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Full Length Research Article

Middle East Respiratory Syndrome-Corona virus: Knowledge and attitude of Qassim University students, KSA

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Globally, since September 2012, 1626 laboratory-confirmed infected cases with MERS including at least 668 related deaths have been reported to WHO from 26 countries. Approximately 80% of human cases have been reported by Saudi Arabia and the numbers of infected cases increase gradually. Effective infection prevention and control depends on awareness of people at all levels. The current study aim to assess the knowledge and attitude of Qassim University students in Saudi Arabia towards Middle East Respiratory Syndrome Coronavirus (MERS-CoV). A cross-sectional study was conducted among 733 undergraduate students at Qassim University. Knowledge and attitude were assessed by using self administered questionnaire. Data were analyzed using SPSS version 16. Descriptive statistics were used for data summarization and presentation. The findings of this study showed that the main sources of information regarding Corona among students were internet followed by television and radio. Less than three quarters of students had satisfactory knowledge and majority of them had positive attitude. Whereas majority of students think that University did not provide awareness campaigns about Corona. Furthermore, the findings explained that female had better knowledge than male and medical students are more knowledgeable than non-medical students with $p > (0.000)$. The current study findings concluded that the studied sample had good knowledge score as well as positive attitude toward MERS-CoV. Future research should recruit students from different regions of the country in order to better assessment of students' knowledge about MERS-CoV.

Keywords: Corona virus, Knowledge, attitude, University students, KSA

INTRODUCTION

Middle East respiratory syndrome (MERS) is a recent infectious disease caused by a coronavirus that contributes increase to respiratory infection (Choi and Kim, 2016). It has been an emerging worldwide health problem that is mainly identified in Kingdom of Saudi Arabia (KSA) with progressive growth in cases and

deaths (Nour et al., 2015). The virus is a new, evolving infectious disease that was primary identified in 2012 in Saudi Arabia (Al-Hazmi et al., 2016). Saudi Arabia showed the first case of MERS and recorded the highest level of infection and mortalities around the world. According to the last statement from World Health Organization (WHO), more than 1626 cases of MERS have been reported in 26 countries worldwide, 668 of them died and the numbers of infected cases increase gradually (WHO, 2017). However, 85% of reported cases

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were detected in Saudi Arabia, mostly in the cities of Riyadh and Jeddah (Meyer et al., 2015; Saudi Ministry of Health, 2014). The infection route has not been clarified evidently, although its transmission through Arabian camels was documented in Saudi Arabia. Most patients originally suffer from a severe acute lower respiratory illness, but others are asymptomatic or indicate a mild acute upper respiratory illness (Centers for Disease Control and Prevention, 2015).

Effective infection prevention and control depending on awareness and compliance of healthcare workers at all levels (WHO, 2017). A survey of healthcare workers in South Korea found a poor level of knowledge of the modes of transmission, which was implicated in the rapid spread of the infection in hospitals (Kim, 2015). Level of the community's awareness and knowledge about the MERS-CoV and their attitudes toward infected persons play a critical role in controlling the disease (Kim and Choi, 2016). Community compliance with preventive measures is as important as well-organized outbreak response and failure to comply with preventive measures in emergency situations may expose public health to risk. Public attitude and knowledge have a serious impact on the spread of infections (Akan et al., 2010). Universities with their large concentrations of young persons have the potential to be a focus of serious outbreak. Consequently; this secondarily may have a negative effect in the community (Akan et al., 2010). Owing to the serious threat posed by MERS-CoV to public health, it is essential to evaluate the knowledge, attitudes and behavior of the public and students towards important and spread of infectious diseases. This information provides baseline statistics for the prevention and control of infectious diseases through estimation of the influence of previous prevention efforts made by the government and guiding the need for further interventions (Al-Mohaisen., 2017).

Available studies about awareness and attitude among the Saudi Arabian community toward this infection are little and limited by the small number of participants. Public awareness of MERS-CoV helps significantly in infection control whereas a lack of necessary information leads to low detection rates, delayed treatment, generate fear and prejudice towards those who are infected, discrimination and stigma (Zaini, 2016; Al-Mohaisen, 2017).

