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PREVALANCE OF *MER'S* IN SAUDI ARABIA: An Epidemiological (KPA) Study

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ABSTRACT: Middle east respiratory syndrome (MERS) is an infection caused by Corona viruses which a zoonotic virus, belonging to the family of viruses that can cause colds and severe acute respiratory syndrome (SARS). The transmission of MERS though is not fully understood however it has been evident that people infected have been in direct or indirect contact with infected dromedary camels in the Middle East which is a zoonotic virus. It is believed that humans can be infected through MERS spreads from close contact with an infected person, all the airborne transmissions. According to statistics published by the World Health Organization on March 31ˢᵗ 2015 a total of 967 laboratory cases have confirmed out of which 379 deaths were reported from Saudi Arabia. About 145 cases including 58 deaths were reported till date. In September 2012, the World Health Organization (WHO) issued a "global warning" about the emergence of a new type of corona virus in both Saudi Arabia and Qatar, where two people were injured. As observed from the epidemiological study survey for MERS, in Tabuk region, 45% of the people have Knowledge about the disease where as 55% are not aware, about 39% are having an awareness Attitude towards the spread of disease, where as 61% are not aware, 46% are aware about the Preventive measures and tentative cure for the disease whereas almost 54% are unawares. Taking the above data in account we conclude that awareness amongst people related to MERS is very scarce or limited, therefore it is recommended to undertake large-scale collaborative epidemiologic studies which may reveal differentiating factors in disease onset, severity, and prevalence.

Key words: MERS, WHO, Knowledge, Attitude & Practice

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INTRODUCTION

Epidemiological analysis of MERS-CoV incidence by the Saudi Ministry of Health, between June 6, 2013 and May 14, 2014, has shown the current epidemic of MERS-CoV has a high fatality. The amounts of MERS-CoV cases and deaths are more in men than women, and those in the age groups of 45–59 and ≥60 years. Since the last risk assessment on 8 March 2015 and as of 5 June 2015, Saudi Arabia has reported 81 additional cases of MERS-CoV. Of the 81 cases, five were identified as healthcare workers. Thirty-one reportedly had contact with suspected or confirmed cases in hospitals or clinics or in the community. Six of the thirty-one were clearly indicated as a nosocomial transmission, while three are currently under investigation for possible nosocomial transmission and the source of the infection is unknown for forty-seven cases.

According to Rapid Risk Assessment: Severe respiratory disease associated with MERS-CoV, 5 June 2015 Of the 79 cases, where age and sex is known, 78% are male (62), while 22% are female (17). The age ranged from 20 to 93 years, with a mean age of 54 for males. For females the age ranged between 24 and 77 years, with a mean age of 55 years. Eleven of the 81 cases reported animal contact and ten are reported to have drunk camel milk and to have had contact with to camels. (Cotten M et al, 2014).

Middle East respiratory syndrome (MERS) *is a severe acute respiratory illness caused by the newly identified MERS corona virus (MERS-CoV).*MERS-CoV infection was first reported in September 2012 in Saudi Arabia, but an outbreak was seen in April 2012. Between April 2012 and September 2013, 130 cases were laboratory-confirmed, most of them occurred in Saudi Arabia, where new cases continue to appear till date. As of 2014, the outbreak remains restricted to the Middle East.

Other cases have been confirmed in Qatar and the United Arab Emirates. (WHO-2014). Cases have also been confirmed in France, Germany, Italy, Tunisia, and the United Kingdom in patients who were either transferred there for care or became ill after returning from the Middle East. Person-to-person transmission has been common in transmission of MERS. Most reported cases have involved severe respiratory illness requiring hospitalization, but at least 21% or patients had mild or no symptoms. (ECDC-2014). The reservoir of MERS-CoV is unknown, many corona virus species are present in bats and camels and a typical relation is seen between the patients infected by MERS and their direct or indirect interaction with camels. Anti-MERS-CoV antibodies have been detected in a few camels, which are the only other currently suspected hosts. The incubation period is about 5 days. More than half of cases have been fatal. Median patient age is 56 yr., and the male: female ratio is about 1.6:1. Infection tends to be more severe in elderly patients and in patients with a preexisting disorder such as diabetes, a chronic heart disorder, or a chronic renal disorder. Fever, chills, myalgia, and cough are common. GI symptoms (e.g. diarrhea, vomiting, abdominal pain) occur in about one third of patients. In all patients, chest imaging detects abnormalities, which may be subtle or extensive, unilateral or bilateral. (Craig R. Pringle; (2014). In some patients, levels of LDH and AST are elevated and/or levels of platelets and lymphocytes are low. A few patients have acute kidney injury. Disseminated intravascular coagulation and hemolysis may develop. Corona viruses were first identified in the 1960s, but we don't know where they come from (Hemida, MG (2013).

