Burnout among public servants after the Great East Japan Earthquake: decomposing the construct aftermath of disaster

Yuriko Suzuki, Maiko Fukasawa, Akiko Obara and Yoshiharu Kim

1Department of Adult Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry, Kodaira, Tokyo, Japan, 2Miyagi Mental Health and Welfare Center, Osaki, Miyagi, Japan and 3National Information Center of Disaster Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry, Kodaira, Tokyo, Japan

Abstract: Objectives: To examine whether disaster-related variables, in addition to known work-related risk factors, influence burnout and its subscales (exhaustion, cynicism, and lack of professional efficacy) among public servants who experienced a major disaster. Methods: Cross-sectional studies were conducted among public servants of Miyagi prefecture at 2 and 16 months after the Great East Japan Earthquake (n=3,533, response rate 66.8%); burnout was assessed at 16 months using the Japanese version of the Maslach Burnout Inventory-General Survey. We examined the relationships between burnout and its subscales with disaster-related variables at 2 months after the disaster, while controlling for age, gender, and work-related variables at 16 months after the disaster. Results: After controlling for age, gender, and work-related variables, a significant risk factor of burnout was having severe house damage. For each subscale of burnout, living someplace other than their own house increased the risk of both exhaustion and cynicism, while handling residents’ complaints did so only for exhaustion. Notably, workers from health and welfare departments showed an increased risk of burnout, exhaustion, and cynicism, but not lack of professional efficacy. Conclusions: The findings suggest that special attention is needed for workers with severe house damage to prevent burnout, as well as those who lived someplace other than their own house to prevent exhaustion and cynicism after a major disaster. Interventions directed at workers of the health and welfare department should focus more on limiting exhaustion and cynicism, rather than promoting professional efficacy. (J Occup Health 2017; 59: 156-164) doi: 10.1539/joh.16-0263-OA

Key words: Administrative personnel, Burnout, Disasters, Relief work

Introduction

Burnout is a psychological reaction typically to work-related stressors and it has been extensively researched using a construct comprising three dimensions—exhaustion, cynicism, and lack of professional efficacy

According to the theory behind this construct, the development of burnout begins with the central component of exhaustion, which in turn leads to cynicism (i.e., feelings of indifference to or distance from one’s work). Alternatively, persistent exhaustion might lead to reduced professional efficacy, although this has been contested with some proposing that a lack of professional efficacy is an independent facet of burnout. Severe burnout is highly related to clinical depression among workers, including office workers and hospital workers, during non-disaster periods. The associated factors have been researched extensively in the area of work-related stressors as well as non-work factors.

In research on disaster mental health, the mental health of local workers has been a particular concern because they not only experience the disaster themselves, but also are pressed to respond to others’ needs in the disaster’s aftermath in addition to completing their regular duties. Previous research has indicated that the severity of disaster damage has an influence on the mental health of workers, and that the risk factors of mental distress differ depending on the degree of damage that workers experienced. Furthermore, the known risk factors of occupa-
tional health, e.g., adequate rest and good workplace communication, were more strongly associated than were disaster-related factors with the mental health of workers after the disaster\(^{9}\). However, despite the fact that burnout has been a notable concern in disaster research, previous studies have focused on it only among humanitarian workers\(^{29}\), public health workers\(^{11}\), local health caregivers\(^{21}\), and lay disaster rehabilitation and reconstruction workers\(^{20}\); currently, no studies have looked at burnout in public servants. Public servants would require special attention because those who work in disaster-affected areas would experience the disaster themselves. The experience of the disaster then might have an additional effect on burnout among workers compared to during non-disaster periods. Thus, disaster-related factors might offer a unique contribution to workers’ burnout alongside the known risk factors (e.g., workload, control, rewards, and community)\(^{15}\). This has some support from previous studies on peculiar psychological responses such as trauma\(^{13}\) and compassion fatigue\(^{21}\). In addition, there is an argument that burnout is a distinct phenomenon or it can be simply attributed to exhaustion or depression. The close examination of the construct of the burnout aftermath of disaster, whether the concept of burnout in normal time is applicable aftermath of disaster, is warranted.

