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Knowledge, Attitudes, and Practices of Saudi Citizens on COVID-19 Pandemic: A Multi-region Survey

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Abstract

Background: Although policies and guidelines may not always be optimal in all settings, a tailor-fitted guideline is appropriate. This study aims to determine the differences in the knowledge, attitudes, and practices (KAP) of Saudi citizens toward Coronavirus Disease 2019 (COVID-19).

Methods: A quantitative-comparative-correlational approach was carried out from March 21 to May 22, 2020. Descriptive statistics, ANOVA, and *t*-test were used to determine the differences in knowledge and demographic characteristics. Linear regression was used to determine relationships among KAP.

Results: The participants' knowledge yielded 82.83%, positive attitudes (M = 2.10; SD = 1.15) and good practices (M = 2.10; SD = 1.15). Significant differences in knowledge were found for gender ($t = -6.79$; $p < 0.001$), marital status ($F = 10.59$; $p < 0.001$), education ($F = 32.46$; $p < 0.001$), occupation ($F = 6.79$; $p < 0.001$), and area of residence ($F = 7.53$; $p < .001$). Knowledge and practices showed a significant relationship ($p < 0.001$).

Conclusions: Gender, marital status, education, occupation, and area of residence are all causal factors that differ regarding knowledge. Moreover, a significant relationship between knowledge and practice is established, which is necessary to improve. These study results can serve as a basis for creating effective health education programs toward COVID-19.

Keywords: attitudes, COVID-19, knowledge, practice, Saudi citizens

INTRODUCTION

The Ministry of Health (MOH) in Saudi Arabia confirmed the first COVID-19 case in the Kingdom on March 2, 2020.[1] Since then, the number of active and critical COVID-19 cases in Saudi Arabia has increased dramatically, and the death toll had risen to 6,596 as of March 19, 2021.[2] From its first detection, Saudi health authorities implemented measures to prevent the further spread of infection. COVID-19 is considered highly contagious with clinical symptoms of fever, dry cough, fatigue, myalgia, and dyspnea.[3,4] The cause of the disease is believed to be a novel strain from the coronavirus (CoV) family that can spread from person to person through respiratory droplets and direct contact.[5] Hence, extreme measures were implemented to avoid the further spread of infection due to its high virulence. According to WHO[6], COVID-19 can be prevented using a combination of public health measures, such as the following: rapid case identification, diagnosis, and management; identification and follow-up of contacts; infection prevention and control in health care settings; implementation of health measures for travelers; population awareness; and risk communication.

The Saudi Arabia MOH devised strict disease prevention and control guidelines, emphasizing hand washing, home quarantine, and reporting of Patient Under Investigation cases.[7] Indeed, Saudi Arabia implemented containment efforts to prevent an increase in COVID-19 cases, such as suspension of foreign flights to and from the Kingdom[8] and the MOH dissemination of COVID-19 prevention information via social media, official websites, and commercials.[9] In addition, the MOH implemented city lockdowns, physical distance, use of disposable medical or cloth masks, hand washing, and gathering size limitations to prevent and decrease the disease transmission.[10] However, despite these measures, the COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE)[11] showed that several efforts failed to work, and thus, the curfew was extended to nearly 24 hours for 21 days, with a brief reprieve for purchasing necessities. In this context, controlling the disease required careful adherence to preventive measures to stop its spread.

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While policies and guidelines may not always be optimal in all settings, tailor-fit guidelines may be appropriate.[12] As such, a study from the perspective of the public knowledge, attitudes, and practices (KAP) can help in establishing appropriate measures. According to Singh *et al*.,[13] controlling infectious diseases largely depends on the knowledge, attitudes, practices, and behavior of the local community. Previous research has considered the KAP concerning different diseases. However, to the best of the current researchers' knowledge, scarce literature has examined COVID-19 KAP since the Kingdom of Saudi Arabia relaxed its nationwide curfew.[14] To this end, collecting public KAP can serve as baseline data for future pandemic policies and ways to become better-informed individuals in society.[15]

This study is of significance in enhancing the efficiency of the current health education programs of the government. Moreover, the results can be used to create effective COVID-19 health education programs with the consideration of the present KAP of the general populace. Therefore, this study aims to determine the KAP regarding COVID-19 differences in knowledge based on demographic characteristics of Saudi citizens. In addition, the relationship of knowledge to attitudes and to practice, and of attitudes to practice are identified.