The Saudi Ministry of Health (MOH) has performed a series of preventive measures, including strategies to control the spread of MERS-CoV and to enhance public health awareness through social media, and distribution of educational materials in shopping malls, schools and mosques. However MOH has reported a positive relation between MERS-CoV infection and direct contact with infected family members. So, it is obvious that people in Saudi Arabia still lack the reasonable awareness regarding the MERS-CoV mode of transmission, and accessible protective measures to decrease exposure

(Jradi, 2016).

In Saudi Arabia, several studies addressed the awareness of healthcare worker and medical students about MERS. The studies showed that awareness among healthcare workers vary between institutions, gender and among different professions (Khan et al., 2014; Kharmah et al., 2015; Al-Mohrej and Agha, 2016; Alsaifi and Cheng, 2016). The knowledge of healthcare workers in Mecca, Medina and Jeddah about MERS was poor and there is need for further education and training programs specially in using personal protective equipments and infection control measures (Alsaifi and Cheng, 2016). In Jeddah, a study addressing the awareness of all procedures concerning prevention and protection from MERS among students of dental college which revealed that more information needs to be provided (Kharmah et al., 2015). In Riyadh undergraduate students of Health colleges' in King Saud Bin Abdul-Aziz University were knowledgeable regarding the clinical aspects of MERS but were lacking background awareness in the basic sciences (Al-Mohrej and Agha, 2016). In Qassim-our setting-a study showed that healthcare workers have good knowledge and positive attitude towards MERS but no data available regarding University students (Khan et al., 2014). Therefore, the current study was designed to assess the knowledge and attitude of Qassim University students towards Middle East Respiratory Syndrome Coronavirus to provide a baseline data regarding knowledge and attitude of University students in Qassim.

STUDY METHODOLOGY

Study design, Setting and participants

A cross-sectional study was conducted for the period of four months at Qassim University in Qassim region, Saudi Arabia. A total of 733 University students who studied at different colleges (Nursing, computer sciences, Preparatory Year Program 'PYP', Medicine, Medical Applied Sciences, Business, Dentistry, Pharmacy) were invited voluntarily to participate in this study. The generated sample size was adequately powered to estimate the process parameters. A convenience sampling approach was adopted in which the respondents were recruited on ease of accessibility.

Measures

The data was collected through a self-administered questionnaire. The study questionnaire was designed by Memish et al., (2014) and its validity and reliability were tested in different studies (Al-Tawfiq and Memish, 2014; Memish et al., 2014). The questionnaire was divided into three parts. The first part includes demographic data of the participants; the second part assessed the knowledge of participants regarding MERS in which Yes or No option

was given against each set of question. The third part determined the attitude of respondents towards MERS in which their response were evaluated through 5 point Likert scale of agreement. The study instrument assessed the knowledge of University students by asking questions about the nature, etiology, symptoms, risk group, consequences, source of transmission, prevention and treatment of MERS-CoV. Knowledge scores ranged from 0-36 and cut off level of <22 were set for satisfactory knowledge and ≥ 22 for good knowledge. Assessment of attitude was carried out through 13 item questions in which the responses were recorded on 5 point Likert scale. A score of 1 was given to strongly agree, 2 to agree, 3 to undecided, 4 to disagree and 5 to strongly disagree. A score of ≥ 48 was considered as positive attitude while score of < 48 was taken as negative attitude.

Data Collection Procedure

Permission was obtained from the University Studies Center at Qassim University as required by its policy. With the help of the responsible administrator at each college, the researcher obtained consent from the students who invited to voluntarily participate in the study. The investigator asked the professors of general studies courses for permission to administer the survey in their classes. The self-administrated questionnaire, which was filled in by participants has a cover letter stating the purpose of the study. The investigators ensured students that data provided would be kept confidential where no names or other identification was collected. After collecting questionnaires from the study sample, the questionnaires with considerable missing data were excluded.

Data analysis

The data collected from the survey was coded and entered into the mainframe computing system using SPSS version 16 (Chicago, IL, USA). Data were analyzed using frequency and percentage statistics, appropriate statistical methods were applied as correlation coefficient (r). Regarding P value, it was considered that: non-significant (NS) if $P > 0.05$, Significant (S) if $P < 0.05$, Highly Significant (HS) if $P < 0.01$.

