

Field Study

Possible Health-protecting Effects of Feeling Useful to Others on Symptoms of Depression and Sleep Disturbance in the Workplace

Jiro TAKAKI¹, Akizumi TSUTSUMI², Hirohiko IRIMAJIRI³, Asako HAYAMA³, Yuri HIBINO⁴, Sakiko KANBARA⁵, Noriko SAKANO¹ and Keiki OGINO¹

¹Department of Public Health, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, ²Occupational Health Training Center, University of Occupational and Environmental Health, ³Yanagawa Clinic, ⁴Department of Environmental and Preventive Medicine, Graduate School of Medical Science, Kanazawa University and ⁵University of KinDAI Himeji, School of Nursing, Japan

Abstract: Possible Health-protecting Effects of Feeling Useful to Others on Symptoms of Depression and Sleep Disturbance in the Workplace: Jiro TAKAKI, et al. Department of Public Health, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences—

Objectives: The aim of this study was to examine the health-protecting effects of feeling useful to others on symptoms of depression and sleep disturbance in the workplace, as well as its buffering effects on associations between stressful work environments and symptoms of depression and sleep disturbance.

Methods: The subjects of this cross-sectional survey were 773 Japanese workers (response rate: 64.8%) of five organizations. Feelings of being useful to others were assessed with one simple question used in a previous study. Psychosocial work environment, sleep disturbance, and depressive symptoms were assessed using the Japanese versions of the Effort-Reward Imbalance Questionnaire, the Pittsburgh Sleep Quality Index, and the 28-item General Health Questionnaire, respectively. We tested for linear and interactive effects with hierarchical regression analyses. **Results:** Feeling useful to others was significantly ($p < 0.05$) and negatively associated with scores of depression and sleep disturbance both in the univariate analyses and after adjusting for age in both genders. Significant ($p < 0.05$) interactions showed that, in both genders, as the effort-reward balance worsened, symptoms of depression increased, but feeling useful to others buffered the associations. **Conclusions:** The results

support the notion that feeling useful to others in both genders in the workplace has possible health-protecting effects.

(J Occup Health 2010; 52: 287–293)

Key words: Depression, Effort-reward imbalance, Feeling useful to others, Psychological stress, Sleep disorders, Workplace

Recently, workplaces in Japan have tended to become more competitive, and the workplace atmosphere has changed to become somewhat cold and inhuman¹. We recently reported that workplace bullying and harassment have become growing issues in Japan². However, it is not sufficient simply to indicate problems. We also need to suggest possible solutions. Warren Edward Buffett, a highly successful individual in a capitalistic, competitive society, stated that the definition of success in the life is to be loved by persons who want to be loved³. He seems to give priority to interpersonal relationships as a way of helping individuals win in competitive societies. If each worker acts usefully to his/her business friends or fellow workers, it would be difficult for workplace bullying and harassment to occur.

Feeling useful to others seems to play an important role in the mental and physical well-being of older adults. Longitudinal studies have shown that older adults who feel useless to others are more likely than those who feel useful to others to experience an increase in disability or to die^{4–7}. In a middle-aged community-living population, the stress-buffering effect on depressive symptoms of providing support was demonstrated for males, but not for females, indicating a gender difference⁸. However, whether feeling useful to others plays an important role in health in the workplace, has not yet been clarified.

In this study, we examined the health-protecting effects

Received Jan 14, 2010; Accepted Jul 1, 2010

Published online in J-STAGE Aug 3, 2010

Correspondence to: J. Takaki, Department of Public Health, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, 2–5–1 Shikata-cho, Okayama 700-8558, Japan (e-mail: jirosinryounaika-ty@umin.ac.jp)

of feeling useful to others on symptoms of depression and sleep disturbance in the workplace, as well as its buffering effects on associations between stressful work environments and symptoms of depression and sleep disturbance. Stressful work environments were measured by the effort-reward imbalance model developed by Siegrist, who suggested that situations in which people believe that they have expended great effort but perceive themselves to have been minimally rewarded lead to states of emotional distress^{9, 10}. Some of the relationships between effort-reward imbalance and health outcomes have been reported to be different depending on gender¹¹. Thus, we analyzed the data for men and women separately.