METHODS

This quantitative-comparative correlational study used a Likert-scale survey instrument to determine the KAP toward COVID-19 Saudi citizens from March 21 to May 22, 2020.

The online questionnaire has four parts: demographics, KAP on COVID-19. Part I includes the demographic variables, such as age, gender, marital status, education, income, occupation, area of residence, Internet access at home, Internet access in other areas, and primary sources of information. Part II of the online questionnaire regarding knowledge has 14 questions adapted from previous literature[16] and modified to extract the objectives of the present study. These questions were answered on a true/false basis with an additional "I do not know" option. A correct answer was assigned 1 point while incorrect and unknown answers were assigned 0 point. The total knowledge score ranged from 0 to 12, with a high score denoting a very good knowledge of COVID-19. Attitudes toward COVID-19 were measured using two questions regarding their agreement on the absolute control, and the confidence in winning the battle against, the disease. The responses are "strongly agree" (1), "agree" (2), "neither agree nor disagree" (3), "disagree" (4), and "strongly disagree" (5). Finally, the assessment of respondents' practices was composed of two behaviors, namely, going to a crowded place and wearing a mask when going out. The responses are "always" (1), "often" (2), "sometimes" (3), "rarely" (4), and "never" (5). Therefore, the lower mean answers denote positive attitudes and practices.

Content validity was used to ensure relevance and purpose of the measurement, yielding 0.78 and 0.79 for relevance and clarity, respectively. The method was pre-tested in Hail city with 50 respondents and yielded a Cronbach's alpha of 0.71.

The participants were citizens from important regions of Saudi Arabia, two each of large and medium-sized regions and one small-sized region. The following inclusion criteria were set to: (1) 18 years old and above; (2) not presently admitted to the hospital as a COVID-19 patient; and (3) willing to participate. Snowball sampling was used from the researchers' networks.

The Institutional Review Board of the University of Hail committee provided their approval for this research (H-2020-153).

The researchers collected the data online. Google forms were used to generate an online survey link and quick response (QR) code linked to the online questionnaire, both of which were shared through various social media platforms (e.g., WhatsApp, Twitter, Snapchat, and Instagram). Moreover, an online poster was posted on websites and official Twitter accounts of several local and popular media outlets, such as the Saudi Gazette and Arab News, along with the link and QR code for the online questionnaire. The poster included a brief introduction to the study background, objectives, methods, voluntary nature of participation, declarations of anonymity and confidentiality, and instructions for completing the questionnaire. Finally, citizens were instructed to fill out the online questionnaire by clicking the link or scanning the QR code.

The data were analyzed using SPSS Version 21. The frequency and percentage were utilized to determine the demographic profile of the respondents. A one-way ANOVA and independent sample t-test was used to determine their differences. The relationships of the demographic profiles to KAP were treated with Pearson correlation.

RESULTS

Table 1 presents the demographic information and its differences. A total of 623 Saudi citizens responded to the online survey. Among the respondents the demographics are as follows: almost half (49.8%) are 20–30 years old with income of over 7000 Saudi Riyals; the majority are female (60.5%) and married (52.5%); most worked in private firms and with tertiary education (both profiles with 74.5%); lived in the Northern region (61.2%); and gained COVID 19 information from social media (71.1%). The comparison of gender (t = 6.79; p < 0.001), marital

status (F = 10.59; p < 0.001), education (F = 32.46; p < 0.001), occupation (F = 6.79; p < 0.001), and area of residence (F = 7.53; p < 0.001) revealed statistically significant differences in COVID-19 knowledge.