Thus, in this paper, we examined the relationship between burnout and various disaster-related variables, in addition to known work-related variables during non-disaster periods. We, in particular, explored the relationships between these two sets of variables with the various components of burnout-exhaustion, cynicism, and lack of professional efficacy-to elucidate the characteristics of each component.

**Subjects and Methods**

**Participants**

The present study targeted all public servants in the Miyagi prefectural government (n=5,305). Miyagi prefecture is proximate to the epicenter of the Great East Japan Earthquake, which occurred on March 11, 2011, and its population before the disaster was estimated to be 2,346,853\(^{25}\). More than 10,000 people died or went missing as a result of the disaster\(^{15}\). Although teachers, police, firefighters, and hospital workers are typically exposed to more severe work conditions, they were not included in the survey because of the different personnel systems among these occupations within the prefecture.

**Study design**

We analyzed the cross-sectional data of the two previously conducted surveys to examine the risk factors of burnout at 16 months after the disaster among various disaster- and work-related variables at 2 and 16 months after the disaster, respectively.

**Procedure**

The Labour Welfare Division of the Miyagi prefectural government implemented the online survey within the organizational intranet in May 2011 and July 2012-namely, 2 and 16 months after the disaster, respectively. This survey was designed and implemented to encourage self-monitoring of workers’ health status after the disaster. All workers were invited to complete the online survey by logging in to the intranet with their worker identification codes. Workers were encouraged to complete the self-administered questionnaire and were offered follow-up counseling if they requested it. We obtained anonymous data with the permission of the Miyagi prefectural government. In the analysis, we used only those workers who completed both of the surveys; their data at both assessment points were identified by matching individual identification codes.

**Measures**

Job burnout served as the outcome measure and was evaluated using the Maslach Burnout Inventory-General Survey (MBI-GS)\(^{19}\). The MBI-GS comprises 16 items in three subscales: emotional exhaustion (5 items), cynicism (5 items), and professional efficacy (6 items). Respondents are asked to report how frequently each item occurred during their work on a 7-point Likert scale ranging from 0 (never) to 6 (every day); subscale scores were calculated by averaging the scores of each subscale. The validity of the Japanese version of the MBI-GS has been confirmed\(^{20}\), and the internal consistency in this study was 0.87 for the total scale, 0.88 for emotional exhaustion, 0.87 for cynicism, and 0.90 for professional efficacy, respectively.

To examine workers’ burnout, we used the “exhaustion plus 1” criterion; in other words, we considered the presence of a high risk of exhaustion and either cynicism or lack of professional efficacy as necessary for a worker to be considered to have burnout\(^{11}\). The high-risk group for each subscale was categorized as having a score above the 75\(^{th}\) percentile for exhaustion and cynicism and below the 25\(^{th}\) percentile for lack of professional efficacy; thus, those with a high risk of emotional exhaustion and another subscale (either cynicism or lack of professional efficacy) were considered to have a high risk of burnout. This assessment criterion has been shown to be clinically valid in the workplace\(^{22}\).

As explanatory variables, we assessed two domains of disaster-related variables at 2 months after the disaster. The first was damage caused by the disaster, which included work area (coastal or inland area; coastal areas were considered more damaged, as they were severely affected by tsunami and earthquake), house damage (half collapse or more severe house damage [answers of total collapse, mostly collapsed, or half collapse] or less than half collapse [answers of partial collapse, little collapse,
or no collapse]), having dead or missing family members (yes or no), and living someplace other than their own house (e.g., a shelter) as of May 2011. The second domain comprised disaster-related work variables, which included the taking part in disaster-related work (yes or no), and more specifically, handling residents’ complaints (yes or no), which was considered an indicator of exposure that might lead to compassion fatigue, and working at a morgue (yes or no), which was considered an indicator of traumatic work, as of May 2011.

