

## Assessment of Knowledge and attitude about MERS-CoV among healthcare workers in Wazarat primary care center of PSMMC, Riyadh, Saudi Arabia

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Abbreviation	Meaning
MERS- COV	Middle East Respiratory Syndrome-Corona Virus
PSMMC	Prince Sultan Military Medical City
MERS	Middle East Respiratory Syndrome
WHO	World Health Organization

### Introduction

Middle East Respiratory Syndrome (MERS) is an acute respiratory illness caused by a novel coronavirus, a member of the large family of other viruses which cause human diseases ranging from simple common cold to more serious condition like Severe Acute Respiratory Syndrome [1]. Typical MERS symptoms include fever, cough, and shortness of breath. Pneumonia is common, but not always present. Gastrointestinal symptoms, including diarrhea might present. The virus appears to cause more severe disease in older

people, people with weakened immune systems, and those with chronic diseases such as renal disease, cancer, chronic lung disease, and diabetes.

The first case of Coronavirus infection was reported in Jeddah, Saudi Arabia in June 2012 [2]. So far, all cases of MERS have been linked through travel to, or residence in, countries in and near the Arabian Peninsula. Since 2012, MERS cases were reported in Twenty-seven countries including Kingdom of Saudi Arabia, Jordan, Algeria, Austria, Bahrain, China, Egypt, France, Germany, Greece, Islamic Republic of Iran, Italy, Kuwait, Lebanon, Malaysia, the Netherlands, Oman, Philippines, Qatar, Republic of Korea, Thailand, Tunisia, Turkey, United Arab Emirates, United Kingdom, United States. and Yemen [3]. However, 80% of those cases were reported from Saudi Arabia [1]. The total number of confirmed cases reached about 2090 cases worldwide with more than 34% of them (730 cases) were passed away [4].

The mood of transmission through non-human to human is still not completely understood, but camels are most likely to be the primary reservoir host for MERS-CoV as an animal source of infection in humans [5]. On another hand, there were multiple health care centers at Arabian Peninsula which report MERS out break within the health care instiutues that includes medical staff and inpatient [6-9]. These outbreaks carried more attention toward the investigation of risk factors for human-to-human transmission which might occurred through respiratory droplets or through direct or indirect contact. The current WHO recommendations for surveillance and control should be regarded as the minimum

standards <sup>[10]</sup>; hospitals should use contact and droplet precautions and should consider the follow-up of persons who were in the same ward as a patient with MERS-CoV infection.

Unfortunately, until now there is no specific treatment or vaccine available for MERS. Therefore, planning for infection prevention and transmission is important and crucial <sup>[11,12]</sup>.

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## Literature Review

It is important to assess knowledge and attitude of health care workers about MERS-CoV, where the report from WHO showed that 20.4% of MERS sufferers were healthcare workers <sup>[13]</sup>. Also, it was demonstrated that healthcare workers are a high-risk population for infection in comparison to the general population <sup>[6,14]</sup>. In fact, the presence of asymptomatic or subclinical MERS-CoV in healthcare represent a great threat to the public health <sup>[15]</sup>, because healthcare workers are in close contact with several patients and other individuals.

The MERS-CoV has impact on healthcare worker feelings and emotions toward their jobs, according to a study that was conducted on 4 tertiary hospitals showed that 85.5% of medical residents believe that their jobs put them at risk for MERS-CoV infection and two third of participants worry about their families to be infected because of their work at hospitals <sup>[16]</sup>. Therefore, proper education and awareness for healthcare workers about MERS-CoV is required to overcome all impacts on health and health workers attitude and prevent risk of transmission of MERS-CoV.

As Saudi Arabia is the country of large number of infected cases worldwide, several studies in Saudi Arabia were conducted about MERS-CoV disease especially on knowledge, attitude and practice of MERS-CoV among healthcare workers and it was found that the knowledge and attitude disparity between different, institutions, professions, and gender <sup>[16-26]</sup>.

In a study conducted in Makkah hospital to assess the knowledge, attitude, and practice of health care providers about MERS-CoV infection, it was found that most of them showed negative attitude and poor knowledge. In fact, there were only 32.4% of participants had good knowledge, and only 8.2% had a positive attitude <sup>[19]</sup>. On the contrary of the findings in the previous study, a study from Al Qassim region was conducted in multispecialty hospitals reported that there were a positive attitude and good knowledge observed among health care providers of different professions toward the MERS-CoV infection <sup>[20]</sup>.

