



RESEARCH ARTICLE

KNOWLEDGE AND ATTITUDE ABOUT MIDDLE EAST RESPIRATORY SYNDROME
CORONAVIRUS (MERS-COV) AMONG MEDICAL STUDENTS IN
KING ABDULAZIZ UNIVERSITY IN JEDDAH, 2015

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ABSTRACT

Background: Coronaviruses are enveloped virus with a high case fatality rate. Medical students are at risk of acquiring this lethal virus.

Aim of the study: Assess the knowledge and attitude among medical students in King Abdulaziz University Hospital (KAUH).

Methods: A cross sectional study was performed in (KAUH) on a 672 Medical students who were participate in this study. Knowledge and attitude were assessed by using self-administered, pretested questionnaire based on WHO guidelines. Descriptive statistics were carried out to express participants' sociodemographic information, mean knowledge and mean attitude scores. Inferential statistics ($p < 0.05$) were used.

Result: Our sample include 56.2% female and 43.8% males with mean age 21.91 ± 1.433 years. 49.9% of them have high social class. The mean knowledge score of the students was 10.32 ± 4.21 (based on 25 knowledge questions) which internet is the main source of their knowledge 19.5%. The mean attitude score was 8.53 ± 1.70 (based on 11 attitude questions). 51.4%, 57.1%, 51.4% of high knowledge were female, and in clinical years and who are lived in north Jeddah respectively. Also, positive attitude was noticed more in female 56.6%, students in clinical years 70.8%, and who are lived in north Jeddah 52.5%.

Discussion: Data of the present research revealed that there is a statistically significant difference in students' knowledge according to their grade in college, age group, and social class ($p < 0.05$) similarly to Muhammad, *et al.*, 2014. While, there is a statistically significant difference in attitude of the studied sample according to their age group, and social class only ($p < 0.05$) similarly to Mohamed O.*et al.*, 2015

Conclusions: Findings of this study showed that female medical students, high social class one and who are in clinical years in KAUH, in Jeddah Saudi Arabia have good knowledge and positive attitude towards MERS CoV more than others.

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INTRODUCTION

Corona viruses are enveloped viruses with a positive-sense, single-stranded RNA genome (Weiss *et al.*, 2014). They are belonging to the family corona viridae that is under to the order nido virales. They are large in size and classify into 4 main subgroups, which are alpha corona virus, beta corona virus, Gamma corona virus and delta corona virus (Stanley G. Sawicki, *et al.*, 2009). Beta corona virus causes a severe respiratory disease called Middle East Respiratory Syndrome Corona-Virus (MERS-CoV), which

is previously known as novel corona virus. This virus is associated with a high case fatality rate (Medical News Today, 2014) and (de Groot *et al.*, 2014). Although, the first human corona viruses were identified in the 1960s (CDC, 2014) the Middle East respiratory syndrome (MERS) is a new human disease. The first case was reported from Saudi Arabia in September 2012, after identification of a novel corona virus (CoV) from 60-year-old male patient who had died of severe pneumonia in Jeddah, Saudi Arabia in June 2012 (Ali M. Zaki, *et al.*; 2012). There was no evidence that the disease was affecting any country before that time (CDC, 2015). As of 30 April 2014, 424 cases of MERS-CoV have been reported globally, including 131 deaths (case-fatality ratio is 31 %). The majority of cases reported from Saudi

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Arabia 342 cases / 105 deaths (ECDC, 2014). Its confirmed number of cases and deaths since September 2012 to March 2015 were 1059 and 394 respectively (case fatality rate 37%) in Saudi Arabia (Wikipedia, 2015). Since April 2012 and as of 21 July 2015, 1392 cases of MERS (including 538 deaths) have been reported by health authorities worldwide, most of these cases were reported by Saudi Arabia 1048 cases / 462 deaths (case-fatality ratio is 44 %) (ECD, 2015).

