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Research Article

Assessment of knowledge towards COVID-19 among Taibah University Community in Madinah, Saudi Arabia: Insights on Symptoms, Transmission, Preventive Measures and Vaccination

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Abstract

Background and Aim: The emergence of Coronavirus disease 2019 (COVID-19) impacted life course worldwide. This cross-sectional study was designed to appraise the knowledge of tertiary educational institution employees and students regarding COVID-19. Materials and Methods: Between February and March 2021, an online questionnaire was completed by 710 participants, including students, faculty members, and administrative staff, who voluntarily participated in the study.

Results: The study demonstrated a high level of knowledge, with 96.72% of participants being aware of COVID-19 infectivity and 94.44% recognizing high fever and headache as common symptoms. Additionally, 98% of participants agreed that practicing proper hygiene helps prevent infection. However, 61.06% expressed hesitancy toward vaccination. Notably, participants with a greater understanding of COVID-19 were more likely to accept the vaccine.

Conclusion: Taibah University community showed a good understanding of COVID-19. However, emphasizing the need for regular precautionary education and promotion will effectively help with future outbreak management.

Kew Words: COVID-19, knowledge; tertiary education; taibah university

Introduction

COVID-19 is caused by a virus termed Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2). The virus is an emerging new strain that was first reported in 2019 in China, Wuhan. The disease was rapidly spreading around the world to the instant that the World Health Organization (WHO) declared COVID-19 as a pandemic in March 2020 [1]. It has become a major cause of concern in communities due to its high infectivity among humans. The virus mode of transmission showed to be mainly via respiratory droplets (coughing or sneezing). Moreover, it can be spread via person-to-person contact through shaking hands or touching contaminated surfaces then touching the eyes, nose, or mouth [2]. Such modes of transmission were very effective in spreading the virus unless the chain of transmission is interrupted. Proper hand hygiene, and avoiding large gatherings can play a crucial role in controlling the spread of the virus [3].

In Saudi Arabia, the first COVID-19 case was reported on the 2nd of March 2020 [4]. Along with reporting the first case in Saudi Arabia, the Saudi government represented by the Ministry of Health responded rapidly to increase the citizens' awareness by founding campaigns on social media and TV. These campaigns aimed to reduce the spread of the infection by advising people to stay home and stay away from large gatherings, as well as promoting wearing masks and good hygienic practices to reduce the infection rates [5]. Despite all these efforts, the virus was fast spreading around the Kingdom's cities, especially in Riyadh and Jeddah the biggest and most crowded cities followed by Makkah and Madinah due to their status as holy cities that host all Muslims from around the globe. This led the government to decree a lockdown with travel restrictions in all cities, followed by 24h curfew [6]. Such measures were applied due to the absence

of effective vaccination and therapeutic agents along with the high spread rate of COVID-19 [7]. These countermeasures played a major role in changing citizens' lifestyles and daily behaviors, contributing to a certain extent to reducing the number of COVID-19 cases [8].

Gradually, life was getting back to normal, employees and students were back to their works and universities by applying precautionary measures such as decreasing students' and staffs numbers, splitting working hours into periods, wearing facemasks, using hand sanitizer and giving students and staff permission for not attending if they have flu-like symptoms. Furthermore, early 2021 vaccines developed by Pfizer BioNTech and AstraZeneca were approved in Saudi Arabia and the government has offered the vaccine to the elderly, patients with chronic diseases, and medical staff via an online vaccination booking system. Then, it was provided for all Saudi and non-Saudi residents in an endeavor to stop the pandemic.

Several studies have highlighted COVID-19 knowledge and awareness among healthcare workers [9, 10] or the general community [11, 12]. However, limited information regarding knowledge and awareness of COVID-19 in communities of educational institutions in Saudi Arabia as well-established knowledge and awareness of such communities with crowded areas and close contact is necessary for effective prevention. Therefore, the aim of this study is to assess the awareness of COVID-19 disease and related infection control practices among employees, faculty members, and students at Taibah University, Madinah, Saudi Arabia following the outbreaks. This study would provide results that can be used to improve educational programs for non-healthcare professionals. Especially in crowded educational institutions or workplaces, as well as proposing data for preventive measurements for future outbreaks.

