



Factors Associated with Burnout among Healthcare Workers during an Outbreak of MERS

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Objective Although healthcare workers (HCWs) experienced significant stress during the 2015 outbreak of Middle East Respiratory Syndrome (MERS), the factors associated with this stress remain unknown. Thus, the present study assessed burnout among HCWs during the MERS outbreak to identify the influential factors involved in this process.

Methods This study was a retrospective chart review of the psychological tests and questionnaires completed by 171 hospital employees from two general hospitals that treated MERS patients. The tests included the Oldenburg Burnout Inventory, Positive Resources Test, the questionnaires assessed exposure to the MERS outbreak event and perceptions about MERS.

Results Of the 171 HCWs, 112 (65.5%) experienced disengagement and 136 (79.5%) suffered from exhaustion. Disengagement was associated with lower levels of purpose and hope, a higher perception of job risk, and exposure to the media. Exhaustion was associated with lower levels of purpose and hope, a higher perception of little control of the infection, a higher perception of job risk, prior experience related to infections, and being female.

Conclusion Our results revealed the risk and protective factors associated with burnout among HCWs during an outbreak of MERS. These findings should be considered when determining interventional strategies aimed at ameliorating burnout among HCWs.

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Key Words Burnout, Middle East Respiratory Syndrome, Infectious disease, Healthcare workers.

INTRODUCTION

Middle East Respiratory Syndrome (MERS) is a respiratory disease that can result in death. It was first reported in September 2012 in Saudi Arabia and then spread throughout the world in 2015.¹ South Korea had the second highest number of MERS cases in the world (n=186) and 38 people died.² During an outbreak of an infectious disease, healthcare workers (HCWs) are easily exposed to intense psychological responses. Thus, burnout is an important factor to consider during such events because it results in HCWs detaching themselves from work and performing at a suboptimal level.^{3,4} Burnout is a state of physi-

cal and emotional depletion that results from persistent exposure to stressful working conditions.⁵ This state consists of exhaustion, which is associated with feelings of emptiness, being drained, and a desire to rest, as well as the experience of disengagement, which results in cynical behavior and distancing oneself from work.⁶ Cimiotti et al.⁷ emphasized that reducing burnout is an important factor when fighting infectious disease in acute care facilities.

Considerable research has assessed burnout in HCWs. For example, Edwards et al.⁸ suggested that burnout in HCWs is affected by organizational factors such as increased workload, time pressures, safety issues, role ambiguity, lack of supervision, and reduced resources. In addition, individual factors such as physical illness, personality, coping strategies, and job attitude also play an influential role.⁹⁻¹¹ Maunder et al.¹² assessed burnout in HCWs during the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) and found that perceived adequacy of training, support, and an adaptive coping style are protective against burnout.

However, few studies have investigated burnout during or

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after a MERS outbreak. Kim and Choi¹³ examined burnout after MERS in terms of job stress caused by MERS, fear of MERS infection, hospital resources for the treatment of MERS, and support from family and friends. Although they found that job stress, poor hospital resources, and poor support from family and friends explained 47.3% of burnout, they did not examine whether personal strength or coping could prevent burnout or how experiences at the time of the incident and perceptions about epidemic disease impact it. Thus, we investigated the proportion of HCWs that suffered from burnout (i.e., engagement and exhaustion) during the 2015 outbreak of MERS and the protective and/or risk factors associated with it (i.e., engagement and exhaustion).

METHODS

Setting and sample

The present study was conducted between June 2015 and June 2016 during the MERS outbreak. A retrospective chart review of psychological tests completed by 171 hospital employees from two general hospitals that treated MERS patients was conducted; the sample consisted of 32 doctors, 77 nurses, and 61 others (i.e., pharmacists, technician, officers, and so forth). Approval was obtained from the Institutional Review Board of National Medical Center in Korea (no. H-1507-056-004).

Measurements

Burnout

Burnout was measured with the Oldenburg Burnout Inventory (OLBI), which was validated in Korean by Na.^{14,15} This scale includes 16 items: 8 measure exhaustion (e.g., “There are days when I feel tired before I arrive at work”) and 8 measure disengagement (e.g., “It happens more and more often that I talk about my work in a negative way”). Each of the subscales includes four positively worded items and four negatively worded items and each item is scored on a scale ranging from 1 (strongly agree) to 4 (strongly disagree). As described in a previous study, the following cutoff scores were defined as high: ≥ 16.8 for disengagement and ≥ 18 for exhaustion.¹⁶ In the present study, the Cronbach’s alpha values were 0.70 for disengagement and 0.82 for exhaustion.