Methods

Subjects

The subjects for this study were recruited from 1,192 workers of five organizations. We distributed self-administered questionnaires between September 2007 and February 2008. About two weeks after the distribution, we collected completed questionnaires from 773 respondents (response rate: 64.8%). The purpose and procedures of this survey were explained to all participants, and written informed consent was obtained from all those included in the analysis. This study was approved by the ethics committee of the Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences.

Measures

The questionnaire collected information about age, gender, socioeconomic status, and lifestyle. Participants' feelings of being useful to others were assessed by a method used in a previous study, via ratings of how often they felt useful to family and friends⁴. Participants responded using a 4-point scale on which 1 signified never or less than 1 day per week, 2 signified 1–2 days per week, 3 signified 3–4 days per week, and 4 signified 5 or more days per week. Because the variable did not seem to be linear, we dichotomized the variable using median splits and coded it as follows: Participants with low feelings of usefulness to others were coded 0 and those with high feelings of usefulness to others were coded 1. We assessed the test-retest reliability of the scale after a 3-month interval and obtained a kappa coefficient¹² of 0.75 (n=48).

Stressful work environments were measured by the effort-reward imbalance model developed by Siegrist. He suggested that situations in which people believe that they have expended great effort but perceive themselves to have been minimally rewarded lead to states of emotional distress^{9, 10}. We used the Japanese version of the Effort-Reward Imbalance Questionnaire (ERIQ), developed by Tsutsumi *et al.*, which is comprised of two main scales,

extrinsic effort and reward¹³. Extrinsic effort refers to the demanding aspects of the work environment (subjective evaluation of workload)¹³. Reward is constructed from three factors: financial remuneration, esteem, and career opportunities, including job security. A score for the effort-reward ratio was obtained by calculating the logarithmic-transformed ratio between extrinsic effort and reward as a continuous measure; higher scores indicated more stressful situations^{13, 14}.

Sleep disturbance was assessed with the Japanese version of the Pittsburgh Sleep Quality Index (PSQI), a self-administered questionnaire originally developed by Buysse and colleagues¹⁵. The PSQI has seven components (with scores of 0–3): sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction¹⁵. The sum of these seven component scores produces one global score for subjective sleep quality¹⁵. Higher scores indicate poorer sleep quality¹⁵. A Japanese version of the PSQI has been developed, and its reliability and validity have been confirmed^{16, 17}.

Depressive symptoms were assessed using the severe depression scale of the Japanese version of the 28-item General Health Questionnaire (GHQ-28), a self-administered questionnaire originally developed by Goldberg and colleagues¹⁸. The GHQ-28 has several subscales, such as severe depression, somatic symptoms, anxiety and insomnia, and social dysfunction¹⁸. According to Goldberg's method, four response options (1, 2, 3, and 4) are scored (as 0, 0, 1, and 1, respectively), and total scores represent the sum of these scores for each participant¹⁸. Higher scores indicate greater psychological distress¹⁸. The Japanese version of the GHQ-28 was developed by the back-translation method, and its reliability and validity have been confirmed^{19–21}.

Statistical analyses

Differences in continuous variables that met assumptions of normality were compared between men and women using unpaired *t*-tests. Continuous variables that did not meet assumptions of normality were compared using the Mann-Whitney *U* test. Dichotomous variables were compared using Fisher's exact test. Then, we calculated Pearson's correlation coefficients for continuous variables that met assumptions of normality or dichotomous variables. Spearman's correlation coefficients were calculated to identify correlations, which included continuous variables that did not meet assumptions of normality. Associations between feeling useful to others and symptoms of depression and sleep disturbance after adjusting for age were assessed with regression analyses. We tested for linear and interactive effects utilizing hierarchical regression analyses to examine the hypothesis that feeling useful to others functioned as an effect modifier in the relationships