Materials and Methods

Selection of study population

A cross-sectional study was conducted between January and March 2021 among students academic staff and employees at Taibah University, Madinah, Saudi Arabia. During this period, an online questionnaire was distributed via university email. The inclusion criteria included all students academic staff and employees at Taibah University.

Study design and data collection

The study aimed to evaluate the awareness of COVID-19 disease and related infection control practices via a self-reported questionnaire. The latest University census was used to determine the required sample size to achieve the study objectives and sufficient statistical power [13]. The sample size needed was calculated with a sample size calculator [14]. Using a margin of error of ± 5%, a confidence level of 99%, a 50% response distribution, and 72225 people, a sample size of 658 was needed. Inclusion criteria include all students, academic staff, and employees who study or work at Taibah University.

The questionnaire consisted of 10 major questions. The first section contained informed consent. The second section consisted of demographic questions: age, gender, educational level, and job title in the university. The third section contained a single question about the information source. The fourth section was designed to assess the participant's knowledge regarding the disease infectivity, incubation period, symptoms, mode of transmission as well as prevention methods and management. The fifth section contained a single question asking whether the participant is willing to take the vaccine. Questions-based proforma was designed in Google Forms and provided in the Arabic language to offer a convenient language for all study populations and to get a high response rate. The questionnaire was sent and distributed online using a specific link, where all responses are stored in the author's google drive. Participants' data were kept anonymous to ensure participants' confidentiality.

Data Analysis

Demographic variables such as gender were divided into male and female. Nationality was also divided into Saudi and non-Saudi. Educational level was categorized into high school, bachelor, and graduate studies. The occupational status was broken down into student, academic staff, and employee. Participants were asked to respond to knowledge items (10 questions) as yes or no, with an additional "don't know" option. Each question equals 1 point if it has a valid answer, incorrect or uncertain (don't know) responses were given a score of zero.

All questions were constructed to identify the knowledge variable related to COVID-19. The overall knowledge level was calculated and represented as high (with a score of 8-10), moderate (with a score of 5-7), and low (with a score of 2-4). Statistical analysis was performed using GraphPad Prism 9 software (San Diego, California USA). All data were subjected to descriptive statistics and normality tests before comparing variables. Data description was based on using frequency and mean tables. Analysis of variance (one-way ANOVA) was performed to compare mean knowledge scores (categorical values) across the different groups. T-test was performed to compare the mean of any two given values.

Ethical approval

This study was approved by the scientific research and ethics committee at the College of Applied Medical Sciences, Taibah University, Madinah (2020/61/104/MLT). The first page of the questionnaire stated the aim and objectives of the study.

Result

Study Demographics

The total number of participants included in this study was 710, where 403 (56.8%) participants were females and 307 (43.2%) were males. Most of the participants 651 (91.5%) were Saudis, while the educational level of more than half of the participants 474 (66.8%) was high school or below (**Table 1**). The number of participants who belonged to medical colleges represented the highest participation rate with 243 (34.2%) participants (**Table 1**).

Characteristic		Freq.	%	Mean	SD	F	P-value
Gender	Male	307	56.8	6.472	1.389	4.397 t-test	<0.0001*
	Female	403	43.2	6.010	1.388		
Nationality	Saudi	651		6.223	1.422	0.8103 t-test	0.4181
	Non-Saudi	59		6.068	1.216		
Educational Background	High School	504		6.250	1.406	11.83	<0.0001*
	Bachelor	113		5.699	1.445		
	Grad Studies	93		6.613	1.180		
Position	Student	491		6.242	1.403	1.878	0.1536
	Academic Staff	150		6.247	1.366		
	Employee	69		5.899	1.497		
College	Preparatory Year	73		5.781	1.465	7.097	<0.0001*

