

The Great East Japan Earthquake Related Article

Original

Personality and Resilience Associated with Perceived Fatigue of Local Government Employees Responding to Disasters

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Abstract: Personality and Resilience Associated with Perceived Fatigue of Local Government Employees Responding to Disasters: Hideaki KITAMURA, et al. Department of Psychiatry, Niigata University Graduate School of Medical and Dental Sciences—Objectives: According to some newspapers, concerns are growing over the health of local government employees in the Great East Japan Earthquake disaster areas. Concerns were consistently present after the Hanshin-Awaji and Niigata-Chuetsu earthquakes but not studied analytically. **Methods:** Municipal employees responding to the disasters after an earthquake and floods answered a questionnaire about the degrees of workload, fatigue, psychological distress, resilience and personality traits. **Results:** Two-thirds of the employees suffered fatigue and psychological distress, which were significantly correlated with workload but inversely correlated with emotional stability personality traits and psychological resilience. **Conclusions:** Together with substantial workload, individual differences in emotional stability and to lesser degree in resilience were found to have an impact on perceived fatigue. These individual factors should be considered as potential mediators of distresses among local government employees responding to disasters. (J Occup Health 2013; 55: 1–5)

Key words: Earthquakes, Floods, Occupational Health Services, Personality, Psychological Resilience

Many studies have reported significant effects of a variety of disasters on the mental health of the disas-

ter workers and volunteers. Regarding the events of September 11th, a systematic review examined 25 articles that met study inclusion criteria using different methods. The articles described varying degrees of mental health symptomatology, from those requiring little to no care to those requiring pharmacotherapy; risk factors for adverse mental health outcomes including exposure to the World Trade Center site and occupational activities; and utilization of mental health services. The majority of previous studies on other disasters also found that the exposure to traumatic events or occupational activities such as those experienced by rescue workers and fire fighters is a major risk for post-traumatic stress disorder (PTSD) and depression¹. Among the rescue workers responding to the 2011 Great East Japan Earthquake, PTSD symptoms were predicted by peritraumatic emotional distress, such as losing control of emotions and being ashamed of emotional reactions, and watching television for extended periods of time. These results suggest that indirect exposure to traumatic events through rescue work may lead to subsequent psychopathology².

In Japan, on the other hand, health problems among local government employees responding to disasters were largely unnoticed until the Great Hanshin-Awaji earthquake and the Niigata-Chuetsu earthquake. Although some employees may end up becoming disaster victims, the majority of workers at government offices and supporting the recovery of devastated areas are not exposed to traumatic events in their occupational activities. According to some newspapers, the same concerns are being expressed about the health of local government employees in the 2011 Great East Japan Earthquake disaster areas because of the workers working without rest to make up for staff

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shortages. Severe working conditions of employees is presumed to be associated with fatigue and psychological distress³⁻⁹, while perception of fatigue and psychological distress may be affected by individual protective or risk factors such as resilience or having a personality vulnerable to stress.

“Psychological resilience” has been used as a term to describe “the positive pole of individual differences in people’s response to stress and adversity¹⁰”. It has been proposed through observation that some did not develop severe difficulties in life or mental illnesses, although they had risk factors for them such as poverty, dysfunctional family and parental mental illnesses. Today, resilience is being studied not only from the perspective of relevance to protection from development of PTSD¹¹ but also from the genetic and psychobiological perspectives^{12, 13}, as well as in specific settings such as mass disasters¹⁴ and workplace adversity¹⁵.

Personality traits observed in nonclinical populations are beginning to be considered to be associated with health behaviors or mental well-being^{16, 17}. Psychiatrists treating personality disorders prefer to categorical approach for its clinical utility¹⁸; however, a quantitative review of taxometric research has revealed that the true prevalence of taxonomic findings is smaller than previously thought, especially in the domain of normal personality¹⁹. The Five-Factor Model of Personality is one of the most prominent personality models and is considered to be a dimensional approach to personality traits²⁰. Neuroticism, extraversion, conscientiousness, agreeableness and openness were empirically proposed, originally assumed to have a biological origin and considered to be unaffected by environmental factors, to develop until early adulthood and remain stable in later life²¹. Since there have been methodological differences in personality assessment among the studies linking personality traits and health behaviors or mental well-being, use of personality inventories based on a common conceptual model appears preferable to make the findings more easily interpretable.

The aim of this study was to investigate whether resilience and personality are linked with fatigue, specifically among local government employees responding disasters. To our knowledge, there have been few studies of the accumulated work stress together with individual factors of employees in disaster settings.