Table 1. Sample characteristics

Variables	Men (N=368)		Women (N=405)		p
	Mean	SD ^a	Mean	SD	
Age (yrs)	43.8	10.4	40.1	10.4	<0.001 ^b
ERIQ ^c scores					
Extrinsic effort	13.6	4.3	13.5	4.5	0.826 ^b
Reward	44.0	7.1	42.2	7.9	0.001 ^b
Effort-reward ratio ^d	-0.26	0.19	-0.25	0.21	0.321 ^b
PSQI ^e global score	4.8	2.4	5.1	2.6	0.126 ^b
GHQ-28 ^f severe depression score	1.0	1.7	1.5	2.1	<0.001 ^g
	N	%	N	%	
Feeling useful to others (median split)					0.827 ^h
Low	210	57.1	235	58.0	
High	158	42.9	170	42.0	

^a: Standard deviation. ^b: Calculated by unpaired *t*-test. ^c: Effort-Reward Imbalance Questionnaire. ^d: The logarithmic-transformed ratio between extrinsic effort and reward; higher scores indicated more stressful situations. ^e: Pittsburgh Sleep Quality Index. ^f: 28-item General Health Questionnaire. ^g: Calculated by the Mann-Whitney *U* test. ^h: Calculated by Fisher's exact test.

between effort-reward imbalance and symptoms of depression and sleep disturbance. Step 1 involved entering the variables of age, effort-reward imbalance, and feeling useful to others in a multiple regression model with depression or sleep disturbance as the dependent variable. Step 2 involved entering the product of the variables representing effort-reward imbalance and feeling useful to others. In accordance with Jaccard *et al.*²²⁾, the continuous variables used as independent variables were mean-centered and the dichotomous variables of feelings of usefulness to others (median splits) were coded (the participants with low feelings of usefulness to others were coded 0 and those with high feeling useful to others were coded 1) prior to the two-way interaction analysis. We also created graphical displays of the regression models based on the recommendations of Cohen *et al.*²³⁾ to further examine the interaction. The regression lines and predicted values illustrating the significant interactions were constructed from the intercepts and the unstandardized regression coefficients. Scores were plotted at the mean, low (1 standard deviation below the mean), and high (1 standard deviation above the mean) values. All the *p* values were two-tailed, and *p*<0.05 was the threshold for significance. All statistical analyses were performed with SPSS 11.0J (SPSS Tokyo, Japan).

Results

Table 1 presents sample characteristics by gender. On average, the men were significantly older and had lower depression scores than the women. The men also gave significantly higher ERIQ reward scores than the women. Tables 2 and 3 show the correlation coefficients for the

study variables for men and women, separately. Age was significantly correlated with scores of depression and some scores of the ERIQ among men. Among women, age was also significantly correlated with scores of feeling useful to others and depression. We therefore included age as a potential confounding variable in the regression models. Feeling useful to others was significantly and negatively correlated with scores of depression and sleep disturbance for both genders (Tables 2 and 3). The standardized regression coefficients for feeling useful to others in regression models that included the variables of age and feeling useful to others as independent variables, with depression as the dependent variable were -0.18 (*p*<0.001) and -0.26 (*p*<0.001) for men and women, respectively. The corresponding variables in regression models for scores of sleep disturbance were -0.19 (*p*<0.001) and -0.13 (*p*=0.011) for men and women, respectively.

Table 4 presents the moderating effects of feeling useful to others on the relationships between effort-reward imbalance and depressive symptoms, using hierarchical multiple regression analyses. For both genders, the interactions of effort-reward imbalance and feeling useful to others significantly contributed to the regression models for scores of depression (Table 4). Otherwise, no significant interactive effects of effort-reward imbalance and feeling useful to others on sleep disturbance were observed for either gender. The regression lines and predicted values illustrating the significant interactions show that, for both genders, as the level of the effort-reward balance worsened, depressive symptoms were exacerbated, but feeling useful to others buffered these associations (Fig. 1).

