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Dynamics of scientific publications on the MERS-CoV outbreaks in Saudi Arabia

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ABSTRACT

Middle East Respiratory Syndrome Coronavirus (MERS-CoV) is an emerging disease with a relatively high case fatality rate. Most cases have been reported from Saudi Arabia, and the disease epidemic potential is considered to be limited. However, human–human transmission has occurred, usually in the context of healthcare facility-associated outbreaks. The scientific and medical community depends on timely publication of epidemiological information on emerging diseases during outbreaks to appropriately target public health responses. In this review, we considered the academic response to four MERS CoV outbreaks that occurred in Al-Hasa in 2013, Jeddah in 2014 and Riyadh in 2014 and 2015. We analysed 68 relevant epidemiology articles. For articles for which submission dates were available, six articles were submitted during the course of an outbreak. One article was published within a month of the Al-Hasa outbreak, and one each was accepted during the Jeddah and Riyadh outbreaks. MERS-CoV epidemiology articles were cited more frequently than articles on other subjects in the same journal issues. Thus, most epidemiology articles on MERS-CoV were published with no preferential advantage over other articles. Collaboration of the research community and the scientific publishing industry is needed to facilitate timely publication of emerging infectious diseases.

Contents

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Introduction

Emerging infectious diseases are a growing cause of major concern worldwide in terms of public health [1]. The importance of immediate collection of reliable epidemiological information, appropriate analysis, and rapid dissemination to relevant stakeholders during an outbreak, is well-recognised in terms of the public health response and containment of the outbreak [2,3]. Information on the causative agent, likely routes of transmission and prediction of how the outbreak might spread, diagnostic criteria, and possible treatments are all relevant. Such information allows public health experts in both national and international agencies and in research settings to formulate and implement prevention policies and strategies based on updated evidence. Dissemination of public health information can be achieved by a number of methods such as online, specialised peer reviewed papers or, for example, on the World Health Organization (WHO) website [4]. However, the primary method for communicating research findings is through the medium of journal articles [5].

One example of a recent emerging infectious disease is the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), a betacoronavirus, which can cause acute respiratory illness in humans, with clinical presentation ranging from asymptomatic to death [6,7]. It was first observed in a 60-year old man with acute pneumonia and subsequent renal failure, who died in a hospital in Jeddah, Saudi Arabia in 2012 [8]. The first human cluster of eleven cases was confirmed retrospectively in a public hospital in Jordan in April 2012 [9]. To date, WHO has been notified of 1800 laboratory-confirmed cases from 27 countries, and of 640 deaths [10]. Most outbreaks have occurred in the Arabian Peninsula, in particular in Saudi Arabia, with occasional spread to other countries, including an outbreak in Korea in 2015 [6]. There have been numerous outbreaks in Saudi Arabia, for example 25 cases in Al-Hasa between April 1st and May 23rd 2013 [11], 255 patients in Jeddah between January 1st and May 16th, 2014 [12,13], 45 patients between March 29th and May 21st, 2014 in King Fahad Medical City in Riyadh, Prince Sultan Military Medical City, between March and April 2014 [14,15], and 130 MERS cases at King Abulaziz Medical City in Riyadh in June–August 2015 [16].

Comparison of queries of the online clinical decision support resource UpToDate with reports of cases was recently shown to be helpful in detection and monitoring of outbreaks of MERS-CoV in Saudi Arabia [17]. Another study examining data related to MERS on the internet-based participatory surveillance system HealthMap suggested that such resources can be helpful in outbreak monitoring [18].

In this review, we analysed the academic publications to four outbreaks that occurred in Saudi Arabia: Al-Hasa 2013, Jeddah 2014 and Riyadh 2014 and 2015. A similar analysis of two outbreaks of severe acute respiratory syndrome (SARS) showed that most articles were published after the outbreaks had ended, even though they had direct public health relevance during the outbreaks [5]. Our analysis included the epidemiology categories and research domains in which journal articles on the four MERS-CoV outbreaks were published; the methodological characteristics of studies in terms of type, design, case definition, and setting; the timeline of publication of studies in relation to the time of the outbreak; and the scientific impact of MER-CoV articles, in terms of level of citations compared to simultaneously published control articles.

