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Research Article

Knowledge, Attitude, and Practice toward COVID-19 among UAE Residents: An Online Cross-Sectional Survey

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Abstract

Background: COVID-19 is an emerging respiratory virus which was initially reported to the WHO on December 31, 2019 and declared as a public health emergency by the WHO on March 11, 2020. ***Aim:*** The aim of the study was to investigate the public knowledge, attitudes, and practice toward COVID-19. ***Method:*** This is an online cross-sectional study. The questionnaire was in both Arabic and English languages and consisted of 4 segments (demographic, knowledge, attitude, and practice). The results were collected anonymously. The data were entered in Excel sheets and then exported and analyzed using SPSS software. ***Results:*** A total of 1,602 UAE residents completed the questionnaire. The mean knowledge score is 71%, which reflects good knowledge. The mean attitude score is 78%, which reflects a positive attitude. The mean practice score is 76%, which reflects good practice. Ninety-four percent of the population avoid handshakes, 93.3% wear face masks regularly, 85.5% use hand sanitizers, and 66% wash their hands, 22.7% drink honey with ginger, 13% still prefer to take garlic, and 82% chose to constantly update themselves with information about COVID-19; however, only 10% relied on purely medical sources. ***Conclusions:*** This study showed that UAE residents have satisfactory knowledge and favorable practice, with an overall high positive attitude. However, it is still encouraged to continue efforts in spreading awareness and public health education across all platforms, as well as increase awareness campaigns and correct misconceptions circulating on nonmedical platforms since they are a major source of information for the public.

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Introduction

COVID-19 is an emerging respiratory virus that has caused a global pandemic, claiming its spot as one of the deadliest pandemics in the 21st century. COVID-19 or SARS-CoV-2 was first diagnosed amid an outbreak of re-

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spiratory illness cases in Wuhan city, Hubei Province, China. It was initially reported to the WHO on December 31, 2019. In 2020, the WHO declared the outbreak a global health emergency. On March 11, 2020, the WHO declared COVID-19 a global pandemic, the first designation since declaring H1N1 influenza a pandemic in 2009 [1, 2]. The first confirmed cases of COVID-19 in the UAE emerged in February 2020 [3].

COVID-19 descends from a large family of viruses that cause a spectrum of respiratory diseases, common cold being the mildest to respiratory failure being the more severe complication of the disease. In the UAE, as of July 2020, there have been 57,988 diagnosed cases and 342 deaths, bringing the case fatality rate to <0.1 [4].

The battle against COVID-19 is still continuing in the UAE. To guarantee the final success, people's adherence to preventive control measures is essential, which is largely affected by their knowledge, attitudes, and practices (KAP) toward COVID-19 in conformance to the KAP theory. To facilitate the outbreak management of COVID-19 in the UAE, there is an urgent need to understand the public awareness of COVID-19 at this critical moment. In this study, we investigated the KAP toward COVID-19 of UAE residents during the rapid rise period of the COVID-19 outbreak. As the most prominent theory suggests having been transmitted from a bat, the virus has spread faster than the mammal could spread its wings and found itself landing internationally, rather unwelcomed.

Methods

Study design: This study was conducted as an online cross-sectional study in the UAE during the COVID-19 outbreak in 2020 from 31 May 2020 to 13 June 2020. The study targeted the general population.

Study procedure: The study was conducted online with a survey in both English and Arabic formats. Participants were all UAE residents, and any candidates who were non-UAE residents were excluded. All participants were older than 16 years and were literate. These inclusions were made to keep the study limited to learning the KAP toward COVID-19 among UAE residents only. The sample size of this online cross-sectional study was calculated using a confidence level of 95% and a margin of error of 5%, with a population prevalence of 50%. The sample size was a minimum of 384. All participants were ensured anonymity and confidentiality as instructed by the Research Ethical Committee, Dubai Health Authority.

Survey design (evaluation tools): The questionnaire and consent form were uploaded in Google Forms. Links for the surveys were spread to the general population through social media platforms, namely, WhatsApp, Facebook, and Instagram. The ques-

tionnaire was referenced in our literature review. This questionnaire aimed to evaluate the KAP of residents of the UAE toward COVID-19. The questionnaire covers 4 segments: demographics, knowledge, attitude, and practice. The demographics segment includes age, gender, nationality, marital status, occupation, and level of education. Knowledge segment questions cover the type of infection, the symptoms of the infection, the route of transmission, susceptibility, and the availability of treatment and vaccination.