Table 2. Correlation coefficients for study variables among men

		1	2	3	4	5	6
1. Age	r						
	<i>p</i>						
2. Feeling useful to others	r ^a	0.08					
	<i>p</i>	0.147					
3. ERIQ ^b extrinsic effort	r ^a	-0.18	-0.05				
	<i>p</i>	<0.001	0.382				
4. ERIQ reward	r ^a	0.06	0.10	-0.53			
	<i>p</i>	0.249	0.065	<0.001			
5. ERIQ effort-reward ratio	r ^a	-0.17	-0.06	0.94	-0.77		
	<i>p</i>	0.001	0.246	<0.001	<0.001		
6. PSQI ^c global score	r ^a	0.00	-0.18	0.31	-0.30	0.33	
	<i>p</i>	0.958	<0.001	<0.001	<0.001	<0.001	
7. GHQ-28 ^d severe depression score	r ^e	-0.15	-0.17	0.32	-0.28	0.34	0.36
	<i>p</i>	0.003	0.001	<0.001	<0.001	<0.001	<0.001

^a: Pearson's correlation coefficient. ^b: Effort-Reward Imbalance Questionnaire. ^c: Pittsburgh Sleep Quality Index. ^d: 28-item General Health Questionnaire. ^e: Spearman's correlation coefficient.

Table 3. Correlation coefficients for study variables among women

		1	2	3	4	5	6
1. Age	r						
	<i>p</i>						
2. Feeling useful to others	r ^a	0.20					
	<i>p</i>	<0.001					
3. ERIQ ^b extrinsic effort	r ^a	0.05	-0.05				
	<i>p</i>	0.288	0.359				
4. ERIQ reward	r ^a	-0.06	0.13	-0.45			
	<i>p</i>	0.262	0.007	<0.001			
5. ERIQ effort-reward ratio	r ^a	0.05	-0.08	0.91	-0.75		
	<i>p</i>	0.273	0.098	<0.001	<0.001		
6. PSQI ^c global score	r ^a	-0.08	-0.14	0.22	-0.27	0.28	
	<i>p</i>	0.101	0.007	<0.001	<0.001	<0.001	
7. GHQ-28 ^d severe depression score	r ^e	-0.19	-0.28	0.18	-0.38	0.29	0.25
	<i>p</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

^a: Pearson's correlation coefficient. ^b: Effort-Reward Imbalance Questionnaire. ^c: Pittsburgh Sleep Quality Index. ^d: 28-item General Health Questionnaire. ^e: Spearman's correlation coefficient.

Discussion

In the workplaces of this study, feeling useful to others was significantly and negatively associated with symptoms of depression and sleep disturbance both in the univariate analyses and after adjusting for age in both genders. Furthermore, feeling useful to others had buffering effects on the associations between effort-reward imbalance and depressive symptoms in both genders. To the best of our knowledge, these are new

findings.

The mechanism of the possible health-protecting effects of feeling useful to others may be the social support provided by reciprocity²⁴. Even if social support is not provided by reciprocity, feeling useful to others can offer enhanced self-esteem to those who turn their position into a valuable asset to be shared with others²⁵. If each worker acts usefully for his/her business friends or fellow workers, it may be difficult for workplace bullying and harassment to occur. Thus, the negative

Table 4. Interactive effects of effort-reward imbalance and feeling useful to others (FUTO) on the depression score^a using hierarchical multiple regression

Gender, step and variable		B ^b	β^c	<i>p</i> for β	R ²	<i>p</i> for ΔF
Men	Step 1					
	Effort-reward ratio ^d	2.85	0.32	<0.001	0.156	
	FUTO	-0.56	-0.16	0.001		
	Step 2					
	Effort-reward ratio	3.70	0.41	<0.001	0.165	0.046
	FUTO	-0.57	-0.16	<0.001		
Effort-reward ratio × FUTO	-1.74	-0.13	0.046			
Women	Step 1					
	Effort-reward ratio	2.88	0.28	<0.001	0.164	
	FUTO	-0.99	-0.23	<0.001		
	Step 2					
	Effort-reward ratio	3.70	0.36	<0.001	0.174	0.032
	FUTO	-1.00	-0.23	<0.001		
Effort-reward ratio × FUTO	-2.07	-0.13	0.032			

