Factors Influencing Emergency Nurses’ Burnout During an Outbreak of Middle East Respiratory Syndrome Coronavirus in Korea

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S U M M A R Y
Purpose: Emergency department (ED) nurses suffer from persistent stress after experiencing the traumatic event of exposure to Middle East respiratory syndrome coronavirus (MERS-CoV), which can subsequently lead to burnout. This study aimed to assess ED nurses’ burnout level during an outbreak of MERS-CoV and to identify influencing factors in order to provide basic information for lowering and preventing the level of burnout.

Methods: Study participants were ED nurses working in eight hospitals designated for treating MERS-CoV-infected patients in Korea. We performed multiple regression analysis to explore the factors influencing burnout.

Results: The ED nurses’ burnout was affected by job stress ($\beta = 0.59$, $p < .001$), poor hospital resources for the treatment of MERS-CoV ($\beta = -0.19$, $p < .001$) and poor support from family and friends ($\beta = -0.14$, $p < .05$). These three variables explained 47.3% of the variance in burnout.

Conclusions: ED nurses taking care of MERS-CoV-infected patients should be aware that burnout is higher for nurses in their divisions than nurses in other hospital departments and that job stress is the biggest influencing factor of burnout. To be ready for the outbreak of emerging contagious diseases such as MERS-CoV, efforts and preparations should be made to reduce burnout. Job stress should be managed and resolved. Working conditions for mitigating job stress and systematic stress management programs should be provided, and hospital resources for the treatment of MERS-CoV need to be reinforced. Moreover, promoting support from family and friends is required.

Introduction

The Middle East respiratory syndrome coronavirus (MERS-CoV) is an emerging infectious disease that infects the respiratory system. Since its first outbreak in Saudi Arabia, the number of affected countries has been increasing [1,2]. Korea had its first MERS-CoV infected patient in May 2015. As of July 30, 2015, the total number of patients in the country diagnosed with the disease was 186. Of these, 33 patients have died, and 153 patients have been treated [3].

Most MERS-CoV-infected patients first visit a hospital’s emergency department (ED). Consequently, ED nurses are the first healthcare professionals to care for patients infected with the novel contagious disease. In fact, there were many cases of exposure to the disease in EDs during the MERS-CoV outbreak [3]. Compared to nurses in other areas, ED nurses are faced with hectic, unpredictable, and ever-changing situations [4]. Because they deal with various diseases, traumatic events, and urgent situations, they do not have enough time for recovery, putting them under persistent stress. As a result, ED nurses are reported to experience much higher burnout than nurses in other hospital departments [5–7]. Burnout is a long-term consequence of prolonged exposure to certain job demands and a reaction that appears when a person can no longer endure the stress they have been undergoing [8]. It is a syndrome of physical, mental, and emotional exhaustion that includes a negative self-concept and work attitude, and a reduced interest in patients [8]. It has also been strongly associated with working conditions in nursing [5–8], leading it to be the focus of many nursing studies [4–10].

Previous studies of ED nurses’ burnout have focused on the severity of burnout or its influencing factors [4–7]. According to a systematic review of 17 reports on emergency room (ER) nurses’ burnout published over the past 25 years, 26.0% of them suffered from burnout [5]. Although varying between studies, the factors influencing burnout have been largely divided into individual factors and work-related factors [5,9]. Individual factors reported in
previous studies include demographic characteristics such as gender, age, religion, education level [5,9], having children, living with family [10], job stress [7,11], personality, coping strategies, and job attitude [5,9]. Major work-related influencing factors are exposure to traumatic events, level of wages, social support, staffing, and lack of material resources [5,9].

A nationwide outbreak of MERS-CoV is an unfamiliar traumatic event for ED nurses, so there has been little research into MERS-CoV-related burnout. Similarly, when severe acute respiratory syndrome such as SARS spread rapidly, most nurses experienced severe stress, and some nurses refused to care for patients [12,13]. In addition, the factors influencing nurses’ desire to leave their jobs during an outbreak of SARS were identified as the perceived risk of fatality from SARS, tenure, work stress, and social relationships [13]. When H5N1 avian flu spread rapidly, Taiwanese nurses’ fear of infection from the disease was a significant factor influencing their willingness to care for patients infected with the avian flu [14]. Since an emerging respiratory infectious disease such as MERS-CoV can happen anywhere in the world, nursing managers need to pay attention to ED nurses’ burnout in association with their experiences of a nationwide MERS-CoV outbreak. However, not even a basic survey has been conducted on the level of burnout experienced by ED nurses, who are in the front line taking care of MERS-CoV patients, or factors of burnout that consider the specific nature of MERS-CoV. Thus, this study attempted to assess ED nurses’ burnout level during an outbreak of MERS-CoV and to identify influencing factors in order to provide basic information for lowering and preventing the level of burnout.