Attitude segment questions cover capability of enduring future public health emergencies, meeting someone cured from COVID-19, and the ability to control the pandemic globally and locally in the UAE. Practice segment questions cover preventive practices, response to getting the infection or having a close contact with a confirmed case, and keeping up to date with news and the source of that.

The knowledge segment includes 6 questions. A scoring system was used by which a score of one is given to each correct answer and 0 to each incorrect answer. Then, the total knowledge score of 6 for each participant was converted to percent (by dividing by 6 and multiplying by 100) to represent the participants' percent knowledge score.

The attitude segment includes 4 questions. A score of one was given to positive attitude responses, and a score of zero was given to each negative attitude response. The total attitude score was then converted to a percent attitude score. The practice segment includes 6 questions. Similarly, a score of one was given to each correct practice, and a score of zero was given to each incorrect practice. The total practice score was then converted to a percent practice score. The mean knowledge, mean attitude, and mean practice scores were calculated by obtaining the sum of values and then dividing it by the total number of responses.

Demographics includes nationality, gender, age-group, marital status, occupation, and level of education. Knowledge includes the type of infection, mode of transmission, symptoms, treatment and vaccination, and susceptible group. Attitude determines are UAE residents more capable to endure such public health emergencies in the future, would they meet someone who was cured from COVID-19, do they think the epidemic will be controlled, and whether they trust the local authorities' efforts to control it. Practice determines do UAE residents practice the preventive measures, what would they do if they develop symptoms, what would they do in case of contact, have they been to a crowded place recently, and are they following the news.

The questionnaire underwent translation and back-translation by professionals and was in both English and Arabic formats. A pilot study was conducted, through which 60 responses were collected from the general population. The feedback from the responses was taken into consideration by editing some of the elements in the survey.

Statistical Data and Analysis

The data are presented as means and SD for numerical variables and count (%) for the categorical variables. The χ^2 test was used to test the association between the groups of participants and the categories of different responses. A p value <0.05 indicates statistical significance. SPSS 24 is used for statistical analysis (IBM SPSS Statistics for Windows, version 24.0.; IBM Corp., Armonk, NY, USA)

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Table 1. Descriptive demographic characteristics of participant (*n* = 1,602)

	N (%)
Nationality	
Local	730 (45.6)
Gender	
Female	1,402 (88)
Age, years	
16–29	1,178 (73.5)
30–49	315 (19.7)
50 or more	109 (6.8)
Marital status	
Married	554 (34.6)
Not married	1,024 (63.9)
Other	24 (1.5)
Education	
College	1,268 (79.2)
High school	331 (20.7)
No school attended	3 (0.2)
Occupation	
Healthcare-related	406 (25.3)

Table 2. Assessing the knowledge toward COVID-19 in the UAE (*n* = 1,602)

Respondents' knowledge question	Correct answer, *n* (%)
1. What type of infection is COVID-19?	1,507 (94.1)
2. What is the main route of transmission?	1,546 (96.5)
3. The following are symptoms of COVID-19	1,414 (88.3)
4. COVID-19 has no specific treatment	927 (57.9)
5. COVID-19 has no vaccine	993 (62)
6. Who are susceptible for COVID-19 infection?	489 (30.5)

Results

Social and Demographic Characteristics

A total of 1,615 people completed the questionnaire. We excluded 13 responses of those who were living outside the UAE, and the final sample included 1,602 UAE residents. The social and demographic data of the participants were as follows: participants were mainly female, 1,402 (88%), compared to only 200 (12%) male respondents. 730 (45.6%) of the participants were local residents, and 872 (54.4%) were nonlocal residents. The majority, 1,178 (73.5%), were between the ages of 16 and 29 years. Of all responses, 1,024 (63.9%) were not married and 554 (34.6%) participants were married. Most participants, 1,268 (79.2%), were in or had completed college. In addition, more than half of the participants, 1,196 (74.7%), worked in non-healthcare-related jobs, while only 406 (25.3%) worked in healthcare-related jobs (Table 1).