^a: 28-item General Health Questionnaire severe depression score. ^b: Unstandardized regression coefficient. ^c: Standardized regression coefficient. ^d: The logarithmic-transformed ratio between extrinsic effort and reward assessed with the Effort-Reward Imbalance Questionnaire; higher scores indicated more stressful situations. All the models were adjusted for age.

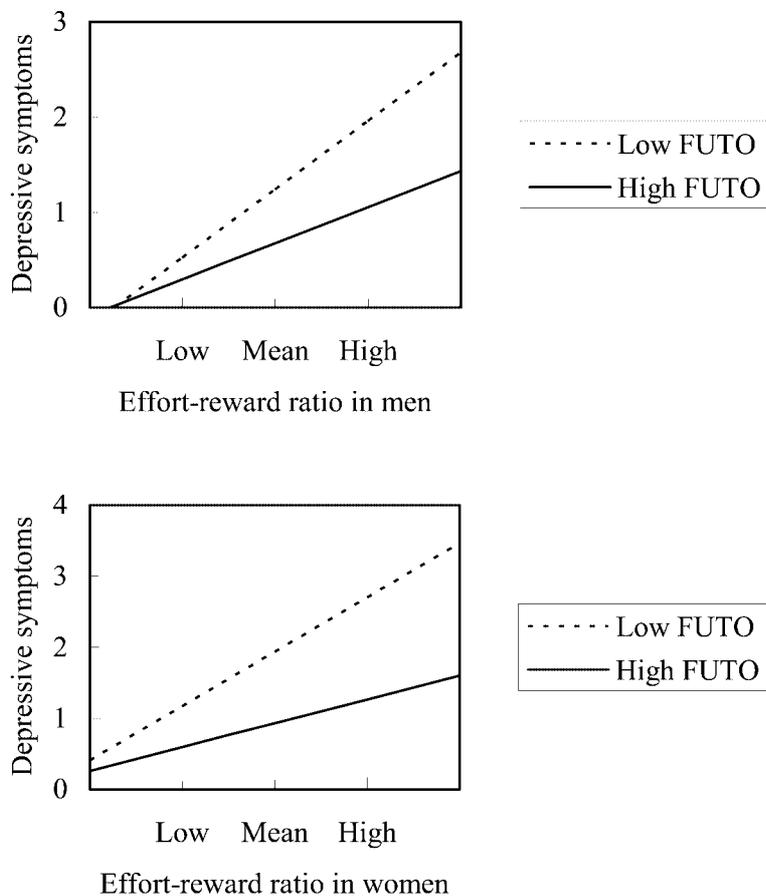


Fig. 1. The regression lines and predicted values illustrating the interactive effects of effort-reward balance and feeling useful to others (FUTO) on depressive symptoms. Effort-reward balance was assessed with the Japanese version of the Effort-Reward Imbalance Questionnaire. The dichotomous variable of feeling useful to others (median splits) were coded as follows: The participants with low feeling useful to others were coded 0 and those with high feeling useful to others were coded 1. Depressive symptoms were assessed using the severe depression score on the Japanese version of the 28-item General Health Questionnaire. Scores were plotted at the mean, low (1 standard deviation below the mean), and high (1 standard deviation above the mean) values.

effects on health caused by workplace bullying and harassment^{26–33}) might be avoided.

This study has some limitations. Because this study used convenience sampling, the results may not be applicable to the entire workforce of Japan. However, because we investigated five organizations and obtained a response rate of over 60%, some generalizability can be expected. Owing to their depressive status, some of the workers did not participate in this study. Nevertheless, it is possible that such workers have extremely high stress work environments, low feelings of usefulness to others, and severe symptoms of depression and sleep disturbance, and their inclusion might have led to stronger associations among the variables than those found.