Subjects and Methods

An earthquake measuring 6 upper on the 7-point Japanese intensity scale (6.7 on the Richter scale) hit Tōkamachi City (Niigata, Japan) the day after the Great East Japan Earthquake on 11 March 2011,

and late in July, intensive rainstorms caused floods and damaged the city again. Seventy-two municipal employees all responding to the disasters participated in the present study. On December 21, the questionnaires were distributed to the subjects, and they were collected on December 23. The questionnaire contained a self-rating Likert-scale checklist disseminated by the Japan Ministry of Health, Labour and Welfare consisting of 13 and 7 questions asking about perceived fatigue and working conditions in the past 30 days, respectively²². Total scores for the questions about fatigue (fatigue score, range: 0–39) and the working conditions (labor score, range: 0–15) and a final evaluation based on both scores (low, slightly high, high, very high) were employed for further analysis. A 5-point Likert-type question (much decreased, decreased, almost same, increased, much increased) was added to estimate the change in workload compared with the previous year.

Psychological distress was measured with the K6/K10^{23, 24}. The K10 consists of 10 items about anxiety and depressive symptoms and contained all 6 items of the K6. In addition to total scores for the K10 (range: 0–40) and K6 (range: 0–24), percentages of the respondents with a score of 15 or more for the K10 and those with a score of 13 or more for the K6 were used as indices for possible common mental disorders and severe psychopathology, respectively. Psychological resilience was assessed with a 5-point bidirectional resilience scale (BRS) developed in Japan²⁵. Indeed, other more popular resilience scales such as the Adolescent Resilience Scale²⁶ and the Resilience Scale²⁷ were available; however, we had great interest in two major factors of the BRS relating to innate and acquired resilience. The two factors were expected to correlate differently with fatigue and K10 scores. Cronbach’s alpha coefficients of innate (12 items, range: 12–60), acquired (9 items, range: 9–45) and general (21 items, range: 21–105) resilience were 0.83, 0.72 and 0.90, respectively. The authors also successfully showed factorial and concurrent validities. Personality traits were evaluated with a Big-Five inventory developed and standardized in Japan²⁸. Indeed, as an inventory based on the Five-Factor Model of Personality, the Japanese version of the revised NEO personality inventory is more popular than the inventory used; however, we selected this because of its preferable standardization procedures. Samples were randomly selected from all over Japan and appropriate age group-stratified standardization was performed.²⁹ The inventory requires participants to answer 70 yes-no questions and provides a standardized score (mean, 50; standard deviation, 10) for each factor.

The *t*-test, and Pearson’s correlation coefficient

Table 1.

| Items | Total n=72 | Construction n=25 | Farming & Forestry n=38 | <i>p</i> -value |
|-----------------------------|---------------|----------------------|----------------------------|-----------------|
| Age (years) | 38.1 [9.0] | 37.8 [9.9] | 38.2 [8.8] | >0.05 |
| Gender (male/female) | 60/12 | 24/1 | 28/10 | 0.04 |
| Job tenure (years) | 13.7 [10.3] | 14.1 [11.2] | 13.7 [9.9] | >0.05 |
| Fatigue score (0–39) | 12.1 [9.8] | 13.7 [8.2] | 13.4 [10.5] | >0.05 |
| Labor score (0–15) | 4.9 [4.3] | 5.3 [3.8] | 5.4 [4.6] | >0.05 |
| Workload at present (%)* | 51.4 | 60.0 | 52.6 | >0.05 |
| Increase in workload (%)** | 76.4 | 64.0 | 44.7 | >0.05 |
| Total score of K10 (0–40) | 18.1 [8.1] | 18.6 [7.0] | 19.0 [9.3] | >0.05 |
| K10≥15 (%) | 18.1 | 20.0 | 21.1 | >0.05 |
| Total score of K6 (0–24) | 10.2 [5.0] | 10.5 [4.3] | 10.7 [5.8] | >0.05 |
| K6≥13 (%) | 6.9 | 4.0 | 10.5 | >0.05 |
| Innate resilience (12–60) | 39.9 [7.6] | 39.2 [6.0] | 39.5 [7.0] | >0.05 |
| Acquired resilience (9–45) | 30.2 [5.4] | 29.0 [5.3] | 30.8 [4.9] | >0.05 |
| General resilience (21–105) | 70.0 [12.0] | 68.2 [10.1] | 70.3 [11.2] | >0.05 |
| Extraversion (S.S.) | 47.6 [9.5] | 46.8 [8.6] | 47.7 [9.0] | >0.05 |
| Agreeableness (S.S.) | 51.1 [10.3] | 50.8 [10.5] | 50.8 [10.0] | >0.05 |
| Conscientiousness (S.S.) | 48.7 [9.9] | 47.7 [7.3] | 49.1 [10.4] | >0.05 |
| Emotional stability (S.S.) | 50.3 [9.0] | 50.1 [6.8] | 49.5 [9.9] | >0.05 |
| Openness (S.S.) | 46.6 [9.7] | 45.0 [8.1] | 47.7 [10.2] | >0.05 |

Values represent means [standard deviation]. *Percentage of respondents whose stress due to labor was considered “high” or “very high”. **Percentage of respondents who answered that workload in 2011 was “much increased” compared with the previous year. S.S., standardized score. Total respondents consist of the employees working at construction, farming and forestry and other divisions. Except for gender, there were no significant differences between the construction and farming and forestry divisions.

