

Medical residents' attitudes and emotions related to Middle East respiratory syndrome in Saudi Arabia

A cross-sectional study

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ABSTRACT

الأهداف: تحديد موقف الأطباء المقيمين ومشاعرهم وتصوراتهم تجاه تفشي متلازمة الشرق الأوسط التنفسية الناجمة عن فيروس كورونا.

الطريقة: هذه دراسة مقطعية، على شكل استبيانات ذاتية، جرى توزيعها وتجميعها قبل بدء الأنشطة التعليمية للأطباء المقيمين في أربعة مستشفيات في الرياض، بالمملكة العربية السعودية. وجرى الحصول على بيانات الاستبيان بين شهري نوفمبر 2015 ويناير 2016. اشتمل الاستبيان على أسئلة متعلقة بالبيانات السكانية (الديموغرافية) للمقيمين، ومشاعرهم وموقفهم وتصوراتهم بالنسبة إلى تفشي فيروس كورونا المسبب لمتلازمة الشرق الأوسط التنفسية.

النتائج: من بين 228 مشاركاً خضعوا للدراسة، كان 85.5% منهم يعتقدون أن عملهم يعرضهم لخطر الإصابة بالعدوى، بينما كان ثلثهم يعتقدون أن أسرهم معرضة لخطر أكبر للعدوى. ولكن 2.6% منهم فقط أبدوا رغبة بتغيير عملهم. وأشار ما يقرب من نصف هؤلاء المقيمين إلى أن المستشفى الذي يعملون فيه كانت لديه خطة واضحة، بينما ارتأت 28% منهم فقط أنهم غير مستعدين جيداً للتعامل مع تفشي فيروس كورونا.

الخاتمة: تُلقي دراستنا الضوء على موقف المقيم، والتأثير النفسي لحالات تفشي فيروس كورونا، المسبب لمتلازمة الشرق الأوسط التنفسية، في الأطباء المقيمين. ولذلك، لا بد من اهتمام واضعي السياسات في المستشفيات بشكل أكبر بمخاوف المقيمين ومشاعرهم، فيما يتعلق بمتلازمة الشرق الأوسط التنفسية.

Objectives: To determine medical residents' emotions, attitudes, and knowledge related to Middle East respiratory syndrome (MERS) outbreaks.

Methods: In this is a cross sectional study, self-administered questionnaires were distributed and

collected before resident education activities in 4 tertiary hospitals in Riyadh, Kingdom of Saudi Arabia, between November 2015 and January 2016. The questionnaire included questions related to residents' demographic data and their emotions, attitudes, and knowledge related to an MERS outbreak.

Results: Of the 228 participants analyzed, 85.5% believed their work put them at risk of infection, and two-thirds believed their family was exposed to a greater risk of infection. However, only 2.6% would change their job. Nearly half of the residents indicated that their hospital had a clear plan, and only 28% considered themselves not well prepared for an MERS outbreak.

Conclusions: Our study highlights medical residents' attitude and emotions related to MERS outbreaks. Residents' concerns and emotions in relation to MERS should be considered in greater detail by hospital policymakers.

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Healthcare workers and residents in hospitals are at high risk of Middle East Respiratory Syndrome (MERS) due to their close contact with MERS patients. In addition to the high physical strain of caring for patients potentially infected with MERS, healthcare workers face a tremendous mental burden in doing so, particularly given that the mortality rate of MERS is high, at 36% (namely, one out of 3 patients die).¹ The World Health Organization (WHO) claims that MERS, which is caused by a strain of corona virus (called MERS-CoV), is “a threat to the entire world”.² The MERS is highly contagious through direct contact with infected patients. Globally, the WHO has reported 1,621 laboratory-confirmed cases of infection with MERS-CoV, and there have been nearly 584 deaths related to MERS-CoV since September 2012.³ The first case was reported in 2012 in Jeddah, the Kingdom of KSA, wherein the MERS-CoV was detected in the sputum of a patient with acute pneumonia and renal failure.⁴ Apart from KSA, nearly 22 countries, including the United Arab Emirates, Kuwait, Qatar, Indonesia, the United Kingdom, and the United States, have confirmed MERS cases.³ The clinical presentation of MERS ranges from mild flu-like symptoms to severe acute respiratory illness and death; mortality is especially common among patients with comorbidities. Recent epidemiological research has highlighted a number of psychiatric morbidities associated with exposure to devastating epidemics of novel and highly lethal viruses.^{5,6} For medical professionals, the psychological effects of such exposure can jeopardize the medical care they provide. This highlights the need to review the Saudi health care system and policies related to infection control. In the present study, we describe medical residents’ emotions, attitude, and perceptions related to an MERS outbreak. Several past studies have examined this for similar, equally threatening, outbreaks such as severe acute respiratory syndrome (SARS)^{5,6} and influenza,⁷ but never for an MERS outbreak. Understanding the fears, anxieties, and reactions of medical residents in close contact with MERS patients may help in devising better personal and family support for hospital employees, which will ultimately aid residents in facing the MERS crisis.

