pISSN 2394-6032 | eISSN 2394-6040

Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20173153

Knowledge and attitude toward Middle East respiratory syndrome coronavirus among heath colleges' students in Najran, Saudi Arabia

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Received: 20 June 2017 Revised: 01 July 2017 Accepted: 03 July 2017

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ABSTRACT

Background: Najran area, Saudi Arabia, has experienced infection of Middle East Respiratory Syndrome (MERS) coronavirus. Knowledge towards prevention and control of the disease is necessary among the health colleges' students as they are at high risk of newly emerging diseases. The present study aimed to investigate the knowledge and attitude of undergraduate health colleges' students in Najran University, Saudi Arabia towards MERS coronavirus.

Methods: A structured questionnaire on MERS was developed by the researcher with the help of existing literatures to cover the survey objectives. From five health colleges, 418 health colleges' students were invited to fill the questionnaire from February 2017 to April 2017 and statistic was used to summarize the responses.

Results: The students were highly aware about the clinical aspects of MERS including diagnosis, treatment, transmission and preventive measures. However, there were statistically significant differences (p<0.05) among health colleges' students regarding their understanding of the basic science of the virus. The students showed positive attitude about MERS and the majority indicated that they are in need for further education about it.

Conclusions: The students were knowledgeable about the clinical aspects of MERS but were lacking background awareness in the basic sciences and there is need for further education and training programs.

Keywords: MERS, Students, Infection, Najran

INTRODUCTION

The Middle East respiratory syndrome (MERS) coronavirus is an emerging pathogen first described from Saudi Arabia in 2012. Typical MERS symptoms includes fever, cough and shortness of breath. Pneumonia is common, but not always present. Gastrointestinal symptoms, including diarrhea, have also been reported. Some laboratory-confirmed cases of MERS infection are reported as asymptomatic. Approximately 35% of reported patients with MERS have died.² Dromedary camels serve as an important reservoir host involved in

transmission to humans, Human-to-human transmission was confirmed in 2013. 3-5 Globally, since September 2012, 1952 laboratory-confirmed infected cases with MERS including at least 693 related deaths have been reported to WHO from 27 countries. Approximately 80% of human cases have been reported by Saudi Arabia.6 Health care workers should be educated and trained in infection prevention and control and should refresh these skills regularly. 6 Transmission of the virus has occurred in health care facilities in several countries, including from patients to health care providers and between

patients in a health care setting before MERS was diagnosed. 7,8

In Saudi Arabia, several studies have measured 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. 9-12 The knowledge of healthcare workers in Mecca, Medina and Jeddah about MERS was poor and there is need for further education and training programs particularly in the use of personal protective equipment, isolation and infection control measures. ⁹ In Jeddah, a study addressing the awareness of all procedures concerning prevention of and protection from MERS among dental students suggested that more information needs to be provided by the authorities for the medical staff. 10 Health colleges' students in King Saud Abdul-Aziz University in Riyadh knowledgeable about the clinical aspects of MERS but were lacking background awareness in the basic sciences.11 In Qassim region, a study showed that healthcare workers have good knowledge and positive attitude towards MERS. 12 In China, a study conducted to measure the awareness of medical students about MERS has shown that Chinese medical students had good knowledge of MERS and the MERS knowledge score varied among students of different majors. 13

According to the National Command and Control Center in the Ministry of Health, Najran was ranked third in terms of the number of MERS infection at the level of Saudi Arabia during 2016. The main objectives of this study were to assess the knowledge and to evaluate the attitude of Saudi health colleges' students in Najran University, Najran, Saudi Arabia about MERS. Under this objective, comparisons among the student of five health colleges were done.

METHODS

We conducted a knowledge survey that addressed MERS and its mode of transmission, prevention, diagnosis and treatment among health colleges' students in Najran University. A structured questionnaire was developed by the researcher with the help of existing literature. 11,13 Out of 1162 health colleges' students registered in five health colleges, 418 participated in this study with percent of 35.9%. The number of registered students varies between the colleges, therefore different number of students participated from each college in this study. However, 32.3% and 33.3% of the registered students participated in the questionnaire from each of the college of medicine and college of pharmacy, respectively. Furthermore, 28.5% of the registered students in the college of nursing participated in this study, whereas 25.6% participated from the college of dentistry. Moreover, 48.6% of the registered students in the college of applied medical sciences participated in this study. The respondents were invited to fill the questionnaire from February 2017 to

April 2017. All of the health colleges' students were Saudi citizens. The characteristics of respondents are mentioned in Table 1.