	N/A	51		5.843	1.239		
	Literature	60		5.817	1.308		
	Science	70		6.129	1.239		
	Community	24		6.000	1.103		
	Management	37		5.973	1.258		
	Medical	243		6.761	1.355		
	Engineering	72		6.208	1.266		
	Education	63		5.635	1.506		
	Law	7		5.857	1.773		
	Family Sciences	10		6.000	1.886		

*** Statistically significant**

Table 1: Demographic characteristics of participants

Source of COVID-19 information

A total of 446 (62.8%) participants had heard about COVID-19 for the first time from social media, followed by 170 (23.9%) through TV/radio or newspapers. Only 11 (1.5%) participants did not recall how they heard about COVID-19 for the first time (**Table 2**).

Source	Freq.	Percentage
Social Media	446	62.8 %
TV/Newspapers	170	23.9 %
Medical Staff	40	5.6 %
Friends	27	3.8 %
Scientific Articles	17	2.4 %
Unknown	11	1.5 %

Table 2: Source of COVID-19 information

Knowledge regarding COVID-19

The knowledge regarding COVID-19 in the university community was intermediate. Intermediate knowledge was the highest with a proportion of 55.8% followed by participants with a high knowledge level (41.5%) and then participants with low knowledge (2.7%) (**Table 3**).

Overall Knowledge	Cut off score	Freq.	Percentage
Low	2-4	19	2.7%
Moderate	5-7	396	55.8%
High	8-10	295	41.5%

Table 3: Participant level of knowledge regarding COVID-19

Among participants, less than half of 349 (49.2%) participants knew that SARS stands for severe acute respiratory syndrome. A high number of responders 599 (85.45%) stated that bats are the reservoir of the virus (**Table 4**).

A significant number of 687 out of 710 participants (96.8%) were well-informed that COVID-19 is a contagious disease. However, the knowledge of participants regarding the difference between COVID-19 and MERS (Middle East Respiratory Syndrome) was poor, as more than half 407 (57.3%) participants believed that both diseases are similar, while 174 (24.5%) thought that they are different diseases and only 129 (18.2%) participants did not know MERS.

In terms of the virus incubation period, more than half 388 (53.2%) of the participants responded correctly that the incubation period for the virus is between 2-14 days (**Table 4**). According to 670 (94.4%) participants, high fever, headache, diarrhea, and losing taste and smell are typical symptoms of COVID-19 (**Table 4**), while only 40 (5.6%) participants did not know all symptoms. Similarly, a high proportion of respondents 679 (95.6%) were well informed that avoiding direct contact, wearing a mask, and washing hands regularly are the measures to break the chain of infection, while only 31 (4.4%) participants did not know the protective measures against the infection or gave wrong answers (**Table 4**).

In aspects of the mode of transmission, a total of 167 (23.5%) participants stated that direct contact, sneezing, coughing, touching contaminated surfaces then touching the face are the transmission mode of COVID-19, while 543 (76.5%) participants gave the wrong answers or did not know the mode of transmission (**Table 4**).

Knowledge of COVID-19 treatment and vaccination

A total of 264 (37.2%) participants answered correctly that there was no treatment available to treat COVID-19 (**Table 4**), while the rest of the participants 446 (62.8%) participants thought that antipyretic and vitamins or hydroxychloroquine was the treatment of choice.

In terms of knowledge about the vaccine, 425 (59.9%) of participants agreed that COVID-19 has an effective vaccine (**Table 4**), 202 (28.5%), while the rest of the participants 285 (40.1%) believed that there is no effective vaccine.

Participants' attitude toward getting vaccinated

When asked about the participants willing to take the vaccine, a total of 299 (42.1%) of participants responded that they would wait to observe the effect of the vaccine on others, 276 (38.9%) wanted to take the vaccine, 79 (11.1%) did not want to take the vaccine and whereas only 56 (7.9%) wanted to wait until vaccination becomes mandatory (**Table 5).** The study also showed that participants with a high level of COVID-19 knowledge were more likely to take the vaccine compared to those with a moderate level of knowledge. This difference was statistically significant (p=0.0309). (**Table 6**).