(*r*) and chi-square or Fisher’s exact probability test were performed with IBM SPSS Statistics 20 (IBM Japan, Tokyo, Japan). A regression model was tested employing the fatigue score as a dependent variable. *P*-values less than 0.05 were regarded as statistically significant. This survey was approved by the Ethics Committee of the Niigata University School of Medicine.

Results

Table 1 summarizes the results. The collection rate was 100%. Over half of the respondents answered 12 of 13 questions as having “occasional” or “frequent” fatigue. Two-thirds of the respondents were considered to have “high” or “very high” stress due to labor.

Table 2 shows the correlation coefficients. Fatigue scores were most strongly correlated with labor scores ($p < 0.001$) and total K10 scores ($p < 0.001$) and weakly correlated with all three resilience scores ($p < 0.05$), while they correlated exclusively with the emotional stability factor ($p < 0.001$).

When age, fatigue and labor scores, general resilience and Big-Five factors were incorporated into a regression model, only labor score ($B = 0.69$; $p < 0.001$)

and emotional stability ($B = 0.25$; $p = 0.002$) had significant standardized coefficients ($F_{8,63} = 13.1$; $p < 0.001$; adjusted $R^2 = 0.58$).

Discussion

What should be emphasized here is that the municipal employees with higher scores for the emotional stability factor had lower scores in perceived fatigue and psychological distress. This correlation failed to be observed in the other Big-Five factors. One of the reasons for dual correlation with fatigue and psychological distress is probably the methodology of the present study because the two inventories for them shared similar questions about anxiety and depression. Although none directly examined the perception of fatigue, prior studies showed a significant negative association of emotional stability³⁰ or neuroticism³¹ with job-related strains in Dutch samples. However, ambiguity remains concerning the causal relationship between the two variables. The mood-congruent effect³², a typical example of the impact of mood on human cognition, implies a possibility that physical and psychological distresses caused a lower self-evaluation, leading to a lower rating of the emotional

Table 2.

| | LS | K10 | IR | AR | GR | E | A | C | ES | O |
|--------------------------|-------------|-------------|--------------|--------------|--------------|-------|-------|-------|--------------|-------|
| Fatigue score (FS) | 0.75 | 0.79 | -0.26 | -0.24 | -0.25 | -0.04 | -0.11 | -0.20 | -0.45 | -0.11 |
| Labor score (LS) | | 0.56 | -0.23 | -0.16 | -0.21 | -0.07 | -0.08 | -0.19 | -0.36 | 0.13 |
| Total score of K10 | | | -0.20 | -0.20 | -0.21 | -0.11 | -0.10 | -0.14 | -0.48 | 0.03 |
| Innate resilience (IR) | | | | 0.73 | 0.95 | 0.62 | 0.50 | 0.66 | 0.52 | 0.58 |
| Acquired resilience (AR) | | | | | 0.90 | 0.52 | 0.50 | 0.61 | 0.41 | 0.56 |
| General resilience (GR) | | | | | | 0.62 | 0.54 | 0.69 | 0.51 | 0.61 |
| Extraversion (E) | | | | | | | 0.36 | 0.48 | 0.29 | 0.61 |
| Agreeableness (A) | | | | | | | | 0.50 | 0.24 | 0.27 |
| Conscientiousness (C) | | | | | | | | | 0.36 | 0.61 |
| Emotional stability (ES) | | | | | | | | | | 0.40 |
| Openness (O) | | | | | | | | | | |

n=72; values are Pearson's product moment correlation coefficients. Bold values represent $p < 0.05$.

stability.

All the resilience scores were modestly correlated with the perceived fatigue or psychological distress, although theoretically innate and acquired resilience was expected to behave differently in relation to them²⁵. One possible reason for this may be related to the measurement of the resilience. A recent methodological review investigated 15 major resilience scales and concluded that a number of the scales were in the early stages of development and that all required further validation work³³. The Adolescent Resilience Scale (ARS)²⁶ used for concurrent validity of the BRS was included in the review. Another issue involves the concept of resilience. Using the Japanese version of the revised NEO personality inventory, Nakaya *et al.* found a significant negative correlation between the ARS scores and neuroticism and positive correlations with the other four factors³⁴. Similarly, Friberg *et al.* showed that all resilience factors were positively correlated with the well-adjusted personality profile measured by the Big Five/5PFs³⁵. Considering the lack of variation in the results of these measurement scales, resilience may have only heuristic value in combining favorable aspects of a person's personality endowment³⁶.

The present study has multiple limitations. First, its small sample size and recruitment from only one local government could limit generalizability. Second, since the scale used here asking about perceived fatigue and working conditions has been used only in Japan and not validated in various populations, the quality of the measurement could be significantly affected. Structured interviews should have been conducted to know whether psychopathology of the participants is beyond a diagnostic level. Third, as the cross-sectional design of the study cannot examine causality, the results should be regarded as preliminary

and problem-posing ones. Further prospective study is essentially needed to confirm the predictive validity of emotional stability and resilience.

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