Data collection included the following steps: contact with the students; explanation about the research and its objectives. After that, he or she was invited to fill the questionnaire regarding their knowledge about MERS. The questionnaire was divided into six parts. The first includes demographic information of the respondents. The second, third and fourth parts measured the knowledge about MERS in 4 areas: virology (basic science of the virus), diagnosis and treatment, and transmission and prevention. The last two parts evaluated the need for education about the disease and the attitude of the health colleges' students toward the MERS infection. The categorical variables distribution was describe by the Percentages, while a chi-square test was used to investigate the differences in the educational needs, attitude and the knowledge about MERS among the health colleges' students in the five different colleges. The statistical significance was determined at a p-value less than 0.05. The Statistical Package for Social Sciences (SPSS) version 20 was used for all statistical analyses. This research has been ethically approved by the research ethics committee at Najran University.

Table 1: Show the characteristics of respondents.

Categories	Number of respondents	Percentage of respondents (%)
College of medicine	77	18.4
College of applied medical sciences	181	43.3
College of dentistry	30	7.2
College of pharmacy	41	9.8
College of nursing	89	21.3
Total	418	100

RESULTS

Results of the knowledge about MERS

As shown in Table 2, the knowledge of the students about MERS was satisfactory in items assessing their knowledge of transmission and prevention of MERS and was under expected in basic science. Regarding items assessing their knowledge of the basic sciences, a minority of the students (21%) knew the history of the first case in Saudi Arabia and only small number (30%) knew the incubation period of the disease. Also, around half of the students (54%) knew the genus to which the virus belonged. Regarding items assessing their knowledge of diagnosis and treatment, 84% realized that cough, fever, chills, and shortness of breath were the typical symptoms of the infection. However, only 51% realized that antibiotics are not an effective treatment against MERS. Moreover, 33% of students knew that

real-time polymerase chain reaction (PCR) was used to diagnose MERS and 22% of the students could identify the approximate mortalities rate of the disease. Regarding items assessing their knowledge of transmission and prevention of MERS, the majority of the students (81-85%) were aware about the mode of transmission, spread of infection and that good hygiene can prevent transmission of infection and patients should be isolated. While, only 39% of the students were aware about availability of MERS vaccine in the market.

Comparison of the results of correct answers according to the specialty of the respondents

As shown in Table 3, the students' knowledge was only statistically significantly different regarding their understanding of the basic science of virus and the availability of MERC vaccine (p<0.05). Students of nursing showed the higher awareness about cause and incubation period of the disease. Students of medicine were highly aware about availability of vaccine, while students of pharmacy were highly aware about the history of disease in Saudi Arabia. In relation to prevention, diagnosis, mode of transmission, and other items, no statistically significant differences were observed among the five groups.

Educational need and attitude about MERS

As shown in Table 4, the study revealed that the majority of the students (74.4%) have not attended training courses or workshop about MERS. Similarly, 76.6% of the students in the study indicated that that they are in need for educational courses and training about the MERS. Regarding attitude, the results showed that the students exhibited a positive attitude about MERS. Although around 88.8% of the students realized that MERS is serious infection, only 26.6% were worried about getting infection and 86.6% mentioned that MERS infection could be prevented.

The comparison of the educational needs and attitude of the respondents according to their specialty

Regarding education, there were significant differences (p<0.05) among different group of students in their need for more educational course. Regarding the attitude, there were significant difference (p<0.05) among different specialties in their worries about infection and that MERS is serious illness. All these data were shown in Table 5.

Table 2: The overall results of correct answers from the correspondents.

Questions	Number of correct answers	Percent of correct answers (%)
Virology		
The first case of human infection with MERS occurred in the Kingdom of Saudi Arabia in 2013.	88	21.1
MERS-CoV is a new member of the beta group of coonavirus, Betacoronavirus.	225	53.8
Incubation period for MERS is 14 days	125	29.9
Diagnosis and treatment		
Polymerase chain reaction (PCR) can be used to diagnose MERS.	145	34.7
Fever, cough and shortness of breath are typical symptoms of MERS	353	84.4
Antibiotic is an effective medication in the treatment of MERS	215	51.4
The approximate mortality rate in average risk patient infected with MERS-CoV is more than 50%.	93	22.2
Transmission and prevention		
MERS can spread through close contact with infected persons like those caring for each other and/or living together	340	81.3
One of the main transmissions modes of MERS is through saliva and nasal drip from the sick MERS patient.	348	83.3
MERS can be prevented by good hygiene practices	357	85.4
Vaccination of MERS is available on the market.	164	39.2
Washing hands with soap and water can prevent MERS transmission.	350	83.7
MERS patients should be kept in isolation	350	83.7

Table 3: Comparison of the correct answers according to the specialty of respondents.