Ethical Issues

Participation in the study was voluntary and the purpose of the study was explained to students prior to distribution of the questionnaires. Written consent was obtained from each study participant by attaching a statement of consent to each questionnaire. However, identification of the students was not recorded anywhere on the questionnaire and confidentiality was assured by analyzing the data in aggregate.

RESULTS

A total of 733 undergraduate University students were participated in the present study, majority of them (88.5%) were female and more than half of students (55.1%) their age ranged between 18 to 21 years old. Additionally majority (93.6%) of them live in urban and 96.6% live with their family, whereas more than two thirds (69.4%) of them study in health colleges (table 1).

Table 1. Number and Percent Distribution of Studied Sample Regarding Their Personal Characteristics

Parameter	N=733	%
<u>Age</u>		
18-21	404	55.1
22-25	325	44.3
> 25	4	0.5
<u>Gender</u>		
Male	84	11.5
Female	649	88.5
<u>Residence</u>		
Urban	686	93.6
Rural	47	6.4
<u>Living with</u>		
Family	708	96.6
Relatives	11	1.5
Students home	5	0.7
Alone	9	1.2
<u>Specialty of college</u>		
Medical	509	69.4
Non-Medical	224	30.6

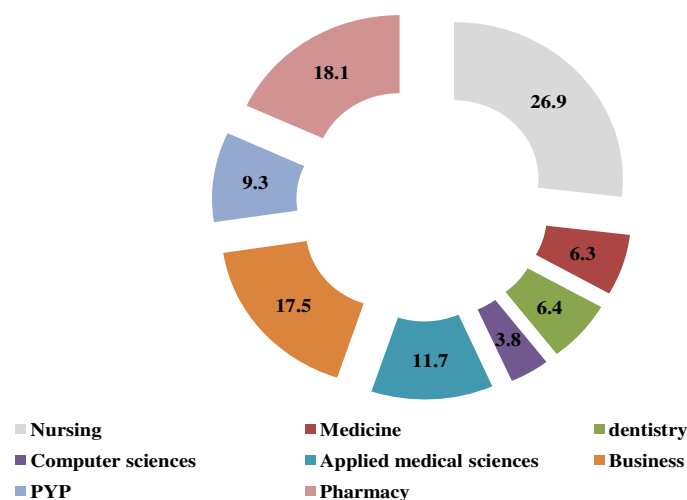


Figure 1. Percentage Distribution of studied sample regarding their Colleges

Figure (1) shows that most (26.9%) of students were in nursing college followed by pharmacy and business students (18.1% and 17.5%) respectively.

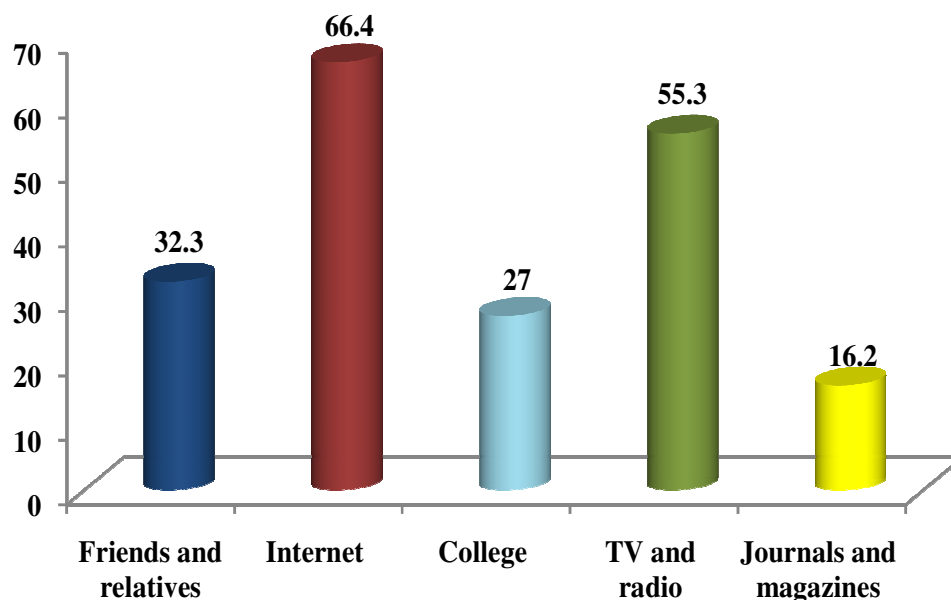


Figure 2. Percent Distribution of Studied Sample Regarding Their Source of Information about Corona

Figure (2) indicates that the main sources of information regarding Corona among students (66.4% and 55.3%) were internet followed by television and radio. Whereas college, journals and magazines (27% and 16.2%) were the scarce sources of information.

