Table 1 Description of damage caused to participants by the Great East Japan Earthquake by level of damage

	All participants		Less damaged participants[a]		Severely damaged participants[b]	
	N 4,331	%	n 3,664	%	n 667	%
Property damage						
None or minimal	2,409	55.6	2,354	64.3	55	8.3
Partial collapse	1,342	31.0	1,310	35.8	32	4.8
Half collapse	366	8.5	0	0.0	366	54.9
Total collapse	214	4.9	0	0.0	214	32.1
Dead or missing family member(s)						
No	4,223	97.5	3,664	100.0	559	83.8
Yes	108	2.5	0	0.0	108	16.2
Lives someplace other than their own house (e.g., a shelter) (n=4,330)						
No	3,359	77.6	3,001	81.9	358	53.8
Previously, yes	887	20.5	663	18.1	224	33.6
Currently, yes	84	1.9	0	0.0	84	12.6

[a] Participants who did not meet the criteria for "severely damaged participants" described below

[b] Participants whose house was half collapsed or totally collapsed, had dead or missing family member(s), or who were living someplace other than their own house as of 2 months after the disaster

who have experienced severe disaster-related damage. On the other hand, handling residents' complaints increased the risk of mental health distress. A previous survey conducted among the firefighters responding to the Great Hanshin–Awaji Earthquake in 1995 found similar findings [20]. Arguably, how to handle residents' complaints is a major challenge for an organization to address in order to perform necessary disaster relief activities while protecting the mental health of its workers. Furthermore, public servants who are responsible for contacting community residents must often repeatedly hear about experiences of the disaster and its impact on residents' lives, which might serve to increase their own distress. When making allowances for severely affected workers, a possible countermeasure is to modify those work assignments requiring close contact with residents.

In the less damaged group, working >100 h overtime per month increased the risk of mental health distress. Previous studies also indicated that extending working hours increased the risk of mental health distress among workers [3, 21, 22]. Managing workloads to avoid extending working hours should not be neglected, not even in the face of disaster relief.

As for workplace communication, poor communication with bosses, colleagues, and subordinates increased the risk of mental health distress in both groups, much more than job type or overwork. In a previous study, promoting communication was significantly and negatively correlated with psychological distress among workers [23]. Although good communication might be dependent upon supervisors or the organizational system, it might also depend upon the communication skills of workers. Therefore, improving workplace communication could be difficult in the short term after a disaster. Daily efforts to promote workplace communication in normal times might protect the mental health of workers without regard to gender, age, or degree of disaster-related damage.

In our study, working at a morgue did not increase the risk of mental health distress. We had anticipated an increased risk based on an earlier study that showed a significantly higher prevalence of posttraumatic stress disorder among those who performed disaster response tasks not common in their usual occupations [10]. In our study, we asked participants only whether or not they worked at a morgue but did not delve into the nature or amount of this work, which contaminated the relationship between morgue work and mental health distress.

When comparing health condition between the less damaged and severely damaged groups, participants in the severely damaged group were more likely to rate their physical condition as low, be dissatisfied with their sleep, and have changes in their appetite and/or alcohol intake. The effects of property damage or loss of family members due to the earthquake or a subsequent change in living environment or lifestyle seemed to detrimentally affect their health.

To evaluate the participants' mental health, we used a score of ≥13 on the K6 [17] to indicate mental health distress. Kessler selected a score of 13 as the optimal cutoff point to screen for serious mental illness as, among other factors, it equalized false-positive and false-negative results [19]. The analysis of the data obtained by the United States National Health Interview Survey in 1997–2009 indicated the proportion of people scoring ≥13 was 3.1 % [24], although some reports revealed a great variety in the proportion among regions or races [25, 26]. In regard to surveys conducted after a disaster, a community survey conducted in the area affected by Hurricane Katrina indicated the proportion of people scoring ≥13 on the K6 increased from 6.1 % before the disaster to 11.3 % about 6 months after it [27]. In a survey conducted 2 to 3 years after the World Trade Center attack, 10.7 % of survivors of collapsed or damaged buildings scored ≥13 on the K6 [28].