Current work-related variables—including work department, degree of involvement in disaster-related work, workload, and degree of workplace communication—were also examined at 16 months after the disaster. For assessing work department, we categorized the 17 possible response options into “health and welfare department” and “others,” mainly because human services workers have been reported to have a higher risk of burnout. For the degree of involvement in disaster-related work, participants were allocated to “yes” or “no” groups, with “yes” comprising those who answered “disaster-related work is primary work” and “mainly engage in disaster-related work,” and “no” comprising those who answered “same as primary work,” “mainly primary work,” or “not involved.” Regarding workload, we asked participants the number of overtime hours worked in the month prior to the survey; this was then recoded into 20 hours or less, more than 20 hours to 40 hours, more than 40 hours to 80 hours, and more than 80 hours. Finally, the quality of workplace communication was categorized as “poor,” “reasonable,” and “good.” For participants’ basic characteristics, we assessed gender and age (in 10-year categories).

Statistical analysis

We paired the datasets of the 4,334 respondents (out of a total of 5,233 workers) at 2 months and 4,662 respondents (out of 5,287 workers) at 16 months after the disaster, and analyzed only those who had responded to all questions at both time points (n=3,533, or 66.8% of all workers at 16 months after the disaster).

First, we calculated the descriptive statistics of the MBI-GS and categorized respondents according to whether they had burnout or not according to the “exhaustion plus 1” criterion, with cut-offs of above the 75th percentile for exhaustion and cynicism and below the 25th percentile for professional efficacy. A total of 563 workers (15.9%) had burnout among all respondents (n=3,533). Of the workers with burnout, 514 had a high risk of exhaustion plus a high risk of cynicism, while 216 had a high risk of exhaustion plus a high risk of a lack of professional efficacy. One hundred sixty-seven workers met the criteria of high risk for all three subscales.

Table 1 shows the descriptive statistics of the subscales of the MBI-GS variables at 16 months after the disaster. All statistical analyses were conducted using Stata 13.0 for Windows (StataCorp LP, College Station, TX). We set a p<0.05 for statistical significance (two-tailed).

Results

The summary statistics of the subscales of the MBI-GS are presented in Table 1. According to the “exhaustion plus 1” criterion, with cut-offs of above the 75th percentile for exhaustion and cynicism and below the 25th percentile for professional efficacy, a total of 563 workers (15.9%) had burnout among all respondents (n=3,533). Of the workers with burnout, 514 had a high risk of exhaustion plus a high risk of cynicism, while 216 had a high risk of exhaustion plus a high risk of a lack of professional efficacy. One hundred sixty-seven workers met the criteria of high risk for all three subscales.

Table 2 shows the descriptive statistics of basic characteristics, and work-related variables at 16 months after the disaster. Workers with burnout were significantly more likely to be women, be 30-39 years old, work in the health and welfare department, be involved in disaster-related work, work longer overtime hours, and have poorer workplace communication. The same relationships were found for workers with exhaustion. Regarding cynicism, all of the basic characteristics and work-related variables except for involvement in disaster-related work were associated with cynicism. Those with a high risk of lack of professional efficacy were more likely to be women and have poorer workplace communication, but were less likely to be workers in the health and welfare department.

Table 3 shows the descriptive statistics of each outcome variable and the disaster-related variables at 2 months after the disaster. Workers with burnout were significantly more likely to have worked in coastal areas, have had a half collapse or more severe house damage, and have lived someplace other than their own house. With regard to exhaustion, having worked in a coastal area, lived someplace other than their own house, and handled residents’ complaints were higher among workers at high risk of exhaustion, while only having lived someplace other than their own house was higher among workers at high risk of exhaustion.
those at high risk of cynicism. None of the disaster-related variables was associated with a lack of professional efficacy.