Table 2 presents the frequency and percentage of respondents with correct answers per question regarding knowledge. The mean knowledge score of respondents is 11.53 out of 14 (82.83%). In general, almost all Saudi participants are knowledgeable on measures to reduce the spread of COVID-19 infection (items 10 to 13), and more than 92% answered correctly. However, only slightly more than half (58.91%) of the participants can differentiate COVID-19 infection from the common flu (item 2). Interestingly, very few (17.17%) know the leading cause of COVID-19 and others still believe that the cause is eating or contacting wild animals.

Table 3 shows the average response regarding attitude and practice. In terms of attitudes toward the recent infection, most of the participants agree that COVID-19 can be successfully controlled (M = 1.94; SD = 0.83) and have confidence that Saudi Arabia can win the battle against the disease (M = 1.63; SD = 0.75). Meanwhile, regarding practices, respondents often avoid crowded places (M = 2.10; SD = 1.15) and always wear masks when leaving home (M = 1.23; SD = 0.67).

TABLE 1. Knowledge score of COVID-19 by demographic variables (N = 623)

Characteristics	Frequency (%)	*M* (SD)	*t*/*F*	*p*
Age				
20–30 years old	310 (49.8)	11.42 (1.79)	2.12	0.970
31–40 years old	236 (37.9)	11.53 (1.87)		
41–50 years old	58 (9.3)	12.03 (1.23)		
>50 years old	19 (3.0)	11.79 (0.85)		
Gender				
Male	246 (39.5)	10.96 (2.14)	−6.79	< 0.001
Female	377 (60.5)	11.91 (1.34)		
Marital Status				
Never Married	274 (44.0)	11.24 (1.97)	10.59	< 0.001
Married	327 (52.5)	11.83 (1.39)		
Separated	22 (3.5)	10.82 (2.89)		
Education				
Elementary/Intermediate	5 (0.8)	11.20 (0.84)	32.46	< 0.001
Secondary	56 (9.0)	9.48 (2.57)		
Upper Secondary	98 (15.7)	11.60 (1.50)		
Tertiary	464 (74.5)	11.77 (1.76)		
Income				
7000 SR and below	313 (50.2)	11.54 (1.84)	0.10	0.920
Above 7000 SR	310 (49.8)	11.53 (1.68)		
Occupation				
Private	464 (74.5)	11.80 (1.37)	6.79	< 0.001
Government	159 (25.5)	10.74 (2.43)		
Area of Residence				
Central region	86 (13.8)	11.10 (2.29)	7.53	< 0.001
Eastern region	37 (5.9)	10.43 (2.15)		
Western region	87 (14.0)	11.64 (1.37)		
Northern region	381 (61.2)	11.76 (1.62)		
Southern region	32 (5.1)	11.00 (1.55)		
Source of Information				
Social media	443 (71.1)	11.55 (1.77)	0.60	0.690
Newspaper /journal	16 (2.6)	11.31 (1.70)		
MOH	131 (21.0)	11.59 (1.48)		
Colleagues/friends	11 (1.8)	11.45 (2.21)		
Search engines	9 (1.4)	11.33 (1.12)		
Television	13 (2.1)	10.77 (3.49)		

Legend: M = Mean; SD = Standard Deviation; t = t-value; F = F-value

TABLE 2. Knowledge of participants toward COVID-19 (N = 623)