Table 2 Demographic participant characteristics and work-related variables by level of damage

	All participants		Less damaged participants[a]		Severely damaged participants[b]		df	χ^2	p value
	N 4,331	%	n 3,664	%	n 667	%			
Gender									
Male	3,351	77.4	2,829	77.2	522	78.3	1	0.4	0.551
Female	980	22.6	835	22.8	145	21.7			
Age group (years)									
18–29	501	11.6	425	11.6	76	11.4	3	7.4	0.060
30–39	1,031	23.8	898	24.5	133	19.9			
40–49	1,426	32.9	1,199	32.7	227	34.0			
50–65	1,373	31.7	1,142	31.2	231	34.6			
Work-related variables									
Job type									
Involved in disaster-related work									
No	1,093	25.2	914	25.0	179	26.8	1	1.1	0.303
Yes	3,237	74.8	2,749	75.1	488	73.2			
Works at a morgue (n=4,327)									
No	4,028	93.1	3,402	92.9	626	94.0	1	1.0	0.317
Yes	299	6.9	259	7.1	40	6.0			
Handles residents' complaints (n=4,327)									
No	4,053	93.7	3,429	93.7	624	93.7	1	0.0	0.976
Yes	274	6.3	232	6.3	42	6.3			
Overwork									
Works > 100 h overtime per month (n=4,330)									
No	4,017	92.8	3,394	92.7	623	93.4	1	0.5	0.493
Yes	313	7.2	269	7.3	44	6.6			
Takes one non-work day each week (n=4,330)									
No	213	4.9	178	4.9	35	5.3	1	0.2	0.670
Yes	4,117	95.1	3,485	95.1	632	94.8			
Working environment									
Work site									
Inland area	3,672	84.8	3,161	86.3	511	76.6	1	40.8	<0.001**
Coastal area	659	15.2	503	13.7	156	23.4			
Workplace communication (n=4,330)									
Poor	143	3.3	116	3.2	27	4.1	2	2.9	0.236
Reasonable	3,117	72.0	2,628	71.7	489	73.3			
Good	1,070	24.7	919	25.1	151	22.6			

Chi-square tests were used

[a] Participants who did not meet the criteria for "severely damaged participants" as described below

[b] Participants whose house was half collapsed or totally collapsed, had dead or missing family member(s), or who were living someplace other than their own house as of 2 months after the disaster

**p<0.01

Community surveys conducted in Japan in normal times reported the proportion of people scoring ≥13 on the K6 was 3.0 % [29] and 2.7 % [30]. According to data from the Comprehensive Survey of Living Conditions, among people aged 15 to 65 years in Miyagi prefecture, the proportion scoring ≥13 was 5.5 % in 2010 and 5.4 % in 2007 [31]. A survey of local government staff reported a proportion of 2.5 % [32]. As for surveys conducted after the Niigata Chuetsu Earthquake in Japan, the corresponding proportion was 2.4 % 1 year after the earthquake, 3.6 % 2 years after it, and 1.8 % 3 years after it among participants of annual health checkup programs conducted by the city affected by the earthquake [33]. In consideration of these reported proportions, the proportion obtained in this study, 3.5 %, is comparable.

In Japan, a score of 5 on the K6 has been recommended as the best cutoff point to maximize the sum of sensitivity and specificity [30] and has been used in several studies [34, 35]. The proportion of people scoring ≥5 on the K6 was reported between 27.5 % [29] to 31.3 % [30] in community settings, 26.7 % in men and 33.1 % in women in a national representative sample of employees [34], 41.6 % among permanent