Another intervention study from Makkah which conducted on primary healthcare workers to assess their knowledge, attitude and practice toward MERS-CoV showed that good knowledge and positive attitude were 43.3% and 45% respectively . However, after the intervention through a health education program among healthcare workers the knowledge and positive attitude increase to 67.9% and 63.8% respectively<sup>[21]</sup>.

A study from Jeddah was performed on dental students about the awareness of MERS protection and prevention producers, and it was suggested that students needed more information from the medical staff<sup>[22]</sup>. A study on King Saud bin Abdul-Aziz University in Riyadh showed that students in health colleges have a good knowledge about the clinical aspects of MERS, but they lacked the knowledge about the background of the basic sciences of the disease<sup>[23]</sup>.

In Najran University students, a study was conducted in five different health colleges, and it revealed that students had a good level of knowledge about the clinical aspects of MERS. However, the participants were found to have low knowledge about the basic sciences related to the virus. Also, the participants showed a positive attitude about the disease<sup>[24]</sup>

On the other hand, there are few worldwide studies outside Saudi Arabia regarding MERS-CoV, and they showed similar results to local studies. A study from China among medical students showed good knowledge about MERS-CoV despite the variation of results among students of different major specialties are ranging from 36.0% to 89.7%<sup>[25]</sup> , while a study conducted in South Korea among nursing students showed that positive knowledge was 84.4% with significant difference related to gender<sup>[26]</sup>.

This study aims to determine the knowledge and attitude of MERS- COV among healthcare workers in primary care center at PSMMC to assure proper health service to suspected MERS- COV cases and possible need of education program.

## **Subject and method**

### **Subject and data collection:**

This study is a cross-sectional study which was conducted in Al-Wazarat Primary Care Centre of PSMMC, Riyadh, Saudi Arabia. Data were collected from June to July 2017. The study was performed on healthcare workers including physicians, pharmacists, nurses, and technicians, and included 283 participants with a minimum response rate of 82.33% (233 participants).

### **Data collection tool:**

Study data were collected by using a validated questionnaire from previous similar study that was done in Qassim area <sup>[20]</sup> . The questionnaire was used in the study after getting a permission from the main author through The email.

The questionnaire consists of three parts; the first part to determine the demographics of participants, while the second part to assess the knowledge of healthcare workers about MERS, finally the third part was mainly to assess attitude of participants toward MERS.

The knowledge was determined through Yes/No/I do not know questions that inquire about the nature, etiology, symptoms, risk group, consequences, source of transmission, prevention, and treatment of MERS-CoV. Assessment of attitude was carried out through 7 item questions in which the responses were recorded on 5 points Likert scale. A score of 5 was given to strongly agree, 4 to agree, 3 to undecided, 2 to disagree and 1 to strongly disagree. A mean score of  $\geq 4$  was considered as positive attitude while score of 1-3 was taken as negative attitude.

#### **Statistical analysis:**

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). For continuous variables were use mean  $\pm$  standard deviation and t-test. Mann writing test was used for small values, and categorical variables were expressed as percentages. P-value less than 0.05 was considered statistically significant.

#### **Ethical approval:**

The study was approved by Al-wazarat primary care center of PSMMC, Riyadh, Saudi Arabia. Also, a written consent has been taken from the research ethical committee in Prince Sultan Military Medical City (Reg.HAP-01-R-015) with project number 822. The date of approval was May 9th, series of 2016 under similar title, change the title for the present title in progress by sending official request.

## Results

The current study included 233 healthcare workers, the females were 131 (56.2%), while the males were 102 (43.8%). Majority of participants 105 (45.1%) were less than 30 years old, followed by those in the age range of 30-39 years were 86 (36.9%), then those between 40-49 years were 26 (11.2%). The participants above 50 years older were only 16 (6.9%). Physicians and nurses represent most of the participants, 36.9% and 39.9% respectively. The pharmacists represent 12.4% and technicians represent 6% of participants while other profession was 4.7%. There were 63 (27%) of had more than ten years of experience, whereas 37 (15.9%) had experience of 7-10 years, 99 (42.5%) had 3-6 years of experience, and 34 (14.6%) had less than three years of experience. Table.1 shows demographics of participants.

