagious nature of this disease set the healthcare workers at the highest risk to contract infection. Factirs such as long working hours with physical and psychological stresses increases the burden on healthcare workers.[10] There is no treatment available so far for this viral infection; only symptomatic relief is possible. Clinical trials are going on around the world for the development of vaccine or medication against this disease.[11]

In order to implement effective measures, having knowledge about modes of disease transmission and basic hygiene principles are vital factors in disease control. Therefore, to quickly respond to the outbreak in a short and sustained manner, the aim of this study was to assess the knowledge of healthcare students in the central region of Saudi Arabia.

METHODOLOGY

A cross-sectional survey was planned to collect information from first academic year to final academic year healthcare students from college of dentistry, medicine and pharmacy living in central region, which includes Qassim and Riyadh region of Saudi Arabia. The data were collected online from 24 March 2020 soon after lockdown in Saudi Arabia by sending Google Form to participants by email, WhatsApp and twitter as it was not possible to do a physical survey during these circumstances.

According to guidelines of the Ministry of Health (Saudi Arabia),[9] a questionnaire was formulated by the authors in English and Arabic language to assess healthcare student's knowledge towards COVID-19 pandemic. Questionnaire consisted of demographic data which includes gender, academic year and associated university/college, and questions related to knowledge.

The questionnaire was comprised of 19 closed-ended questions to gather information about clinical presentations, transmission routes and prevention of COVID-19. These questions were comprised of 'yes/no' answers with an additional 'Don't know' choice. A correct answer was given 1 mark and an incorrect answer was given 0 mark. The knowledge score ranged from 0 to 19, the higher score indicates better knowledge about COVID-19. The score criteria were classified as having 0–7 as 'poor' knowledge, those with scores of 8–14 were classified as 'moderate' knowledge and those with scores of 15–19 were classified as 'good' knowledge.

The sample size was calculated by using Epi Info software version 5.4.1 assuming the prevalence of 50% with 4% margin of error and 95% confidence level. The calculated sample size for this study was 567.[12] This study was approved by the ethical review board DRC/007FA/20.

The collected data were analysed by using frequencies of correct knowledge answers. Knowledge scores of students according to their characteristics were compared with χ^2 test and t-test. Logistic and Linear regression analysis was used to control confounders and assess the relationship of knowledge score with student characteristics. The statistical analysis was done on SPSS 23 to analyse the data. A p value of <0.05 was considered statistically significant.

RESULTS

Data from 612 students were collected and analysed for the study. Descriptive analysis showed that 406 (66.3%) of the students were male while 206 (33.7%) were female; 109 (17.8%) of them were from college of dentistry, 393 (64.2%) of them were from college of medicine while 110 (18.0%) of them were from college of pharmacy; and 29 (4.7%) of them were in first year, 53 (8.7%) of them were in second year, 110 (18.0%) of them were in third year, 154 (25.2%) of them were in fourth year while 266 (43.5%) of them were in fifth year.

The cross tabulation between student characteristics and their knowledge showed that among their gender, college and academic year, only academic year was significantly associated with their knowledge (p=0.009) where students in first year were more likely to have moderate knowledge than students in second, third, fourth and fifth year (93.1% vs 73.6%, 59.1%, 68.2% and 69.9%, respectively) while students in third year were more likely to have good knowledge than students in first, second, fourth and fifth year (40.9% vs 6.9%, 26.4%, 31.8% and 30.1%, respectively) (table 1).

The mean knowledge score comparison across student characteristics revealed that among their gender, college and academic year, the mean knowledge score was significantly different across their academic year only (p<0.001) where students in third year had highest mean knowledge score than students in first, second, fourth and fifth year (12.85±1.63 vs 11.14±1.59, 12.25±1.80, 12.58±1.81 and 12.45±1.82, respectively) (table 2).

The linear regression analysis of association between student characteristics and their knowledge showed that among their gender, college and academic year, only academic year was significantly associated with their knowledge (preclinical vs clinical, β: 0.797, p<0.001) (table 3).