Table 3 Health condition by level of earthquake damage

	All participants		Less damaged participants [a]		Severely damaged participants [b]		df	χ^2	p value
	N 4,331	%	n 3,664	%	n 667	%			
Physical condition									
Bad	38	0.9	26	0.7	12	1.8	3	20.9	<0.001**
Not so good	575	13.3	461	12.6	114	17.1			
As usual	3,245	74.9	2,761	75.4	484	72.6			
Good	473	10.9	416	11.4	57	8.6			
Sleep									
Sleepless	20	0.5	13	0.4	7	1.1	3	16.2	0.001**
Not so good	623	14.4	503	13.7	120	18.0			
Good	2,675	61.8	2,271	62.0	404	60.6			
Excellent	1,013	23.4	877	23.9	136	20.4			
Appetite (n=4,330)									
Unchanged	3,651	84.3	3,119	85.2	532	79.8	2	12.5	0.002**
Decreased	296	6.8	239	6.5	57	8.6			
Increased	383	8.9	305	8.3	78	11.7			
Change in alcohol intake (n=4,326)									
Unchanged	2,076	48.0	1,795	49.0	281	42.3	3	13.4	0.004**
Decreased	734	17.0	610	16.7	124	18.7			
Increased	426	9.9	342	9.3	84	12.6			
Nondrinker	1,090	25.2	914	25.0	176	26.5			
Mental health distress (K6 score)									
≥5	1,814	41.9	1,478	40.3	336	50.4	1	23.4	<0.001**
≥10	429	9.9	328	9.0	101	15.1	1	24.2	<0.001**
≥ 13	150	3.5	111	3.0	39	5.9	1	13.4	<0.001**

Chi-square tests were used

[a] Participants who did not meet the criteria for "severely damaged participants" as described below

[b] Participants whose house was half collapsed or totally collapsed, had dead or missing family members, or who were living in other than their own house as of 2 months after the disaster

**p<0.01

employees of a manufacturing company [35], and 17.6 % in a survey of local government staff [32]. Among the participants in the above-mentioned annual health checkup programs conducted after the Niigata Chuetsu Earthquake, the proportion was 23.4 % 1 year after the earthquake [33]. Considering these reported proportions, the proportion obtained in this study (i.e., 41.9 % of all participants scoring ≥5) seems relatively high.

To the best of our knowledge, no other surveys have reported K6 scores of public servants working in a devastated area soon after a major disaster. Therefore, we are not able to compare our results with those of other studies. We reasoned that our study population faced especially stressful circumstances as disaster victims and as workers with increased workloads in the disaster's aftermath. They would have had to cope with unfamiliar disaster-related duties and respond to residents' complaints or anger. Thus, we would expect their K6 scores to be higher and that a larger proportion of them would score ≥5. Furthermore, 2 months after the disaster, resources that could have been used to care for them were limited. This is why we used a score of 13 on the K6 as the cutoff point to identify (and give priority to) highly distressed

participants. The suitable cutoff point for them might vary over time as their circumstances change.

To promote the mental health of workers serving in devastated areas, high-risk workers who are severely affected by a disaster might benefit from engaging in disaster-related work that offers a sense of contribution to disaster relief as well as from avoiding stressful contact with community residents. Workers who have experienced less damage might benefit from coordinated work schedules that prevent unduly long overtime hours. Finally, facilitating good workplace communication would seem to be of benefit to all workers.

Limitations

In this study, we used the K6, a simple screening instrument of non-specific psychological distress, to measure our participants' mental health status. Earlier studies on post-disaster mental health focused on posttraumatic stress disorder [6–8], and several studies identified the differences between risk factors of posttraumatic stress disorder from those of depressive symptoms [11, 14, 15]. We might have been able to

Table 4 Relationships between demographic characteristics and work-related variables and mental health distress as measured by the K6 in less damaged participants