Positive resources

Positive resources were measured with the Positive Resources Test, which was developed and validated in Korean by Huh et al.¹⁷ This measure includes 23 items scored on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores are generated for five subscales: optimism, purpose and hope, self-regulation, social support, and caring and serving.

Their Cronbach’s alpha values were 0.79, 0.78, 0.55, 0.70, and 0.81, respectively.

Exposure to MERS

Participants also answered the following questions about their exposure to MERS: “Have you been within 2 meters of a MERS patient while not wearing personal protective equipment (PPE)?” “Have you treated MERS patients in person while wearing PPE?” “Have you experienced MERS-like symptoms after contact with MERS patients?” “Have you ever been quarantined?” “Have your hospital or employees been exposed to media reports about the MERS outbreak, such as TV, internet, radio and so on?” All questions were answered with either “yes” or “no.”

Perceptions about MERS

Perceptions about MERS were assessed with a 10-item measure similar to the one described by Chong et al.¹⁸ Questions addressed the following: perceived job risk, acceptance, fear of falling ill with MERS, lack of control over infection, chance of survival if infected, fear of infecting others with MERS, concern about infecting family and friends, and other’s avoidance of their family because of their work. Each item was answered on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Because items were heterogeneous, we treated each item as a separate variable (Table 1).

Data analyses

All data were analyzed using SPSS for Windows version 22.0 (IBM Corp., Armonk, NY, USA). The means and standard deviations (SD) were calculated for burnout, positive resources, and MERS-related recognition. Categorical data were summarized using frequencies and percentages of occurrence (sex, job title, and so forth). The psychological effects of the MERS outbreak on employees were assessed based on scores on items measuring burnout and factors that might explain the variance in burnout were identified using between-group differences and correlation analyses. Between-group differences in para-

Table 1. Major items of perception about MERS

Items
My job puts me at great risk
I accept the risk of caring for MERS patients
I am afraid of falling ill with MERS
I have little control over whether I get infected or not
I have little chance of survival if I were to get MERS
I am afraid I will pass MERS to others
My family and friends are worried they might get infected through me
People avoid my family because of my work

MERS: Middle East Respiratory Syndrome

metric variables were determined using Student's t-tests and analysis of variance (ANOVA) and differences in non-parametric variables were determined using Mann-Whitney U tests. Correlation analyses were performed on continuous variables. Stepwise regression analyses were performed to derive predictive model for burnout. All factors identified as significant by the difference tests and correlation analyses were included as predictor variables and burnout (exhaustion, disengagement) was treated as the criterion variable. Statistical significance was set at $\alpha=0.05$ (two-tailed).

RESULTS

General characteristics

Table 2 presents the characteristics of the total sample. Of the 171 participants, the mean age was 34.2 years ($SD=9.8$), 66.1% were female, 45.3% were nurses, 18.8% were doctors, 17.65% were pharmacists or other healthcare workers, 18.24% were technicians or office workers, and 88.7% had received MERS education. In addition, 3.5% were exposed to one or more MERS patients within 2 m without personal protective equipment (PPE), 44% had cared for MERS patients in person with PPE, 7.3% experienced MERS-like symptoms, 3% were quarantined, and 78.6% responded that their hospital or employees were exposed to MERS-related media.

Prevalence of burnout

The mean score for disengagement was 17.6 and the mean score for exhaustion was 20.7 (Table 3). More than 65.8% of participants experienced disengagement and more than 79.5% experienced exhaustion.

Factors influencing burnout

To identify the factors that influenced burnout, between-group analyses of demographic variables, medical history, traumatic experiences, work-related characteristics, and exposure to MERS were conducted (Table 4). The level of disengagement significantly differed according to sex, work experience, providing care while using PPE, and exposure to media. The level of exhaustion significantly differed according to sex, prior traumatic events, prior experience related to infection, job type, providing care while using PPE, and exposure to media.

