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Public Awareness And Knowledge Of COVID-19 In Eastern Province, Saudi Arabia: An Online Cross-Sectional Survey

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ABSTRACT

The infectious Coronavirus disease (COVID-19) represents an important threat to public health. We assessed the awareness and knowledge rate of the general population toward the COVID-19 in eastern province, Saudi Arabia. A self-reported closed-ended questionnaire consisted of 26 questions divided largely into three categories including demographic characteristics, knowledge rate and awareness source of COVID-19. SPSS was used for data analysis and reliability was tested using Cronbach's alpha, Chi-squared (χ^2) test was used for the determination of the distribution of the variables. The study included total of 1078 participants; the study variables showed a very good level of reliability. The overall knowledge score indicated that the majority of the participants had high knowledge, especially between participants who aged from 31-45 years old, received university education or higher and who were employed. Half of the participants prefer television as a source of their information about COVID-19. High overall awareness and knowledge of COVID-19 was reported. High percentages of participants had sufficient knowledge regarding the disease nature, incubation time, risk groups, transmission, symptoms and prevention of the disease. However, expressed poor knowledge regarding the treatment and usefulness of antibiotics.

Keywords: COVID-19; SARS-CoV-2; Awareness; Knowledge; Questionnaire

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INTRODUCTION

The coronavirus disease (COVID-19) outbreak first appeared in December 2019 in Wuhan and rapidly spread across China [1-3]. On March 11th, World Health Organization (WHO) officially documented the COVID-19 as a pandemic as the disease rapidly spread all over the world [2-4]. Situation reports by the WHO indicated more than ten million COVID-19 confirmed cases and over half million reported deaths around the world and still numbers increases, updated situation reports can be reached in WHO [5]. In Saudi Arabia, the first confirmed case of COVID-19 was reported on March 2, 2020.

The virus causing COVID-19 belongs to the beta-coronavirus group, and has been renamed as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) [6]. SARS-CoV-2 showed partial similarity with Middle East respiratory syndrome coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV), in genomic organization, clinical manifestations and pathological signs [7].

Initial studies indicated a relation between most cases of infection and a local market for fish and wild animals, which indicated a transmission from animal-to-human. However, later studies confirmed a transmission of the SARS-CoV-2 from human-to-human through direct contact or respiratory droplets [8,9]. Also, studies indicated that the incubation period of the SARS-CoV-2 is 2 – 14 days [10].

Males are more influenced with COVID-19 infection than females, as the sex hormones can play a role on both innate and acquired immune responses [11]. Additionally, chronic diseases such as diabetes, hypertension, cancer and others may increase the risk of COVID-19 infection [12]. Moreover, studies indicated that smoking could be a harmful indicator for COVID-19 [12]. COVID-19 patients showed clinical signs including fever, dry cough and shortness of breath, however, some cases showed upper respiratory tract and gastrointestinal symptoms [8, 12].

Due to the massive spread of the SARS-CoV-2 infection, a global cooperation between governments, health care providers, and the public is needed. Therefore, the Saudi governmental authorities applied a wide range of precautionary procedures to border the extend of the COVID-19 outbreak that were in accordance with the WHO guidelines. Also, providing the general public with information regarding the virus mode of transmission and suitable protective procedures help in controlling and preventing COVID-19 [13]. Therefore, Saudi Ministry of Health (MOH) and related health authorities introduced number of public educational campaign in order to raise the awareness and knowledge of the public. The MOH used several methods to reach the general population like television, newspapers, educational flyers and posters, social media, and other internet resources.

The present study was designed to assess the knowledge and awareness of COVID-19 among the general population in the eastern province, Saudi Arabia through a reliable and consistent questionnaire.

METHODS

Study design

A self-reported closed-ended questionnaire containing a number of multiple-choice questions, was used to determine the awareness and knowledge rate of COVID-19 between general population in eastern province, Saudi Arabia. The survey was available for two weeks during April 2020. Questions were written in English language at first, after a detailed search for information from the websites of both WHO and the MOH with some modifications. Questions were reviewed and validated by virology and infectious diseases experts to consider the relevance, length, and simplicity of the questions. Then the survey was pilot-verified with 30 people as a test group to guarantee the appropriateness of the questionnaire. Consequently, the questions were revised, Arabic translation was conducted by a professional translator. The pilot-test results were not involved in the report of the current study.

The questionnaire was developed electronically through Google Forms (https://www.google.com/forms/) and the study participants were provided with a message included the link of the survey.

For calculation of the study sample size, depending on the z-score equation, the size of the population representing (2,500,000 people), confidence level used was 99% and margin of error was 4%, sample size needed is 1037 participants.