The last outbreak from 22 March to 12 April was in Jeddah and including 16 new additional cases (W.H.O., 2015). Number of cases mainly increases in spring (March) by the fact that camels give birth at that time (Jaffar A Al-awfiq *et al.*, 2014). MERS is capable to infect humans and many animal species (Sander van Boheemena, *et al.*, 2012). All human CoVs are thought to originate from animal reservoirs, emerging from bats and dromedary camels in the Middle East, respectively. It is still unclear whether the transmission through person-to-person contact occurs via large respiratory droplets, due to coughing and sneezing (Judith MA van den Brand, *et al.*; 2014). The incubation period of these viruses is from 2 to 14 days (Medscape, 2014). MERS cases presented with fever, cough, sore throat, shortness of breath, myalgia, chest pain, malaise and gastro-intestinal symptoms such as diarrhea, vomiting and abdominal pain (A Mailles *et al.*, 2013). There are some cases that may be presented by severe illness like respiratory failure, which requires mechanical ventilation in an intensive care unit. These Severe illnesses could be in diabetic, renal failure, chronic lung disease, immune compromised persons, organ failure especially of the kidneys and septic shock (W.H.O, 2014). Complications described in fatal cases are hyperkalemia with associated ventricular tachycardia, disseminated intravascular coagulation leading to cardiac arrest, pericarditis and multi-organ failure (Mohammad Mousa Al-Abdallat, *et al.*, 2014). Middle East respiratory syndrome (MERS) diagnosed by two main ways, the first way is molecular test polymerase chain reaction (PCR) and the second way is serology test (enzyme-linked immune sorbent assay (ELISA), Immune fluorescent assay (IFA) and the neutralizing antibody assay)(CDC, 2015). Until now there is no virus-specific prevention or treatment (e.g. vaccine or antiviral drugs) is available (CDC, 2014).

Patients with suspected MERS-CoV infection should be cared under contact and droplet precautions until testing results (Helena C. Maltezou *et al.*, 2014). As the time of several methods of treatments have been tried to reduce the effects of the virus, individual' symptoms management has been most successful one. Ventilator strategies for Acute Respiratory Distress Syndrome (ARDS), treating co-infections and renal replacement therapy for acute renal failure are the most common methods. Other strategies such as riba virin cyclosporine A, and other treatments have been tried without clinical data to support their effectiveness (Bridget V. Stirling *et al.*, 2014). Also we can add some prevented measures to eliminate disease complications. Some of these measures are, patients who are clinically diagnosed or suspected MERS-CoV infection should be cared under contact and droplet precautions until testing results, accordance with WHO guidelines, a high protection mask (e.g., N95 respirator) along with eye goggles, gowns, and

gloves should be used during aerosol-generating procedures; the latter should be performed in an adequately ventilated room (Helena C. Maltezou *et al.*, 2014). Workers should also avoid exposing family members to soiled work clothing, shoes, or other items that may have come into contact with camel excretions. (W.H.O.,2014). At the end, all the countries of the region need to be vigilant and put in place enhanced public health surveillance plan for identifying suspected cases using WHO's recommended case definition and investigation protocol for early diagnosis and treatment (Malik *et al.*, 2012).

With the increase in prevalence of Middle East Respiratory Syndrome (MERS) worldwide and in Middle East especially Saudi Arabia, healthcare workers (HCWs) and medical students are at risk of acquiring and subsequently transmitting this lethal virus. Many research was done to measure the knowledge and attitude of (health care worker, nurses) toward MERS- coA and the effect of this knowledge on the outcome of these disease. As in one research (Knowledge, attitude and practices of healthcare providers towards infection at Makkah hospitals, Saudi Arabia) they targeted healthcare providers in Makkah public hospitals by assessing their knowledge, attitude and practices (KAP) towards MERS- CoV. They are considered a high-risk group through direct contact with the suspected cases of infection during Umrah and Hajj season (Mohamed O. Nour, *et al.*, 2015). Also in Qassim region of Saudi Arabia research about the knowledge and attitude of Healthcare workers including Physicians, Pharmacists, Nurses and Laboratory staff in two hospitals of Qassim region in Saudi Arabia was done (Muhammad Umair Khan, *et al.*, 2014). Medical students are the future doctors, so we must evaluate and assess their knowledge and attitude toward CoV. To put an affected plan for improve and to strength the weak points. In view of all previous data, this research will evaluate medical students about their knowledge of and attitude towards MERS in king Abdulaziz University in Jeddah.