Correlation analyses were performed to assess positive resources and perceptions about MERS (Table 5). The level of disengagement was significantly correlated with optimism, purpose and hope, self-regulation, caring and serving, perceived job risk, fear of falling ill with MERS, lack of control over infection, little chance of survival if infected, fear of passing MERS to others, worry of family and friends getting infected through oneself, and avoiding one's family because of one's work. The

Table 2. General characteristics of the participants (N=171)

	N (%)	M (SD)
Sociodemographic variables		
Gender		
Female	113 (66.1)	
Male	58 (33.9)	
Age		34.2 (9.8)
Job type		
Doctor	32 (18.8)	
Nurse	77 (45.3)	
Pharmacist, other health care worker	30 (17.65)	
Technician, office worker	31 (18.24)	
Working experience		
<3 year	51 (30.0)	
3–10 year	69 (40.6)	
>10 year	50 (29.4)	
MERS education	149 (88.7)	
Exposure to MERS		
Exposure without PPE	6 (3.5)	
Caring with PPE	74 (44.0)	
MERS like symptoms	12 (7.3)	
Quarantined	5 (3.0)	
Exposure to media	125 (78.6)	
Traumatic experiences		
Prior traumatic events	36 (21.7)	
Prior infection experience	53 (32.1)	

PPE: personal protective equipment, MERS: Middle East Respiratory Syndrome

Table 3. Prevalence of the burnout (N=171)

Burnout	M (SD)	Range (%)
Disengagement (≥ 16.8)	17.6 (2.5)	10–31 (65.8)
Exhaustion (≥ 18)	20.7 (3.5)	9–30 (79.5)

level of exhaustion was significantly correlated with optimism, purpose and hope, self-regulation, social support, perceived job risk, acceptance, fear of falling ill with MERS, lack of control over infection, little chance of survival if infected, fear of passing MERS to others, worry of family and friends getting infected through oneself, and avoiding one's family because of one's work.

Stepwise regression analyses were conducted to determine which variables accounted for significant variance in burnout (Table 6); variables that were significant ($p<0.05$) in previous analyses were retained. Purpose and hope, perceived job risk, and exposure to media explained 33% of disengagement and purpose and hope, lack of control over infection, perceived job risk, prior experience related to infection, and sex explained 38% of exhaustion.

DISCUSSION

We found that 65.5% of HCWs reported disengagement and

79.5% reported exhaustion during the 2015 MERS outbreak. In addition, disengagement was associated with lower levels of purpose and hope, the perception of higher job risk, and ex-

Table 4. Relationship of gender, marital status, living with family, medical history, traumatic experience, work-related characteristics, exposure to MERS to burnout

	N	Disengagement		Exhaustion	
		M (SD)	t, F/p	M (SD)	t, F/p (scheffe)
Sociodemographical variables					
Gender					
Female	113	18.0 (2.4)	t=2.68/p=0.016	21.4 (3.4)	t=3.72/p<0.001
Male	58	17 (2.6)		19.3 (3.4)	
Job type					
Doctor ¹	32	18.4 (2.5)	F=1.63/p=0.104	20.8 (3.3)	F=6.12/p=0.006 (2>3)
Nurse ²	77	17.7 (2.4)		21.4 (3.3)	
Others ³	61	17.2 (2.6)		19.6 (3.5)	
Working experience					
<3 year	51	17.2 (2.6)	F=3.79/p=0.043	20.4 (3.1)	F=0.27/p=0.599
3–10 year	69	18.2 (2.5)		21.0 (3.7)	
>10 year	50	17.3 (2.3)		20.5 (3.5)	
MERS education					
Yes	149	17.6 (2.5)	t=3.67/p=0.586	20.6 (3.4)	t=0.98/p=0.426
No	19	17.9 (2.6)		21.3 (4.2)	
Traumatic experience					
Prior traumatic events					
Yes	36	18.1 (2.4)	t=-1.66/p=0.148	21.8 (3.3)	t=-2.09/p=0.023
No	130	17.5 (2.5)		20.3 (3.4)	
Prior experience related to infection					
Yes	53	18.1 (2.1)	t=-1.77/p=0.052	21.6 (3.3)	t=-2.91/p=0.007
No	112	17.3 (2.6)		20.1 (3.3)	
Exposure to MERS					
Exposure without PPE					
Yes	6	18.8 (2.7)	t=-1.00/p=0.231	22.8 (2.6)	t=-1.93/p=0.071*
Uncertain or no	164	17.6 (2.5)		20.6 (3.5)	
Caring with PPE					
Yes	74	18.3 (2.7)	t=2.61/p=0.006	21.5 (3.7)	t=-3.00/p=0.003
No	94	17.2 (2.2)		20.0 (3.2)	
MERS like symptoms					
Yes	12	18.7 (1.9)	t=2.06/p=0.147	22.5 (3.1)	t=2.15/p=0.063
No	152	17.6 (2.5)		20.6 (3.5)	
Quarantined					
Yes	5	19.4 (3.0)	U=269*/p=0.289	22.2 (4.2)	U=289*/p=0.210
No	160	17.6 (2.5)		20.6 (3.5)	
Exposure to media					
Yes	125	18.0 (2.4)	t=3.73/p<0.001	21 (3.4)	t=2.37/p=0.014
No	34	16.3 (2.4)		19.4 (3.3)	