Table 2. Number and Percent Distribution of Studied Sample Regarding Their General Knowledge of Corona

Parameter	Yes		No	
	N	%	N	%
1. Have you ever heard of Corona's disease?	722	98.5	11	1.5
2. Are you interested in learning about Corona's disease?	588	80.2	145	19.8
3. Is it a disease that affects the Middle East only?	365	49.8	368	50.2
4. Is an old disease disappeared and returned during these years?	77	10.5	656	89.5
5. Do you know that Corona is a new disease that does not know much of its characteristics?	502	68.5	231	31.5
6. Do you think that the disease will increase the severity and widespread in the near future?	267	36.4	466	63.6
7. Is it a seasonal disease?	344	46.9	389	53.1
8. The cause of Corona's disease is virus?	632	86.2	101	13.8
9. Is Corona infectious disease?	691	94.3	42	5.7
10. Do you think Corona is a hereditary disease?	19	2.6	714	97.4
11. Do you know someone who is infected with Corona?	34	4.6	699	95.4
12. Is there a vaccine against Corona?	265	36.2	468	63.8

Regarding general knowledge of Corona table (2) indicates that majority (98.5%) of students heard about Corona and 97.4% of them known that Corona is not a hereditary and 94.3% reported that Corona is infectious disease. In addition, 86.2% of them agree that virus is the cause of Corona and 80.2% are interested in acquiring information about the disease. Whereas 63.8% known that Corona had not a vaccination and 63.6% of participants think that Corona severity and widespread will increase in the future. Small percentage of them (4.6%) who know someone infected with Corona.

Table 3. Number and Percent Distribution of Studied Sample Regarding Their Knowledge about Symptoms and Methods of Transmission of Corona

Parameter		Correct		Wrong		incomplete	
		No	%	No	%	No	%
1.	Do you think Corona has obvious symptoms?	448	61.1	285	38.9		
2.	Can you identify the person with the disease?	194	26.5	539	73.5		
3.	What are the initial symptoms of the disease?	94	12.8	48	6.5	591	80.6
4.	What are the advanced symptoms of this disease?	482	65.8	251	34.2		
5.	What are the methods of transmission of corona?	145	19.8	9	1.2	579	79
6.	Is Corona disease transmitted by sexual relationship?	390	53.2	343	46.8		
7.	Is Corona disease transmitted during childbirth?	474	64.7	259	35.3		
8.	Corona disease is transmitted among animals?	77	19.8	656	89.5		
9.	The source of this disease is camels?	417	56.9	316	43.1		

Table (3) reflects that students had poor knowledge regarding symptoms and methods of transmission regarding Corona. Whereas (26.5% and 12.8%) of them can identify person with the disease and know the initial symptoms of the disease. Furthermore (19.8%) known the methods of transmission of corona and disease is transmitted among animals. Meanwhile nearly two thirds (61.1%, 65.8%) agree that Corona has obvious symptoms and known its complications, additionally more than half (53.2% and 56.9%) agree that Corona disease transmitted by sexual relationship and source of this disease is camels respectively.

Table 4. Number and Percent Distribution of Studied Sample Regarding Their Knowledge about Treatment and Prevention of Corona

Parameter		Correct		wrong		incomplete	
		No	%	No	%	No	%
1.	Is there an effective treatment against the disease?	295	40.2	438	59.8		
2.	Do you think that alternative medicine (herbs) can treat the disease?	362	49.4	371	50.6		
3.	What are the methods of prevention of Corona?	280	38.2	12	1.6	441	60.2
4.	Do you comply with methods of prevention?	483	65.9	250	34.1		

Regarding knowledge about treatment and prevention of Corona table 4 shows that nearly half (59.8% and 50.6%) of students think that there is an effective treatment against the disease and alternative medicine (herbs) can treat the disease. In addition (38.2% and 65.9%) had good information about the methods of prevention of Corona and comply with methods of prevention.