The results of the modified Poisson regression analysis are presented in Table 4. Among the disaster-related variables, only experiencing a half collapse or more severe house damage at 2 months was associated with burnout (PR: 1.27, 95% CI: 1.02-1.58) after controlling for age, gender, and work-related variables at 16 months. For exhaustion, those who had lived someplace other than their own house (PR: 1.19, 95% CI: 1.03-1.38) and had handled residents’ complaints (PR: 1.24, 95% CI: 1.00-1.54) showed an increased risk of exhaustion, while for cynicism, only having lived someplace other than their own house (PR: 1.19, 95% CI: 1.03-1.38) led to an increased risk. Lack of professional efficacy again showed no association with any disaster-related variables.

Notably, among the work-related variables controlled for in the model, working at the health and welfare department, more overtime work hours, and poorer workplace communication were associated with a higher prevalence of burnout. All of the work-related variables at 16 months after the disaster were associated with exhaustion, while working at the health and welfare department, working overtime for more than 80 hours per month, and having poorer workplace communication were associated

| Table 2. Relationship between basic characteristics, work-related variables, and burnout (including its subscales) as measured by the Maslach Burnout Inventory-General Survey |
|-------------------------------------------------|
| Burnout<sup>1)</sup> | Exhaustion | Cynicism | Lack of professional efficacy |
| (±) | (±) | (±) | (±) | (±) | (±) | (±) | (±) |
| n % | n % | n % | n % | n % | n % | n % | n % |
| 563 2.970 | 801 2.732 | 858 2.675 | 982 2.551 |

### Basic characteristics

**Gender**

- Men 368 65.4 2,348 79.1<sup>**</sup>
- Women 195 34.6 622 20.9

**Age group (years)**

- 18-29: 79 14.0 349 11.8<sup>**</sup>
- 30-39: 199 35.4 1,032 34.8
- 40-49: 118 21.0 422 14.2
- 50-65: 97 17.2 920 31.0

### Work-related variables as of July 2012

**Department**

- Health and welfare: 152 27.0 531 17.9<sup>**</sup>
- Others: 411 73.0 2,439 82.1

**Involvement in disaster-related work**

- No: 431 76.6 2,406 81.0<sup>**</sup>
- Yes: 132 23.5 564 19.0

**Hours of overtime per month**

- 0-20 hours: 352 62.5 2,331 78.5<sup>**</sup>
- 20-40 hours: 118 21.0 422 14.2
- 40-80 hours: 76 13.5 192 6.5
- 80+ hours: 17 3.0 25 0.8

**Workplace communication**

- Good or reasonable: 406 72.1 2,756 92.8<sup>**</sup>
- Poor or neither: 157 27.9 214 7.2

Chi-square tests were used. *: p<0.05. **: p<0.01

<sup>1)</sup> Those who met the exhaustion plus 1 criterion: in other words, those who had a high risk of both exhaustion and either cynicism or lack of professional efficacy on the Maslach Burnout Inventory-General Survey. A high-risk group for each subscale was categorized as having a score above the 75<sup>th</sup> percentile (below the 25<sup>th</sup> percentile for lack of professional efficacy).
Table 3. Relationships between disaster-related variables and burnout (including its the subscales) according to the Maslach Burnout Inventory-General Survey