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Methods. Setting and participants. Four tertiary hospitals in Riyadh, Kingdom of Saudi Arabia (KSA) were included in this study: King Khalid University Hospital, King Fahad Medical City Hospital, King Abdulaziz Medical City Hospital, and King Faisal Specialist Hospital. We included all Saudi Board Internal Medicine residents who rotated into these hospitals between November 2015 and January 2016. Data were collected using self-administered questionnaires, which were distributed and collected before resident education activities. The questionnaire contained a short description of the study aim and objectives. The study was conducted after obtaining ethical approval from the King Saud University Research Center (Research Project Number E-16-1873).

Content of the questionnaire. We adopted and modified an existing questionnaire based on a literature review.⁸ The questionnaire comprised 2 parts. The first part contained questions on participants’ background information, including age, marital status, training level (ranging from R1 to R4), and knowledge of MERS (ranging from bad to good). The second part comprised 4 main sections that included an assessment of 1) work-related and 2) non-work related emotions, 3) the residents’ attitude toward MERS, and (4) their knowledge of an MERS outbreak. Each question in these sections was measured using a 3-point Likert scale that ranged from “disagree” (1) to “agree” (3). We piloted the questionnaire in a group of 10 residents to assess its clarity.

Statistical analysis. All data were summarized as frequencies (percentages) or medians (interquartile ranges [IQRs]). We examined the relationships between age and the main variables (emotions, attitudes, and knowledge) using Spearman’s rank correlations. Spearman’s correlations were also used to determine the relationships between work-related concerns and knowledge of an MERS outbreak. All statistical analyses were performed using the Statistical Package for the Social Sciences (IBM Corp., Armonk, NY) version 21.

Results. Response rate and background characteristics. A total of 228 questionnaires were analyzed (response rate: 75%). Table 1 shows the descriptive statistics of participants’ background characteristics. The median (IQR) age was 26 years (25-28 years). Most of participants were male and single (65% for both), and 94% of participants rated their level of knowledge about MERS as fair or good

Work- and non-work-related emotions. Table 2 shows the percentage of participants who selected each

answer option for the work-related and non-work-related emotions questions. Overall, most of residents agreed that their work put them at risk (85.5%) and that this risk was a part of their job (60%). Most of the residents did not agree that they should not look after MERS patients (64%). Furthermore, while around half of the residents reported being afraid of a MERS infection, 2.6% reported that they might change their current job due to the risk. At least two-thirds of the

residents believed that their job put their family at a greater risk of infection.

Attitude and knowledge of MERS outbreak.

Table 3 presents the percentages of participants who selected each answer option for the questions on attitudes toward and knowledge of an MERS outbreak. For the attitude questions, more than half of the respondents disagreed with the idea that people would avoid them and their family due to a higher risk of infection associated with their job. However, nearly 39% of the residents said agreed that they avoided telling their family about this potentially greater risk. For the knowledge questions, approximately half of the participants reported having attended infection control training and had received adequate personal protective equipment training. Nearly 47% of residents believed that their hospital had a clear plan for handling a MERS outbreak. However, a minority of residents felt that they were not personally well prepared for a MERS outbreak (28%).

Correlation analysis. Correlations between the work-related emotions and knowledge questions are shown in Table 4. Overall, participants who believed their hospital to have a clear plan for handling a MERS outbreak were less likely to feel that they should not look after MERS patients ($\rho=-0.14$, $P=0.038$) or that they might change their job due to the risk of MERS ($\rho=-0.14$, $P=0.037$). Furthermore, they were more likely to agree that the risk of contracting MERS was a part of the job ($\rho=0.16$, $P=0.015$) and to feel

Table 1 - Characteristics of survey respondents of medical residents in 4 tertiary hospital between November 2015 and January 2016.

Characteristics	n (%)
<i>Gender</i>	
Male	148 (64.9)
Female	80 (35.1)
<i>Marital status</i>	
Unmarried	153 (67.0)
Married	75 (33.0)
<i>Training level</i>	
R1	92 (40.4)
R2	43 (18.9)
R3	54 (23.7)
R4	39 (17.1)
<i>Knowledge of MERS</i>	
Bad	12 (5.3)
Fair	105 (46.0)
Good	11 (48.7)
Age, median (IQR)	26 (25-28)

IQR - interquartile range,
MERS - Middle Eastern Respiratory Syndrome

Table 2 - Percentages of responses to the work- and non-work-related emotions questions.