	All		K6<13		K6≥13		df	χ^2	p value
	N 3,664	%	n 3,553	%	n 111	%			
Demographic characteristics									
Gender									
Male	2,829	77.2	2,759	77.7	70	63.1	1	13.0	<0.001**
Female	835	22.8	794	22.4	41	36.9			
Age group (years)									
18–29	425	11.6	414	11.7	11	9.9	3	13.2	0.004**
30–39	898	24.5	858	24.2	40	36.0			
40–49	1,199	32.7	1,159	32.6	40	36.0			
50–65	1,142	31.2	1,122	31.6	20	18.0			
Work-related variables									
Job type									
Involved in disaster-related work (n=3,663)									
No	914	25.0	885	24.9	29	26.1	1	0.1	0.772
Yes	2,749	75.1	2,667	75.1	82	73.9			
Works at a morgue (n=3,661)									
No	3,402	92.9	3,295	92.8	107	96.4	1	2.1	0.148
Yes	259	7.1	255	7.2	4	3.6			
Handles residents' complaints (n=3,679)									
No	3,429	93.7	3,328	93.8	101	91.0	1	1.4	0.241
Yes	232	6.3	222	6.3	10	9.0			
Overwork									
Works >100 h overtime per month (n=3,663)									
No	3,394	92.7	3,297	92.8	97	87.4	1	4.7	0.031*
Yes	269	7.3	255	7.2	14	12.6			
Takes one non-work day each week (n=3,663)									
No	178	4.9	174	4.9	4	3.6	1	0.4	0.545
Yes	3,485	95.1	3,379	95.1	106	96.4			
Working environment									
Work site									
Inland area	3,161	86.3	3,072	86.5	89	80.2	1	3.6	0.058
Coastal area	503	13.7	481	13.5	22	19.8			
Workplace communication (n=3,663)									
Poor	116	3.2	90	2.5	26	23.4	2	160.4	<0.001**
Reasonable	2,628	71.7	2,553	71.9	75	67.6			
Good	919	25.1	909	25.6	10	9.0			

Chi-square tests were used
*p<0.05, **p<0.01

identify different risk factors had we used the assessment scale for posttraumatic stress symptoms as an outcome measure. We also identified participants who scored ≥13 on the K6 to have mental health distress but did not consider the severity of their distress. Therefore, we cannot argue that work-related variables increased the risk of mental health distress among participants who had already scored ≥13 due to the effects of earthquake damage.

In addition, the use of a score of ≥13 as a cutoff point produced small samples with mental health distress, which raised questions about the robustness of our results. To confirm the stability of our findings, we also conducted repeated analysis of the data using cutoff scores of 10, 11, and 12 and obtained almost the same results as those with a cutoff score of ≥13. In the less damaged group, adjusted odds ratios for working >100 h overtime per month fell within 1.30 to 1.53, although they were not statistically significant. In the severely damaged group, adjusted odds ratios of handling residents' complaints fell within 1.54 to 2.45 and of disaster-related work 0.52 to 0.95, although they were not statistically

Table 5 Relationships between demographic characteristics and work-related variables and mental health distress as measured by the K6 in severely damaged participants

	All N 667	All %	K6<13 n 628	K6<13 %	K6≥13 n 39	K6≥13 %	df	χ^2	p value
Demographic characteristics									
Gender									
Male	522	78.3	501	79.8	21	53.9	1	14.5	<0.001**
Female	145	21.7	127	20.2	18	46.2			
Age group									
18–29	76	11.4	70	11.2	6	15.4	3	2.8	0.427
30–39	133	19.9	125	19.9	8	20.5			
40–49	227	34.0	211	33.6	16	41.0			
50–65	231	34.6	222	35.4	9	23.1			
Work-related variables									
Job type									
Involved in disaster-related work									
No	179	26.8	161	25.6	18	46.2	1	7.9	0.005**
Yes	488	73.2	467	74.4	21	53.9			
Works at a morgue (n=666)									
No	626	94.0	589	93.9	37	94.9	1	0.1	0.812
Yes	40	6.0	38	6.1	2	5.1			
Handles residents' complaints (n=666)									
No	624	93.7	590	94.1	34	87.2	1	3.0	0.085
Yes	42	6.3	37	5.9	5	12.8			
Overwork									
Works >100 h overtime per month									
No	623	93.4	586	93.3	37	94.9	1	0.1	0.703
Yes	44	6.6	42	6.7	2	5.1			
Takes one non-work day each week									
No	35	5.3	33	5.3	2	5.1	1	0.0	0.973
Yes	632	94.8	595	94.8	37	94.9			
Working environment									
Work site									
Inland area	511	76.6	481	76.6	30	76.9	1	0.0	0.962
Coastal area	156	23.4	147	23.4	9	23.1			
Workplace communication									
Poor	27	4.1	19	3.0	8	20.5	2	37.3	<0.001**
Reasonable	489	73.3	458	72.9	31	79.5			
Good	151	22.6	151	24.0	0	0.0			