*Mann-Whitney U test

Table 5. Relationship of the age, positive resources and perception about MERS to the burnout

	Disengagement		Exhaustion	
	Pearson r	p	Pearson r	p
Age	-0.131	0.089	-0.199	0.009
POREST				
Optimism	-0.418	<0.001	-0.412	<0.001
Purpose and hope	-0.455	<0.001	-0.394	<0.001
Self regulation	-0.381	<0.001	-0.418	<0.001
Social support	-0.098	0.204	-0.165	0.031
Caring and serving	-0.252	0.001	-0.137	0.074
Perception about MERS				
Perceived job risk	0.375	<0.001	0.413	<0.001
Acceptance	0.102	0.189	0.182	0.018
Fear of falling ill with MERS	0.199	0.009	0.305	<0.001
Lack of control over infection	0.256	0.001	0.387	<0.001
Little chance of survival if infected	0.163	0.034	0.185	0.016
Fear of passing MERS to others	0.284	<0.001	0.410	<0.001
Worrying of family and friends of getting infected through me	0.282	<0.001	0.374	<0.001
Avoiding my family because of my work	0.158	0.041	0.255	0.001

Table 6. Variables that explain variance in burnout

	β	t	p
Dependent variable: disengagement			
Purpose and hope (in POREST)	-0.321	-5.971	0.000
Perceived job risk (in Perception of MERS)	0.457	3.346	0.001
Exposure to media	1.240	3.070	0.003
	Model R ² =0.33, p-value<0.001		
Dependent variable: exhaustion			
Purpose and hope (in POREST)	-0.353	-4.910	0.000
Lack of control over infection (in Perception of MERS)	0.821	3.348	0.000
Perceived job risk (in Perception of MERS)	0.446	2.156	0.033
Prior infection work experience	1.120	2.343	0.020
Sex	0.999	2.091	0.038
	Model R ² =0.38, p-value<0.001		

posure to media whereas exhaustion was associated with lower levels of purpose and hope, a lower level of perceived control, and the perception of higher job risk. However, receiving MERS education did not have a significant effect.

It is important to note that the majority of participants in the present study experienced burnout during the outbreak. The rate of burnout was similar to that observed in emergency nurses after the outbreak although the present sample included various job types, including doctors, pharmacists, and technicians.¹³

We also found that, among these groups, nurses reported the highest level of burnout and that women had a higher level of burnout than men. This is in contrast to the findings of Maslach and Jackson,¹⁹ who reported that men are slightly more vulnerable to burnout than women. It is possible that there were more female nurses than females in the other groups and thus future studies should determine whether high levels of burnout are more affected by sex or job. Nonetheless, our findings suggest that nurses should be a priority of interventions aimed at reducing burnout.

Of the personal strength variables, purpose and hope were the most powerful protective factors against both exhaustion and disengagement. This suggests that people who have purpose and hope can bear hardships and cope well with disastrous situations, which is consistent with previous findings. For example, Youssef found that employees with hope report higher levels of job satisfaction, work happiness, and actual performance.²⁰ Similarly, Sherwin et al.²¹ examined occupational burnout among nurses in chronic care rehabilitation units and found that a higher level of hope is significantly associated with lower burnout. Therefore, during an outbreak of epidemic disease, setting attainable purposes and committing to those purposes could aid in the prevention of burnout in HCWs.