METHODOLOGY

By a cross section study we are trying to measure the knowledge and the attitude about Middle East Respiratory Syndrome Corona-virus among medical students in female and male sections in king Abdulaziz University in Jeddah by electronically (using Google Drive program) self-administered, validated questionnaire based on WHO guide lines. Pilot study was done to test the accessibility, and clearance of the questions of questionnaire. For 3 to 6 months all the participants were contact by internet to briefed about the objectives and the outcomes of the research; those who approve to sign the consent form were enrolled in this study. Descriptive statistics were carried out to express participants' sociodemographic information, mean knowledge score and mean attitude score of medical students. Inferential statistics (Mann-Whitney U test and Kruskal Wallis tests, $p < 0.05$) were used to examine differences between study variables. Student-t-test (for continuous variables), chi-square and Fisher exact test (for categorical variables) will be used to examine differences between the groups. Knowledge and attitude scores will be dichotomized and logistic regression will be used to

investigate the factors associated with high knowledge and attitude scores in our study population. For the statistical analysis, SPSS 20 will be used.

Aim of the study (Objective)

- 1- Assess the knowledge and attitude among medical students in KAUH.
- 2- Compare the knowledge and attitude about MERS-coA virus in male and female medical students in KAUH.

Study instrument

The data was collected through an electronically self-administered pre tested, validated questionnaire (pilot study was done to examine the accessibility, validity of questionnaire and the clearance of its questions). The questionnaire was distributed and explanations to the participants by email or Facebook using Google Drive program. A team of authors designed the study instrument after a rigorous literature review and depends on WHO Guidelines. After an initial draft of the questionnaire was designed, it was validated after saw from ethical approval. The questionnaire was divided into 3 parts. The first part comprised of socio demographic information of the respondents. The second part assessed the knowledge about corona virus and Middle East Respiratory Syndrome (MERS) in which Yes, No or I don't know option was given against each set of question. The identification of the source of respondents' knowledge also occupied in this second part. The study instrument assessed the knowledge of HCWs by asking questions about the nature, etiology, symptoms, risk group, consequences, source of transmission, prevention and treatment of MERS-CoV. Knowledge scores ranged from 0-25 items and 15 is a cut off level. <15 were set for poor knowledge and ≥ 15 right answer for good knowledge. The last part determined the attitude of respondents towards MERS in which their response were evaluated through agree or disagree. Assessment of attitude was carried out through 11 items questions in which the responses were recorded on 2-point like scale. A score of 1 was given to yes agree, 2 to disagree. Also attitude scores was done. The scale ranged from 0-11 items and cut off level of. <7 were set for poor attitude and ≥ 7 right answer for good attitude.

Data analysis

Descriptive statistics were carried out to express participants' sociodemographic information, mean knowledge score and mean attitude score of medical students. Inferential statistics (Mann-Whitney U test and Kruskal Wallis tests, $p < 0.05$) were used to examine differences between study variables. Student-t-test (for continuous variables), chi-square and Fisher exact test (for categorical variables) will be used to examine differences between the groups.

Knowledge and attitude scores will be dichotomized and logistic regression will be used to investigate the factors associated with high knowledge and attitude scores in our study population. Data was statistically analyzed using SPSS version 20.

Ethical approval

Departmental research committee, department of family and community medicine in King Abdulaziz University, approved the study.

Consent form and Confidentiality

Furthermore, written consent was signed by participants via internet. It was obtained from the respondents prior to participation in the study. Confidentiality and privacy will be preserved through the study. Participants will be informed that they have the right to withdraw from the study at any time, without affecting the level of their level of study in university.

RESULTS

A total of 672 medical students were responded to the study questionnaire. Majority of them were female (56.2%) and belonging to clinical years (70.7%). The result involve two major sections which are univariate and multivariate analysis sections. Univariate Analysis include demographic characteristics which mentioned in Table 1 and the social characteristics of the studied sample in Table 2. Table 3 and 4 represent knowledge questions and the respond to it. Table 5 represent source of knowledge. Table 6 and 7 shows the attitude. While multivariate analysis section contains tables 8 and 9 which show the regression Analysis of some factors affecting knowledge and attitude respectively of the studied sample about MERS-CoV infection.