Table 1 Cross tabulation between student characteristics and their knowledge

| | Knowledge | | |
| | Moderate | Good | |
Variable	n (%)	n (%)	P value
Gender			
Male	271 (66.7)	135 (33.3)	0.098
Female	151 (73.3)	55 (26.7)	
College			
Dentistry	71 (65.1)	38 (34.9)	0.611
Medicine	273 (69.5)	120 (30.5)	
Pharmacy	78 (70.9)	32 (29.1)	
Academic year			
First	27 (93.1)	2 (6.9)	0.009
Second	39 (73.6)	14 (26.4)	
Third	65 (59.1)	45 (40.9)	
Fourth	105 (68.2)	49 (31.8)	
Fifth	186 (69.9)	80 (30.1)	

Table 2 Mean knowledge score comparison across student characteristics

| | Knowledge score | |
Variable	Mean±SD	P value
Gender		
Male	12.52±1.76	0.441
Female	12.40±1.88	
College		
Dentistry	12.60±1.77	0.746
Medicine	12.46±1.78	
Pharmacy	12.44±1.92	
Academic year		
First	11.14±1.59	
Second	12.25±1.80	<0.001
Third	12.85±1.63	
Fourth	12.58±1.81	
Fifth	12.45±1.82	

Table 3 Linear regression analysis of association between student characteristics and their knowledge

Variable	Coefficient	SE	t	P value
Gender (male vs female)	−0.168	0.154	−1.093	0.275
College (aentistry vs medicine/pharmacy)	−0.266	0.192	−1.385	0.166
Academic year (preclinical vs clinical)	0.797	0.217	3.677	<0.001

The logistic regression analysis of association between student characteristics and their knowledge revealed that among their gender, college and academic year, only academic year was significantly associated with their knowledge where students in third, fourth and fifth year had significantly higher odds of having good knowledge than students in first year (OR: 9.383, 95% CI 2.119 to 41.539, p=0.003; OR: 6.494, 95% CI 1.481 to 28.479, p=0.013; and OR: 6.461, 95% CI 1.491 to 28.007, p=0.013, respectively) (table 4).

Table 4 Logistic regression analysis of association between student characteristics and their knowledge

Variable	OR (95% CI)	P value
Gender (male vs female)	1.387 (0.947, 2.032)	0.093
College (dentistry vs pharmacy)	1.255 (0.687, 2.292)	0.46
College (medicine vs pharmacy)	1.012 (0.629, 1.629)	0.959
Academic year (second vs first)	4.639 (0.971, 22.169)	0.055
Academic year (third vs first)	9.383 (2.119, 41.539)	0.003
Academic year (fourth vs first)	6.494 (1.481, 28.479)	0.013
Academic year (fifth vs first)	6.461 (1.491, 28.007)	0.013

Table 5 Questionnaire of knowledge towards COVID-19

	Questions	n (%) Correct answer
1	COVID-19 is also known as SARS-CoV-2.	361 (59%)
2	Coronavirus is the causative organism responsible for MERS (Middle East respiratory syndrome), SARS (severe acute respiratory syndrome) and COVID-19.	414 (67.6%)
3	In COVID-19, the Chinese horseshoe bats are the most probable origin.	187 (30.6%)
4	Does COVID-19 has any intermediate host?	183 (29.9%)
5	COVID-19 can be transmitted by close contact with infected person or animal.	507 (82.8%)
6	COVID-19 can be transmitted from respiratory droplets and physical contact.	540 (88.2%)
7	COVID-19 incubation period is 1–14 days.	582 (95.1%)
8	The main clinical symptoms of COVID-19 are fever, dry cough and shortness of breath.	608 (99.1%)
9	Patients with COVID-19 cannot infect others when a fever is not present.	15 (2.5%)
10	Isolation and treatment are effective ways to reduce the spread of infection in patients with COVID-19.	606 (99%)
11	Individuals should avoid going to crowded places such as airports, train stations and avoid taking public transportations.	607 (99.2%)
12	People who have contact with COVID-19 patient should be immediately isolated in a proper place for at least 14 days.	605 (98.9%)
13	It is important to stay 6 feet away from a person who is infected with COVID-19.	486 (79.4%)
14	Presently, there is no effective treatment for COVID-19, but early symptomatic and supportive care can help most patients recover from the infection.	550 (88.9%)
15	Antibiotics can be used as first line of treatment.	335 (54.7%)
16	COVID-19 does not develop to severe cases in all patients. Elderly patients with chronic illnesses, are more likely to be serious cases.	475 (77.6%)
17	As per guidelines from health authorities, washing hands with soap and water for at least 20 s can help in prevention of COVID-19.	484 (79.1%)
18	PCR is used to diagnose COVID-19.	270 (44.1%)
19	COVID-19 vaccines are available in the market.	583 (95.3%)

COVID-19, coronavirus disease 2019; PCR, polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome–coronavirus-2.