Methods

Study design

This was a cross-sectional design study conducted to identify the factors influencing MERS-CoV-related burnout in ED nurses who had experienced an outbreak of MERS-CoV in Korea.

Setting and sample

During the outbreak of MERS-CoV in Korea, 15 hospitals designated for treating MERS-infected patients in Seoul, Gyeonggi-do, and Incheon, Korea. The participants were drawn from nurses working in the EDs of these hospitals. This study used convenience sampling to select eight EDs, all of which gave their consent to the survey. The sample size was estimated using G*Power 3.1 [15]. With an input $\alpha = .05$, a medium effect size of .15, power of .90, and the number of predictors at 18 for a linear multiple regression analysis, the minimum sample size required for this study was 183. However, for an even distribution of the participants among the hospitals selected, this study sampled 30 ED nurses from each institution by simple random sampling, for a total of 240 ED nurses. Of all the participants, 223 replied to the survey (response rate 92.9%). After unanswered questionnaires were excluded, 215 questionnaires were used as valid data in this study.

Ethical consideration

Approval for conducting this study was obtained from the Institutional Review Board of Gachon University in Korea (no. 2015-4396-201504-HR).

Measurements

Burnout [16] and job stress [17] were measured with a scale from previous studies, which was translated into Korean, validated, and used by Choi et al [18]. Other scales were developed by the researcher through a literature review [5,9,13,14] and the developed tools were tested for content validity by two infection control nurse practitioners, one infectious disease specialist (doctor), and one nursing professor. The developed tools were translated into Korean by two PhD-prepared bilingual nursing faculty and then back translated into English. Back translation was performed by a separate professional translator, who did not have prior information about the scale. In addition, the scales were tested through a pilot study with 15 ED nurses.

MERS-CoV-related burnout

MERS-CoV-related burnout was assessed using the Oldenburg Burnout Inventory (OLBI) developed by Demerouti et al [16]. In order to limit the study to burnout related to MERS-CoV, the phrase “caused by MERS-CoV” was added to each item. The OLBI consists of 16 items in two subdomains: emotional exhaustion and disengagement from work. Each item is answered on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a high score meaning a high level of burnout. Cronbach $\alpha$ of the scale was .78 in the previous study, .78 in the preliminary survey, and .80 in the main survey.

MERS-CoV-related job stress

MERS-CoV-related job stress was assessed by measuring the pressure from time and anxiety with a scale developed by Parker and DeCotiis [17]. In order to limit the study to job stress related to MERS-CoV, the phrase “caused by MERS-CoV” was added to each item. This scale consists of nine items, with each item answered on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A high score means a high level of stress. Cronbach $\alpha$ of the scale was .78 in the previous study, .90 in the preliminary survey, and .93 in the main survey.

Fear of MERS-CoV infection

The scale for fear of MERS-CoV infection was developed by the researcher based on a previous study of nurses’ fear during the outbreak of H5N1 avian flu [14]. This scale has just one item, “I am afraid of being infected with MERS-CoV,” which is answered on a 10-point visual analogue scale. A high score means a high fear of MERS-CoV infection.

Hospital resources for the treatment of MERS-CoV

The scale for measuring hospital resources for the treatment of MERS-CoV was developed by the researcher based on previous studies reporting material resources as one of the influencing factors of burnout [5,9,13,14]. In this scale, each item is answered on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree), with a high score meaning satisfactory hospital resources for the treatment of MERS-CoV are available. The three items of this scale are as follows: “My hospital is equipped with facilities sufficient for preventing the spread of MERS-CoV,” “My hospital applies the best infection control guideline for preventing the spread of MERS-CoV,” and “My hospital discusses how to prevent MERS-CoV regularly.” Cronbach $\alpha$ of the scale was .78 in the preliminary survey and .81 in the main survey. Content validity index was .95.

Support from family and friends

The scale for measuring support from family and friends was developed by the researcher based on previous studies reporting social support as one of the influencing factors of burnout [5,9,13,14]. In this scale, each item is answered on a 4-point scale ranging from 1
(strongly disagree) to 4 (strongly agree), with a high score meaning high support from family and friends. The four items of this scale are as follows: “My friends will avoid me if they find that I have cared for MERS patients,” “My friends will support me caring for MERS patients,” “My family will avoid me if they find that I have cared for MERS patients,” and “My family will support me caring for MERS patients.” Cronbach α of the scale was .76 in the preliminary survey and .80 in the main survey. Content validity index was .90.