Questions	n	Disagree (%)	Neutral (%)	Agree (%)
<i>Work-related emotions</i>				
My job puts me at great risk of exposure to MERS	228	5.0	9.5	85.5
I am afraid of being infected with MERS	228	17.6	29.4	53.0
I should not look after MERS patients	228	64.0	20.6	15.4
The risk I am exposed to is unacceptable	228	40.8	32.0	27.2
I accept that the risk of contracting MERS is a part of my job	228	21.0	19.0	60.0
I might change my job due to the risk of contracting MERS	228	86.4	11.0	2.6
I am confident that my hospital would look after me if I were to ever contract MERS	227	23.0	20.0	57.0
<i>Non-work-related emotions</i>				
I would be concerned for my:				
1. Wife/husband	75	6.0	5.0	89.0
2. Parents	224	7.0	8.0	85.0
3. Children	214	9.3	25.2	65.5
4. Close friends	221	9.5	17.5	73.0
5. Work colleagues	222	7.7	17.6	74.7
People close to me would be worried about my health	226	6.0	19.0	75.0
People close to me would be worried that they might get infected through me	226	11.3	24.0	64.7

MERS - Middle Eastern Respiratory Syndrome

Table 3 - Percentages of responses to the attitudes toward and knowledge of an MERS outbreak questions (n=228).

Question	Disagree	Neutral	Agree
I would be afraid of telling my family about the risk I am exposed to	40	21	39
People would avoid me due to my job	59	22	19
People would avoid my family members due to my job	85	10	5
I would avoid telling other people about the nature of my job	69	12.6	18.4
There would be inadequate staff at my workplace to handle the increased demand	29.8	30.7	39.5
There would be more conflict among colleagues at work	35	34.7	30.3
I would feel more stressed at work	29.4	24.6	46
I would see an increase in workload	36.5	7.5	56
Knowledge and preparedness for an MERS outbreak			
I have attended infection control training sessions	36.5	7.5	56
In our hospital, we have a sufficient number of infection control staff	26.3	30.7	43
I have attended infection control-related meetings	53.9	11.4	34.7
Our hospital has a clear plan for handling an MERS outbreak	19	34	47
I have received adequate personal protective equipment training	36	19	45
I am personally prepared for an MERS outbreak	28	33	39

MERS - Middle Eastern Respiratory Syndrome.

Table 4 - Spearman's correlations between knowledge of an MERS* outbreak and work-related emotions in the last in the last 6 months.

Standards	My job puts me at great risk of exposure to MERS	I should not be looking after MERS patients	I accept that the risk of contracting MERS is a part of my job	I might change my job due to the risk of contracting MERS	I am confident that my hospital would look after me if I were to ever contract MERS
I have attended infection control training sessions	$\rho=0.04$ P=0.552	$\rho=0.01$ P=0.855	$\rho=-0.03$ P=0.700	$\rho=0.13$ P=0.053	$\rho=-0.03$ P=0.610
Our hospital has a clear plan for handling an MERS outbreak	$\rho=-0.04$ P=0.610	$\rho=-0.14$ P=0.038	$\rho=0.161$ P=0.015	$\rho=-0.14$ P=0.037	$\rho=0.29$ P=0.001
I have received adequate personal protective equipment training	$\rho=-0.03$ P=0.643	$\rho=0.09$ P=0.190	$\rho=0.09$ P=0.186	$\rho=0.04$ P=0.575	$\rho=0.11$ P=0.099
I am personally prepared for an MERS outbreak	$\rho=0.08$ P=0.211	$\rho=-0.20$ P=0.002	$\rho=0.15$ P=0.026	$\rho=-0.16$ P=0.019	$\rho=0.10$ P=0.126

MERS - Middle Eastern Respiratory Syndrome, ρ - Spearman's rank correlation coefficient, P - probability value

confident that the hospital would look after them if they contracted MERS ($\rho=0.29$, $p<0.001$).

Residents who felt personally ready for a MERS outbreak were more likely to accept the risk as part of their job ($\rho=0.15$, $p=0.026$) and to disagree that they should not look after MERS patients ($\rho=-0.20$, $p=0.002$) or that they might change their job due to the risk of MERS infection ($\rho=-0.16$, $p=0.019$). We also observed a significant correlation between having received adequate personal protective equipment training and acceptance of the risk as part of their job ($\rho=0.15$, $p=0.022$) As their age increased, respondents were significantly more likely to report being afraid of infection ($\rho=0.15$, $p=0.02$,) and that the risk they were exposed to was unacceptable ($\rho=0.21$,

$p=0.001$). Respondents who were married were more likely to agree that the risk they were exposed to was unacceptable compared to those who were not currently married ($p=0.005$). There were no other differences by marital status or gender. As training level increased, participants were more likely to feel that they should not be looking after patients ($p=0.007$) and that the risk they were exposed to was unacceptable ($p=0.001$). Finally, participants with higher self-rated knowledge of MERS were more likely to feel that the job put them at risk ($p=0.006$), but were also more likely to accept the risk as part of their job ($p=0.003$).