The questionnaire about coronavirus with correct rate among students is shown in table 5.

DISCUSSION

The present cross-sectional study reported the level of knowledge among healthcare students during coronavirus outbreak. In the current population, we found an overall rate of 65.7% (12.5/19×100) on knowledge questionnaire which indicates that most respondents have satisfactory knowledge about COVID-19. Most of the students showed adequate knowledge, whereas some responses were unexpected. The transmission of disease from asymptomatic cases is the most important step in controlling the spread of infection. However, in our study, only 2.5% of the participants answered correctly about the transmission of this disease in the absence of fever. The result of a similar study carried out among students in Saudi Arabia is consistent with our findings.[13] It is important to note that students were not aware that people without having fever can be a source of transmission of virus, and this is the main reason health authorities and government are enforcing social distancing in all the places. There is a strong need for proper awareness about this ailment by using easily available and effective means of communication.

The background of this disease is important in understanding the origin of this virus. We found that only 30.6% answered correctly about the origin of coronavirus. The most probable reason for sparse awareness was that there was a difference in knowledge level among student groups. Our results are consistent with the conclusion of previous survey on university students in Saudi Arabia.[14]

Furthermore, our study revealed that a higher knowledge score was significantly associated with students who belong to higher grade of study. This showed that awareness was low among junior students. The main underlying reason achieving low score was that they were not involved in patient management and mostly they are limited to preclinical work. These results also showed the significance of improving knowledge gradually as they proceed to higher grades. Previous studies showed a similar result on the association between age and level of knowledge on other strains of coronavirus.[15 16] Educational programme should be implemented to target the demographic group such as students with a lower level of understanding. In this study, this appears to be those students who were in their initial year of study.

Healthcare students should be more cautious about this silent enemy. There are high chances of presenting patients with COVID-19 in clinical settings. Students' awareness is imperative about the use of personal protective equipment and N95 mask as they are recommended for suspected or confirmed COVID-19 cases. Importance of using surgical mask and hand hygiene has been emphasised repeatedly by the WHO and health authorities. In this regard, various studies have shown washing hand with soap and water for at least 20 s and using alcohol-based sanitiser to reduce the risk of spreading the infection.[17–19]

The current condition demands robust strategies to prevent infection among high-risk population. The healthcare students must follow the recommendations issued by regulatory authorities, which includes universal cross infection control protocols along with some additional protection so that chances of getting infected from COVID-19 could be greatly curtailed.

The study includes a limitation. This survey was conducted in a limited period, with rapidly emerging research and treatment of this disease, which may alter the knowledge of students. Extensive studies must be conducted nationwide to assess the knowledge and awareness of students about this disease.

CONCLUSIONS

The healthcare students from the central region of Saudi Arabia showed satisfactory knowledge of COVID-19 with an overall

percentage of 65.7% correct answers. This study showed that more emphasis should be placed on educating the students to improve their level of knowledge by implementing educational programmes using social media resources in order to create more awareness. Health authorities must be actively involved in the process of education about COVID-19 pandemic.

Main messages

► Healthcare students keep their knowledge update through a reliable source so they can protect themselves and the community.
► Heathcare students must play their role in educating the community about this disease.
► Routine use of face mask, hand sanitiser, and maintaining social distancing are imperative while staying outdoors.

Current research questions

► Is there any variation in level of knowledge about COVID-19 among healthcare students in different regions of Saudi Arabia?
► Does the use of social media resource is helpful in promotion of public health education?
► Does the role of face mask and social distancing are effective in prevention of COVID-19?

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