International Journal of Psychology and Counselling Vol. 2(4), pp. 65-71 October, 2010
Available online at http://www.academicjournals.org/IJPC
ISSN 2141-2499 ©2010 Academic Journals

Full Length Research Paper

Working hours and psychological health among Japanese restaurant services workers

Yasumasa Otsuka* and Megumu Tatemaru

Department of Psychology, Graduate School of Education, Hiroshima University, 1-1-1 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8524, Japan.

Accepted 24 June, 2010

The purpose of the study was to investigate the relationship between the number of working hours and psychological health among restaurant services workers compared to office workers in the restaurant industry. Research participants are 1,107 workers in restaurant services. Analyses of variance were performed to test the association of negative emotions, fatigue, and concentration/activity levels, measured by the "subjective symptoms" subscale of the self-diagnosis check list for assessment of worker's accumulated fatigue, as dependent variables, and occupation (services worker vs. office worker) and number of working hours per day ("8 h or less", "8 to 10 h", "10 to 12 h", or "12 h or more") as independent variables. There was a significant main effect of the number of working hours on negative emotions and concentration/activity levels, suggesting that long working hours were associated with a high level of negative emotions and low concentration/activity levels. The interaction between number of working hours and occupation had a significant effect on fatigue. Post hoc comparisons in each occupation indicated that the fatigue scores in each working-hour group were significantly different among service workers. Reducing the number of working hours is essential to maintain employees' health, especially restaurant services workers' subjective fatigue.

Key words: Working hours, fatigue, negative emotions, concentration/activity levels, restaurant services workers.

INTRODUCTION

Due to increased internationalization and competition, increased utilization of information and communication technology, the changing workforce configuration, and flexibility and new organizational practices (Kompier, 2006), the efficiency of the '24-h society' has been increasing in many countries. The '24-h society' demands employees to work longer hours, while adverse health effects have occurred. Many previous studies showed adverse health effects of long working hours. In Japan, long working hours led to high blood pressure (Iwasaki et al., 1998), sleep deprivation (Sasaki et al., 1999a, b), fatigue (Otsuka et al., 2009; Sasaki et al., 1999a), low quality of life (Maruyama and Morimoto, 1996), and *karoshi* (death brought on by overwork or job-related exhaustion) (Uehata, 1991).

Most studies, however, have examined these effects either at a particular worksite or industry, or by aggregating data over a wide range of industries (Dembe et al., 2008). In this study, we focused on restaurant services workers, who perform various kinds of work related to the preparation and cooking of meals and the serving of food and beverages in various commercial establishments and institutions. Several studies showed that restaurant services workers had serious health problems or high injury risks compared with other workers. For example, higher age-standardized hospitalization ratios were found for many diseases and injuries among employees in hotels and restaurants than in the working population at large in Denmark (Hannerz et al., 2002). In Asian countries, Cho et al. (2008) showed that compared with the 'business activities' industries, Korean workers in the 'hotel and restaurant' industries

*Corresponding author. E-mail: yasumasa-otsuka@hiroshima-u.ac.jp. Tel: 81-82-424-6769. Fax: 81-82-424-6769.

had a significantly greater risk of depression after controlling for gender, age, marital status, duration of employment, and occupational stress. Although these studies could not consider their working hours, long working hours may also have negative effects on restaurant services workers' psychological health compared with other occupations. However, the relationship between the number of working hours and psychological health is not clear in restaurant services workers.

For restaurant services workers, occupational factors such as chemical (e.g., passive smoking, chemical aromatic hydrocarbons and other fumes, etc.), ergonomic (e.g., standing and working, bending, lifting, carrying, etc.), accidents (e.g., high risk of burns or falling, etc.), and psychosocial (e.g., violence, sexual harassment, high emotional demands, etc) factors seemed to have potential significance for their health (Hannerz et al., 2002). Some of these factors may also be associated with workers' psychological health. For example, Nakata et al. (2008) revealed that non smokers exposed to passive smoking at work are more likely to have been associated with a higher degree of depressive symptoms than those without such exposure among Japanese workers who worked in small and medium-scale enterprises. With regard to ergonomic factors, Collins (2009) pointed out the potential relationship between physical demands of work and fatigue. In general, compared with service workers, the prevalence and severity of passive smoking or physical demands were lower among office workers. Thus, long working hours would be more strongly associated with psychological health among service workers than among office workers.

The purpose of this study was to investigate the relationship between the number of working hours and psychological health among restaurant services workers compared with office workers. We hypothesize that long working hours are more strongly associated with psychological ill-health among service workers than among office workers who work in the restaurant industry.

METHOD

The study design was cross-sectional. The Research Ethics Committee of the Hiroshima University Graduate School of Education reviewed and approved the study protocol.

