Middle East Respiratory Syndrome- Potential Public Health Risk for India

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ABSTRACT

Published on 30th September 2014

Middle East Respiratory Syndrome known as MERS is increasingly being recognized as a potential global threat. Seventy-five percent of the recently reported cases appear to be secondary cases; meaning that the individuals acquired the infection from another infected person. The majority of these secondary cases are healthcare workers who have been infected within the healthcare setting, and a few were patients who were in the hospital for other reasons. With Hajj season around and with a large expat population working in Middle East, India is at a higher risk. Improved surveillance, massive public awareness, sensitization of health workers, strengthening laboratory diagnosis are important in preventing a potential importation of the virus and the local spread.

Keywords: Middle East Respiratory Syndrome, Corona Virus, MERS-CoV, Mass gathering

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INTRODUCTION

The last decade has witnessed the emergence of respiratory viruses as a global threat to health security and has led to worldwide epidemics with substantial morbidity, mortality, and economic consequences.[1] The latest among them is the Middle East Respiratory Syndrome known as MERS,[2] with the World Health Organization (WHO) reporting, in 2012, two cases of severe community- acquired pneumonia caused by a novel human â- corona virus, subsequently named the Middle East respiratory syndrome corona virus (MERS-CoV).[2,3,4]

There is no vaccine against MERS Corona virus infection and there is no specific antiviral treatment recommended for MERS till date. However, medical care can help relieve symptoms such as respiratory problems, and this includes assisted ventilation for severe cases.[5]

EPIDEMIOLOGY

MERS-CoV, previously known as Novel corona virus 2012, is a single stranded RNA virus, first reported in Saudi Arabia in September 2012.[2] Corona viruses derive their name from the fact that under electron microscopic examination, each virion is surrounded by a "corona," or halo (Figure 1). This is due to the presence of viral spike peplomers emanating from each proteinaceous envelope.[5]

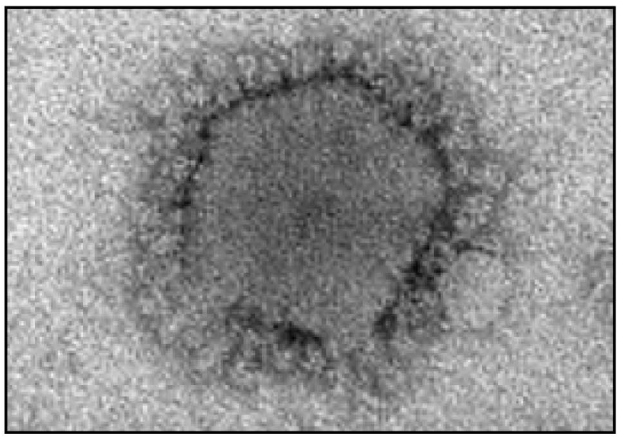

Figure 1. **Negative stain electron microscopy of MERS-CoV[5]**

Clinically, all patients presented primarily with symptoms of severe acute respiratory illness like fever, cough, and shortness of breath, while a few also showed gastro-intestinal symptoms.[1,3,4] A number of secondary complications have also been reported, including acute renal failure, multi-organ failure, acute respiratory distress syndrome (ARDS), and consumptive coagulopathy. The average age of patients who have had confirmed MERS-CoV is 51 years (range: 14 months to 94 years), with a male predominance. X-ray showed abnormalities in close to ninety percent of cases.[1]

The incubation period is from 2 to 14 days, and it is believed that patients are not contagious during the incubation period. However, when a patient has had MERS, it would have spread to others who were in close

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Table 1. Country wise case distribution