We also found that perceptions about MERS were an important variable predicting HCW burnout, particularly in terms of perception of job risk and lack of control. The subjective perception of job risk was a risk factor for both exhaustion and disengagement and lack of control over infection was a risk fac-

tor for exhaustion. Previous studies have emphasized the importance of a sense of control and security in psychological health and Glass and McKnight revealed a modest association between perceived uncontrollability and burnout.^{22,23} It is possible that one's perception of job risk and feelings of lack of control could result in feelings of helplessness, which in turn would result in HCWs detaching themselves from work and feeling exhausted. Preparedness can increase confidence in the ability to do a job as well as psychological well-being.²⁴ However, our results indicate that receiving MERS education was not protective against burnout, which is inconsistent with previous findings showing that perceived adequacy of training is a significant predictive factor.¹² Taken together, these findings suggest that MERS education programs should be revised to strengthen safety and have tougher anti-infection measures to better protect against burnout in HCWs.

In terms of experiences at the time of infection, we found that exposure to media was one of the most important factors. When exposed to media, individuals may feel like they are under constant surveillance and could be subjected to negative comments by anonymous people, which may lead to the experience of stress and withdrawal from work. For example, when MERS broke out in Korea, it was common to observe a social stigma against patients who recovered from the infection, the families of infected people, and HCWs. In this type of environment, exposure to media might be stressful and leave HCWs feeling alienated. Volpone and Avery²⁵ reported that perceived discrimination based on race, sex, age, family obligation, and/or sexual orientation is related to psychological withdrawal that leads to physical issues such as lateness, absenteeism, and the intent to quit. Our findings suggest that discrimination in society as well as in the workplace could lead to burnout among HCWs. Thus, social campaigns and practical measures aimed at decreasing excessive public fear and rumors toward HCWs may be helpful. On the other hand, we found that experience of MERS-like symptoms, quarantine, and exposure without the use of PPE were not significantly associated with burnout. It is possible that the number of HCWs who experienced these situations was insufficient to produce significant results.

We also found that prior work experience with infections was related to high levels of exhaustion, which indicates that experienced workers were more likely to feel tired. It is possible that prior work experience with treating infected patients could be traumatic for workers. For example, workers with repeated indirect traumatic experiences are more likely to experience burnout, and thus the identification and treatment of individuals with traumatic work experience may be effective for reducing future burnout in HCWs.²⁶ It is also possible that experienced workers might be overloaded and have significant responsibilities. A high work load is related to dissatisfaction

at work and differences in quality of care, and thus it may be helpful to properly distribute work responsibilities and focus on experienced workers when intervening to prevent burnout in HCWs.^{27,28}

The present study had several limitations that should be considered. First, we included HCWs from only two hospitals, which may limit the generalizability of the results. Second, although we targeted individuals who performed certain tasks related to MERS, we did not assess the exact tasks that they did at that time, and thus it was not possible to determine which specific tasks or experiences were more likely to lead to burnout. Regardless, our findings suggest that HCWs in risky work situations were more vulnerable to burnout. Third, perceptions about MERS and exposure to MERS were not measured using validated scales. Although the subjective perception of infections is a very important factor related to psychological problems, an appropriate scale has yet to be developed. Thus, it will be necessary to develop and validate instruments that can measure subjective attitudes and perceptions about infections. Fourth, the numbers of HCWs who experienced MERS-like symptoms, were quarantined, and who were exposed to MERS without PPE were insufficient to produce significant results. Future studies should include a sufficient number of individuals with these experiences.

The present findings are meaningful in several ways. First, we found that a majority of HCWs in hospitals that treated MERS patients during the outbreak experienced burnout. Second, nurses, women, and experienced workers are more vulnerable to burnout. Third, our findings expand on previous findings by showing that personal strength and perceptions about infections are important factors that predict burnout in HCWs, which emphasizes the importance of personal strength factors, such as purpose and hope, in protecting workers against burnout. On the other hand, perception of high job risk and a sense of a lack of control are risk factors of burnout. Finally, our findings suggest practical ways to reduce burnout. For example, exposure to media is an important factor in burnout, which suggests that guidelines for the media coverage of epidemic diseases should be set.

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Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: So Hee Lee. Data curation & Investigation: Hyun Chung Kim, So Young Yoo, Kang Uk Lee, So Hee Lee. Formal analysis: Yae Eun Seo, Hae Woo Lee. Funding acquisition: So Hee Lee. Writing—original draft: Yae Eun Seo. Writing—review & editing: So Hee Lee.

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