Participants

A self-administered questionnaire was mailed to 2,970 service and office workers, who worked in the restaurant industry in Japan during October and November, 2008. A total of 1,187 workers returned the questionnaire (response rate = 40.0%). After excluding 80 participants who left more than one questionnaire item incomplete, the responses of the remaining 1,107 participants (753 service workers and 354 office workers) were analyzed. It took 10 to 15 min to complete the questionnaire. No incentives were used. The characteristics of the service workers and office workers in the restaurant industry are shown in Table 1.

Overall, the service workers were slightly younger, more often men (62.9 vs. 54.2%), more often smoked (44.6 vs. 33.9%), more managers (42.0 vs. 29.0%), and worked longer hours and less years than the office workers. The proportion of full-time workers was less among the service workers than among the office workers (66.3 vs. 80.2%). No significant difference was found in alcohol consumption.

Materials

Working hours

The number of working hours was measured by questionnaire with a single item asking, "How long do you work, on average, during the days that you do work in this company?", followed by four choices: "8 h or less" (approximately no overtime hours a month), "8 to 10 h" (approximately less than 45 overtime hours a month), "10 to 12 h" (approximately less than 80 overtime hours a month), "12 h or more" (approximately more than 80 overtime hours a month). The criteria of 45 and 80 overtime hours a month were adopted from the Comprehensive Program for the Prevention of Health Impairment Due to Overwork (Japan International Center for Occupational Safety and Health, 2002). In Japan, if the number of overtime hours exceeds 45 h per month, employer shall submit information on the working environment, working hours, the number of late night work assignments and the number of late night work hours, the results of past medical examinations, etc., with respect to workers engaged in the relevant overtime work to the industrial physician, and shall receive advice and guidance from the industrial physician, etc., on health management at the workplace. Furthermore, if the number of overtime hours exceeds 80 h per month and an employee requests administrative guidance or the number of overtime hours exceeds 80 h per month for 2 to 6 consecutive months, the employer should make an effort to provide employees with administrative guidance by industrial physician.

Psychological health

Psychological health was assessed using the "subjective symptoms" subscale of the Self-Diagnosis Check List for Assessment of Worker's Accumulated Fatigue (Japan International Center for Occupational Safety and Health, 2004) presented by the Japanese Ministry of Health, Labour and Welfare. This questionnaire was a state measure of worker's subjective fatigue with 13 items. Japan Industrial Safety and Health Association (2004) indicated that this questionnaire consisted of three dimensions such as fatigue, psychological stress reactions, and physical stress reactions. Participants were instructed to rate their psychological health during the past month. Although the response categories in the original scale are 0 (rarely), 1 (sometimes), and 3 (often), we revised the categories to 1 (rarely), 2 (sometimes), and 3 (often) because in Likert scaling, every item is generally scored on an ordinal level with equally spaced response categories in order to estimate the participants' positions on the continuum with the sum of the scores of the responses to the items (van Alphen et al., 1994).

Statistical analyses

Differences in demographic variables and percentages of respondents between office and service workers were assessed using the χ^2 test. The factor structure of the psychological health scale was assessed using the maximum likelihood extraction and Promax rotation methods. Analysis of variance (ANOVA) was conducted to determine the effects of occupation (service worker vs. office worker), number of working hours (8 h or less, 8 to 10 h, 10 to

Table 1. Characteristics of the respondents and the results of χ2 tests by office and service workers.

	Office worker		Service worker		Chi-Square
	N	**(%)***	***N***	**(%)***	
Gender					8.1**
Men	192	(54.2)	474	(62.9)	
Women	162	(45.8)	276	(36.7)	
Age (years)					26.9***
< 20	1	(0.3)	25	(3.3)	
20 - 29	87	(24.6)	245	(32.5)	
30 - 39	135	(38.1)	260	(34.5)	
40 - 49	83	(23.4)	109	(14.5)	
50 - 59	37	(10.5)	88	(11.7)	
≥ 60	11	(3.1)	23	(3.1)	
Smoking					11.2**
No	230	(65.0)	411	(54.6)	
Yes	120	(33.9)	336	(44.6)	
Alcohol consumption					0.1
No	120	(34.0)	261	(34.7)	
Yes	233	(66.0)	490	(65.1)	
Number of working hours (per day)					50.1***
< 8	59	(16.7)	174	(23.1)	
8 - 9	219	(61.9)	297	(39.4)	
10 - 11	54	(15.3)	189	(25.1)	
≥ 12	22	(6.2)	93	(12.4)	
Employment type					22.7***
Full-time	284	(80.2)	499	(66.3)	
Part-time	70	(19.8)	254	(33.7)	
Occupation					17.3***
Manager	102	(29.0)	311	(42.0)	
Nonmanager	250	(71.0)	429	(58.0)	
Length of service (year)					20.4***
< 1	33	(9.3)	101	(13.5)	
1 - 3	77	(21.8)	181	(24.2)	
4 - 5	52	(14.7)	144	(19.3)	
6 - 10	80	(22.6)	171	(22.9)	
10 - 20	77	(21.8)	108	(14.4)	
≥ 21	35	(9.9)	43	(5.7)	

* Figures do not always add up to 100% due to rounding or missing data. ** P < 0.01, *** P < 0.001.