Question	Correct Answer	Correct answer n (%)
SARS stands for Severe acute respiratory syndrome	Yes	349 (49.2)
Do you think MERS and COVID-19 are similar?	No	174 (24.5)
Is COVID-19 infectious?	Yes	687 (96.8)
Bats are the primary host of COVID-19?	Yes	607 (85.8)
The incubation period of the disease is 2-14 days	Yes	383 (53.9)
High fever, headache, diarrhea and loosing taste and smell are typical symptoms for COVID-19	Yes	670 (94.4)
Direct contact, sneezing, coughing, touching contaminated surfaces then touching face are the transmission mode of COVID-19	Yes	167 (23.5)
Avoiding direct contact, wearing mask, and washing hand regularly are the measures to break the chain of infection	Yes	679 (96.6)
Is there any treatment for COVID-19?	No	404 (56.9)
Is there an effective vaccine against COVID-19	Yes	426 (60)

Table 4: Knowledge of the university community regarding COVID-19

Attitude toward COVID-19 vaccination	Freq.	Percentage	Knowledge (n,%)		
			Low	Moderate	High
Will take the vaccine	276	38.9%	5 (26.3%)	139 (35.1%)	132 (44.7%)
Wait to observe the effect of vaccine on others	299	42.1%	8 (42.1%)	178 (44.9%)	113(38.3%)
wait until vaccination is mandatory	56	7.9%	2 (10.5%)	24 (6.1%)	30 (10.2%)
Will not take the vaccine	79	11.1%	0	55 (13.9%)	20 (6.8%)

*Low knowledge's P-value is too small to be calculated

Table 5: Participants' attitude toward COVID-19 vaccination and their CVID-19 knowledge level

Knowledge vs attitude toward COVID-19 vaccination		Mean	SD	Freq.	F	P-value
Moderate	Will take the vaccine	5.417	0.7313	139	0.7067	0.5485
	Wait to observe the effect of vaccine on others	5.315	0.7302	178		
	Wait until vaccination is mandatory	5.333	0.8165	24		
	Will not take the vaccine	5.436	0.6876	55		
High	Will take the vaccine	7.477	0.7148	132	3.000	0.0309*
	Wait to observe the effect of vaccine on others	7.673	0.7956	113		
	Wait until vaccination is mandatory	7.300	0.5960	30		
	Will not take the vaccine	7.750	0.9105	20		
***statistically significant**						

Table 6: Participants' COVID-19 knowledge level in relation to their attitude toward vaccination

Discussion

The associations between demographic characteristics and knowledge of the participants indicate that age, gender, source of information, and affiliation are significantly related to knowledge. Specifically, respondents from medical colleges showed a higher level of knowledge compared to those from other affiliations. This finding is consistent with previous studies that reported higher knowledge scores among medical college students compared to students from other colleges [15, 16]. Similarly, a study on MERS-CoV infection found that age, specialty, and experience were significantly associated with mean knowledge scores [17]. In contrast, a study on MERS-CoV in multispecialty hospitals in Qassim, Saudi Arabia, reported that gender and experience were significantly associated with the knowledge [18].

This study observed that social media and mass media (TV, radio, and newspaper) were highly effective in delivering COVID-19 pandemic news, representing jointly around 86.7% (62.8% and 23.9% respectively). These findings were consistent with a study conducted on the Egyptian community that showed social media and TV to be the primary sources of COVID-19 awareness (80.8% and 35.1% respectively) [19]. The findings of this study also agreed with a recent study on the Saudi public showing 75.9% of participants used social media as the main source of their knowledge about the disease [20]. Indeed, another study showed that participants' knowledge was also gained mainly through the internet/social media (55.7%) and Television (27.5%) [21]. However, it is noteworthy that information on social media can vary as some depend on referenced sources while others on unreferenced misleading information. Thus, governments must take advantage of such platforms to establish reliable information sources in order to avoid widespread public panic.