Country	Currently infected*	Recovered	Died	Total cases
Saudi Arabia	191	227	292	710
United Arab Emirates	47	14	6	67
Jordan	9	1	4	14
Qatar	4	0	4	8
Iran	4	0	0	4
Kuwait	2	0	1	3
United Kingdom	1	0	2	3
Tunisia	0	2	1	3
Netherlands	2	0	0	2
France	1	0	1	2
Oman	0	0	2	2
United States of America	0	2	0	2
Greece	1	0	0	1
Yemen	1	0	0	1
Italy	1	0	0	1
Malaysia	0	0	1	1
Egypt	0	1	0	1
Germany	0	0	1	1
Lebanon	0	1	0	1
Algeria	0	0	1	1
Bangladesh	1	0	0	1
Total	265	248	316	829

* as on 13th August 2014

physical contact with the patient. Seventy-five percent of the recently reported cases appear to be secondary cases; meaning that the individuals acquired the infection from another infected person. The majority of these secondary cases are healthcare workers who have been infected within the healthcare setting, and a few were patients who were in the hospital for other reasons.

As of 13th August 2014, a total of 829 laboratory-confirmed cases including 316 deaths due to MERS Corona virus infection have been reported.[6] The case fatality rate in symptomatic patients is thirty eight percent compared to nine to twelve percent in SARS.[7,8] With all reported cases originating in the Arabian Peninsula, Saudi Arabia alone has reported 710 lab-confirmed cases and 292 deaths. The Virus has already appeared in more than ten countries outside the region. Of the 829 cases worldwide, only eighteen (Table 1) occurred outside of the Middle East but still a third of them were fatal.[5,6] Bangladesh

Although camels are suspected to be the primary source of infection for humans, the exact routes of direct or indirect exposure remain unknown. Investigations to identify the source of infection and routes of exposure are still ongoing. Comparison of the genetic sequences with other publicly available virus sequences does not indicate any significant changes that would explain the current increase in reported cases.[5]

Laboratory confirmation

Throat-swab, sputum, tracheal-aspirate, or broncho-alveolar-lavage specimens can be transported using viral transport medium, and subjected to real-time reverse transcriptase–polymerase-chain-reaction (RT-PCR) assays to test for MERS-CoV.[9] Confirmatory laboratory testing requires a positive PCR on at least two specific genomic targets or a single positive target with sequencing on a second. A positive test on a single PCR target or a positive test with an assay that has limited performance data available or a negative test on an inadequate specimen is considered inconclusive.

CLINICAL MEASURES

Clinicians should evaluate patients for MERS- CoV infection if they develop fever and symptoms of respiratory illness, such as cough or shortness of breath, within 14 days after traveling from countries in or near the Arabian Peninsula. In addition, evaluate patients with respiratory symptoms and fever who have been in contact with a symptomatic recent traveler from

Table 2. MERS Case definitions

Patient Under Investigation (PUI) A patient under investigation (PUI) is a person with the following characteristics:
A. Fever (? 38°C, 100.4°F) and pneumonia or acute respiratory distress syndrome (based on clinical or radiological evidence) AND EITHER:
• a history of travel from countries in or near the Arabian Peninsula within 14 days before symptom onset, OR • close contact with a symptomatic traveler who developed fever and acute respiratory illness (not necessarily pneumonia) within 14 days after traveling from countries in or near the Arabian Peninsula OR • a member of a cluster of patients with severe acute respiratory illness(e.g. fever and pneumonia requiring hospitalization) of unknown etiology in which MERS-CoV is being evaluated, in consultation with state and local health departments.
OR
B. Close contact with a confirmed or probable case of MERS while the case was ill AND
• fever (>100°F) or symptoms of respiratory illness within 14 days following the close contact. (This is a lower threshold than category A.)
Confirmed Case
A confirmed case is a person with laboratory confirmation of MERS-CoV infection.
Probable Case
A probable case is a PUI with absent or inconclusive laboratory results for MERS- CoV infection who is a close contact of a laboratory-confirmed MERS-CoV case

this area. Cases have been defined and classified into patients under investigation, probable and confirmed cases by CDC Atlanta (Table 2).[5]

Close contact is defined as a) any person who provided care for the patient including a healthcare worker or family member or had similarly close physical contact; or b) any person who stayed at the same place (e.g. lived with visited) as the patient while the patient was ill.