| Disaster-related variables as of May 2011 | Burnout\(^{b}\) | Exhaustion | Cynicism | Lack of professional efficacy |
|------------------------------------------|----------------|------------|----------|-------------------------------|
|                                          | (+) n %        | (-) n %    | (+) n %  | (-) n %                       | (+) n % | (-) n % | (+) n % | (-) n % |
| Work site                                |                |            |          |                               |         |         |         |         |
| Inland area                              | 460 81.7 2,546 | 85.7 653 81.5 | 2,353 86.1 | 716 83.5 2,290 85.6 | 823 83.8 2,183 85.6 |
| Coastal area                             | 103 18.3 424 14.3 | 379 13.9 | 142 16.6 385 14.4 | 159 16.2 368 14.4 |
| House damage                             |                |            |          |                               |         |         |         |         |
| Less than half collapse                   | 396 82.5 2,321 86.2 | 2,135 86.0 | 630 84.7 | 2,087 86.0 | 717 83.7 2,000 86.4 |
| Half collapse or more severe             | 84 17.5 371 13.8 | 339 13.7 | 114 15.3 341 14.0 | 140 16.3 315 13.6 |
| Dead or missing family member (s)        |                |            |          |                               |         |         |         |         |
| No                                       | 548 97.5 2,896 97.5 | 2,663 97.5 | 834 97.3 2,610 97.6 | 956 97.4 2,488 97.6 |
| Yes                                      | 14 2.5 74 2.5 | 69 2.5 | 23 2.7 65 2.4 | 26 2.7 62 2.4 |
| Lives someplace other than their own house|                |            |          |                               |         |         |         |         |
| No                                       | 411 73.3 2,323 78.3 | 2,153 78.7 | 631 73.7 2,103 78.7 | 740 75.4 1,994 78.3 |
| Yes                                      | 150 26.7 645 21.7 | 578 21.2 | 225 26.3 570 21.3 | 242 24.6 553 21.7 |
| Involving in disaster-related work       |                |            |          |                               |         |         |         |         |
| No                                       | 139 24.7 734 24.7 | 681 24.9 | 211 24.6 662 24.8 | 259 26.4 614 24.1 |
| Yes                                      | 423 75.3 2,235 75.3 | 2,050 75.1 | 646 75.4 2,012 75.2 | 723 73.6 1,935 75.9 |
| Works at a morgue                        |                |            |          |                               |         |         |         |         |
| No                                       | 529 94.0 2,767 93.2 | 2,539 92.9 | 801 93.4 2,495 93.3 | 918 93.5 2,378 93.2 |
| Yes                                      | 34 6.0 203 6.8 | 193 7.1 | 57 6.6 180 6.7 | 64 6.5 173 6.8 |
| Handles residents’ complaints            |                |            |          |                               |         |         |         |         |
| No                                       | 516 91.7 2,786 93.8 | 2,566 93.9 | 792 92.3 2,510 93.8 | 920 93.7 2,382 93.4 |
| Yes                                      | 47 8.4 184 6.2 | 166 6.1 | 66 7.7 165 6.2 | 62 6.3 169 6.6 |

Note. Chi-square tests were used. \(^{*}\): p<0.05, \(^{\ast\ast}\): p<0.01

\(^{b}\) Those who met the exhaustion plus 1 criterion: in other words, those who had a high risk of both exhaustion and either cynicism or lack of professional efficacy on the Maslach Burnout Inventory-General Survey. A high-risk group for each subscale was categorized as having a score above the 75th percentile (below the 25th percentile for lack of professional efficacy).

Discussion

We found that, among the disaster-related variables included in this study, only having experienced a half collapse or more severe house damage was associated with an increased risk, while working at the health and welfare department was associated with a decreased risk.

with an increased prevalence of cynicism. For lack of professional efficacy, only poorer workplace communication was associated with an increased risk, while working at the health and welfare department was associated with a decreased risk.

cynicism, whereas handling residents’ complaints were an additional risk factor for exhaustion. Notably, none of the disaster-related variables was associated with a lack of professional efficacy. We confirmed that known work-related risk factors for burnout—namely, working in human services, longer overtime hours, and poor workplace communication—was associated with an increased prevalence of burnout, much like during non-disaster periods. These increases were mainly due to the increased risk of exhaustion.