Corona viruses are species in the genera of virus belonging to one of two subfamilies *Corona virinae* and *Torovirinae* in the family *Corona viridae*, in the order Nidovirales. Corona viruses are enveloped viruses having positive-sense RNA genome and a nucleocapsid. The genomic size of corona viruses ranges from approximately 26 to 32 kilobases, extraordinarily large for an RNA virus.

The name "corona virus" is derived from the Latin *corona*, meaning crown and refers to the characteristic appearance of virions under electron microscopy this morphological vision is created by the viral spike (S) called aspeplomers, which are proteins present on the viral surface and determine the host tropism. (Hemida, MG, 2013, De Groot RJ, 2013).

Signs and symptoms

According to the discovered cases so far, the symptoms may include the following:
1. Fever and cough.
2. Shortness of breath
3. Congestion in the nose and throat
4. Diarrhea.
5. In advanced cases, the patient can have very serious complications, which may lead to death, such as: severe pneumonia (WHO-2015).

Transmission: The spreading of MERS is not completely understood, but experts believe that the main way it spreads is through close contact with an infected person (by caring for or living with the person, or having direct contact with their respiratory secretions and body fluids. The people who have been infected by MERS have all been in a health care facility or among close family members (Figure1.) (Wernery U et al, 2016).

Prevention: Not having any vaccine virus Coruna, but it is recommended by following these preventive measures: A. Frequent washing of hands with soap and water. B. Avoid touching your nose, mouth and eyes when dirty hands. C. Avoid direct contact with infected or participation of their tools. (Wernery U et al, 2016).

Objectives of the study: The present study aims at

1. Deciphering the status of spread of MERS in Saudi Arabia, in its various provinces.

2. It is aims to reveal data for descriptive epidemiological study of MERS cases in Saudi Arabia.

3. The study also includes frequency and percentage of cases along with the crude incidence rate (CIR), and the age-standardized incidence rate (ASIR).

MATERIALS AND METHODS

Data Collection: An epidemiological (Observational) review study was conducted for all MER'S cases diagnosed in Saudi Arabia in 2012 to 2014. The data is available in World Health Organization (WHO) regarding all the MER'S cases in Saudi Arabia and is publicly available. The data is also searched from Pub Med, Medline, WHO, National and local hospital registry (WHO-2014).

Statistical Analysis: The WHO gives reports on the prototype of MERS in Saudi Arabia, so as to study the incident based occurrence of the disease. These data provide an in-depth analysis of MERS statistic and discuss the frequency and percentage of cases, along with the crude incidence rate (CIR), and the age-standardized incidence rate (ASIR) in the Saudi Arabia. The overall age-standardized rates per was calculated which is a important for making comparisons between different populations age structure. An epidemiological Observational study was carried out using a questioner (Annex 1) to analysis Knowledge, Attitude and Practice (KAP) regarding the MERS in Tabuk Region of Saudi Arabia.

RESULTS

The number of cases of infected with Corona Globally in total are 1069 as on January 2015 with 403 number of deaths and 38% Case Fertility rate (CFR) (Figure 2). The CFR % shows a decline from 2014 which was 43.5%.

The total number of cases as on January 2015 in Saudi Arabia are 981 out of which 548 recovered, 5 are active patients, 428 deaths. The case fatality rate (CFR) in Saudi Arabia 2013 was 43.5% two new cases were registered in Al Riyadh and Hafoof region Saudi Arabia on 20 April 2015. (WHO-2012-13).

Al Riyadh and Al Makahregion shows the maximum number of cases followed by Al Medina. The probable reason being these places are the centers of expats and Saudi travellers. As visible the maximum number of cases are those whose job titles are unknown followed by the health care workers. When data was analyzed for age group it was found more cases were registered with men in an age group of 50-59 whereas for female the age group was 30-39. It was noticed that the numbers of MERS cases increased with the onset of festive season in Saudi Arab as seen, the number of cases registered starts to increases during Ramadan reach its peak during Hajj and trends continues till Janaddriyah. Global trends can be seen in Figure 3.

However 80% of cases in Saudi Arabia were registered in males, though it is difficult to conclude that the virus is less impact on women as it may be the veil, Islamic dress code for women in Saudi Arabia's role in reducing the infection rate because it protects the mouth and nose of the transmission of viruses.