Discussion. We examined the attitudes and emotions related to an MERS outbreak of the medical

residents serving as frontline physicians in 4 tertiary care hospitals in Riyadh, KSA. Overall, our results indicated that most of medical residents believed their job put them at considerable risk of exposure and were afraid of contracting MERS; however, they also believed that it was part of their professional duty to care for MERS patients and accepted this risk of infection. Participants were also not willing to change their jobs due to the risk of exposure to MERS and they were confident that the hospitals would look after them if they were infected. These results generally accord with 2 recently published studies conducted in KSA among health care workers (HCWs), which sought to examine their attitudes and concerns regarding the emerging outbreak of MERS-CoV. In particular, in both studies, HCWs reported that their job put them at a high risk of contracting the infection.^{9,10} For example, Abolfotouh et al⁹ reported that around 70% of surveyed participants felt at risk of contracting a MERS-CoV infection at work, although around 61% felt obligated to provide medical care for patients infected with MERS-CoV. These findings are also consistent with studies conducted in other countries dealing with different viral outbreaks that had major emotional impacts on healthcare workers.⁵⁻⁷ For instance, during the SARS outbreak in 2003, approximately two-thirds of healthcare workers in Toronto experienced concern for their own or their family's health.⁶ In Hong Kong, 68% of participants reported a high level of stress and 57% were found to have experienced psychological distress; high stress was much more common among nurses and younger workers.⁶ Unsurprisingly, most medical residents at the 4 centers recognized their professional obligation to look after patients with MERS despite the potential risk to themselves. This contrasts with the findings of a previous study in Australia during the avian influenza outbreak of 2006, wherein a hospital staff absentee rate of 38% was found.¹¹ Similar findings to the Australian study were reported in Hong Kong and Mainland China during the SARS outbreak, wherein a large number of HCWs were absent or refused to look after the infected patients.⁶ By contrast, in Germany, only 28% of surveyed healthcare workers agreed that it would be professionally acceptable for healthcare workers to abandon their workplace during an influenza pandemic to protect themselves and their families, whereas 52% disagreed with this statement.¹² We found that older residents were more likely to report being afraid of infection than were younger residents. This is in contrast to Nickell et al⁵ study, wherein 73% of staff who were younger than 30 years of age reported

being concerned about infection, compared with only 65.6% of staff who were older than 50 years Tam et al⁶ reported a similar finding to Nickell et al⁵ younger staff members were more prone to job stress during a SARS outbreak than were older staff. However, in both Tam et al⁶ and Nickle et al⁵ studies, medical doctors were a minority of participants, making up only 9% and 3% of their cohort. In contrast, Wong et al⁸ report no significant differences in distress among the age groups⁸ In line with our study, Abolfotouh et al⁹ reported that a greater percentage of HCWs who were older than 35 years of age reported a high level of concern about infection than did HCWs who were younger than 35 years (27% versus 23%)¹² Our finding may be attributed to the fact that we included only physicians. In addition, the cultural background of our sample might have influenced our findings: older physicians tend to have families and to be supporting their loved ones. Moreover, the median age of our sample differed from that of previous studies showing that younger staff had more concerns about infection than did older staff. In our study, around half of residents reported receiving adequate training in the use of personal protective equipment. In contrast, a study of HCWs affiliated with the Ministry of Health showed that most of participants lacked confidence in using protective equipment¹⁰

The difference in findings might be attributed to the fact that our study was conducted at a tertiary hospital, which tend to have more opportunities for continuing medical education and hold more workshops. Moreover, the available level of expertise is often greater than that of primary or secondary hospitals. Another reason might be that we used medical residents as a sample, whereas most of participants in the other studies were nurses. The limitations of the present study include the cross-sectional research design and the possibility of reporting bias. Moreover, because the study was conducted in 4 tertiary hospitals in a single city, the results might not be generalizable to residents in other parts of the country. Although the MERS outbreak started in Jeddah, it has continued since its discovery in 2012 and spread to most of the hospitals in the country, including those involved in this study. Therefore, it is likely that all medical residents in these 4 hospitals had been exposed to or cared for suspected cases of MERS-CoV. Nevertheless, our study provides initial evidence for the attitudes, perceptions, and emotions related to an MERS outbreak among medical residents.

In conclusion, medical residents are the frontline physicians in handling patients with MERS during outbreaks, a fact that causes them and their families

serious concern and stress. In spite of this, their work performance and patient care does not appear to be affected. All medical staff, including medical residents, should be educated and provided with all the necessary infection control measures as well as effective psychosocial support. Furthermore, medical residents' concerns and stress should be addressed in institutions' planning of MERS outbreak strategies.

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Supplements

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