**Data collection**

Data were collected during the period from July 20, 2015 to July 31, 2015, about 2 months after the outbreak of MERS-CoV and when the disease had not yet been controlled. The researcher visited the eight convenience-sampled hospitals designated for treating MERS-CoV patients, explained the purpose of this study, obtained their consent, and delivered the questionnaires. The charge nurse of the relevant department in each hospital explained the purpose of the study to the nurses, obtained their written consent, and then distributed and collected the questionnaires. The whole process of the survey was conducted anonymously, and all personal information was kept confidential.

**Data analysis**

The data were collected and analyzed using SPSS for Windows version 21.0 (IBM Corp., Armonk, NY, USA), and the normal distribution of the main variables was confirmed before analysis (Kolmogorov-Smirnov test). The participants’ general characteristics, MERS-CoV-related burnout, job stress, fear of MERS infection, availability of hospital resources for the treatment of MERS-CoV, and support from family and friends were analyzed with frequencies, percentages, means, and standard deviations. Scale reliability was assessed with Cronbach α. Differences in burnout according to general characteristics were analyzed using independent t tests, analysis of variance, and Scheffe’s post hoc test. Correlation was computed using Pearson’s correlation test. Multiple regression was performed using the enter method with input variables found to be significant in the difference testing and correlation analysis, to explore factors influencing MERS-CoV-related burnout.

**Results**

**General characteristics and differences in MERS-CoV-related burnout**

The participants’ mean age was 28.17 years, and 201 (93.5%) were female. In addition, 172 (80.0%) were unmarried, and 128 (59.5%) had at least a bachelor’s degree. The mean length of clinical experience was 2.58 years. Most of the participants (183, 85.1%) were working under the three-shift system, and 119 (55.3%) had actual experience in caring for MERS-CoV-infected or MERS-CoV-suspected patients. The mean number of hospital beds was 857.37. The level of MERS-CoV-related burnout was found to be significantly higher in nurses who worked a three-shift system, and in those who had nursed MERS-CoV-infected or MERS-CoV-suspected patients than those who did not (p < .05) (Table 1).

**Characteristics and correlation among the main variables**

The mean score of MERS-CoV-related burnout was 3.02 out of 5; MERS-CoV-related job stress was 3.25 out of 5; fear of MERS-CoV infection was 6.71 out of 10; hospital resources for the treatment of MERS-CoV was 2.88 out of 4; support from family and friends was 2.49 out of 4 (Table 2).

MERS-CoV-related burnout was significantly correlated with MERS-CoV-related job stress, fear of MERS-CoV infection, availability of hospital resources for the treatment of MERS-CoV, and support from family and friends (p < .05). However, it was not significantly correlated with age, number of beds, or length of clinical experience.

**Factors influencing MERS-CoV-related burnout**

MERS-CoV-related job stress was found to be the biggest influencing factor of MERS-CoV-related burnout (β = .59, p < .001), with the level of MERS-CoV-related burnout higher when job stress

| Variables | Characteristics | n (%) | Burnout Mean ± SD | t or F (p) |
|-----------|-----------------|-------|-------------------|------------|
| Sociodemographic characteristics | Gender | Female | 201 (93.5) | 3.02 ± 0.46 | 0.04 |
| | Male | 14 (6.5) | 3.04 ± 0.47 | (.841) |
| | Age (yr, Mean ± SD, range) | 28.17 ± 5.45 (22.00–46.00) | | |
| | Marital status | Single | 172 (80.0) | 3.04 ± 0.45 | 2.39 |
| | Married | 43 (20.0) | 2.92 ± 0.47 | (.109) |
| | Child | Yes | 29 (13.5) | 2.96 ± 0.46 | (.65) |
| | No | 186 (86.5) | 3.03 ± 0.46 | (.422) |
| | Religion | Yes | 67 (31.2) | 3.01 ± 0.43 | 0.08 |
| | No | 148 (68.8) | 3.03 ± 0.48 | (.779) |
| | Education level | Diploma | 87 (40.5) | 3.09 ± 0.48 | 3.01 |
| | BSN | 99 (46.0) | 3.01 ± 0.45 | (.052) |
| | ≥ MSN | 29 (13.5) | 2.84 ± 0.41 | |
| | Live with family | Yes | 127 (64.2) | 3.02 ± 0.48 | 0.02 |
| | No | 88 (35.8) | 3.02 ± 0.43 | (.978) |
| Work-related characteristics | Hospital beds (Mean ± SD, range) | 857.37 ± 494.40 (250.00–1,737.00) | | |
| | Length of clinical experience (yr, Mean ± SD, range) | 2.58 ± 2.33 (0.10–9.00) | | |
| | Monthly salary (10,000 won) | < 300 | | | |
| | | ≥ 300 | 42 (20.0) | 2.94 ± 0.39 | (.233) |
| | Position | Staff | 184 (85.6) | 3.04 ± 0.45 | 2.06 |
| | | Charge or higher | 31 (14.4) | 2.91 ± 0.52 | (.152) |
| | Three-shift system | Yes | 183 (85.1) | 3.07 ± 0.46 | 12.99 |
| | No | 32 (14.9) | 2.76 ± 0.38 | (<.001) |
| | Experience in caring for MERS-CoV-infected or MERS-CoV-suspected patients | Yes | 119 (55.3) | 3.09 ± 0.48 | 6.34 |
| | No | 96 (44.7) | 2.93 ± 0.42 | (.013) |

