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Abstract

Background: Saudi Arabia is considered the epicentre of MERS-CoV. Since 2012, a total of 1844 cases of MERS-CoV have been reported. A recent cluster, with 8 cases, has been reported in Najran region in the south-western region of the country. This analysis of data from that region on health care workers (HCWs) awareness and attitudes towards the prevention and control of MERS-CoV may be useful when planning health education programmes about this emerging infectious disease.

Aims: We aimed to investigate the knowledge and attitude of HCWs toward MERS-CoV in south-western Saudi Arabia.

Methods: This cross sectional study was conducted on HCWs in primary health care centres and hospitals at Najran. A questionnaire containing 14 knowledge and 8 attitude items was completed by all 870 participants.

Results: Overall, > 80% of HCWs were aware about MERS-CoV etiology, mode of transmission, risk factors, and signs and symptoms. Knowledge scores revealed 51% of participants had sufficient knowledge. Physicians and nurses had significantly better knowledge compared with other HCWs (p = 0.001). Participants who worked at institutions with established infection control programme scored significantly better on knowledge questions (P = 0.001). Concerning attitude, > 70% of HCWs exhibited a positive attitude toward MERS-CoV.
Conclusion: the HCWs in Najran region showed a high level of knowledge and positive attitude toward MERS-CoV. There was a noticeable difference in knowledge level between different professions. Periodic educational interventions and professional campaigns are still needed. Any interventions should be directed towards the non-physician and non-nursing professions.

Keywords: MERS-CoV; health care workers; knowledge; attitudes, infection control

Citation: Asaad A; El-Sokkary R; Alzamanan M; El-Shafei M. Knowledge and attitudes towards Middle East respiratory syndrome-coronavirus (MERS-CoV) among health care workers in south-western Saudi Arabia. East Mediterr Health J. 2020;26(4):xxx–xxx. https://doi.org/10.26719/emhj.19.079

Received: 19/05/18; accepted: 20/09/18

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Introduction

Two strains of coronavirus have been found to infect humans: severe acute respiratory syndrome-coronavirus, SARS-CoV, and Middle East respiratory syndrome-coronavirus MERS-CoV) (1). In September 2012, the first case of MERS (the index case) was reported in Saudi Arabia. Soon afterwards, a patient from Qatar who had visited Saudi Arabia began experiencing acute respiratory symptoms and renal failure. The symptoms and type of virus described in these 2 patients were similar (2).

As of May 2018, a total of 2220 laboratory-confirmed cases, including 790 deaths (case-fatality rate 35.6%), have been reported to the World Health Organization (WHO) from a total of 27 countries. The majority of cases have been reported in the Middle East (3). Transmission has most commonly been associated with nosocomial outbreaks (4–8).
Saudi Arabia is considered the epicentre of MERS-CoV. Since 2012, a total of 1844 cases of MERS-CoV have been reported, with 716 related deaths and a case-fatality rate of approximately 38.8% (3). Between January through May 2018, the Ministry of Health reported 75 laboratory confirmed cases with 23 deaths occurring in 4 distinct clusters (2 health care and 2 household clusters) in different regions of the country. Among these recent clusters, a household cluster was reported from Najran region with 8 reported cases, and the source of infection is believed to be camels at the initial patient’s home (3,9). This epidemiologic pattern poses great public health challenge to the local health authorities and health care sectors in view of the fact that Saudi Arabia traditionally hosts large gatherings such as the Hajj pilgrimage (10–12).

So far, no vaccine has been developed for MERS and no antiviral treatment is specifically recommended. Therefore, applying preventive measures to reduce the spread of the disease is of the utmost importance (13). The WHO and the Centers for Disease Control and Prevention (CDC) have published recommendations for the prevention and control of MERS infection in health care settings (14). This includes hand hygiene, wearing personal protective equipment, and patient placement (15).

Given the mode of MERS transmission, health care workers (HCWs) in contact with MERS patients are expected to be at a high risk of infections. Previous clinical studies have shown that the seroprevalence of MERS-CoV among HCWs who had had contact with MERS patients ranged from 0.3% to 20.9%. Therefore, use of personal protective equipment is crucial to reducing transmission. Gowns and gloves are recommended as a contact precaution, and surgical masks are recommended as a droplet precaution (16–19). However, these effective infection prevention and control practices depend on awareness and compliance among HCWs at all levels (15). A poor level of knowledge has been implicated in the rapid spread of the infection in hospitals (18). Despite many previous Saudi Arabian studies examining the knowledge and practices in regard to MERS among HCWs in different regions of the country (10,11,20,21), data from the south-western region are scarce. In addition, HCWs represent a major section of the Saudi Arabian population and constitute a considerable source of infected cases in the country (16,17). Najran region alone has 7 general hospitals and 55 primary health care centres, with a total of 3320 HCWs, including 784 physicians and 1842 nurses, according to the Ministry of Health statistics (9).

This study aimed to investigate the knowledge and attitude of HCWs toward MERS infection in south-western Saudi Arabia. The findings may be useful in recommending any remedial measures and additional interventions in the study area to improve awareness and attitudes among HCWs.

**Methods**
Sample

This cross-sectional, descriptive study of a representative sample of Saudi HCWs (physicians, dentists, pharmacists, nurses and laboratory staff) in primary health care centres and hospitals in Najran, a city in south-western Saudi Arabia, was conducted from June to October 2016. The study was conducted according to the international guidelines of Strengthening the Reporting for Observational Studies in Epidemiology; STROBE (22). The sample size required for the study was estimated to be 685, based on an average previous estimate of 54% MERS awareness among Saudi HCWs (10), with an absolute precision of 2% and at a 95% confidence interval. To avoid loss of participants, a total sample of 870 HCWs was included in the present study. A stratified proportional allocation random sample was used. The stratification factors taken into consideration were the age, sex, type of health care speciality and relative number and type of health care facility.

The study followed the principles of the Helsinki Declaration and ethical approval was obtained from the ethics and research committee of Najran University. Written consent was obtained from all participants.

Questionnaire interview

A standardized questionnaire was distributed and completed by all participants inside their health care facilities (primary health care centres and hospitals) during the first 2-month period of the study. The self-administered questionnaire was developed, with some modifications, using the frequently asked questions from the WHO and the Saudi Ministry of Health websites (9,23).

The questionnaire was initially designed in English and translated into Arabic by experts in infectious diseases and biostatistics to match with the local colloquial Arabic terminology used by physicians and health educators in the community. After translation and back translation (24), the questionnaire was pilot tested on 20 HCWs (7 doctors, 6 nurses and 13 technicians) who are not included among the study participants to determine acceptability and the clarity of the questions, and to confirm its face validity; it was then modified accordingly.

The questionnaire comprised 3 parts addressing knowledge and attitude of HCWs regarding MERS. The first part covered demographic data such as age, sex, current job and participants’ source of knowledge on MERS (6 items). The second part assessed the knowledge of HCWs by asking questions about the etiology, incubation period, symptoms, risk group, consequences, source of transmission, prevention and treatment of MERS (11 items). A scoring system was
applied to assess the level of knowledge of each subject, as has been previously used (with some modifications) (11): 2 points for each correct answer, 1 point for an incorrect answer. A total of ≥ 12 points (≥ 60% of total marks) was considered sufficient knowledge. Participants were grouped into 2 categories according to their level of knowledge: insufficient (}