An Epidemiological observational study was undertaken amongst a mixed population in Tabuk region. A total of 250 samples were analyzed with the help of a questioner (Annex1). The questioner analyzed the Knowledge (know the disease) & Attitude (response towards the disease) and Practice (measures for prevention of disease) - (KAP) for the disease. As observed from the observational study survey 45% of the people have knowledge about the disease where as 55% are not aware about MERS, 39% are having an awareness attitude towards the spread of disease, where as 61% are not aware, 46% are aware about the preventive measures and tentative cure for the disease whereas almost 54% are unawares. (Figure 4). Taking the above data in account it is concluded that awareness amongst people related to MERS is very scarce or limited, therefore it is recommended to undertake large-scale collaborative epidemiologic studies which may reveal differentiating factors in disease onset, severity and prevalence.
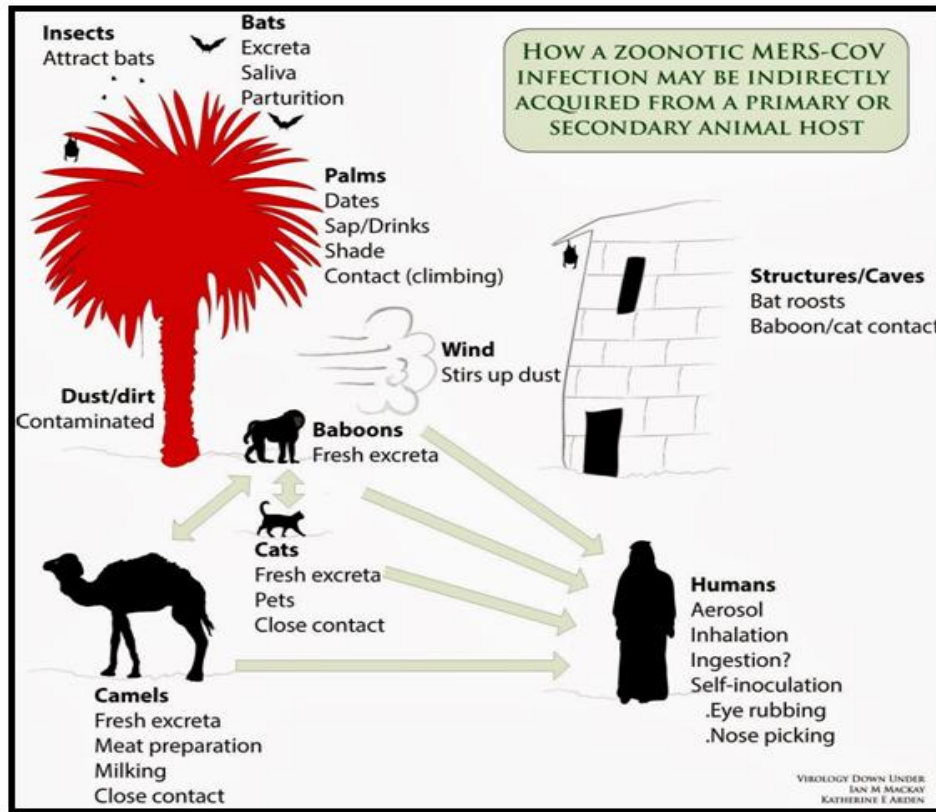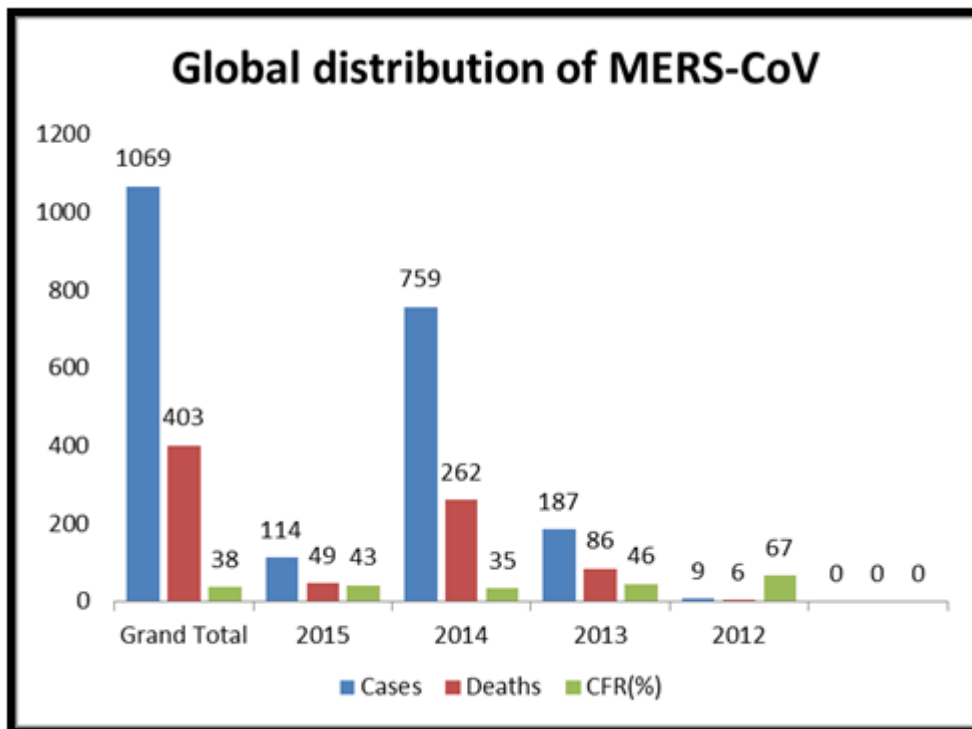
Figure 1: Probable spreading agents of MERS