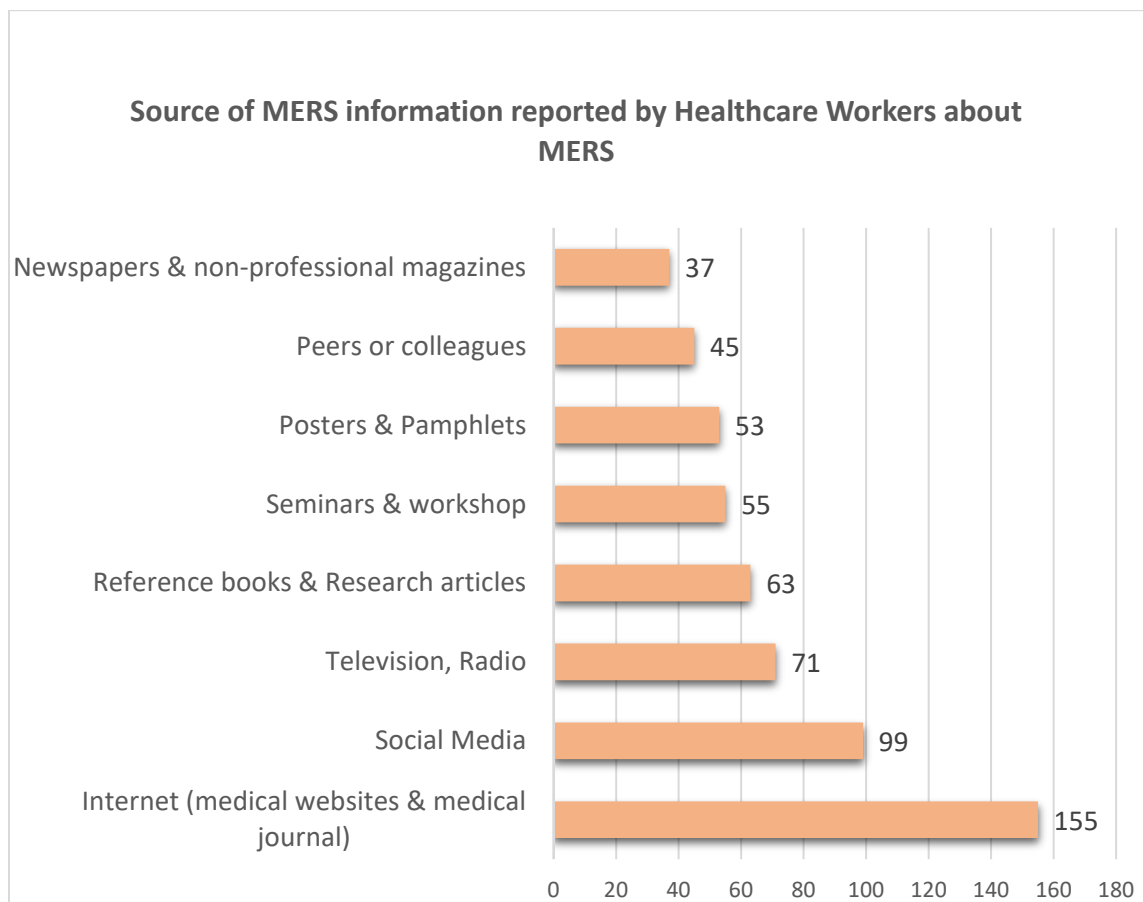
**Table1: Demographics of healthcare workers**

Characteristics	Health Care Workers (233)	
	Number	(%)
<b>Gender</b>		
Male	102	(43.8)
Female	131	(56.2)
<b>Age in years</b>		
<30	105	(45.1)
30-39	86	(36.9)
40-49	26	(11.2)
≥50	16	(6.9)
<b>Profession</b>		
Physician	86	(36.9)
Nurse	93	(39.9)
Pharmacist	29	(12.4)
Technician	14	(6.0)
Others	11	(4.7)
<b>Years of experience</b>		
<3	34	(14.6)
3-6	99	(42.5)
7-10	37	(15.9)
>1	63	(27.0)



Participants received their information about MERS from different sources, figure.1. The most common source among Healthcare workers was the internet which were either medical websites or medical journals representing 27% (155), followed by social media 17% (99), then television and reference books representing 12% (71) and 11% (63) respectively. While seminars and workshop represented only 10% (55) and finally posters, peers or colleges and newspapers which represented 9% (53), 8% (45) and 6% (37) respectively.