The university community displayed sufficient knowledge as 96.8% stated that the disease is contagious. This was not surprising as many promotional

campaigns have emphasized the high infectivity of the disease, as well as applying a curfew in the kingdom for about 3 months to stop the infection chain. Approximately 53.9% of the community indicated that the incubation period of the virus is 2-14 days. This period is crucial in preventing the disease and quarantining individuals until the appearance of symptoms or laboratory confirmation. Such finding was consistent with previous studies that were done on university students [22, 23] in which most participants agreed that the incubation period of the diseases was 2-14 days. In terms of the disease symptoms, our findings were consistent with other studies that were directed toward university students [22, 24], showing a high knowledge level of the disease symptoms (**Table 4).** Being knowledgeable about the symptoms might help to decrease the infection by avoiding contact with individuals displaying such symptoms. Surprisingly, the university community has displayed a poor knowledge level regarding the disease mode of transmission.

In terms of treatment, only 56.9% of the university community was aware that there was no currently available treatment and that all the administered treatments depended primarily on supportive therapy. The current level of knowledge in our study was lower than a previous study which showed that 80.8% of participants were aware that only supportive therapy is available for infected individuals [22]. While the knowledge regarding treatment was low in another study as 51% of students knew that there was no treatment for COVID-19 [25]. However, more than half of the participants provided accurate information regarding the vaccine as 60% agreed that there is an effective vaccine, yet only 38.9% were willing to take the vaccine, while 42.1% decided to wait to observe the effect of vaccination on the vaccinated individuals (**Table 5**). This surprisingly low percentage can be attributed to different factors, the first factor was the time of questionnaire publishing that took place shortly after presenting the vaccine in the Kingdom of Saudi Arabia. The second factor was that the public considered that the vaccine's clinical trial was short in order to offer a safe vaccination or concerns about the vaccine's side effects [26], as several cases of thrombosis with thrombocytopenia in people who received AstraZeneca vaccine [27, 28]. The third factor was the lack of knowledge and following rumors regarding the vaccine from non-official sources. This hesitation to receive the vaccine matched with other global studies conducted in Russia and Poland, in which the participants showed low enthusiasm towards receiving COVID-19 vaccination (54.9% and 27.3% respectively). On the contrary, a Chinese study revealed a high percentage of participants willing to take the COVID-19 vaccination (88.6%) [29].

The study showed that the participants who have a higher level of knowledge about COVID-19 are more likely to accept the COVID-19 vaccine compared to those with a moderate level of knowledge. This is consistent with previous international studies that have shown a positive association between knowledge and vaccine acceptance [29, 30]. However, in contrast to our findings, there is another study that observed individuals with lower knowledge levels regarding COVID-19 still displaying positive attitudes toward the COVID-19 vaccine [31].

The limitations of this study include the reliance on self-reported measures introduces the possibility of recall and social desirability biases. The study's focus on knowledge and vaccine acceptance without delving into underlying reasons or exploring additional factors. Generalizability is limited to the specific tertiary educational institution studied. The timeframe of data collection may not reflect current knowledge and attitudes. These limitations should be considered when interpreting the findings, and future research can address these shortcomings for a more comprehensive understanding.

Conclusion

In conclusion, this study revealed a high level of knowledge among participants, with a significant awareness of COVID-19 infectivity and recognition of common symptoms. The majority also acknowledged the importance of practicing proper hygiene for infection prevention. However, vaccine hesitancy was prevalent, with a notable 61.06% expressing reservations. Interestingly, the findings highlighted that individuals with a better understanding of COVID-19 were more inclined to accept the vaccine. These outcomes underscore the importance of ongoing education and promotion efforts to address vaccine hesitancy and enhance outbreak management in the Taibah University community and similar contexts.

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