The major risk factor for burnout was house damage. Despite the fact that job burnout refers to emotional strain related to working life, recent research has begun looking at variables outside of work condition. It is likely that severe house damage led to residence instability and per-
### Table 4. Prevalence ratio (PRs) and 95% confidence interval (95% CI)s for burnout and its subscales of the Maslach Burnout Inventory-General Survey according to disaster-related variables, while controlling for age, gender, and work-related variables (n=3,170)

| Disaster-related variables as of May 2011 | Burnout\(^1\) | Exhaustion | Cynicism | Lack of professional efficacy |
|----------------------------------------|--------------|------------|----------|------------------------------|
|                                        | PR 95% CI    | PR 95% CI  | PR 95% CI | PR 95% CI                   |
| Work site (reference: Inland area)     |              |            |          |                             |
| Coastal area                           | 1.12 0.91 - 1.38 | 1.12 0.96 - 1.32 | 1.01 0.85 - 1.19 | 1.08 0.92 - 1.27 |
| House damage (reference: Less than half collapse) | 1.12 0.96 - 1.38 | 1.01 0.85 - 1.19 | 1.14 0.97 - 1.33 |
| Half collapse or more severe           | 1.27 1.02 - 1.58 | 1.16 0.97 - 1.38 | 1.07 0.89 - 1.28 | 1.14 0.97 - 1.33 |
| Dead or missing family member(s) (reference: No) | 0.81 0.45 - 1.43 | 0.85 0.54 - 1.34 | 1.00 0.68 - 1.48 | 0.96 0.66 - 1.37 |
| Lives someplace other than their own house (reference: No) | 1.19 1.03 - 1.38 | 1.19 1.03 - 1.38 | 1.08 0.94 - 1.25 |
| Previously or currently yes            | 1.15 0.95 - 1.39 | 1.19 1.03 - 1.38 | 1.19 1.03 - 1.38 | 1.08 0.94 - 1.25 |
| Involved in disaster-related work (reference: No) | 0.95 0.78 - 1.16 | 0.97 0.83 - 1.13 | 0.97 0.83 - 1.12 | 0.95 0.83 - 1.08 |
| Works at a morgue (reference: No)      | 1.12 0.79 - 1.58 | 0.98 0.73 - 1.31 | 1.06 0.81 - 1.38 | 0.99 0.78 - 1.26 |
| Handles residents’ complaints (reference: No) | 1.28 0.98 - 1.67 | 1.24 1.00 - 1.54 | 1.15 0.93 - 1.43 | 0.98 0.77 - 1.23 |
| Basic characteristics                   |              |            |          |                             |
| Gender (reference: Men)                |              |            |          |                             |
| Women                                  | 1.58 1.31 - 1.90 | 1.50 1.30 - 1.74 | 1.15 0.99 - 1.34 | 1.26 1.10 - 1.45 |
| Age group (reference: 18-29 years old) |              |            |          |                             |
| 30-39 years old                        | 1.23 0.96 - 1.57 | 1.15 0.95 - 1.40 | 1.13 0.93 - 1.38 | 1.14 0.92 - 1.41 |
| 40-49 years old                        | 0.95 0.74 - 1.21 | 1.00 0.83 - 1.22 | 0.97 0.80 - 1.18 | 1.23 1.01 - 1.49 |
| 50-65 years old                        | 0.70 0.52 - 0.95 | 0.77 0.60 - 0.97 | 0.63 0.50 - 0.80 | 1.26 1.02 - 1.55 |
| Work-related variables as of July 2012 |              |            |          |                             |
| Department (reference: Other than health and welfare) |              |            |          |                             |
| Health and welfare                     | 1.34 1.11 - 1.62 | 1.46 1.26 - 1.69 | 1.31 1.13 - 1.51 | 0.80 0.68 - 0.95 |
| Involved in disaster-related work (reference: No) | 1.17 0.96 - 1.43 | 1.25 1.08 - 1.46 | 1.13 0.96 - 1.31 | 0.97 0.84 - 1.14 |
| Overtime per month (reference: 0-20 hours) | 1.49 1.22 - 1.83 | 1.60 1.36 - 1.88 | 1.05 0.89 - 1.24 | 1.00 0.85 - 1.17 |
| 20-40 hours                            | 1.80 1.41 - 2.29 | 2.11 1.77 - 2.52 | 1.14 0.92 - 1.41 | 0.89 0.70 - 1.14 |
| 40-80 hours                            | 2.76 1.87 - 4.08 | 3.29 2.54 - 4.26 | 1.80 1.27 - 2.53 | 1.32 0.83 - 2.10 |
| 80+ hours                              | 2.92 2.47 - 3.47 | 2.22 1.93 - 2.54 | 2.58 2.27 - 2.93 | 1.76 1.53 - 2.02 |
| Workplace communication (reference: Good or reasonable) |              |            |          |                             |
| Poor or neither                        | 1.12 0.86 - 1.46 | 1.23 1.08 - 1.46 | 1.13 0.96 - 1.31 | 1.07 0.88 - 1.30 |
|                                    |              |            |          |                             |