Question	Medicine	Applied medical sciences n (%)	Dentistry n (%)	Pharmacy n (%)	Nursing n (%)	P- value
Virology			`			
The first case of human infection with MERS occurred in the Kingdom of Saudi Arabia in 2013.	20 (26.0)	36 (19.9)	3 (10.0)	15 (36.6)	14 (15.7)	0.029
MERS-CoV is a new member of the beta group of coronavirus, Betacoronavirus.	44 (57.1)	90 (49.7)	15 (50.0)	19 (46.3)	57 (64.0)	0.006
Incubation period for MERS is 14 days	25 (32.5)	48 (26.5)	9 (30.0)	7 (17.1)	36 (40.4)	0.011
Diagnosis and treatment						
Polymerase Chain Reaction (PCR) can be used to diagnose MERS.	38 (49.4)	53 (29.3)	12 (40.0)	15 (36.6)	27 (30.3)	0.141
Fever, cough and shortness of breath are typical symptoms of MERS	64 (83.1)	150 (82.9)	26 (86.7)	36 (87.8)	77 (86.5)	0.843
Antibiotic is an effective medication in the treatment of MERS	45 (58.4)	92 (50.8)	15 (50.0)	25 (61.0)	38 (42.7)	0.352
The approximate mortality rate in average risk patient infected with MERS-CoV is more than 50%.	20 (26.0)	39 (21.5)	6 (20.0)	11 (26.8)	17 (19.1)	0.266
Transmission and prevention						
MERS can spread through close contact with infected persons like those caring for each other and/or living together	65 (84.4)	143 (79.0)	25 (83.3)	34 (82.9)	73 (82.0)	0.915
One of the main transmissions modes of MERS is through saliva and nasal drip from the sick MERS patient.	62 (80.5)	157 (86.7)	22 (73.3)	33 (80.5)	74 (83.1)	0.771
MERS can be prevented by good hygiene practices	64 (83.1)	156 (86.2)	28 (93.3)	34 (82.9)	75 (84.3)	0.908
Vaccination of MERS is available on the market.	46 (59.7)	63 (34.8)	9 (30.0)	18 (43.9)	28 (31.5)	0.008
Washing hands with soap and water can prevent MERS transmission.	59 (76.6)	152 (84.0)	27 (90.0)	38 (92.7)	74 (83.1)	0.268
MERS patients should be kept in isolation	64 (83.1)	151 (83.4)	24 (80.0)	35 (85.4)	76 (85.4)	0.548

Table 4: The overall results of attitude about MERS and the need for more education.

Question	Answer	n	%
Educational needs			
Have you ever attended a workshop or training course about MERS?	Yes	107	25.6
Trave you ever attended a workshop of training course about MERS?	No	311	74.4
Do you think you need more educational courses about MERS?	Yes	320	76.6
Do you tillik you need more educational courses about MERS?	No	98	23.4
Attitude			
	Yes	362	86.6
MERS infection can be prevented.	No	31	7.4
	I do not know	25	6.0
	Yes	111	26.6
You are at risk of getting MERS infection	No	244	58.4
	I do not know	63	15.1
	Yes	371	88.8
MERS infection is a serious illness?	No	19	4.5
	I do not know	28	6.7

Table 5: Comparison of the results of attitude and educational needs according to the specialty of respondents.

Question	Answer	Medicine n (%)	Applied medical sciences n	Dentistry n (%)	Pharmacy n (%)	Nursing n (%)	P- value
Educational needs							
Have you ever attended a workshop or training course about MERS?	Yes	18 (23.4)	45 (24.9)	7 (23.3)	13 (31.7)	24 (27.0)	0.564
	No	59 (76.6)	136 (75.1)	23 (76.7)	28 (68.3)	65 (73.0)	
Do you think you need more	Yes	67 (87.0)	139 (76.8)	24 (80.0)	26 (63.4)	64 (71.9)	0.041
educational courses about MERS?	No	10 (13.0)	42 (23.2)	6 (20.0)	15 (36.6)	25 (28.1)	
Attitude							
	Yes	66 (85.7)	155 (85.6)	29 (96.7)	34 (82.9)	78 (87.6)	0.675
MERS infection can be prevented.	No	5(6.5)	14 (7.7)	0 (0.0)	2 (4.9)	4 (4.5)	
	I do not know	6 (7.8)	12 (6.6)	1 (3.3)	5 (12.2)	7 (7.9)	
	Yes	26 (33.8)	35 (19.3)	8 (26.7)	11 (26.8)	31 (34.8)	
You are at risk of getting	No	43 (55.8)	110 (60.8)	15 (50.0)	26 (63.4)	50 (56.2)	0.036
MERS infection	I do not know	8 (10.4)	36 (19.9)	7 (23.3)	4 (9.8)	8 (9.0)	
MERS infection is a serious illness?	Yes	72 (93.5)	157 (86.7)	27 (90.0)	34 (82.9)	81 (91.0)	0.015
	No	2 (2.6)	16 (8.8)	3 (10.0)	2 (4.9)	5 (5.6)	
	I do not know	3 (3.9)	8 (4.4)	0 (0.0)	5 (12.2)	3 (3.4)	