I-Univariate Analysis

Table (1) Illustrates demographic characteristics of the studied sample. The highest percentage of the studied sample (62.4%) was belonged to the age group 19 up to 22 years old. The mean age of the studied sample was 21.91 ± 1.433 years. It was also observed that more than half of the sample (56.2%) was female. About their nationality, 96% of the samples were Saudi while only 4% of them were non-Saudi. As regard to their residence in Jeddah, about half of them (51.6%) lives in north Jeddah and 26% were live in its middle, while 13.5% and 8.8% of them were live in east and south of Jeddah respectively.

Table (2) Shows social characteristics of the studied sample. It was represent that most of studied sample (70.7%) was in clinical grade. Regarding the family income, only 1.2%, and 2.4% of the studied sample had an income less than 3.000 RS and 3.000-5.000 real Saudi per month respectively. 49.9% of them were above 20000 real Saudi per month. Also in the social class, it was observed that 49.9% belonged to high social class while only 3.6% was belonging to low one.

Table (3) Represents some main knowledge questions about MERS corona virus of the studied sample. There were 25 questions in the questionnaire but here is the main 14 questions. The most corrected questions were answered by (83.5%) is whether MERS can be fatal. The second correct question is the symptoms that the patient will present by like fever, cough and shortness of breath are hallmark of MERS (81.1%).

In response to the question washing hand with soap and water for at least 30 sec can help in prevention of transmission of disease a range of responses was (77.8%). In the q if Camels serve as intermediate hosts for MERS- CoV on not (74.1%) was answered correctly. On the other hand the overall response to All MERS patients develops severe acute respiratory illness question and if its spread through close contact with infected persons like caring and/or living (93.8%), (93.3%) was poor respectively. In the type of MERS-CoV that it caused by alpha corona virus (87.6%) were incorrect.

Table (4) Represents the Knowledge of the Studied Sample According to Social- demographic characteristics. The relation between the gender and knowledge shows that (51.4%) of higher knowledge was in female and (43.1%) of low knowledge was in male. Concerning to clinical grade, (77.6%) of intermediate knowledge is in clinical years. When we compare the knowledge with age group it noticed that (71.9%) of low knowledge are at the age of 18-22 and the intermediate ones is (40.9%) in 23-27 age. It can be seen from the data that the higher social class has an intermediate knowledge of (83.9%). It was found that more than half the low score (54.4%) were live in North Jeddah. Related to high score it was (51.4%), also in north. All these differences were found to be statistically insignificant ($P>0.05$) except that of the clinical grade which has statistically significant difference ($P<0.05$).

Table 5 and Graph (1) Above show that the most common source of knowledge was the Internet (42.7%) from the single source. As can be seen from the table (above) there is more than one (TV+book+internet) choice that the majority of the sample was choosing (54.3%).

Table (6) Illustrated some attitude of the studied sample towards MERS-CoV infection. It shows that (94.6%) was agree that transmission of MERS-CoV infection can be prevented by using universal precautions given by CDC, WHO etc. It also showed (93.3%) agreed that active participation of health care worker in hospital infection control program can reduce the prevalence of MERS. 93.8% of the studied sample agreed about that, healthcare workers must acknowledge himself or herself with all the information about the virus. Regarding isolation of the patients, 90% of the sample agreed that MERS patients should be kept in isolation. In addition, about 92.4% was agree when dealing with MERS patients gowns, gloves, mask and goggles must be use. Concerning management, 87.4% was agree that Intensive and emergency treatment should be given to diagnosed patients. As regard prevention of transmission of virus, 72.9% was agree about boiling milk of camel before drinking can reduce the transmission. In addition, 64.4% agreed that Avoid visiting farms, markets, barns, or other places where animals are present could reduce the transmission of the virus. Also About 69.5% of the sample agreed that consumption of raw or undercooked animal products increase the risk of MERS infection.

Table (7) Illustrates the attitude of the Studied Sample According to Social- Demographic Characteristics. The low

attitudes were equal in both male and female compared to high attitude were more in female than male (56.6%). The highest percentage of high attitude was (70.8%) in the clinical years. Also it was found that (95.8%) of high attitude was Saudi. If we now turn to the age, 65.6% of low attitude were in 18-22 years. (84.1%) of high attitude were in higher social classes. Regarding attitude and where the sample lives in Jeddah, in the low attitude the percentage of sample (34.4%) were equal in both north and middle of Jeddah. While in high attitude, more than half the sample was from North, 25.6% were from middle and 13.1% were from east. All these differences were found to be statistically insignificant.