\(^1\) Those who met the exhaustion plus 1 criterion: in other words, those who had a high risk of both exhaustion and either cynicism or lack of professional efficacy on the Maslach Burnout Inventory-General Survey. A high-risk group for each subscale was categorized as having a score above the 75th percentile (below the 25th percentile for lack of professional efficacy).

sistent life stress, which might have increased stress in the work domain. The fact that the other disaster-related variables—such as work area, bereavement, or living someplace other than their own house—were not associated with burnout might be due to the nature of the outcome variable. Specifically, a traumatic event such as bereavement might have a greater influence on phenomena such as traumatic reactions, while secondary life stress (e.g., living someplace other than their own house) might influence outcomes such as depressive symptoms, as suggested in previous research\(^2\).

During disasters, workers might need to engage in multiple highly stressful jobs, such as working in a morgue or handling residents’ complaints, which are often unexpectedly assigned to public servants in Japan\(^3\). The variable of handling residents’ complaints nearly reached signifi-
cance in its relation with burnout; however, the other seemingly traumatic job that we assessed—working in a morgue—was not at all associated with burnout. Again, this might also be due to our chosen outcome (job burnout); if we had selected an outcome such as mental distress or traumatic reaction, then the more traumatic experiences, such as working in a morgue, might have had a greater impact. This has been found in a previous disaster study, wherein exposure to grotesque scenes was associated with greater mental distress among recovery workers.

Meanwhile, in examining each dimension of the burnout construct, different patterns of variables were associated with each subscale of burnout. The associated factors of exhaustion included the disaster-related variables of living someplace other than their own house and handling residents’ complaints, as well as all of the work-related variables at 16 months after the disaster. These risk factors are similar to those found for psychological distress, such as that measured by the Kessler 6 (29), which seems reasonable because the exhaustion subscale of the MBI-GS comprises items relating to emotional responses to work-related stressors. The similarity in risk factors between exhaustion and psychological distress are in line with previous discussions on how exhaustion is representative of a depressive response to job-related stress (30). As noted above, handling residents’ complaints was significantly associated only with exhaustion, but it almost reached significance for burnout as well, which coincides with a previous finding that working in customer services is strongly related to job burnout in non-disaster periods (31). Handling residents’ complaints might have nearly led to job burnout through its association with emotional exhaustion, which in turn might have been the result of compassion fatigue among workers.

Concerning cynicism, the only significant risk factor among the disaster-related variables was living someplace other than their own house at 2 months after the disaster. Cynicism represents workers’ distant and indifferent attitude towards their job, making it interesting that prolonged living in a place other than their own house led to a higher risk of cynicism in addition to exhaustion which is in line with the proposed theory that cumulative stressor leads to exhaustion and then cynicism. Prolonged displacement has been noted as a major stressor among workers after a natural disaster (32). However, it is unclear why severe house damage was only a risk factor of burnout, whereas living someplace other than their own house was only a risk factor of exhaustion and cynicism. The underlying mechanisms of these relationships warrant further investigation.