DISCUSSION

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 ministry of health in Saudi Arabia, 1612 infected case, 668 of them died and the numbers of infected cases increase gradually.6 Effective infection prevention and control depends on awareness and compliance of healthcare workers at all levels. 6 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. 15 The development of researches in this area becomes necessary, as absence of awareness may result in increased rate of infection. Prior studies in the central, east and west areas of Saudi Arabia investigated the awareness regarding MERS.⁹⁻¹² For the first time in Najran area and even in the south west of Saudi Arabia, the present study attempted to assess knowledge about this disease.

The targets of this study were the health colleges' students of the five health colleges in Najran University. Previous cases have shown that medical students, especially the pre-clinical year medical students, are at high risk of newly emerging diseases, including SARS and swine flu. 16,17 Our results revealed that health colleges' students had a good level of awareness of the clinical aspects of MERS, especially the mode of transmission and prevention. This result was in consistent with the previous studies in other parts of Saudi Arabia

which indicated that general Saudi population, health care worker as well as medical students showed a high level of awareness in the clinical aspect of the disease. 11,12,18,19 This awareness could be attributed to the awareness campaigns in the hospital and on social media, which were the most common sources of information. As recommended by CDC, Saudi Arabia has led the relevant authorities to initiate educational campaign targeted towards public and health professionals. 20 These campaigns mainly focused on prevention and symptoms of MERS.²¹ The present study revealed that respondents' knowledge of the basic sciences related to the virus was relatively lower in comparison to their knowledge in the clinical sciences. These results were similar to that previously obtained in other parts of Saudi Arabia. 11,22 Lack of emphasis on this information in their clinical practice and in awareness campaigns could explain their lack of awareness.

The present study showed that there were no significant differences among students of the five different specialties except in the basic science and about vaccine availability. As our targets were undergraduate students, one could argue that the difference in the level of awareness could be obtained from practice and after period of experience. Previous study indicated the significant difference in knowledge among physician, nurses and other health practitioners and showed that physician were more aware in all aspect of the disease. Other study revealed that level of awareness increased with the years of experience. ²³

The present study revealed that the majority of the students did not attend any educational or training course about MERS and indicated that they were in need for more education. However, there was significant difference among the different specialties regarding the need for more education. The need for more education was in consistent with other previous works.^{9,23} To improve the significant lack of knowledge among the health students in the basic science, more education and practical applications are needed. Previous study indicated the importance of health education in improving knowledge, attitude and practice toward MERS infection in preventing the virus spread and disease outbreak.²³ The study showed that level of satisfactory knowledge, positive attitude, and good practice of studied health care workers significantly improved after exposure to educational program.²³ Another study recommended that courses on new emerging diseases, field epidemiology, and tropical medicine should be introduced to medical students to prepare them for dealing with these types of health emergencies.²⁴ The present study showed positive attitude of the students about the disease and there were significant differences among different specialties. Although the majority of the students indicated that the disease is serious illness, the majority of the students believed that the disease could be prevented and only one third were worried about getting infection. This result was in consistent with previous works, who indicated the positive attitude from the health care worker about the disease especially after training courses.^{9,23}

CONCLUSION

Najran's health colleges' students are aware about the clinical aspect but level of basic science was unsatisfactory. They showed positive attitude toward MERs and mentioned that they are in need for more educational and training courses. We recommend additional, new courses in order to improve the students' knowledge of recent infection trends.

ACKNOWLEDGEMENTS

I would like to thank all of the participants for their assistance in data collection.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee at Najran University

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Cite this article as: Alqahtani AS. Knowledge and attitude toward Middle East respiratory syndrome coronavirus among heath colleges' students in Najran, Saudi Arabia. Int J Community Med Public Health 2017;4:2641-7.