Knowledge on COVID-19	Correct	Incorrect
1. The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia.	589 (94.5)	34 (5.5)
2. Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus.	367 (58.9)	256 (41.1)
3. COVID-19 has no effective cure at present, but early symptomatic and supportive treatment can help most patients recover from the infection.	560 (89.9)	63 (10.1)
4. Not all persons with COVID-19 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases.	488 (78.3)	135 (21.7)
5. Eating or contacting wild animals would result in infection by the COVID-19 virus.	107 (17.2)	516 (82.8)
6. Persons with COVID-19 cannot infect others when a fever is not present.	491 (78.8)	132 (21.2)
7. The COVID-19 virus spreads via the respiratory droplets of infected individuals.	585 (93.9)	38 (6.1)
8. Ordinary residents can wear general medical masks to prevent infection by the COVID-19 virus.	518 (83.1)	105 (16.9)
9. Children and young adults do not need to take measures to prevent infection by COVID-19 virus.	555 (89.1)	68 (10.9)
10. To prevent infection by COVID-19, individuals should avoid going to crowded places such as train stations and taking public transportation.	597 (95.8)	26 (4.2)
11. Isolation and treatment of people who are infected with COVID-19 are effective ways to reduce the spread of the virus.	609 (97.8)	14 (2.2)
12. People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days.	610 (97.9)	13 (2.1)
13. Frequent hand washing with soap and water for at least 20 seconds, especially after you have been in a public place or after blowing your nose, coughing, or sneezing, is recommended to prevent the spread of the disease.	576 (32.5)	47 (7.5)
14. Hand rubbing of hand sanitizer that contains at least 60% alcohol can be used if soap and water are not readily available.	533 (85.6)	90 (14.4)

TABLE 3. Attitude, and practices of participants toward COVID-19 (N = 623)

Attitude and Practice on COVID-19	Mean	SD
Attitude	**1.79**	**0.69**
Do you agree that COVID-19 will finally be successfully controlled?	1.94	0.83
Do you have confidence that Saudi Arabia will win the battle against the COVID-19 virus?	1.63	0.75
Practice	**1.66**	**0.71**
In recent days, do you avoid crowded places?	2.10	1.15
In recent days, do you wear a mask when leaving home?	1.23	0.67

Pearson coefficient was used to test the relationship between participants' KAP regarding COVID 19. However, the only relationship between knowledge and practice was established based on the findings of the study with a *P*-value of less than 0.001. This result indicates that as the participants gain knowledge on COVID-19, the more they agree that Saudi Arabia can finally control and win the fight against the disease, which is a sign of positive attitude (Table 4).

TABLE 4. Relationships between knowledge, attitude, and practice

Variables	r	*P**
Knowledge and Attitude	−0.022	0.58
Knowledge and Practice	−0.024*	< 0.001
Attitude and Practice	−0.020	0.62

*Pearson correlation

DISCUSSION

The above results can be used to inform policymakers for improved delivery and efficiency of current health education programs. In this study, the Saudi citizens had good knowledge of COVID-19 disease, which can be attributed to their educational status, where approximately 75% are at the tertiary level. Moreover, the MOH has exerted its best efforts to inform people on COVID-19 through social media. This present study is consistent with that of Al-Hanawi and colleagues [17], in which people gained knowledge regarding COVID-19 to

protect themselves and their families. Moreover, Alhazmi *et al*.[10] found that knowledge of COVID-19 in Saudi Arabia has an average of 81.3%. Similarly, Olapegba *et al*.[18] found that the Nigerian public exhibited relatively high knowledge regarding COVID-19, which is credited to their information from TV and radio. As such, the MOH's massive informational campaign on COVID-19 is practical and must be continued to address the knowledge gap among Saudi citizens.

The good attitudes and practices of the respondents in this study imply a better disposition of Saudi citizens amid this pandemic. The results can be credited to their excellent knowledge of the disease and its prevention. As such, the public's understanding of COVID-19 enhances their attitude, leading to exemplary practice. Indeed, earlier studies found that the respondents' attitudes and practices about COVID-19 were optimistic [10,19] despite misinformation that has been widely disseminated. Al-Hanawi and colleagues[17] believed that the government's unprecedented steps and rapid response in establishing tight controls and preventive measures against COVID-19 to secure residents and ensure their well-being can explain the positive views and high confidence in controlling the disease. As such, notably, the Kingdom's leadership used its prior experience with the spread of the MERS-CoV to implement a set of proactive and preventive measures to combat COVID-19.