**Figure.1: Source of MERS information reported by Healthcare workers about MERS**



There were 13 questions to assess the knowledge of Healthcare workers about MERS, the number, and the percentage of participants who gave wrong answers and those who answered correctly in each question is shown in Table.2. There were only three questions that most of the participants answered them incorrectly, the first one was investigating the type of virus that causes MERS, there were 85 answered incorrectly. There were 82.4% of participants mentioned the wrong answer about the incubation time for the virus and 53.6% answered incorrectly the question that asked if antibiotics are the first line of treatment. There was about half of participants were uncertain about the correct answers of two questions about availability of MERS vaccine and use of polymerase chain reaction in diagnosis of MERS, were 54.1%, 52.4 answered correctly respectively. Most participants answered the remaining eight questions correctly.

**Table 2: Answers of healthcare workers about MERS questions**

Questions about MERS	Correct answer		Incorrect answer	
	Number	(%)	Number	(%)
MERS-CoV is caused by alpha coronavirus	35	(15)	198	(85.0)
MERS patients develop severe acute respiratory illness	200	(85.8)	33	(14.2)
Fever, cough, and shortness of breath are hallmark symptoms of MERS	209	(89.7)	24	(10.3)
People with co-morbidity (Diabetes, cancer and other chronic diseases) are more likely to be infected	202	(86.7)	31	(13.3)
Incubation time for virus is 14-28 days	41	(17.6)	192	(82.4)
It spread through close contact with infected persons like caring and living	197	(84.5)	36	(15.5)
The main source of MERS virus is plant	148	(63.5)	85	(36.5)

Washing hand with soap and water for at least 30 secs can help in prevention of transmission of disease)	192	(82.4)	41	(17.6)
Vaccination of MERS virus is available in market	126	(54.1)	107	(45.9)
Polymerase Chain Reaction (PCR) can use to diagnose MERS	122	(52.4)	111	(47.6)
Special Caution must be taken when person presents with symptoms of MERS from Arabian Peninsula region	173	(74.2)	60	(25.8)
Antibiotics are first-line treatment	108	(46.4)	125	(53.6)
MERS can be fatal	201	(86.3)	32	(13.7)

There was a positive attitude among healthcare worker regarding all seven questions about the attitude toward MERS with a score >4 in all questions. The profession of participants was the only factors that affect their attitude toward MERS. However, the attitude toward using the protective measures like Gowns, gloves, mask, and googles when dealing with MERS patients was not affected by profession as shown in Table.3.

**Table 3: Significance regarding different factors in attitude of healthcare workers towards MERS**

Items Participants' responses	P-value**				Mean Attitude Score $\pm$ SD*
	Profession	Gender	Age	Experience	
Transmission of MERS-CoV infection can be prevented by using universal precautions given by CDC, WHO, etc.	0.000	0.248	0.762	0.254	4.44 $\pm$ 0.76
Prevalence of MERS can be reduced by active participation of health care worker in hospital infection control program	0.000	0.739	0.480	0.359	4.36 $\pm$ 0.77
Any related information about MERS should be disseminated among peers and other healthcare workers	0.000	0.052	0.280	0.552	4.35 $\pm$ 0.77

MERS patients should be kept in isolation diagnosed patients	0.047	0.405	0.041	0.286	<b>4.48±0.74</b>
Intensive and emergency treatment should be given to diagnosed patients	0.003	0.082	0.461	0.108	<b>4.33±0.90</b>
Healthcare workers must acknowledge themselves with all the information about MERS	0.002	0.712	0.350	0.116	<b>4.61±0.70</b>
Gowns, gloves, mask, and googles must be used when dealing with MERS patients	0.122	0.248	0.684	0.281	<b>4.64±0.64</b>

\*A score of 5 was given to strongly agree, 4 to agree, 3 to undecided, 2 to disagree and 1 to strongly disagree. A mean score of  $\geq 4$  was considered as positive attitude while score of 1-3 was taken as negative attitude.