II-Multivariate Analysis

Table (8) represents regression analysis of some factors affecting knowledge of the studied sample about MERS-CoV infection. It reveals that grade in college was the most powerful predictor of knowledge (β Coefficient= 0.947), next to it gender and age group (β Coefficient= 0.240 and 0.118 respectively). With least effect, nationality and social class which have an inverse relationship (β Coefficient = - 0.09 and - 0.009 respectively).

Table (9) represents regression analysis of some factors affecting attitude of the studied sample about MERS-CoV infection. It shows that the gender has the most powerful predictor of attitude (β Coefficient= 0.465), next to it social class (β Coefficient= 0.420). Age and grade in college, which have least effect on attitude of the studied sample (β Coefficient = - 0.328 and - 0.115 respectively).

DISCUSSION

Far as we know, there are no previous confirmation of similar studies, particularly none that examined the medical student knowledge and attitude towards MERS Co virus in Saudi Arabia. In light of this, the comparison of our findings in most of variables has been made with Qassim and Makkah studies who study on the health care workers. Another some findings compared to other studies because it is not involved in the Qassim and Makkah studies. Most of our responders had gained knowledge about MERS from internet. this result was in line with Mohamed O. Nourl,etal, 2015 and Muhammad Umair Khan, *et al.* 2014 (52.3%, 26%) respectively. However, in other study like (Brug *et al.*, 2004; Fatiregun *et al.*, 2011) and scientific journals were reported by Albano *et al.* (2014) they report the Televisions are the main source. This difference could be due to rapid progress in technology and internet. Also, now Internet technologies is more easy and fast way to gain information. and most of the educational materials and health messages on MERS- CoV, nowadays, are posted online by the WHO and Saudi' Ministry of Health which may have urged all healthcare providers and medical students to use internet technology to gain access to those documents.

Knowledge

In our study there is some questions testing the knowledge of medical student about MERS similar to other researches'

questioned. Comparing our result with Qassim study, We found our student give positive response as them in some questions. 408 (60.7%) of our students comparing with 101 (66%) of them gave correct answer about "plant is the main source of MERS." 545 (81.1%) of our students know "fever, cough and shortness of breath are hallmark symptoms of MERS" but 147 (96%) of them know it. 523(77.8%) know that "washing hand with soap and water for at least 30 seconds can help in prevention of transmission of disease" comparing with 142 (94%) of them. 434 (64.6%) of our students think "Vaccination of MERS virus is available in market" comparing with 109 (71.2%) of Qassim' health care workers. 561 (83.5%) of our student know that "MERS can be fatal" comparing with 103 (67.3%) of them. Comparing between the result of our students with Qassim health care workers in answering previous question show our students have poor information about MERS than their health care workers. But our student give more correct answer 561 (83.5%) than them 103 (67.3%) when asked that "can MERS be fetal". The weaknesses of our students' knowledge appear more when asked about type of virus, mode of spreading and incubational period. They gave negative response 589 (87.6%) incorrect answers when asked about MERS is caused by alpha corona virus. 627(93.3%) answered incorrect when asked about "close contact with infected persons like caring or living could be allowed to MERS-cov to be spread". 423(62.9%) answered incorrect when asked about "the median incubation period for MERS-cov is approximately ranged from 2 to 14 days". Also half and near to half of our students not know the correct answers for diagnostic test, does antibiotic use for treatment, and does people with comorbidity have more the chance to develop MERS. Only 359(53.4%) of our students gave correct answer about "polymerase chain reaction (PCR) can be used to diagnose MERS". 336 (50%) of our students answered correct for question asked about " people with comorbidity (Diabetes, cancer, other chronic disease) have more chance to develop MERS". Use of antibiotic as the first line of treatment in MERS was answered correctly only by 330 (49%) of our students (Muhammad Umair Khan, *et al.*, 2014). Even when we compared our students with Mohamed O. Nour *et al.*, 2015 we still see the weakness in the knowledge of our students 45(6.7%) compared to 264 (92.2%) of their health care workers answer correctly about "transmission from infected person to another". The weakness that present in our students could be explain by lack of experience while in AlQassim and Makkah they found the experienced people who have more than 10 years of experience have more knowledge. Concerning age group, it shows that participants between 18-22 years old have higher knowledge (62.9%). While in AlQassim (87.47%) they were between 40-49 years old, and more than 30 years old in Makkah (51%). A significant difference ($P < 0.05$) was found in knowledge of the Clinical years with those in the Pre clinic years. Regarding the relation between characteristics of the studied sample and knowledge in our research and compared with similar researches done in Al Qassim and Makkah, revealed that females have more knowledge than males(56%) while in Al Qassim and Makkah males are higher in knowledge (44.4%, 57.7%) respectively. This could be related to high percentage of female (56.2%) in our samples.