As for reliability of the measurement of feeling useful to others, internal consistency cannot be calculated with a single item. The test-retest reliability of the scale measuring the feeling of being useful to others was assessed at 3 mo with the kappa coefficient and emerged as 0.75. This figure could be good if we consider the possibility that the 3-month interval might have involved seasonal change.

As for multiple comparisons, this study potentially employed 2 (gender) × 2 (depression and sleep disturbance as the dependent variables) = 4 interaction analyses. Some may argue that Bonferroni inequality should have been applied. However, the use of Bonferroni inequality is based on the assumption that all the tests are independent of each other. Scores of depression and sleep disturbance correlated with each other and the correlations found for men and those for women resembled each other. The application of Bonferroni inequality to these analyses might not be appropriate.

Because this study used a cross-sectional design, it was difficult to determine the causal nature of the relationships of feeling useful to others and effort-reward imbalance with symptoms of depression and sleep disturbance. Our results did not prove our hypothesis, but only supported it. Longitudinal research is necessary to clarify the causality. If the causality was proved, enhancing useful behaviors to others (e.g., rewarding useful behaviors to the other members in the workplace) might promote the mental health of workers.

Acknowledgments: This work was supported in part by funding from the Junpukai Foundation and in part by funding from Health Science Center Foundation.

References

- Mizutani H. Workplace bullying/power harassment and law measures. 2nd edition. Tokyo (Japan): Minjihou-Kenkyukai; 2008 (in Japanese).
- Takaki J, Tsutsumi A, Fujii Y, et al. Assessment of workplace bullying and harassment: reliability and validity of a Japanese version of the Negative Acts Questionnaire. *J Occup Health* 2010; 52: 74–81.
- Buffett M, Clark D. The Tao of Warren Buffett: Warren Buffett's words of wisdom explained. London (UK): Simon & Schuster UK Ltd; 2008.
- Gruenewald TL, Karlamangla AS, Greendale GA, Singer BH, Seeman TE. Feelings of usefulness to others, disability, and mortality in older adults: the MacArthur study of successful aging. *J Gerontol B Psychol Sci Soc Sci* 2007; 62: 28–37.
- Grand A, Grosclaude P, Bocquet H, Pous J, Albaredo JL. Predictive value of life events, psychosocial factors and self-rated health on disability in an elderly rural French population. *Soc Sci Med* 1988; 27: 1337–42.
- Pitkala KH, Laakkonen ML, Strandberg TE, Tilvis RS. Positive life orientation as a predictor of 10-year outcome in an aged population. *J Clin Epidemiol* 2004; 57: 409–14.
- Okamoto K, Tanaka Y. Subjective usefulness and 6-year mortality risks among elderly persons in Japan. *J Gerontol B Psychol Sci Soc Sci* 2004; 59: 246–9.
- Takizawa T, Kondo T, Sakihara S, Ariizumi M, Watanabe N, Oyama H. Stress buffering effects of social support on depressive symptoms in middle age: reciprocity and community mental health. *Psychiatry Clin Neurosci* 2006; 60: 652–61.
- Tsutsumi A, Kawakami N. A review of empirical studies on the model of effort-reward imbalance at work: reducing occupational stress by implementing a new theory. *Soc Sci Med* 2004; 59: 2335–59.
- Siegrist J. Adverse health effects of high effort-low reward conditions at work. *J Occup Health Psychol* 1996; 1: 27–43.
- Peter R, Hammarström A, Hallqvist J, Siegrist J, Theorell T; SHEEP Study Group. Does occupational gender segregation influence the association of effort-reward imbalance with myocardial infarction in the SHEEP study? *Int J Behav Med* 2006; 13: 34–43.
- Cohen J. A coefficient of agreement of normal scales. *Educ Psychol Meas* 1960; 20: 37–46.
- Tsutsumi A, Ishitake T, Peter R, Siegrist J, Matoba T. The Japanese version of the Effort-Reward Imbalance Questionnaire: a study in dental technicians. *Work Stress* 2001; 15: 86–96.
- Pikhart H, Bobak M, Siegrist J, et al. Psychosocial work characteristics and self rated health in four post-communist countries. *J Epidemiol community Health* 2001; 55: 624–30.
- Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res* 1989; 28: 193–213.
- Doi Y, Minowa M, Uchiyama M, Okawa M. Development of the Japanese version of the Pittsburgh Sleep Quality Index. *Jpn J Psychiatry Treat* 1998; 13: 755–63 (in Japanese).
- Doi Y, Minowa M, Uchiyama M, et al. Psychometric assessment of subjective sleep quality using the Japanese version of the Pittsburgh Sleep Quality Index (PSQI-J) in psychiatric disordered and control subjects. *Psychiatry Res* 2000; 97: 165–72.
- Goldberg DP, Hillier VF. A scaled version of the