A total of 6 questions were used to measure knowledge. The mean score was 4.2, with an SD of 1.24, and the overall percent knowledge score was 71%. Majority of the participants knew that COVID-19 is a viral infection, 1,507 (94.1%) with the main route of transmission being respiratory droplets and close contacts 1,546 (96.5%). 1,414 (88%) participants identified the main symptoms of the infection included fever and cough. However, the percentage of participants knowing there is currently no specific treatment and no vaccine available (at the time the

survey was being conducted) was considerably lower, 927 (57.9%) and 993 (62%), respectively. Similarly, only 489 (30.5%) participants answered that the population in general is susceptible for COVID-19 infection, whereas the remaining 1,113 (69.5%) answered either "elderly" or "people with pre-existing diseases" (Table 2).

Assessing people's attitude was one of the objectives of the study because a positive attitude reflects the impact of public education. Statistics showed a positive attitude in every element. The percent attitude score was 78.3%.

1,176 (73.4%) of the participants were confident that the COVID-19 pandemic will be successfully controlled. 1,399 (87.3%) participants were confident that the UAE specifically is capable of controlling the virus within the country. When asked if they were more capable of enduring a public health emergency like this one in the future, 1,240 (77.4%) participants answered "yes." Public education most probably has been a major contributor in spreading awareness, and that has manifested in the general public attitude. Finally, when the participants were asked what they would do if someone cured from CO-VID-19 wanted to meet them, 1,184 (Table 3) (73.9%) said they would meet them and 418 (26.1%) said they would find an excuse not to meet them. While the numbers for both meeting them and being nicer or meeting them and being the same were almost identical, only a minority said they would not meet a person cured from COVID-19 (Fig. 1). It is advisable by the WHO that a sick patient should continue social distancing till 2 weeks after the last symptom disappears since they can still infect others [3]. It is worth noting that the question does not specify taking precautionary measures during the meeting.

Furthermore, the questionnaire had 6 questions to assess the populations' practice. The questions asked the following: what they do to prevent the infection, what would they do if they ever experienced symptoms of the disease, what would they choose to do when in contact

Table 3. Assessing the attitude toward COVID-19 in the UAE (n = 1,602)

Respondents' attitude question	Response, n (%)		
Do you think you will be more capable to endure such public health emergencies?	Yes 1,240 (77.4)	I will be the same 228 (14.2)	No 134 (8.4)
What would you do if someone cured of COVID-19 wanted to meet you?	I will meet them and be nicer 597 (37.3)	I will meet them like usual 587 (36.6)	I will find an excuse not to meet them 418 (26.1)
Do you think that COVID-19 will finally be successfully controlled?	Agree 1,176 (73.4)	I do not agree 62 (3.9)	Not sure 364 (22.7)
Do you have confidence that the UAE will successfully control it?	Agree 1,399 (87.3)	I do not agree 16 (1.0)	Not sure 187 (11.7)
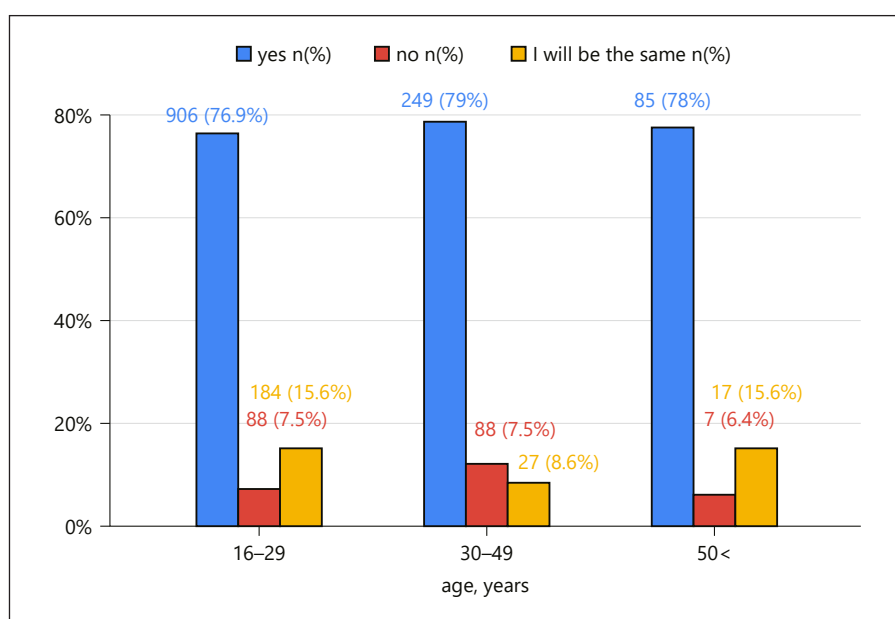
Fig. 1. Association between age and attitude toward meeting someone cured from COVID-19.