Attitude

Our result show positive attitude was noticed toward "transmission be prevented by using universal precautions given by CDC, WHO"; "Healthcare workers must acknowledge himself or herself with all the information about the virus"; "prevalence of MERS can reduce by active participation in infection control program", "gowns, gloves, mask and goggles must be use when deal with patient"; "patients should be kept in isolation" (94.6% , 93.8% , 93.3% , 92.4%, 90%) respectively. In other hand negative attitude was seen in relation to "Intensive treatment should be given to diagnosed" , "boiling milk of camel before drinking can reduce the transmission", "avoid places where animals are present" , "consumption of raw or undercooked animal products increase the risk of MERS infection" (87.4% , 72.9%, 69.5%, 64.4%) respectively . Regarded attitude this study show positive value of transmission of MERS can be prevent by precaution and prevalence of MERS reduced by active participation in control program. Study of (Muhammad Umair Khan *et al.*, 2014) (Truong Anh Thu *et al.*, 2012) was in line with our result for take precaution and negative attitude for participation in control program, but study of Mohamed O. Nour *et al.*, 2015 (60%) have positive attitude about this point. Our responder have negative attitude (64.4%) toward "avoid visiting place where the source of infection. this response was agree with Mohamed O. Nour *et al.*, 2015 (43%) . Overall, age group and clinic grade were significantly with knowledge ($p < 0.05$, $p < 0.05$), this result was agree with Muhammad Umair Khan *et al.*, 2014 accorded to experience ($p < 0.002$). this similarity could be due when person is high grade he has more experience. The strength of this study we believe that the study addresses a major health problem that challenges in Saudi Arabia. It is a novel one as it study the students' knowledge and attitude about MERS Cov which not discussed before. It has highlighted the area where very little research has been done. About this study' limitations. First, as a cross-sectional study, it describes the relationship between the predictor and dependent variables as general association and not to be taken as a cause-effect relationship. Second, information was not cover all students because we collect data at end of academic year where exam been start. Third, self-reported information may not be entirely accurate and should be viewed with caution as it may reflect the subjective views of participants themselves. The last one, picking the internet as a method of collection of data also has a low response rate, less accuracy and take a long time.

Conclusion

Based on the above results there is poor knowledge of medical students toward MERS- cov. Although the attitude is high but we requires an intervention to improve their knowledge towards the infection that will reflect on the overall health of both medical students and suspected or confirmed cases of corona virus infection. Our result was high in knowledge and positive attitude in female, clinical years and who are lived in north Jeddah.

Recommendation

It reveals from our research there is gap in knowledge

especially in the pre-clinical students. So as a level of primary and secondary prevention of the disease we need to elevate the knowledge and improve the attitude of our medical students "who are the future's doctors" toward MERS-cov for decrease disease transmission, early diagnosis and treatment and prevent its complications. This can be done by the following:

- 1- Health campaigns for KAU students to overcome the gap in the knowledge.
- 2- Translate the knowledge to brochures or videos to augment the knowledge of the students, which would also positively influence their attitude towards MERS-CoV.
- 3- Merge scientific lecture about Corona virus infection and methods of its prevention and control within the curriculum of the medical students specially to the preclinical years.

Finally, One of the main messages of the educational workshop is to "take MERS-CoV seriously, but don't panic". It is important for the medical students to be prepared to act both in the role of community educator and in their role as a learner. They are in a close contact with patients and also moving in the university and classrooms, which are high-density environments. Confirmation and corroboration should be done on the promotion of evaluation skill among medical students for the abstraction of information from internet to develop their knowledge. The ministry of health website should also be kept novel regularly and our students must be encouraged to enter official website to seek knowledge on health related issues. Additionally, under-utilized sources as seminars and availability of research articles could also be employed in a campaign to educate medical students regarding MERS. Further researches must be done to hold all or even most medical students in all Saudi Arabia universities to assess their knowledge and attitude and subsequently improve any drop.