Study participants and data collection

The questionnaire was distributed among general population aged 18 and over existing in four cities in the eastern province of Saudi Arabia, namely Al Ahsa, Hafr Al-Batin, Khobar, and Dammam. Participants were reached through social media platforms (Whatsapp, Twitter and Facebook), were informed that the questionnaire is intended for the scientific research only and an online consent was obtained before proceeding.

Questions

The questionnaire consisted of 26 questions that were largely divided into three categories including demographic characteristics, knowledge rate and awareness source of COVID-19.

Demographic characteristics: involved five questions including gender, age, profession, educational level, and region (within Saudi Arabia).

Knowledge rate: involved 19 questions evaluating knowledge about nature of disease, causes, transmission, treatment, availability of a vaccine, signs and symptoms, mortality, and methods of prevention. The knowledge section was assessed on Likert scale of Yes, No, I do not know; where a score of 1 was given for each correct answer and incorrect/ do not know answers were given no score. Higher score indicated greater knowledge of the respondent; where score range between 15–19 indicate high knowledge, score between 10–14 indicate moderate knowledge and score < 10 indicate poor knowledge.

Awareness source: involved one question to gather the participants source of information about COVID-19.

Data Analysis

Data was exported and examined by the SPSS IBM, version 24.0 for Windows. Each scale of the questionnaire was tested for reliability by Cronbach's alpha in order to detect the inner consistency of the scale. According to **Tavşancıl [**14]**,** alpha value ranging from 0.6 to 0.7 was considered satisfactory level of reliability, and alpha value of 0.8 or higher, was considered very good level of reliability. For both the frequencies (n) and percentages (%) of variables, the $p < 0.05$ indicated statistically significant. Chi-squared (χ^2) test or Fisher's exact test was used to ascertain the distribution of the categorical variables between groups. Also, linear regression was used to analyze significant relationships between two variables.

Ethics Statement

The study protocol was approved by the Research Ethics Committee of King Faisal University with the reference number: REC REF. NO. KFU-REC/2020 - 03 - 07.

RESULTS

All the study variables were tested for the reliability and result showed a very good level where Cronbach's alphas for the participants awareness source, and knowledge rate were 0.96 and 0.90 respectively.

Demographic Characteristics

Total of 1078 participants including 59% female ($p < 0.01$) and 41% male. About half (50.5%) of the participants were aged from 31-45 years old, graduated from university (50.6%) and were employed (72.5%) ($P < 0.001$). Most of participants (91.7%) were living in the Eastern Province ($P < 0.001$) (**Table 1**).

Table 1. Demographic data (*n* = 1078)

Factors	*n*	%	*p* value
Gender			
Female	636	59	< 0.01*
Male	442	41	
Age (years)			
18-30	354	32.8	
31-45	544	50.5	< 0.001**
46-60	134	12.4	
> 60	46	4.3	
Education level			
Uneducated	51	4.7	
School	303	28.1	
University	546	50.6	< 0.001**
Postgraduate	178	16.5	
Employment			
Unemployed	296	27.5	
Employed	782	72.5	< 0.001**
Location			
Eastern Province	988	91.7	< 0.001**
Outside the Eastern Province	90	8.3	
Parameters represented as frequency (*n*) and percentage (%); data was analyzed by χ^2 test. *p* value < 0.01 is significant; **p* value < 0.001 is highly significant.			

Knowledge of general population about COVID-19

The overall knowledge score indicated that most of the respondents (n=885, 82%) had relatively high knowledge, while a considerable number (n=110, 10% and n=83, 8% respectively) had moderate and fair knowledge about COVID-19.

Table 2. Responses to questions related to the Knowledge of public regarding COVID-19

Questions	Correct			Incorrect	
	n	%		n	%
1. Have you heard about novel Corona?	1017	94.3		61	5.7
2. Is there a difference between old and novel Corona disease?	997	92.5		81	7.5
3. Corona disease is due to a viral infection?	985	91.4		93	8.6
4. Incubation time for virus rage between few days to 2 weeks	850	78.8		228	21.2
5. COVID-19 can be transmitted from person to another	1003	93.0		75	7.0
6. COVID-19 can be transmitted from animals to humans?	922	85.5		156	14.5
7. COVID-19 spreads through close contact with infected people?	938	87		141	13
8. COVID-19 can cause direct death	1002	92.9		76	7.1
9. Cough, fever and Shortness of breath are characteristic symptoms of COVID-19	943	87		136	13
10. COVID-19 cause severe respiratory illness	936	86.8		142	13.2
11. Patients infected with COVID-19 may have no signs or symptoms	965	89		114	11
12. People with chronic diseases (diabetes, cancer, and other chronic diseases) are most susceptible to infection with COVID-19	861	80		218	20
13. Using soap for hand washing for at least 20 seconds helps in preventing infection	915	85		164	15
14. Face mask should be used in crowds to help in reducing infection	952	88		127	12
15. Patients with COVID-19 should be kept isolated	958	89		121	11
16. Is there a cure for COVID-19?	650	60.3		428	39.5
17. Is there a vaccine for COVID-19?	554	51.4		524	48.6
18. Antibiotics are one of the most important drugs for the treatment of COVID-19	156	14		923	86
19. People with strong immunity are less likely to become infected with COVID-19	464	43		615	57