Figure 2: Prevalence of MERS-CoV Global distribution
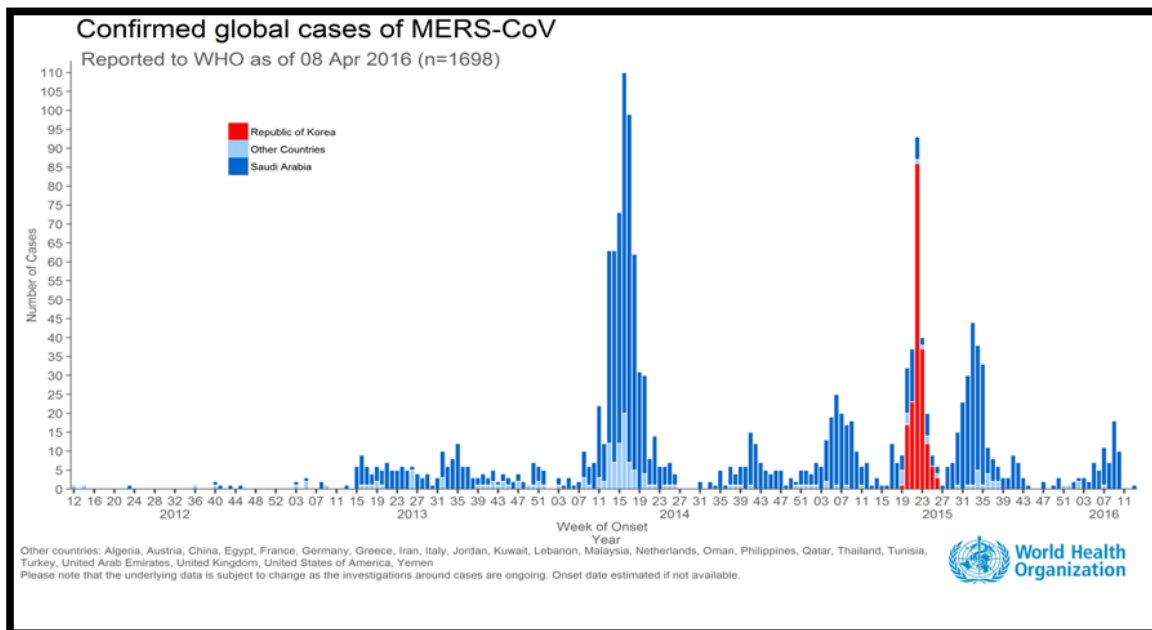
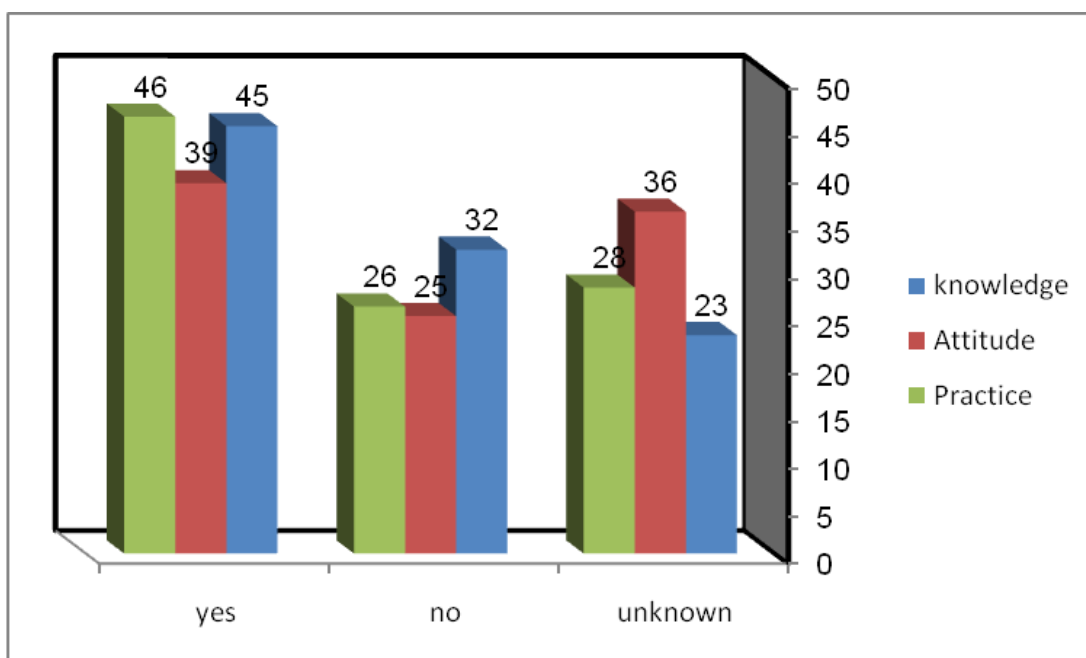**Figure 3: New Cases registered by 2016 (Curtsey WHO)**