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Appendix II

King Abdulaziz University Family and Community Medicine Department

Knowledge and attitude of medical students in King AbdulAziz university in Jeddah about middle east respiratory syndrome coronavirus (MERS-COV)

This Informed Consent Form is for medical students (male and female) who are studying in King AbdulAziz

university in Jeddah, and who we are inviting to participate in research of " Knowledge and attitude about middle east respiratory syndrome corona virus (MERS-COV).

Principal Investigator: Dr. Iman Mohmmad Wahby Salem, Associated Professor of Community medicine, King Abdulaziz University.

Organization: King Abdulaziz University, Family and Community Medicine Department.

Sponsor: The Researchers themselves.

PART I: Information Sheet

Introduction

We are doing research on middle east respiratory syndrome corona virus (MERS- COV), which is common in Saudi Arabia and Jeddah especially has a many outbreaks of it since 2012. I am going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me, the study doctor or the staff.

Purpose of the research

Middle East respiratory syndrome (MERS) is a new human disease. The first case was reported from Saudi Arabia in September 2012, after identification of a novel corona virus (CoV) from 60-year-old male patient who had died of severe pneumonia in Jeddah, Saudi Arabia in June 2012. Its confirmed number of cases and deaths since September 2012 to March 2015 were 1082 and 439 respectively (case fatality rate 40%) (CDC, 2015). The last outbreak from 22 March to 12 April was including 16 new additional cases (W.H.O.,2015). Number of cases mainly increase in spring (March) by the fact that camels give birth at that time. So, we need to assess the knowledge and attitude of medical students (future's doctors) about this infectious disease to enhance their capability for early diagnosis and treatment of this disease as a level of secondary prevention until the line of primary prevention (vaccine) will appear Insha'Allah.

Type of Research

This is a cross sectional study. In this study, a medical students will fill a self administered questionnaire by complete answer on all questions as much as possible according to their knowledge and attitude. This questionnaire based on the recommendations of WHO.

Participant selection

We are inviting all medical students (men and women) who are studying in king abdulaziz university in Jeddah ranged

from grade 2 to grade 6to participate in these research.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not.

B. Description of the Process

During the research, the participant will self filling an online questionnaire through an University site by using a Google drive program.

Duration

The research takes place over 3-6 months. In total, you will be asked to invite all students from grade 2 to grade 6 during 3 months as a duration of data collection.

Risks and hazards

By participating in this research (no intervention or invasive technique) there is no any side effects or risks of participant.

Benefits

If you participate in this research, you will have the following benefits: you will refresh your knowledge about middle east respiratory syndrome corona virus (MERS- COV), you can evaluate any shortage in these knowledge and you can add some information about this subject from our questionnaire. According to the result of these research, the researcher will put some recommendations to elevate the knowledge, increase awareness and improve the attitude of medical students about middle east respiratory syndrome corona virus (MERS-COV).

Confidentiality

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no-one except the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researchers will know what your number, and all your data on the computer.

Sharing the Results

The knowledge that we get from doing this research will be shared with you through community meetings before it is made widely available to the public. Confidential information will not be shared. After these meetings, we will publish the results in order that other interested people may learn from our research.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose. It is your choice.

Who to Contact

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact any of the following: Shahad T Howladar, Huda M Balto, Raneem H Abushanab, Heba S Alshiekh. This proposal has been reviewed and approved by King Abdulaziz University Research Ethics Committee (REC). You can ask me any more questions about any part of the research study, if you wish to. Do you have any questions?

PART II: Certificate of Consent

I have read the foregoing information. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant _____

Date ____/____/____

Day/month/year

Signature of Participant _____

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that I will fill the research' questioner. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the consent has been given freely and voluntarily.

Print Name of Researcher/person taking the consent

Shahad T Howladar, Huda M Balto, Raneem H Abushanab, Heba S Alshiekh. Signature of Researcher

/person taking the consent _____ **Date** _____/

Day/month/year