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# Middle East respiratory syndrome coronavirus in Al-Madinah City, Saudi Arabia: Demographic, clinical and survival data

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## KEYWORDS

Characteristics;  
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Saudi Arabia;  
Survival

**Abstract** *Background:* Middle East respiratory syndrome coronavirus (MERS-CoV), is an emerging virus respiratory infection. It has a high mortality rate and a wide spectrum of clinical features. This study describes the clinical characteristics and outcome of MERS infected patients.

*Methods:* A retrospective study was conducted of all confirmed MERS-CoV infections from March 2014 to May 2014 at two tertiary care hospitals in Al-Madinah region (Saudi Arabia). We gathered data about demographic, clinical presentation, and factors associated with severity and mortality.

*Results:* A total of 29 cases were identified; 20 males (69%) and nine females (31%), age  $45 \pm 12$  years. The death rate was higher for men (52%) than for women (23%). Initial presentation was fever in 22 (75%) cases, cough in 20 (69%) cases, and shortness of breath in 20 (69%) cases. Associated comorbidities were diabetes mellitus in nine (31%) patients and chronic kidney disease (CKD) in eight (27%) patients. Duration of symptoms before hospitalization ranged from 2.9 days to 5 days. Elevated liver enzymes were present in 14 (50%) patients and impaired renal profile present in eight (27%) patients. We also describe in this study radiological patterns and factors associated with mortality.

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*Conclusion:* MERS-CoV infection transmission continues to occur as clusters in healthcare facilities. The frequency of cases and deaths is higher among men than women and among patients with comorbidities.

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## 1. Introduction

In Saudi Arabia, a beta new coronavirus was isolated for the first time at the end of 2012 from a patient who presented with acute community acquired pneumonia [1]. He died 11 days later from progressive severe respiratory failure and acute renal failure (ARF) and his sputum sample was negative for respiratory viruses commonly tested. Epidemiology of Middle East respiratory syndrome coronavirus (MERS-CoV) was expanded after exploring the large hospital outbreak in Al-Hasa, Saudi Arabia [2]. Subsequently, the virus was designated as MERS-CoV [3]. The geographic distribution of the cases has been mainly linked to the Arabian Peninsula particularly from Saudi Arabia where most of the cases were reported [4–7]. However, in some countries in North America, Europe, Africa, and Asia, the disease has been detected in some travelers from endemic countries [3,7–13]. The initial occurrence of MERS-CoV was thought to have particular predominance for male patients and those with comorbid diseases. The male-to-female ratio was between 2.8:1 and 3.3:1 [2,6]; this male predominance might have been related to the nature of the outbreak. Initial cases were reported among elderly patients with a median age of 56 years. MERS-CoV has a very high mortality rate, and complications arising from infection can result in severe respiratory and renal failure [2]. Symptoms of MERS-CoV range from mild upper respiratory symptoms to rapidly progressive severe pneumonia requiring intubation, and multiorgan failure. A significant number of patients may present with nonrespiratory symptoms such as headache, myalgia, and gastrointestinal symptoms of nausea, diarrhea, or vomiting [2,14]. This study describes the demographic, clinical characteristics, and outcome of MERS-CoV in Al-Madinah region, Saudi Arabia.

## 2. Materials and methods

A retrospective chart review study of all confirmed MERS-CoV cases recorded by two tertiary hospitals from the Madinah region from March 2014 to May 2014. Institutional Review Board approval was

obtained for our study from authorities of both hospitals. A case was confirmed as having infection if MERS-CoV real-time polymerase chain reaction was positive, using the recommended sampling technique (nasopharyngeal swab and tracheal aspirates or bronchoalveolar lavage in intubated patients). Extraction of RNA was performed with Roche MagNa Pure LC (RNA viral isolation Kit). Samples were pretreated with lysis according to the manufacturer's instructions [15]. We obtained data about demographic characteristics, clinical presentation, laboratory results, diagnosis, incubation period, smoking history, comorbidities, and history of contact with camels or MERS-CoV positive patients in regions within the Madinah area. We recorded the duration of the patient's illness, microbiological test results, and reviewed imaging and treatments received. We also recorded the following outcomes: duration of mechanical ventilation, intensive care unit (ICU) length of stay, and survival during hospitalization until the patient is discharged from hospital.

### 2.1. Statistical analysis

Data were analyzed using IBM SPSS for Windows, version 18.0. The frequency of cases of MERS-CoV infection and percentage of resulting deaths were calculated. Statistical analyses of demographics, clinical, and laboratory descriptive data are tabulated. Descriptive statistics such as means and standard deviation mean ( $\pm$ SD) were used to describe the age of the patients, laboratory test results, and duration of illness. Frequencies and percentages  $n$  (%) were used to describe demographic and MER-COV outcomes. We also did a correlation with the outcome using the  $t$  test and Fisher's exact test as appropriate with a significant value at  $p \leq 0.05$ .

## 3. Results

The total number of cases with confirmed MERS-CoV infection reported from April 2014 to May 2014 was 29. The majority of patients (60%) were men, and the median age was 45 years. The most common symptoms were fever (75.9%) and

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