Chi-square tests were used
*p<0.05, **p<0.01

significant. As for workplace communication, adjusted odds ratios fell within 7.02 to 9.00 in the less damaged group and 5.37 to 8.01 in the severely damaged group with statistical significance (results available upon request).

Furthermore, that the clinical importance of scores ≥13 on the K6 is not known is a major limitation of this study. However, there are practical and ethical problems in conducting more detailed assessments of mental disorders in a disaster setting with limited resources. Instead, repeated use of the K6 or other brief scales and accumulating the patterns of score distributions might be practically useful when responding to future disasters. In future studies, although the clinical meaning of a particular score and available resources might vary with the situation, in ordinary times, we need to establish an evidence base for the proportion of people who need support as determined by particular K6 scores.

As for property damage, we were able to use the data from the second survey only for 3,743 (86.4 %) participants. Among them, 1,069 participants reported a level of property damage different from the first survey, 968 of whom reported

Table 6 Adjusted odds ratios and 95 % confidence intervals of work-related variables for mental health distress (score ≥13 on the K6)

	Less damaged participants[a]		Severely damaged participants[b]	
	OR	95 % CI	OR	95 % CI
Job type				
Disaster-related work				
No	1.00		1.00	
Yes	0.96	0.60–1.55	0.39	0.18–0.86
Work at a morgue				
No	1.00		1.00	
Yes	0.56	0.20–1.61	1.68	0.35–8.04
Handling residents' complaints				
No	1.00		1.00	
Yes	1.41	0.70–2.84	4.79	1.55–14.82
Overwork				
Works >100 h overtime per month				
No	1.00		1.00	
Yes	2.06	1.11–3.82	1.10	0.23–5.27
Takes one non-work day each week				
No	1.00		1.00	
Yes	1.46	0.51–4.21	0.80	0.17–3.74
Working environment				
Workplace communication				
Good or reasonable	1.00		1.00	
Poor	10.96	6.63–18.09	9.14	3.34–24.97

Logistic regression analyses were performed with adjustment of gender, age-group, and work site

[a] Participants who did not meet the criteria for "severely damaged participants" as described below

[b] Participants whose house was half collapsed or totally collapsed, had dead or missing family member(s), or who were living someplace other than their own house as of 2 months after the disaster

more severe damage in the second survey. Therefore, because the property damage of those who did not participate in the second survey might have been more severe, we might have underestimated the property damage of our study participants. Furthermore, as for severity of earthquake damage, we could use data only on property damage, dead or missing family members, and whether living someplace other than their own home. Therefore, the less damaged group might have included participants who experienced severe damage, including damage to their parent's house, dead or missing relatives or friends, or being injured or their family being injured.

Small group sizes, especially for the severely damaged group, hindered our efforts to detect relationships between several work-related factors and mental health distress. Also, the cross-sectional nature of our data made it difficult to infer causality. We could not obtain information on many well-known risk factors for post-disaster mental health such as socioeconomic status, family factors, pre-disaster psychological symptoms, social support [5], and prior trauma history [12, 15] because we had to limit the number of study questions considering the time constraints of conducting this study only 2 months after a major disaster. Future studies are needed to consider the aforementioned factors when exploring the relationships between work-related variables and mental health in efforts to reform the working conditions of public servants working in a devastated area soon after a disaster.

Ethical Considerations All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975 as revised in 2000. This study involved secondary analysis of existing data. The study protocol was reviewed and approved by the Ethics Committee of the National Center of Neurology and Psychiatry.

Conflict of Interest None.