Figure 4: Result of "KPA" Observational study in Tabuk Region KSA

Recommendations: Consult a health care provider or visit a travel health clinic preferably six weeks before you travel.

1. Be aware that the risk may be higher for travellers with chronic medical conditions (e.g.: diabetes, heart disease, kidney disease, respiratory disease).

2. Practice safe food and water precautions.-Avoid food that may be contaminated with animal secretions. Avoid raw or undercooked (rare) meat. Only eat foods that are well cooked and served hot. Avoid unpasteurized dairy products such as raw camel milk. Avoid close contact with all wild or farmed animals, such as bats and camels-If you have chronic medical conditions, your risk may be higher. If you must visit a farm or market, make sure you practice good hygiene and wash your hands before and after contact with animals.

3. Protect yourself and others from the spread of germs and flu-like illness-If you are sick with flu-like symptoms, delay travel or stay home. Travellers should recognize signs and symptoms of flu-like illness, and delay travel or stay home if not feeling well.

4.   Wash your hands frequently- Avoid touching your eyes, nose and mouth with your hands as germs can be spread this way. Wash your hands with soap under warm running water for at least 20 seconds, as often as possible. Use alcohol-based hand sanitizer if soap and water are not available.

5.   Practice proper cough and sneeze etiquette-Cover your mouth and nose with your arm to reduce the spread of germs. Try to avoid close contact with people who are sick.

6.   Stay up-to-date with your vaccinations-There is no vaccine for MERS-CoV, however it is important to be up-to-date on all of your routine and recommended vaccinations prior to travel.

7.   Monitor health-If flu-like symptoms such as fever, cough and/or shortness of breath appear within 14 days after returning from travel, seek medical attention immediately.

Annex 1. Questioner used in the study.

NAME [   ] **AGE** [   ] **DATE** [   ]

	No	yes	Unknown
Questionnaireformeasuring theratio ofthe awareness of thecommunitythe direction ofthe coronavirus.	○	○	○
1. Have you heard about corona virus?	○	○	○
2. Do you know the symptoms of this disease?	○	○	○
3. Is it contagious diseases?	○	○	○
4. Do you haveto knowhow to preventCoronavirus?	○	○	○
5.Do you abide by such means?	○	○	○
6. Have you ever met a person infected with corona ?	○	○	○
7. Is it appeared flu symptoms?	○	○	○
8. Did you expect that he was infected with corona?	○	○	○
9. Does he has a chronic disease?	○	○	○
10. Did you lose consciousness?	○	○	○
11. Are people should avoid contact with animals or animal products coming into contact ?	○	○	○
12. Have you had contact with person(s)who are in close contact with animals because of their work ?	○	○	○
13. Have you had contact with a person who had a respiratory illness/ diarrhea/vomiting ?	○	○	○
14. Did you visit or care for any sick person?	○	○	○
15. Did you know that the new corona virus (Middle East respiratory syndrome) is a new virus does not know a lot of properties?	○	○	○

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