All parameters are represented as frequency (n) and percent (%).

The frequencies of correct and incorrect responses to questions evaluating the knowledge and awareness of general population regarding COVID-19 are presents in **Table 2.** Results indicated that the vast majority of the participants (94.3%) heard about novel Corona disease, were familiar that new disease differs from the diseases

aroused before (92.5%), aware that COVID-19 is caused by viral infection (91.4%), and the virus incubation time rage between few days to two weeks (78.8%). Also, participants were aware that COVID-19 can be transmitted from person to another (93%); disease spread through close contact with infected people (87%), can be transmitted from animals to humans (85.5%), and can cause direct death (92.9%).

Many respondents (87%) knew that cough, fever and shortness of breath are characteristic symptoms, COVID-19 cause severe respiratory illness (86.8%) and patients infected with COVID-19 may have no signs or symptoms (89%), people with chronic diseases (diabetes, cancer, and other chronic diseases) are most susceptible to infection with COVID-19 (80%).

Participants agreed that using soap for hands washing for at least 20 seconds can help in preventing COVID-19 infection (85%), also participants agreed that wearing face mask in crowds (88%) and isolating patients with COVID-19 (89%) help reducing the infection. About half (51.4%) knew that there is no vaccine against COVID-19 and little more (60.3%) knew that there are no confirmed effective treatments specifically for COVID-19. On the other hand, the majority of the participants (86%) did not know that antibiotics are not useful for the treatment of COVID-19. Only 43% of participants agreed that strong immunity play a role in disease prevention.

Awareness sources

Approximately, half of the participants (n = 569, 53%) indicated that they received their information about COVID-19 from the television. Participants that received their information from other sources like Newspapers, Social Media, and Health Care Providers were limited (15%, 15%, and 14% respectively). However only 3% of participants gained their information from family and friends.

Association between demographic factors and knowledge rate regarding COVID-19

Table 3. Association between demographic factors and overall knowledge level regarding COVID-19

Factors	High			Moderate			Fair			p value
	n	%		n	%		n	%		
Gender										
Female	520	82		71	11		45	7		0.4
Male	365	83		39	9		38	8		
Age (years)										
18-30	252	72		58	16		44	12		0.01**
31-45	492	90		31	6		21	4		
46-60	99	74		20	15		15	11		
> 60	42	91		1	2		3	7		
Education level										
Uneducated	39	76		3	6		9	18		0.001**
School	249	82		35	12		19	6		
University	455	83		59	11		32	6		
Postgraduate	142	80		13	7		23	13		
Employment										
Unemployed	215	73		55	18		26	9		0.001**
Employed	670	86		55	7		57	7		
Entire parameters are represented as frequency (*n*) and percentage (%); the data were analyzed by a χ^2 test. *p* value < 0.01 is significant; **p* value < 0.001 is highly significant										

Overall knowledge level varied across different factors of the study participants. No significant differences between female and male were found in the total knowledge. A statistically significant high overall knowledge was found between participants who aged from 31-45 years old (P< 0.01). Also, participants received university education or higher (P< 0.001) and who were employed (P< 0.001) showed significantly high overall knowledge toward COVED-19 (**Table 3**).

Association between awareness source and knowledge rate regarding COVID-19

The association of awareness source and knowledge rate showed significant differences between participants with a high, moderate and fair level of knowledge on COVID-19 (**Table 4**).

Table 4. Association between awareness source and overall knowledge level on COVID-19

	Total		High		Moderate		Fair		
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	*p-value*
Health Care Providers	150	14	132	88	7	5	11	7	0.001**
Television	569	53	487	85	61	11	21	4	0.001**
Newspapers	166	15	132	79	18	11	16	10	0.001**
Social Media	165	15	126	76	20	12	19	12	0.001**
Family and friends	28	3	8	28	4	14	16	57	0.02*
All parameters are represented as frequency (n) and percent (%); the data were analyzed by X^2 Test. *p-value <0.05 is significant, ** p-value <0.01 is highly significant									

On determining effect of the awareness source on the knowledge rate, the determination coefficient was 0.005; so, around 0.5% of the variation in the Awareness source (independent variables) by knowledge rate.