International travel

There is no evidence of community spread of the disease to date and there is no restriction on air travel.[5] However all travelers to the Arabian Peninsula and neighboring countries should take basic steps to protect their health such as hand washing and avoiding close contact with sick people. These countries include Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, the Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates, and Yemen. Travelers who develop fever and symptoms of respiratory illness like cough or shortness of breath within 14 days after traveling from these countries should consult their nearest Doctor and mention their recent travel. People who are sick should stay home from work or school and delay future travel to reduce the possibility of spreading illness to others.

Public health relevance for India

Of the 16.8 million travelers departed on commercial flights from Saudi Arabia, Jordan, Qatar and UAE for an international destination between June and November 2012, 16.3% flew to India. Kozhikode and Mumbai airports are among the top twelve destinations, which received more than 350,000 commercial air travelers each from these MERS-CoV source countries during the same period.[10]

The Hajj or pilgrimage to Makkah, Saudi Arabia, is one of the largest yearly religious mass gatherings worldwide, with more than 2 million people from more than 184 countries.[11,12] India sends the maximum number of pilgrims for Hajj (ten percent of total pilgrims), only next to Indonesia.[10] Kerala has one of the highest numbers of Indian emigrants in Middle East.[13] Of the 1.6 Million non-resident Keralites, United Arab Emirates accounted for 0.5 Million (35 per cent) while Saudi Arabia accounted for 0.45 Million (28 per cent).[14] It is therefore important that we keep vigilant in preventing the entry of the virus to the country to the maximum possible extend and also to diagnose and isolate any imported cases at the earliest to prevent secondary cases. Currently the diagnosis facility is available in many centres including National Institute of Virology Pune, Kasturba Medical College Manipal and Rajiv Gandhi Centre for Biotechnology Thiruvananthapuram.

CONCLUSION

During Hajj 2012 and Hajj 2013, no cases of MERS-CoV infection were detected and no cases were reported after pilgrims returned to their home country.[15] However, considering that the Hajj pilgrimage is around, it is advisable that health establishments and the Government machinery take appropriate clinical and public health measures.

It is not always possible to identify patients with MERS-CoV early because some have mild or unusual symptoms. For this reason, it is important that health-care workers apply standard precautions consistently with all patients – regardless of their diagnosis – in all work practices all the time. Take precautions to reduce contact between any patient seeking care for symptoms consistent with MERS- CoV infection and other patients and staff. Droplet precautions should be added to the standard precautions when providing care to all patients with symptoms of acute respiratory infection. Contact precautions and eye protection should be added when caring for probable or confirmed cases of MERS-CoV infection. Airborne precautions should be applied when performing aerosol-generating procedures.[9]

Public health measures would include widespread public campaign about the disease through media and mechanisms to sensitize airline crew and returning passengers from Middle East (through information pamphlets handed over on- board) before they de-plane about the need to report to a doctor immediately if they develop fever, cough or breathing difficulties. Surveillance should be improved- both in community as well as in airports. The airport authorities can have health desk at major airports, to screen passengers who report with fever and respiratory symptoms and link them to the department of health for close follow-up. The health department staffs should be re-sensitized especially with regard to eliciting recent travel history of patients. Government should also put a system in place for rapid collection, transportation and testing of samples in suspected cases and have at-least one isolation unit (2 or 3 beds) ready at every district.

These measures are of utmost public health importance to avoid importation; and also to prepare the country's health system to manage the cases and prevent the local spread of MERS if it gets imported.

END NOTE

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Conflict of Interest: None declared

Cite this article as: FM Shaffi, Sajith Kumar, SS Lal. Middle East Respiratory Syndrome- Potential Public Health Risk for India. Kerala Medical Journal. 2014 Sep 30;7(3):52-55

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