Journal of Infectious Diseases & Preventive Medicine

Alsolamy et al., J Infect Dis Preve Med 2017, 5:2
DOI: 10.4172/2329-8731.1000159

Research Article OMICS International

Middle East Respiratory Syndrome: Global Outbreak Data Analysis

Sami Alsolamy[1*], Sami Yousif[2], Badr Alotabi[3], Nawfal Aljerian[2], Khaled Alrajhi[2], Sameerah Al-Somali[2] and Abdulmohsen Alsaawi[2]

[1]Department of Emergency Medicine and Intensive Care, King Saud bin Abdulaziz University for Health Sciences and King Abdullah International Medical Research Center, Riyadh, Saudi Arabia

[2]Department of Emergency Medicine, King Saud bin Abdulaziz University for Health Sciences and King Abdullah International Medical Research Center, Riyadh, Saudi Arabia

[3]Department of Emergency Medicine and Disaster Management, King Fahd Medical City, Riyadh, Saudi Arabia

[*]**Corresponding author**: Sami Yousif, Department of Emergency Medicine and Intensive Care, King Saud bin Abdulaziz University for Health Sciences and King Abdullah International Medical Research Center, Riyadh, Saudi Arabia, Tel: +966-11-8011111 x19991l; E-mail: dr_sami911@yahoo.com

Received date: February 08, 2017; **Accepted date**: March 30, 2017; **Published date**: April 06, 2017

Abstract

Background: The Middle East Respiratory Syndrome coronavirus (MERS-CoV) is a new human disease initially reported from the Arabian Peninsula in September 2012. Since then, the disease has spread worldwide. We present the available demographic and epidemiological data reported by the World Health Organization (WHO).

Methods: We abstracted and analyzed all disease outbreak news archives from WHO about MERS-CoV between September 23, 2012 and December 4, 2015.

Results: One thousand six cases of Middle East Respiratory Syndrome (MERS) were identified, with an average age of 52.7 years and where males comprised 68.1% of the cases. Comorbidities and healthcare workers reported in 47.1% and 15.5% of cases respectively. History of camel contact was reported in 9.8% of cases and contact with a laboratory confirmed MERS-CoV case was reported in 21.6% of cases. The overall mean (SD) from symptoms onset to date of laboratory confirmation was 5.2 days (4.2 days), CI 95% [4.9-5.6].

Conclusion: Our analyses demonstrated males are predominately affected by this disease. Observing the period from date of symptoms onset to date of laboratory confirmation was shorter among female patients and patients without comorbidities. In addition, it was significantly shorter in 2015 compared with 2014. Further analysis of an available MERS-CoV database could provide better understanding and guidance for future research activities.

Keywords: Middle East Respiratory Syndrome; Coronavirus; Outbreak

Introduction

The Middle East Respiratory Syndrome coronavirus (MERS-CoV) is one of the deadliest and least understood emerging pathogens in the 21st century and continues to pose a threat to global public health because of its high fatality rate [1]. As of January 22, 2016, the World Health Organization (WHO) reported 1,626 laboratory confirmed cases of MERS-CoV, including at least 586 related deaths in 26 countries worldwide [2]. MERS-CoV originates in the coronavirus family, a single-stranded RNA virus with high mutation rates1. MERS-CoV is considered a zoonotic virus that has crossed the species barrier to humans and has been strongly linked to camels in the Arabian Peninsula [3]. Since its outbreak, the WHO issued a worldwide alert, working to educate and organize the surveillance and control of this disease. The novelty of the disease and gaps in knowledge of the epidemiology of this disease create challenges in developing recommendations for diagnosis, treatment, prevention, and control. In an effort to gain a better understanding of the epidemiology of MERS-CoV, this paper presents an attempt to analyze all publically available global surveillance data of MERS-CoV cases reported by WHO to date.

Methods

We analyzed all disease outbreak news archives from WHO about MERS-CoV between September 23, 2012 and December 4, 2015 [4,5]. We included all cases that contained data about age and gender (at minimum) and excluded cases reported as clusters without clinical details due to difficulty of merging individual patient data. Data on age, gender, profession, comorbidities, contact with camels or contact with laboratory confirmed MERS-CoV cases, date of symptoms onset, and date of laboratory confirmation were retrieved and analyzed.

Descriptive statistics of the demographic variables are presented and followed by mean comparison tests of observing time between date of symptoms onset and date of laboratory confirmation with age group, gender, profession and presence of comorbidities. Where data was not normally distributed, we used non-parametric Wilcoxon Rank-Sum and Kruskal-Wallis tests using a statistical package software, Stata version 12 (StataCorp®).