Materials and methods

Literature review

We searched the MEDLINE database for all published articles on epidemiology of the MERS-CoV outbreaks in Al-Hasa in 2013 [11], Jeddah in 2014 [12,13], and Riyadh in 2014 [14,15] and 2015 [16]. We searched for all journal articles written in English in which the main subject studied was one of the above MERS-CoV outbreaks. The searches focused on journal articles published during each outbreak to the present. Outbreak dates were taken based on the WHO and the Saudi Ministry of Health (MOH). These dates were (1) April 1st and May 23rd 2013 for the Al-Hasa outbreak, (2) January 1st and May 16th, 2014 for the Jeddah outbreak, (3) March 29th and May 21st, 2014 for the Riyadh 2014 outbreak and (4) June–September 28th 2015 for the Riyadh 2015 outbreak [11–13,16]. The literature search was carried out in September 2016. Separate searches were carried out for each outbreak. The following search equation was initially used for the Al-Hasa outbreak to maximise retrieval of potentially relevant articles and to exclude publication types other than journal research articles:

Search strategy: [Middle East Respiratory Syndrome coronavirus OR MERS-CoV] AND All fields: [Al-Hasa OR Al-Ahsa] AND Publication type: [Journal article] AND Language: [English] AND Date-publication [2013/04/01-Present].

The search was modified with respect to the location and the start date depending on the outbreak under consideration. Thus for the Jeddah outbreak, [Al-Hasa OR Al-Ahsa] was replaced by [Jeddah] and the Date-publication was changed to [2014/01/01-Present], and for the Riyadh 2014 and 2015 outbreaks, [Al-Hasa OR Al-Ahsa] was replaced by [Riyadh] and the Date-publication was changed to [2014/03/29-Present], covering both Riyadh outbreaks. Searches excluded articles with the following exclusion criteria, adapted from Xing et al. [5]: (1) The main study objective was not MERS-CoV; (2) The data analysed in the study were not collected from the relevant outbreak(s), for example for outbreaks in other countries or different outbreaks in Saudi Arabia, or it was unclear from which outbreak the data had been gathered, as no dates were given; (3) The data analysed in the study were related to a subject other than epidemiology of the relevant outbreak(s), such as feasibility studies for proposed therapies, animal studies on viral effects; (4) The article was not an original study, for example a review or a letter; (5) The study was carried out using only qualitative methodology; (6) The study sample size was <3 cases.

Further searches were carried out using the Web of Science Core Collection, in order to collect any relevant articles not detected in MEDLINE searches. The search equation used for the Al-Hasa outbreak was: Title: [Middle East Respiratory Syndrome coronavirus OR MERS-CoV] AND Topic: [Al-Hasa OR Al-Ahsa]. The search was refined to include only references from 2013 to the present, in English, in the categories Public Environmental & Occupational Health and Infectious Diseases. For the other outbreaks, [Al-Hasa] was changed to [Jeddah] or [Riyadh] accordingly, and the start date changed to 2014 or 2015 as appropriate.

In order to compare the timeline for publication dates in academic research journals to publication of public health bulletins, we also searched public health bulletins for any relevant outbreaks from the start of the earliest outbreak (Al-Hasa, 01/04/2014) to the present. We searched Morbidity and Mortality Weekly Report (MMWR) from the Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO) Weekly Epidemiological Report (WER) and monthly Bulletin of the World Health Organization. At the time of the literature review and spanning the time of the MERS-CoV outbreaks, the Saudi Epidemiology Bulletin was inaccessible for the relevant time period, with issues only available online up to 2012 [http://fetp.edu.sa/Bulletin.html, accessed 31.08.2016].

Data analysed

Articles were classified as in Xing et al. [5] according to four categories (1) investigation and surveillance; (2) case management; (3)

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