Do you think that the University has provided sufficient awareness campaigns about Corona disease?

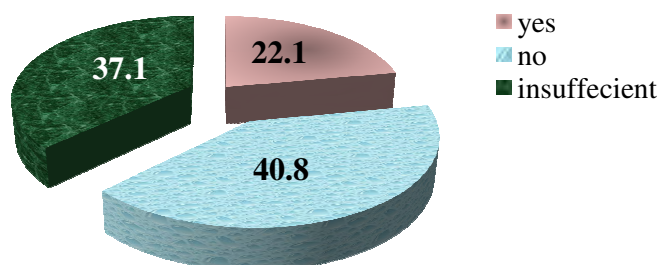


Figure 3. Percent Distribution of Studied Sample Regarding Their Opinion about Awareness Campaign Presented by University

Figure (3) shows that majority of students (40.8% and 37.1%) think that university did not provide awareness campaigns about Corona or the awareness campaigns were insufficient respectively.

Table 5. Number and Percent Distribution of Studied Sample Regarding their attitude toward Corona

Parameter	SA & A		I don't know		D & SD	
	N = 733		N = 733		N = 733	
	N	%	N	%	N	%
1. Transmission of MERS-CoV infection can be prevented by using universal precautions given by WHO and CDC	695	94.8	26	3.5	12	1.6
2. Prevalence of MERS can be reduced by active participation of health care worker in hospital infection control program	665	90.7	56	7.6	12	1.6
3. Any related information about MERS should be disseminated among peers and other healthcare workers c	709	96.7	19	2.6	5	0.7
4. MERS patients should be kept in isolation	656	89.5	66	9	11	1.5
5. Intensive and emergency treatment should be given to diagnosed patients	706	96.3	23	3.1	4	0.5
6. Gowns, gloves, mask and goggles must be used when dealing with MERS patients	690	94.1	35	4.8	8	1.1
7. Healthcare workers must acknowledge themselves with all the information about MERS	716	97.7	12	1.6	5	0.7
8. Healthcare workers should constantly update their knowledge of the disease	712	97.1	14	1.9	7	1
9. Health professionals should carefully deal with, before, during and after communicating with a Corona patient	713	97.3	17	2.3	3	0.4
10. You must follow preventive measures at home	687	93.7	34	4.6	12	1.6
11. Owning a hand sanitizer lotion in a pocket or bag is important	670	91.4	43	5.9	20	2.7
12. The mask should be used in gatherings, markets and park	554	75.6	94	12.8	85	11.6
13. I will not sit next to an infected student or a member of her family who is infected	560	76.4	122	16.6	51	7

N.B: SA & A mean strongly agree and agree- SD & D mean strongly disagree and disagree

Regarding attitude toward Corona, table (5) describes that general positive attitude among majority of students.