The knowledge of participants was significantly increased with age, and years of experience. Also, the knowledge of participants affected by profession, where physician and pharmacist were the most knowledgeable. The positive attitude of participants toward MERS was affected significantly only by profession participants as shown in Table.4

**Table 4: Mean score of knowledge and attitude of Healthcare workers towards MERS**

Characteristics	Knowledge score Mean rank	P value	Attitude score Mean rank	P value
Gender				
Male	122.37	0.277	115.34	0.737
Female	112.82		118.29	
Age in years				
<30	96.7	0.00	107.08	0.101
30-39	126.49		123.02	
40-49	143.5		118.94	
≥50	156.13		146.59	
Profession				
Physician	162.51	0.000	126.02	0.006
Nurse	86.94		123.53	
Pharmacist	110.0		100.76	
Technician	74.75		61.00	
Others	87.95		105.33	
Years of experience				

<3	79.75	0.001	96.85	0.202
3-6	115.66		116.19	
7-10	125.43		121.14	
>1	134.26		126.72	

## Discussion

In this study most the healthcare workers were females 56.2% and most of all participants 42.5% had an experience of 3-6 years which may represent the young population of Saudi Arabia. Internet including medical websites and medical journals followed by social media were the main sources of information. Similar results were found in two studies in Qassim and Makkah <sup>[20,21]</sup>. Another study among medical student in Riyadh show that social media was the main source of their information about MERS <sup>[23]</sup>. The social media was the third common source in among dental student in Jeddah <sup>[22]</sup>. This could indicate the popularity of social media among healthcare worker and medical students and address the importance of utilizing it to sharing some of health information with public through the commonly used type of social media.

Overall, the knowledge about MERS were appropriate among participants were appropriate. However, the poor knowledge about type of virus that causes MERS, incubation time for the virus, and need of antibiotics as the first line of treatment were shared with other studies. In Qassim study <sup>[20]</sup>, main source of the virus, the first line of treatment and fatality of the virus were not known to high parentage of participants. The type and structure of virus, and mortality rate were not known to high percentage of medical student in Riyadh and Najran studies <sup>[22,23]</sup>.

The participants in this study showed a positive attitude toward MERS that was affected significantly by profession participants. The studies indicate a direct correlation between the knowledge of participants with an increase in their age and year of experience, and type of profession. This finding might address the importance utilization the knowledge of highly profession and expert staff by conducting education and training program for junior staff. Also, incorporating the social media as way of sharing information.

## **Conclusion**

The present study revealed that the most common source of information for MERS-CoV was the internet including medical magazines and websites followed by social media. There was a good level of knowledge and attitude of healthcare workers regarding MERS-CoV, and the most affecting factor was professions of healthcare workers. Age and years of experience were factors influencing knowledge but not the attitude, while gender affected neither knowledge nor attitude. It is very recommended to establish educational programs for healthcare workers to widen their knowledge.

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## Appendix I: Questionnaire

Prince Sultan Medical Military City  
Family and Community Medicine  
Riyadh-Saudi Arabia



**Assessment of Knowledge and attitude about MERS-CoV among healthcare workers in  
Wazarat primary care center of PSMMC, Riyadh, Saudi Arabia**

*I am Dr. Wael Althagafi a family medicine resident in residency training program,  
conducting this questionnaire to assess knowledge and attitude of healthcare  
workers about middle East respiratory syndrome, in which aiming to improve our  
health care system*

*Please, remember that all the information here will be handled as confidential  
information for scholar purpose use*

*Filling this questionnaire means your full consent to be part of this study*

*Thanks for your time and cooperation*

*For any enquiries and to follow the result of this study please don't hesitate to  
contact*

**DR. WAEEL ABDUL-AZIZ ALTHAGAFI**

**CONTACT NUMBER: +966531380800**

**EMAIL: DR.ALTHAGAFI@GMAIL.COM**

## Questionnaire

### Section A

Kindly, answer the following questions.

A1. Age: ..... years.

A2. Gender:

☐ Male

☐ Female

A3. Profession:

☐ Physician

☐ Nurse

☐ Pharmacist

☐ Technician

Other, please specify:.....

A4. Years of Experience:..... years.

A5. What is your main source of information of Middle East Respiratory Syndrome (MERS):

May choose more than one option

☐ Television, Radio.

☐ Posters and Pamphlets.

☐ Seminars and Workshop.

☐ Social media (twitter, Instagram, Snapchat. etc.).

☐ Peers or colleagues.

☐ Reference books and Research articles.

☐ Newspapers and non-professional magazines.

☐ Internet (medical website, medical journal).