with a confirmed COVID-19 case, whether they have recently been to a crowded area, if they follow regular updates on COVID-19, and what their source is (Table 4).

The results regarding practices followed by the population during this pandemic have reflected maturity on an individual level, with 1,489 (94.2%) of the population chose to avoid handshakes, 1,375 (87.0%) used hand sanitizers, 1,515 (95.8%) washed their hands regularly, and 1,495 (94.6%) participants wore face masks. Nonetheless, the belief in herbal medicine still plays a role in today's health practices; the results showed that 213 (13.5%) individuals preferred to take garlic and 363 (23.0%) others would drink honey with ginger.

Another aspect evaluated was the population's response if they experienced any respiratory symptoms mimicking those of COVID-19. 1,475 (93.2%) participants chose to analyze the situation rationally and stay home for observation and quarantine or go to the hospital for treatment.

Additionally, the populations' response if they ever came into contact with a confirmed case was also evaluated; 1,511 (95.5%) opted to report their cases to the health authority. Also, 1,365 (86%) opted to avoid going to crowded places.

Finally, when asked about being updated with COVID-19 news, 1,311 participants (82.9%) replied that they kept themselves up to date. 1,000 (62.4%) respondents

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Table 4. Assessing the practice toward COVID-19 in the UAE (n = 1,602)