- General Health Questionnaire. *Psychol Med* 1979; 9: 139–45.
- 19) Nakagawa Y. The theory behind understanding psychiatric and neurotic symptoms using a questionnaire and its clinical application. Monograph of NIMH Japan, Part 2. Ichikawa (Japan): National Institute of Mental Health; 1982 (in Japanese).
 - 20) Fukunishi I. The assessment of cut-off point of the General Health Questionnaire (GHQ) in the Japanese version. *Shinri-rinsyo* 1992; 3: 228–34 (in Japanese).
 - 21) Narita K. The factor structure of a General Health Questionnaire in a Japanese community sample, using a 28-item version. *Ronen-shakai-kagaku* 1994; 16: 19–28 (in Japanese).
 - 22) Jaccard J, Turrisi R, Wan CK. *Interaction Effects in Multiple Regression*. Newbury Park (CA): Sage; 1990.
 - 23) Cohen J, Cohen P, West SG, Aiken LS. *Applied multiple regression/correlation analysis for the behavioral sciences*. 2nd edition. Hillsdale (NJ): Erlbaum; 2003.
 - 24) Bowling NA, Beehr TA, Johnson AL, Semmer NK, Hendricks EA, Webster HA. Explaining potential antecedents of workplace social support: reciprocity or attractiveness? *J Occup Health Psychol* 2004; 9: 339–50.
 - 25) Biegel DE, Naparstek AJ. *Community support systems and mental health*. New York (NY): Springer; 1982.
 - 26) Brousse G, Fontana L, Ouchchane L, et al. Psychopathological features of a patient population of targets of workplace bullying. *Occup Med* 2008; 58: 122–8.
 - 27) Marsh J, Patel S, Gelaye B, et al. Prevalence of workplace abuse and sexual harassment among female faculty and staff. *J Occup Health* 2009; 51: 314–22.
 - 28) Hansen AM, Hogh A, Persson R, Karlson B, Garde AH, Ørbaek P. Bullying at work, health outcomes, and physiological stress response. *J Psychosom Res* 2006; 60: 63–72.
 - 29) Quine L. Workplace bullying in NHS community trust: staff questionnaire survey. *BMJ* 1999; 318: 228–32.
 - 30) Niedhammer I, David S, Degioanni S. Association between workplace bullying and depressive symptoms in the French working population. *J Psychosom Res* 2006; 61: 251–9.
 - 31) Mikkelsen EG, Einarsen S. Bullying in Danish work-life: prevalence and health correlates. *Eur J Work Org Psychol* 2001; 10: 393–413.
 - 32) Mikkelsen EG, Einarsen S. Relationships between exposure to bullying at work and psychological and psychosomatic health complaints: the role of state negative affectivity and generalized self-efficacy. *Scand J Psychol* 2002; 43: 397–405.
 - 33) Kivimäki M, Virtanen M, Vartia M, Elovainio M, Vahtera J, Keltikangas-Järvinen L. Workplace bullying and the risk of cardiovascular disease and depression. *Occup Environ Med* 2003; 60: 779–83.