**Section B**

Kindly, choose one answer only

B1. MERS is caused by alpha coronavirus:

☐ Yes    ☐ No    ☐ I don't know

B2. MERS patients develop severe acute respiratory illness:

☐ Yes    ☐ No    ☐ I don't know

B3. Fever, cough and shortness of breath are hallmark symptoms of MERS:

☐ Yes    ☐ No    ☐ I don't know

B5. People with co-morbidity (Diabetes, cancer and other chronic diseases) are more likely to be infected:

☐ Yes    ☐ No    ☐ I don't know

B6. Incubation time for virus is 14-28 days:

☐ Yes    ☐ No    ☐ I don't know

B7. It spread through close contact like caring and/or living with infected persons:

☐ Yes    ☐ No    ☐ I don't know

B8. The main source of MERS virus is plant:

☐ Yes    ☐ No    ☐ I don't know

B9. Washing hand with soap and water for at least 30 secs can help in prevention of transmission of disease:

☐ Yes    ☐ No    ☐ I don't know

B10. Vaccination of MERS virus is available in market:

☐ Yes    ☐ No    ☐ I don't know

B11. Polymerase Chain Reaction (PCR) can be used to diagnose MERS:

☐ Yes    ☐ No    ☐ I don't know

B12. Special caution must be taken when a person presents with symptoms of MERS from Arabian Peninsula region:

☐ Yes    ☐ No    ☐ I don't know

B13. Antibiotics are first line treatment for the management of MERS:

☐ Yes    ☐ No    ☐ I don't know

B14. MERS can be fatal :

☐ Yes    ☐ No    ☐ I don't know

<b>Section C</b> <u>Kindly, circle the number that best indicates your opinion</u>					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
C1. Transmission of MERS-CoV infection can be prevented by using universal precautions given by CDC, WHO etc.	5	4	3	2	1
C2. Prevalence of MERS can be reduced by active participation of health care worker in hospital infection control program	5	4	3	2	1
C3. Any related information about MERS should be distributed among peers and other healthcare workers	5	4	3	2	1
C4. MERS patients should be kept in isolation	5	4	3	2	1
C5. Intensive and emergency treatment should be given to diagnosed patients	5	4	3	2	1
C6. Healthcare workers must be familiar with the information about MERS	5	4	3	2	1
C7. Gowns, gloves, mask and googles must be used when dealing with MERS patients	5	4	3	2	1

## Appendix II: C.V

PERSONAL INFORMATION			
First Name: Wael		Gender: Male	
Middle Name: Abdulaziz		Nationality: Saudi	
Family Name: Althagafi		Marital Status: Single	
City of Residence in KSA: Riyadh		D.O.B (DD/MM/YY): 19/10/1987	
Employment Status : <input type="checkbox"/> Internship <input type="checkbox"/> Unemployed <input checked="" type="checkbox"/> Employed			
Mobile Number : 0531380800	Telephone Number : 0112132823	Email : <a href="mailto:dr.althagafi@gmail.com">dr.althagafi@gmail.com</a>	
ACADEMIC QUALIFICATIONS			
Degree/Specialty	University	Year of Certification	City/Country
MBBS	King Saud University	2013\2014	Riyadh
PROFESSIONAL EXPERIENCE			
Position/Title	Institute	Period of Employment	City/Country
(Saudi board of Family Medicine)	Prince sultan medical military city	3 years	Riyadh\ KSA
<i>*For Service Resident, must complete</i>			
Specialty:		Period of Service:	
Name of Institute:			
RECENT CONTINUING MEDICAL EDUCATION ATTENDANCE (CONFERENCE, WORKSHOP, ETC.)			
Event Name	Date of Event	City/Country	
2 <sup>nd</sup> SCHS international conference	12-13 April - 2015	Riyadh\ KSA	
Intensive family medicine course review course	28 FEB -3 MAR	Jeddah \KSA	
3 <sup>rd</sup> international family medicine conference and exhibition	17-19 April -2016	Dubai \UAE	
12 <sup>th</sup> scientific forum (family practice the ultimate solution)	29-31 March -2016	Al-Khobar\ KSA	
RESEARCH/PUBLICATION OR SCIENTIFIC PRESENTATION			
Title of Research/Publication or Scientific Presentation	Name of Event/Journal or Research Institute	Year	
Assessment of Knowledge and attitude about MERS-CoV among healthcare workers in Wazarat primary care center of PSMMC, Riyadh, Saudi Arabia	(in progress)	2017	