Respondents' practice question	Response, n (%)		
A. I avoid hand shaking	Yes 1,489 (94.2)	No 113 (5.8)	
B. I wash my hands	Yes 1,515 (95.8)	No 87 (4.2)	
C. I use alcoholic hand rub	Yes 1,375 (87.0)	No 227 (13)	
D. I cough and sneeze in a tissue and throw it in waste bin	Yes 1,179 (74.6)	No 423 (25.4)	
E. I wear a face mask	Yes 1,495 (94.6)	No 107 (5.4)	
F. I drink ginger with honey	Yes 363 (23.0)	No 1,239 (77)	
G. I eat garlic	Yes 213 (13.5)	No 1,389 (86.5)	
2. Have you gone to any crowded places in the recent days?	Yes 217 (13.7)	No 1,385 (86.3)	
3. Do you follow regular updates on the virus?	Yes 1,311 (82.9)	No 291 (17.1)	
4. What would you do if you had fever and dry cough?	I want to go to the hospital but I am scared OR I don't know what to do 107 (6.8)	I will think logically 1,475 (93.2)	
5. What would you do if you had close contact with confirmed cases?	I will do what I did before the pandemic OR I will be nervous and don't know what to do 71 (4.5)	I will report my case 1,511 (95.5)	
6. Sources of update	Medical sources 173 (10.8)	Nonmedical sources 1,000 (62.4)	Combined 69 (4.3)
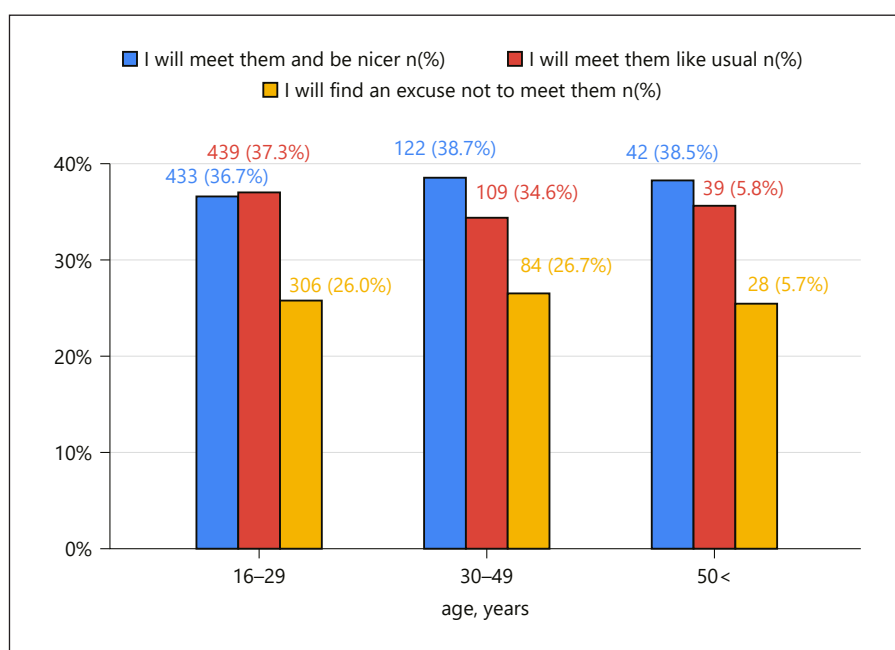
Fig. 2. Association between age and the ability to endure future public health emergencies.
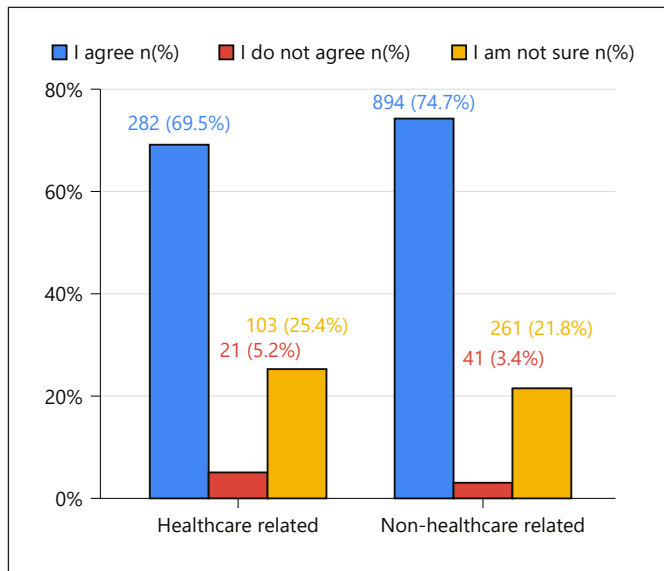
Fig. 3. Association between occupation and do you think CO-VID-19 will be successfully controlled.

acquired their information from nonmedical sources, while only 173 respondents (10.8%) relied purely on medical sources such as Medscape or PubMed. Furthermore, we tried to evaluate certain correlations in our study. On assessing correlations between age-groups and attitudes, we found that most participants in all age-groups had felt more capable of enduring public health emergencies in the future ($p = 0.002$) (Fig. 2). In addition, all age-groups also showed a positive attitude toward meeting someone with COVID-19 infection, where the majority answered they would meet them and be nicer or meet them like usual ($p = 0.929$).

Upon assessing correlations between occupation (healthcare-related and non-healthcare-related) and believing COVID-19 will finally be controlled, we found similar results. Majority, 894 (74.7%), of non-healthcare workers and 282 (69.5%) of healthcare workers agreed that it will be controlled (p value = 0.074) (Fig. 3).

With our results, we also tried to evaluate if there were any differences in practice between male and female individuals if they ever developed fever and dry cough. A slightly greater percentage of women 1,308 (93%) said they would think through it logically, whereas 167 (88.8%) men answered the same ($p < 0.010$).

Both groups, males and females, also responded positively when asked what they would do if they ever came in contact with confirmed cases. 173 (92%) males and 1,338 (96%) females answered they would report their case (p value = 0.014).

Discussion

On the first day of this study, the May 31, 2020, the total number of confirmed COVID-19 cases in the UAE was 34,557, the total number of recoveries was 18,196, and the total number of deaths was 264. As of the last day of this study, the June 31, 2020, the total number of cases in the UAE was 41,990, the total number of recoveries was 27,049, and the total number of deaths was 288 [5]. Understanding the trend and pattern in between is necessary to calculate the impact of the novel coronavirus on the health system as well as the economy. To the best of our knowledge, this is the first study of its kind that has been conducted in the UAE.