References

1. National Police Agency. Damage and police action after the Great East Japan Earthquake, 2011. as of July 10, 2013. 2013. http://www.npa.go.jp/archive/keibi/biki/higaijokyo.pdf. Accessed 18 July 2013. (In Japanese).
2. Reconstruction Agency. Number of deaths owing to the effects of the Great East Japan Earthquake. as of March 31, 2013. 2013. http://

www.reconstruction.go.jp/topics/20130510_kanrenshi.pdf. Accessed 18 July 2013. (In Japanese).

3. Inoue K, Inoue K, Kobayashi T, Kobayashi R, Suda S, Kato S. Consideration on the cases of "workplace-associated mood disorder" in the aftermath of the Great East Japan Earthquake. Rinsho Seisin Igaku. 2012;41:1209–15 (In Japanese).

4. Takeguchi M, Noguchi R, Maruyama Y, Tanaka M. Experiences of psychological support for the public health nurses in the affected area by The Great East Japan Earthquake Disaster. Nihon Shudan Saigai Igakkai-shi. 2012;17:687 (In Japanese).

5. Norris FH, Elrod CL. Psychosocial consequences of disaster: a review of past research. In: Norris FH, Galea S, Friedman MJ, Watson PJ, editors. Methods for disaster mental health research. New York: The Guilford Press; 2006. p. 20–42.

6. Galea S, Nandi A, Vlahov D. The epidemiology of post-traumatic stress disorder after disasters. Epidemiol Rev. 2005;27:78–91.

7. Bills CB, Levy NA, Sharma V, Charney DS, Herbert R, Moline J, et al. Mental health of workers and volunteers responding to events of 9/11: review of the literature. Mt Sinai J Med. 2008;75:115–27.

8. Neria Y, DiGrande L, Adams BG. Posttraumatic stress disorder following the September 11, 2001, terrorist attacks: a review of the literature among highly exposed populations. Am Psychol. 2011;66: 429–46.

9. Gross R, Neria Y, Tao XG, Massa J, Ashwell L, Davis K, et al. Posttraumatic stress disorder and other psychological sequelae among World Trade Center clean up and recovery workers. Ann N Y Acad Sci. 2006;1071:495–9.

10. Perrin MA, DiGrande L, Wheeler K, Thorpe L, Farfel M, Brackbill R. Differences in PTSD prevalence and associated risk factors among World Trade Center disaster rescue and recovery workers. Am J Psychiatry. 2007;164:1385–94.

11. Stellman JM, Smith RP, Katz CL, Sharma V, Charney DS, Herbert R, et al. Enduring mental health morbidity and social function impairment in World Trade Center rescue, recovery, and cleanup workers: the psychological dimension of an environmental health disaster. Environ Health Perspect. 2008;116:1248–53.

12. Cukor J, Wyka K, Jayasinghe N, Weathers F, Giosan C, Leck P, et al. Prevalence and predictors of posttraumatic stress symptoms in utility workers deployed to the World Trade Center following the attacks of September 11, 2001. Depress Anxiety. 2011;28:210–7.

13. Wisnivesky JP, Teitelbaum SL, Todd AC, Boffetta P, Crane M, Crowley L, et al. Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. Lancet. 2011;348:888–97.

14. Tapp LC, Baron S, Bernard B, Driscoll R, Mueller C, Wallingford K. Physical and mental health symptoms among NYC transit workers seven and one-half months after the WTC attacks. Am J Ind Med. 2005;47:475–83.

15. Ehring T, Razik S, Emmelkamp PM. Prevalence and predictors of posttraumatic stress disorder, anxiety, depression, and burnout in Pakistani earthquake recovery workers. Psychiatry Res. 2011;30: 161–6.

16. Miyagi prefecture. Population and the number of households based on Basic Resident Register, as of May, 2013. 2013. http://www.pref.miyagi.jp/soshiki/toukei/juki-tsuki.html. Accessed 19 July 2013. (In Japanese).

17. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med. 2002;32:959–76.

18. Furukawa TA, Kawakami N, Saitoh M, Ono Y, Nakane Y, Nakamura Y, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. Int J Methods Psychiatr Res. 2008;17:152–8.