Significant differences are observed when Saudi citizens are compared in terms of knowledge and their demographic characteristics. This study found higher knowledge on COVID-19 among females more than males, participants who worked for private companies over those in the government sector, and married people than those who are single or separated. Similarly, people from the Northern region present better knowledge than those from the Central and Eastern areas, while Saudi citizens from the Western regions differ significantly from those from the East. Such a result can be credited to the active information dissemination and communication of the regional health authorities. The implications are thus addressing the significant variables can perhaps further advance the knowledge of COVID-19 and, thereby help with the decreasing number of infected individuals. The present findings are similar to those of earlier studies. For example, knowledge differs based on gender, marital status, education, occupation, and area of residence.[16] Moreover, KAP differences were found among geographical regions, and the causal factors are gender, marital status, and education qualification for several regions.[20] This difference held true for the findings in Bangladesh, where a large variety of sociodemographic characteristics, such as age group, gender, education level, monthly family income, and location of urban residence dwellers, had a significant effect on participant knowledge ratings.[21] Such findings highlight the importance of continuous improvement of knowledge through education initiatives that target these factors. To this end, improving the KAP of the general population is critical and effective health education programs[22] must be developed with consideration of KAP modifying elements.[23] The assumptions if that as knowledge in these areas improves, attitudes and practices concerning COVID-19 also improves.[24,25] In this context, health policymakers can determine the efficiency of current health education programs for the public since the COVID-19 outbreak.

Apart from determining the good general knowledge of COVID-19 among Saudi citizens, this study found that knowledge and practice has a significant relationship. This suggests that the good knowledge of Saudi citizens is highly likely to be observed in their practice toward precautionary measures against COVID-19. Indeed, the general population demonstrates a solid understanding of COVID-19 and is expected to display appropriate disease prevention measures.[14] Furthermore, earlier studies have established this relationship between knowledge and practice,[26] with poor knowledge associated with poor practice.[27] According to Almoayad *et al*.,[28] a high likelihood of implementing preventive measures during the COVID-19 pandemic was associated with complete knowledge and attitude ratings. By contrast, a study on the KAP of medical and allied health students found no relationship between knowledge and attitudes, and thus knowledge does not translate to attitudes.[19] The present findings recommend that the incessant provision of information regarding COVID-19 by the government improves the status of Saudi Arabia in terms of preventing the infection and spread of the disease.

Overall, the present findings provide a basis for innovative public health solutions through scientific evidence and can serve as a reference for future public healthcare initiatives. This study also helps select the best platforms for delivering health education programs to address the COVID-19 pandemic. Thus, Saudi citizens can receive appropriate and timely knowledge on the disease.

The authors acknowledge the study limitations and suggest measures to address such concerns in future investigation. One limitation is the non-representation of each region in Saudi Arabia, where generalization of the results may not be possible. This issue can be addressed by using criteria on the regions to be included in the study. For example, large cities can be used to represent large or small regions. Moreover, this study has not explored the differences the participants' attitudes and practices in terms of demographic characteristics, which may enhance the research substance. Therefore, future studies are recommended to include differences in attitudes and practices. Lastly, the English version of the questionnaire should be translated into Arabic to enable the participation of more Saudi citizens.

CONCLUSIONS

Saudi citizens have good knowledge, positive attitudes, and good practices toward COVID-19. However, gender, marital status, education, occupation, and area of residence are all causal factors that differ in their knowledge. Moreover, a significant relationship is established between knowledge and practice, but no significant relationships are found from knowledge to attitudes and attitudes to practice. Therefore, policymakers can use this evidence as a basis to create effective health education programs for COVID-19.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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