Results

The WHO released 226 outbreak news reports, from which 1006 detailed cases were included. Ages ranged between 10 months and 109 years, with a mean of 52.7 years and a standard deviation (SD) of 18.1 years. Males comprised 68.1% (685) of cases. Comorbidities were reported in 47.1% (474) of cases, with age mean of 60.1 years (SD 15.3

year), and where male 71.7% (340) were male. Healthcare workers reported in 15.5% (156) of cases, with age mean of 38.5 years (SD 11.2 year), and where males comprised 51.9% (81) of cases, of which 19.2% (30) had comorbidities. History of camel contact was reported in 9.8% (99) of cases, with age mean of 56.7 years (SD 15.0 year). Males comprised 91.9% (91) of these cases, of which 77.8% (77) had comorbidities. Contact with laboratory confirmed MERS-CoV cases were reported in 21.6% (217) of cases, with mean age 43.4 years (SD 16.7 years). Males comprised 59.4% (129) of these cases, of which 35.0 % (76) had comorbidities and 30.9% (67) were healthcare workers. Date of symptoms onset and date of laboratory confirmation were reported in 86.4% (869) and 57.6% (581) of cases respectively. The overall mean (SD) of time from symptoms onset to date of laboratory confirmation was 5.2 days (4.2 days), CI 95% [4.9-5.6]. We further stratified the time from symptoms onset to date of laboratory confirmation based on age, gender profession, comorbidities and reporting year (Table 1).

Variables (N)		Mean time to diagnosis in days (95% CI)	P value
Age group	0–18 years (16)	2.6 (0.9–4.3)	0.3
	18–65 years (708)	5.2 (4.8–5.6)	
	65+ years (282)	5.5 (4.7–6.2)	
Gender	Female (193)	4.6 (4.1–5.2)	0.02
	Male (338)	5.6 (5.1–6.0)	
Comorbidity	Yes (243)	5.8 (5.2–6.3)	0.05
	No*(288)	4.8 (4.4–5.2)	
Healthcare worker	Yes (81)	3.9 (3.2–4.6)	<0.001
	No (423)	5.5 (5.1–5.9)	
Reporting year	2014 (52)	7.7 (6.4–9.0)	<0.001
	2015 (478)	4.9 (4.6–5.3)	
*Comorbidities not mentioned			

Table 1: Associations of Observing Period from Date of Symptoms Onset to Date of Laboratory Confirmation Based on Age, Gender, Comorbidities, healthcare worker and reporting years.

Discussion

This study describes the largest sample of confirmed MERS-CoV cases and confirms previous study findings indicating males are predominately affected by this disease [6,7] and is in comparison to Severe Acute Respiratory Syndrome (SARS), where there is a predominance of females in all cases [8]. Healthcare workers were at high risk and accounted for one-sixth of all cases, in comparison to SARS in which healthcare workers accounted for one-fifth of all cases.

It was notable there was a statistically significant shorter observation period from date of symptoms onset to date of laboratory confirmation among female patients and patients not reported to have comorbidities. This may be due to the complexity of patients presenting with comorbidities, in addition to lacking specific symptoms of MERS-CoV. Healthcare workers also have a significantly shorter observation period from date of symptoms onset to date of laboratory confirmation. This may be due to better access to the healthcare system or higher suspicion when symptoms first develop. We could not demonstrate a statistically significant association in the period from date of symptoms onset to date of laboratory confirmation among age groups. However, we did find that the observation period from date of symptoms onset to date of laboratory confirmation was significantly shorter in 2015 compared with 2014. This can be explained by increased awareness about the disease due to public education and time effect.

The general limitations of analyzing outbreak data apply to this study. Specific limitations in this study include the inconsistencies in the format of reporting different variables, the lack of updates on contact tracing results and patient outcome after the initial reporting, and cases that did not specify and define comorbidities.

Our study was based on publically available global surveillance data. Standardized national surveillance and reporting of MERS-CoV would enable better global analysis of this pathogen. Therefore, further analysis of an available MERS-CoV database could provide better understanding and guidance for future research activities.

Acknowledgment

Additional Contributions: We thank Ms. Najla Alassmi (Department of Emergency Medicine,), Ma. Theresa Fullente, RN (Department of Emergency Medicine,) and ZieYan Law, RN (Intensive care department,) for contributing in data extraction. No compensation was received for these contributions.

Conflict of Interest Disclosures

Authors have no potential conflicts of interest to disclose.

References

1. Alsolamy S (2015) Middle East respiratory syndrome: knowledge to date. Crit Care Med 43:1283–1290.
2. World Health Organization (2016) Middle East Respiratory Syndrome Coronavirus (MERS-CoV).
3. Azhar EI, El-Kafrawy SA, Farraj SA (2014) Evidence for camel-to-human transmission of MERS coronavirus. N Engl J Med 370: 2499–2505.
4. World Health Organization (2016) Disease outbreak news (MERS-CoV).
5. World Health Organization (2015) Archive of MERS-CoV cases in the Republic of Korea.
6. Assiri A, Al-Tawfiq JA, Al-Rabeeah AA (2013) Epidemiological, demographic, and clinical characteristics of 47 cases of Middle East respiratory syndrome coronavirus disease from Saudi Arabia: a descriptive study. Lancet Infect 13: 752–761.
7. Saad M, Omrani AS, Baig K (2014) Clinical aspects and outcomes of 70 patients with Middle East respiratory syndrome coronavirus infection: a single-center experience in Saudi Arabia. Int J Infect Dis 29: 301–306.
8. Chan-Yeung M, Xu RH (2003) SARS: epidemiology. Respirology 8: S9–14.