Note: MERS-CoV – Middle East respiratory syndrome coronavirus; BSN – Bachelor of Science in Nursing; MSN – Master of Science in Nursing.
was high. In addition, poor hospital resources for the treatment of MERS-CoV ($\beta = -0.19$, $p < .001$) and poor support from family and friends ($\beta = -0.14$, $p < .05$) increased MERS-CoV-related burnout. These three variables explained 47.3% of the variance in MERS-CoV-related burnout (Table 3).

The regression analysis satisfied the basic assumption of the model. The Durbin-Watson statistic was 1.75, indicating that there was no autocorrelation. Tolerance was .78, which was smaller than 10, indicating that there was no multicollinearity problem.

### Table 3: Linear Regression Analysis for Influencing MERS-CoV-related Burnout (N = 215).

| Variables                                    | B     | SE    | $t$ (p)     | CI     | $R^2$ | Adjusted $R^2$ |
|----------------------------------------------|-------|-------|-------------|--------|-------|----------------|
| Constant                                     | 1.86  | .25   | 7.36 (.001) | 28.49 (.001) | .481  | .473           |
| Three-shift system (yes)                     | 0.11  | .07   | .09        | .161 (.103) | -.025 | 0.03           |
| Experience in caring for MERS-CoV-infected  | 0.05  | .04   | .05        | 1.01 (.003) | -0.05 | 0.15           |
| or MERS-CoV-suspected patients (yes)         |       |       |            |        |       |                |
| MERS-CoV-related job stress                  | 0.34  | .03   | .59        | 11.07 (.001) | 0.28  | 0.40           |
| Fear of MERS-CoV infection                   | 0.01  | .02   | .01        | -.024 (.808) | -0.02 | 0.17           |
| Hospital resources for treatment of MERS-CoV | 0.14  | .04   | .19        | -.372 (.103) | -0.22 | 0.05           |
| Support from family & friends                | 0.14  | .06   | .14        | -2.50 (.013) | -0.22 | 0.06           |

Note. $R^2$ – confidence interval; MERS-CoV – Middle East respiratory syndrome-coronavirus.
the systematic review [5] and literature review [7], which reported that hospital resources and support from family and friends were major influencing factors for ED nurses’ burnout [5,7]. In particular, a lack of material resources is reported to be correlated with a high level of burnout [22]. These findings suggest that, in preparation for the outbreak of an emerging infectious disease, hospitals should prepare facilities for preventing infection, establish systematic infection control guidelines, and continue discussions about preventive measures [13,14]. What is more, support from family and friends experienced as more extensive social support, was found to be another influencing factor, as reported in previous studies [5,9]. In the context of employment, typical sources of social support are coworkers, supervisors, and the organization in general.

Social support from one’s supervisor and colleagues is found to provide a buffering effect that directly or indirectly reduces job stress [5,9,12,14]. Accordingly, it is suggested that the aspect of social support from an employee’s supervisor and colleagues should be taken into consideration for further research in future studies. If social support is provided in consideration of national and cultural factors, it may reduce burnout in nurses caring for patients in such a national crisis as the outbreak of MERS-CoV [12,14].

The principles of MERS-CoV infection prevention and control strategies associated with healthcare suggest the need for administrative controls and hospital resources [2]. In addition, if the government, with strong leadership, develops stronger and more resilient health systems in preparation against emerging contagious diseases such as MERS, ED nurses’ MERS-CoV-related burnout will be another influencing factor of MERS-CoV-related burnout was MERS-CoV-related job stress, followed by availability of hospital resources for the treatment of MERS-CoV and support from family and friends. These three variables explained 47.3% of the variance in MERS-CoV-related burnout. The outcome of this study is expected to provide basic information related to ED nurses’ burnout in connection to an outbreak of an emerging infectious disease such as MERS-CoV and to contribute to programs and strategies for reducing burnout. In order to lower the level of burnout, nursing managers need to make efforts to reduce job stress, to reinforce hospital resources for the treatment of MERS-CoV, and to promote support from family and friends. Particularly in the area of ED nursing, it is essential that we develop effective and systematic burnout management programs for monitoring and preventing burnout in preparation against possible future outbreaks of infectious diseases.

**Conflicts of interest**

The authors declared no conflict of interest.

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