The overall knowledge score about COVID-19 among our study participants was 71%, with a mean score of 4.26 (SD 1.24; range 0–6). Interestingly, the results of this study showed us that 993 (62%) respondents believed there is a viable vaccine for COVID-19. It is worth noting that though multiple research centers around the world are in the work of developing a vaccine, there was no vaccine safe to use for the public when the questionnaire was being conducted. Additionally, only 489 (30.5%) participants understood that people, in general, are susceptible to COVID-19 infection, whereas the overwhelming majority believed it was either the elderly or people with pre-existing conditions. This misunderstanding can probably be addressed via appropriate health education.

Overall, this study demonstrated an adequate knowledge score. Factors that could have contributed to this include the government's efforts in raising awareness through campaigns [6], accessible information online, and a high educational level with 79% of the respondents having attended college. Our findings of an overall adequate knowledge score are consistent with similar studies carried out in other countries [7–9].

The attitude score was 78%, which reflects a positive attitude among the population. There was a marginal difference between the overall female versus male scores, healthcare versus non-healthcare workers, and different levels of education for all the attitude questions. Finally, the calculated practice score was 76%.

In a similar KAP study carried out in Sudan with demographics like ours, where majority of participants were predominantly young females, they found that higher knowledge scores were associated with better practices and a positive attitude among participants. Their findings also showed that young citizens, particularly women, had good KAP toward COVID-19 [10].

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In regard to most participants (62.4%) choosing non-medical sources to stay updated on the matter, these sources range from local authorities, local news and newspapers, social media platforms, to friends or family. It is very important to advise users however to only consider reliable Websites. Moreover, the results showed that some respondents still preferred herbal remedies such as garlic (13%) or honey with ginger (23%). Although Chinese researchers conducted a meta-analysis for available guidelines for traditional herbal remedies that help in guiding treatment measures of COVID-19, this still requires further clinical evidence to support its efficacy [11].

With regard to practices to safeguard from COVID-19, participants who were in college or obtained a higher degree had a practice score of 76.88% compared to 74.72% scored by participants with less education. This contrasts with the knowledge scores of both groups, in which people who were in or graduated college scored 72.89%, while people who completed high school and less scored 66.52%.

Surprisingly, when it came to practices between healthcare workers or non-healthcare workers, both groups scored 76%. Assessing COVID-19 knowledge however showed that participants in healthcare-related jobs scored 77.75%, whereas participants in non-healthcare-related jobs scored only 69.46%.

A few limitations were faced during the study; female UAE residents proved to be more adamant to fill the survey than males as 88% of participants were female. And 73.5% of participants belonged to the age-group of 16–29 years seemingly because the younger age-groups are the most active on social media and use smartphones more frequently.

Conclusion

As per the main principle of epidemiology, public education is one of the key tools to spread appropriate knowledge, positive attitude, and sound practices. The study results show a positive attitude, good knowledge, and good practice among the general population in the UAE. However, as not 100% of participants answered all the questions correctly, it is still encouraged to maintain continuous efforts to spread awareness and public health education across all platforms, virtually as well as in real life. The results of this study can be used to customize future awareness campaigns while targeting the desired population, as well as to direct further research about COVID-19

in the country, and specifically educating the public about the nature of the virus, who the susceptible groups are, and where the world stands when it comes to a vaccine against COVID-19 today and advising individuals who rely on social media to acquire updates on the virus to refer only to reliable accounts.

Statement of Ethics

The study obtained the ethical approval by the Emirates Institutional Review Board for COVID-19 Research Committee Number DOH/CVDC/2020/1342, dated on July 13, 2020. The participants were not compensated, and all participants gave a digital consent form, which mentions the objective, and the method of the research conduction would be given to the participants before proceeding with the questionnaire. All participants were insured for anonymity and confidentiality.

Conflict of Interest Statement

The authors state that this research was held in the absence of any commercial or financial relationships that could be labeled as a potential conflict of interest.

Author Contribution

All authors contributed to the survey design. L.L., A.H.A., A.A., and Z.S. analyzed the results. All authors contributed to the writing of the manuscript. All authors listed have made significant contributions to the study and approved it for publication.

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