19. Kessler RC. Screening for serious mental illness in the general population. Arch Gen Psychiatry. 2003;60:184–9.

20. Kato H, Asukai N. Psychological effects of rescue workers: a large scale survey of fire fighters following the 1995 Kobe earthquake. Jpn Soc Trauma Stress Stud. 2004;2:51–9 (In Japanese).

21. Virtanen M, Ferrie JE, Singh-Manoux A, Shipley MJ, Stansfeld SA, Marmot MG, et al. Long working hours and symptoms of anxiety and depression: a 5-year follow-up of the Whitehall II study. Psychol Med. 2011;18:1–10.

22. Virtanen M, Stansfeld SA, Fuhrer R, Ferrie JE, Kivimäki M. Overtime work as a predictor of major depressive episode: a 5-year follow-up of the Whitehall II study. PLoS One. 2012;7: e30719.

23. Eguchi H, Tsuda Y, Tsukahara T, Washizuka S, Kawakami N, Nomiyama T. The effects of workplace occupational mental health and related activities on psychological distress among workers: a multiple cross-sectional analysis. J Occup Environ Med. 2012;54: 939–47.

24. Mojtabai R. National trends in mental health disability, 1997–2009. Am J Public Health. 2011;101:2156–63.

25. Albrecht SS, McVeigh KH. Investigation of the disparity between New York City and national prevalence of nonspecific psychological distress among Hispanics. Prev Chronic Dis. 2012;9:E52.

26. Prochaska JJ, Sung HY, Max W, Shi Y, Ong M. Validity study of the K6 scale as a measure of moderate mental distress based on mental health treatment need and utilization. Int J Methods Psychiatr Res. 2012;21:88–97.

27. Kessler RC, Galea S, Jones RT, Parker HA. Hurricane Katrina Community Advisory Group. Mental illness and suicidality after Hurricane Katrina. Bull World Health Organ. 2006;84:930–9.

28. Brackbill RM, Thorpe LE, DiGrande L, Perrin M, Sapp 2nd JH, Wu D, et al. Surveillance for World Trade Center disaster health effects among survivors of collapsed and damaged buildings. MMWR Surveill Summ. 2006;7:1–18.

29. Kawakami N. Distribution and associated factors of mental health status by K6 in a national survey in Japan. In: Hashimoto H editor. Report on Research on Statistics and Information by the Health and Labour Sciences Research Grants. 2006. (In Japanese).

30. Sakurai K, Nishi A, Kondo K, Yanagida K, Kawakami N. Screening performance of K6/K10 and other screening instruments for mood and anxiety disorders in Japan. Psychiatry Clin Neurosci. 2011;65: 434–41.

31. National Information Center of Disaster Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry. Special summary report of the Comprehensive Survey of Living Condition, 2010 and 2007. http://saigai-kokoro.ncnp.go.jp/document/medical.html. Accessed 19 July 2013. (In Japanese)

32. Suzuki K, Sasaki H, Motohashi Y (2010). Relationships among mood/anxiety disorder, occupational stress and the life situation: results of survey of a local government staff. Bulletin of Akita University Graduate School of Medicine Doctoral Course in Health Sciences. 2010;18:120–129.

33. Suzuki Y, Furukawa TA, Kawakami N, Horiguchi I, Ishimaru K, Kim Y. Predictors for psychological distress after the Niigata-Chuetsu earthquake in Japan using pre-disaster physical health indicators. Seishin Hoken Kenkyu. 2010;56:98–7.

34. Inoue A, Kawakami N, Tsuchiya M, Sakurai K, Hashimoto H. Association of occupation, employment contract, and company size with mental health in a national representative sample of employees in Japan. J Occup Health. 2010;52:227–40.

35. Inoue A, Kawakami N, Tsuno K, Tomioka K, Nakanishi M. Organizational justice and psychological distress among permanent and non-permanent employees in Japan: a prospective cohort study. Int J Behav Med. 2013;20:265–76.