In addition, simple linear regression analysis indicated a significant association among awareness source and knowledge rate ($p < 0.02$). The coefficient of the awareness source was 0.012, accordingly knowledge rate increases by 0.012 for each extra unite of the awareness source, and 95% confident that for every awareness source corvette, their mean knowledge rate increases in the range of 0.002 and 0.022 **(Table 5)**.

Table 5. Simple linear regression analysis of Awareness source on knowledge rate

Coefficients [a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.972	0.017		57.200	.000	.939	1.005
	Awareness source	**0.012**	0.005	0.071	2.342	**0.02**	**0.002**	**0.022**
a. Dependent Variable: knowledge rate								

DISCUSSION

The present study aimed to develop a questionnaire evaluating the awareness and knowledge toward COVID-19 outbreak between the general population in the eastern province, Saudi Arabia. The results indicated that the variables of the research achieved a very good level of reliability. The study indicated that the overall awareness and knowledge of COVID-19 among the public population in the eastern province, Saudi Arabia was generally high. This result may be due to the Availability of latest information and educational materials related to COVID-19, represents a powerful tool in educating the general population and highlighting their effective roles in preventing the spread of the virus which can lead to the control of the disease outbreak. Therefore, the Saudi Ministry of Health (MOH) started a governmental public health education programs and awareness campaigns to increase the awareness among the general population [13, 15].

Data obtained from this study was similar to a recent study on public knowledge, attitude and perception regarding COVID-19 in different regions in Saudi Arabia especially the western region [16]. Likewise, our data was similar to study on knowledge of COVID-19 among Chinese residents, where most respondents were knowledgeable about COVID-19 [17].

In evaluating the association between demographic factors and knowledge rate of the general population regarding COVID-19, there was no significant differences in the total knowledge between female and male. However, there was a significant high overall knowledge between age, education level and employment. In addition, higher knowledge rate was also found among younger participants with age range between 18 to 45 years old. The association between younger age and higher knowledge rate was also found in the study on COVID-19 in different areas in Saudi Arabia [15]. However, our data were inconsistent with the study in China, indicated a significant difference in the COVID-19 knowledge across age-groups, categories of marital status, and education levels [17].

It is worth noting that the majority of participants were aware about the nature of the disease cause, incubation time, risk groups, transmission, symptoms and prevention of the disease. Although these are clinical parameters and may be difficult to the public to know, however due to the dynamic situation and the awareness campaigns especially in media which could potentially contribute to high knowledge rate. the result is in accordance with the study conducted by **Al-Hanawi and colleagues** [16] on COVID-19 in different areas in Saudi Arabia. However, our results were in contrast with several studies conducted in corona virus diseases previously caused outbreaks like MERS-CoV and SARS-CoV which indicated lack of knowledge about the nature of the disease [18-21].

On the other hand, there were gaps in knowledge concerning the use of antibiotics for COVID-19 treatment, as most of the participants believed that antibiotics can be useful for the treatment. Therefore, MOH should raise the awareness about the disadvantages of the unselective or inappropriate administration of antibiotics [22].

Also, the current study has emphasized that less than half of the participants agreed that strong immunity play a role in disease prevention. Likewise, this may represent a gap of knowledge and the public should be educated about the immunity role of in decreasing the clinical outcomes of COVID-19. As proved by several studies recently published [23, 24].

As for awareness source, about half of the participants stated that they received their information about COVID-19 from the television, while other information sources like Newspapers, Social Media, and Health Care Providers were limited in numbers. This result recommends that the value of information now found via the television is well revised and to some extent adequate. Unlike previous studies concerning information source regarding MERS-CoV in Saudi Arabia that stated that most participants gained their information from the internet [20, 25]. The reason for that shift in sources of information may be due to the fear of the public from the ongoing outbreak and the seek for the official and true information. Consistent with our results, Chinese population received their information from various channels including television, social media and official websites [17].

CONCLUSION

The overall awareness and knowledge of COVID-19 among the public population in eastern province, Saudi Arabia was generally high. High percentages of participants had sufficient knowledge regarding the disease nature, incubation time, risk groups, transmission, symptoms and prevention of the disease. However, expressed poor knowledge regarding the treatment and usefulness of antibiotics. The main source of information about the disease gained from the television. This may reflect the success of public health education programs in raising the awareness of the general population about the COVID-19 outbreak.

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