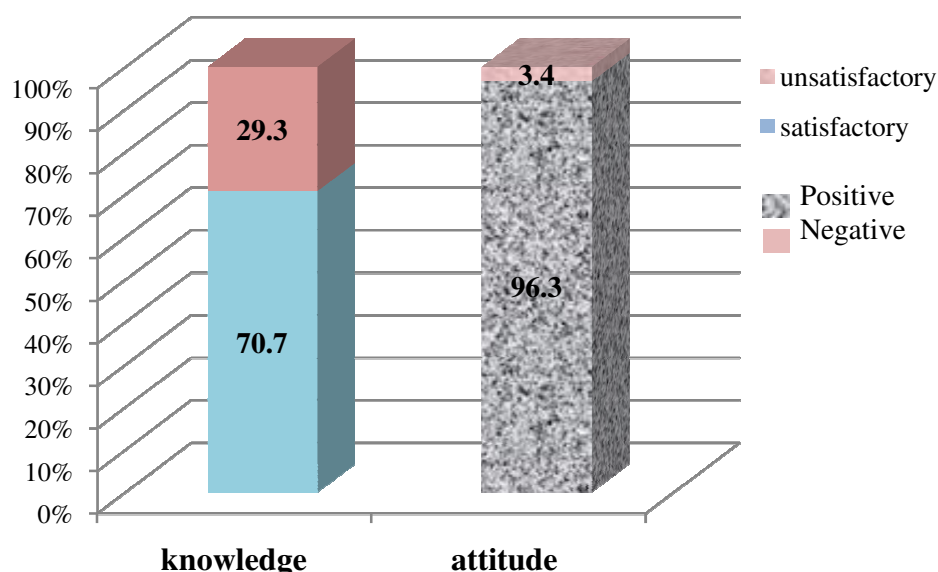


Figure 4. Percent Distribution of Studied Sample Regarding Their Total Knowledge and Attitude about Corona

Regarding total knowledge and attitude about Corona figure (4) describes that more than two thirds (70.7%) of students had satisfactory knowledge and majority (96.3%) of them had positive attitude.

Table 6. Correlation between Total Knowledge, Total Attitude about Corona and Personal Characteristics of Studied Sample

Items	Total knowledge		Total attitude	
	<i>R</i>	<i>p-value</i>	<i>R</i>	<i>p-value</i>
Age	0.066	0.074	-0.081	0.029
Gender	0.183	0.000**	-0.008	0.826
College specialty	-0.235	0.000**	-0.051	0.164

Table (6) shows that strongly positive correlation between gender and total knowledge regarding Corona which means that female had better knowledge than male $p > (0.000)$. Additionally it shows that strongly negative correlation between college specialty and total knowledge regarding Corona which means that health colleges' students had better knowledge than non-health colleges' students $p > (0.000)$. Whereas it shows that there are no relations among personal characteristics and attitude toward Corona $p \leq (0.05)$.

DISCUSSION

Levels of knowledge about a particular infectious illness can be influenced by the seriousness of the illness, spread of the disease and methods for sharing and distribution of knowledge. In the case of MERS, the localized spread of the disease in Saudi Arabia and the number of fatalities associated with it might have increased public interest in understanding how to maintain proper precautionary measures both on the community and on the individual level (Al-Hazmi et al., 2016).

The current study aimed to assess the knowledge and attitude of Qassim University students in Saudi Arabia towards Middle East Respiratory Syndrome Coronavirus (MERS-CoV). The distribution of the demographic variables of the respondents showed a high percentage of medical colleges students, urban dwellers and female. This may be justified by the fact that male and females studying in separate campuses due to cultural norms in Saudi Arabia and if the data collectors are females, male will have a little opportunity to participate due to difficulty in contacting them. Regarding the age of participants, the majority of studied sample was less than or equal to 25 years old; which consistent with many previous studies among University students (Al-Hazmi et al., 2016; Elnagar et al., 2017; Alshammari et al., 2018).

Regarding to the students' source of information about corona virus, most of students depending on internet (66.4%) followed by TV and Radio (55.3%) as a source of information. This is a logical finding due to recently widespread of internet, where most of the colleges' students become internet users and considering it as a main source of information. This finding more or less is

similar to the findings from previous studies in which knowledge about emerging infectious diseases was obtained by internet and watching TV (Hassan, 2016; Kim and Choi, 2016). The current study confirmed the fact that students of health colleges are more knowledgeable compared to other specialties and this result is in accordance with Amaty et al. (2013). This difference in the level of knowledge between health colleges and non-health colleges could be obtained from study subjects and experience of practice. The present study showed good knowledge and positive attitude among students in Qassim University about the disease and the majority of them believed that the disease could be prevented by using universal precautions given by WHO. These results are consistent with a study conducted in the same region and revealed good knowledge and positive attitude among healthcare workers towards MERS (Khan et al., 2014) and also consistent with other study which done by Alqahtani (2017) in Najran city among 418 health colleges' students. In spite of that, the current results are inconsistent with previous research which done among nursing students in Hail University and reported negative attitude about the disease (Alshammari et al., 2018). The main limitations of this study were that the study exhibits results from a single University within a specific region and the number of male subjects in this study was small; therefore, results cannot be generalized in Saudi Arabia and additional cross-sectional multi-institutional studies with convergent sample of both sexes that reflect cultural characteristics from other Saudi Arabian Universities are needed. Future research should recruit students from different regions of the country in order to better assessment of students' knowledge about MERS-CoV.

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