Notably, the lack of professional efficacy, or the feeling of inadequacy and incompetence in performing one’s work, was not associated with any of the disaster-related variables. As noted above, there has been discussion that lack of professional efficacy is an independent construct of burnout and is more affected by individuals’ job resources or coping strategies than by job stressors (33). Unlike the other subscales, the lack of professional efficiency was not related to work overload, as represented by overtime hours. In an additional analysis, we noted that the correlation between exhaustion and cynicism was 0.67, whereas the correlations of these two subscales with the lack of professional efficacy were only 0.03 and 0.06, respectively. This finding coincides with the results of a previous study (34), and adds further empirical support for the notion that lack of professional efficacy is a distinct facet of burnout from exhaustion and cynicism.

Among the work-related factors, we found that working at the health and welfare department was significantly associated with higher risk of burnout, exhaustion, and cynicism, but a significantly decreased risk of a lack of professional efficacy. The majority of workers in the health and welfare departments of Miyagi prefecture provide public health and welfare services and work in the frontline in disaster response, which might underlie the higher risks of exhaustion and cynicism. This coincides with past findings that health care workers show a higher risk of burnout in non-disaster periods (35). Interestingly, our analysis suggested that while workers in health and welfare departments tend to be emotionally distressed and therefore experience a greater risk of exhaustion and cynicism—their professional efficacy was preserved. This implies that countermeasures should focus on reducing levels of exhaustion and cynicism for workers in health and welfare departments, such as by lessening the workload (e.g., by providing additional workforce in the health and welfare field), to ensure that they can exercise their efficacy during disasters.

Strengths and limitations

The strengths of this study were that it provided an empirical basis for the factors influencing burnout after a disaster among public servants; few past studies have been conducted on this topic despite much concern about it in disaster field. Furthermore, the study had a large sample size and drew on consecutive surveys to identify disaster-related predictors of future burnout. By identifying risk factors among the disaster-related domains, this study adds insight on the features of burnout after a disaster.

However, this study has several limitations. First, we were not able to determine the burnout levels prior to the disaster. Without such prior information, it is impossible to determine whether the burnout observed at 16 months after the disaster was newly developed or had persisted from before the disaster. However, the identified factors would likely predict burnout after the disaster, regardless of whether it was newly developed in this study or not. Second, although the quality of workplace communic-
tion showed a consistent relation with a greater risk of burnout and all three of its subscales, its measure was a single, self-reported item. Thus, the validity of this finding requires further examination. Finally, this study targeted prefectural public servants in Japan, which means that it is not generalizable to other workers therein. For example, mental distress was found to be more severe among public servants in municipalities\(^1\) as they were more likely to experience severe disaster damage and work conditions, and more intense interactions with residents. Furthermore, the results might differ by specific occupation-for instance, rescue workers, police, firefighters, and members of the self-defense force are likely to experience differing types of traumatic events or critical incidents. Despite these limitations, the findings of this study will serve as a reference point for understanding the degree of burnout among public servants after a disaster. To our knowledge, this has not been quantified before.

In conclusion, the findings suggest that, at 16 months after a disaster, only severe house damage at 2 months after the disaster was associated with burnout. As such, those who have experienced objective severe damage from a disaster will benefit from more careful attention at work. According to the “exhaustion plus one” criterion, priority should be given to easing exhaustion in order to prevent workers’ burnout after a disaster, including attention to living conditions after the disaster. Furthermore, careful accommodation of work-related factors during non-disaster periods might promote workers’ well-being after a disaster. Workers from the health and welfare department were significantly more likely to experience exhaustion and cynicism, but, conversely, were less likely to feel a lack of professional efficacy. Thus, work accommodations specific to health and welfare professionals, such as interventions to address work overload, might be helpful for reducing exhaustion while still promoting their professional efficacy in times of disaster.

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Compliance with ethical standards: All procedures in this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. We obtained permission for secondary analysis of existing data from the Miyagi prefectural government. The study protocol was approved by the institutional review board of the National Center of Neurology and Psychiatry (A2012-022).

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