12 h and 12 h or more), and their interaction on psychological health. In addition, Analysis of covariance (ANCOVA) adjusted for gender, age, smoking, alcohol consumption, employment type and length of service was conducted to determine the effects of occupation (service worker vs. office worker), number of working hours (8 h or less, 8 to 10 h, 10 to 12 h, and 12 h or more), and their interaction on psychological health. The significance level of all statistical analyses was $P < 0.05$ (two-tailed test). All data were analyzed using the Statistical Package for the Social Sciences version 14.0 (SPSS, Inc., Chicago, IL).

Table 2. Factor analysis of the subjective symptoms scale using maximum likelihood extraction and Promax rotation method (N = 1.107)[†].

	F1	*F2*	*F3*
F1: Negative emotions (α=0.87)			
Anxiety	0.859	0.047	-0.104
Depressed	0.791	-0.006	0.069
Restless	0.760	-0.102	0.163
Irritable	0.680	0.172	-0.081
F2: Fatigue (α=0.85)			
Feel tired when waking up in the morning	-0.003	0.848	-0.031
Get tired more easily than before	-0.032	0.842	0.010
Exhausted (excluding after exercise)	0.111	0.636	0.023
Feel ill	0.080	0.483	0.180
F3: Concentration/Activity levels (α=0.72)			
Lack of concentration	-0.027	-0.007	0.925
Often make mistakes	0.011	0.051	0.486
Unmotivated	0.304	0.143	0.323

Inter-factor correlations

	F1	*F2*	*F3*
F1	1.000	0.710	0.698
F2		1.000	0.638
F3			1.000

[†] Two items ("Cannot sleep" and "Feel very sleepy during work") were eliminated since low factor loadings were found in preliminary factor analysis.

RESULTS

First, factor structure of the psychological health scale was assessed since the “subjective symptoms” subscale of the Self-Diagnosis Check List for Assessment of Worker’s Accumulated Fatigue consisted from three dimensions such as fatigue, psychological stress reactions, and physical stress reactions (Japan Industrial Safety and Health Association, 2004). Second, based on the factor analysis, a two-way ANOVA and ANCOVA adjusted for gender, age, smoking, alcohol consumption, employment type and length of service were conducted to test the relationship between the number of working hours and psychological health among service workers compared to office workers in the restaurant industry.

Factor structure of the psychological health scale

Initial exploratory factor analysis resulted in three factors. Two items "Cannot sleep" and "Feel very sleepy during work", were dropped because of low factor loadings. As a result, 11 items were left in the final analysis.

The factor structure of the 11-item psychological health scale was assessed using the maximum likelihood extraction and Promax rotation methods. The proportion of explained variance suggested a three-factor solution, accounting for 70.3% of the total variance. Loading of the items on each of the three factors (negative emotions, fatigue, and concentration/activity levels) resulted in values that were all above 0.32. The “negative emotions” subscale is related to anxiety or depressive feelings (4 items; e.g., depressed), the “fatigue” subscale is related to physical exhaustion (4 items; e.g., feel tired when waking up in the morning), and the “concentration/activity levels” subscale is related to lack of concentration and low activity (3 items; e.g., lack of concentration). All items in each subscale were listed in Table 2. A total was summed for each subscale. Cronbach’s alpha coefficients for each subscale were 0.87, 0.85, and 0.72, respectively.

Occupation, number of working hours, and psychological health

A two-way ANOVA and ANCOVA adjusted for gender, age, smoking, alcohol consumption, employment type and length of service were used to test the relationship between the number of working hours and psychological health among service workers compared to office workers in the restaurant industry. Table 3 shows the results of two-way ANOVA on the effects of occupation and number

Table 3. Psychological health scores according to the daily number of working hours and occupation and the results of ANOVAs.

Stress reactions	Occupations	Number of working hours per day								Analysis of variance (ANOVA)				
		8 h or less		8 - 10 h		10 - 12 h		12 h or more		Working hours		Occupation		Working hours × Occupation
										Main effects	Multiple comparison†	Main effects	Multiple comparison†	Interaction effects
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*F*	P < 0.05	*F*	P < 0.05	*F*
Negative emotions	Office	6.12	(2.48)	6.70	(2.44)	6.83	(2.17)	7.68	(2.44)	18.04*	d>b; c>a	0.00		0.73
	Service	5.72	(1.98)	6.53	(2.22)	6.99	(2.40)	8.09	(2.72)					
Fatigue	Office	6.46	(2.17)	6.58	(2.18)	6.94	(2.44)	7.77	(2.07)	5.76		2.03		2.88*
	Service	5.99	(1.87)	7.02	(2.15)	7.60	(2.43)	8.76	(2.43)					
Concentration /Activity levels	Office	4.27	(1.34)	4.55	(1.40)	4.74	(1.49)	5.14	(1.52)	26.62*	c, d>a; d>b	3.37		0.39
	Service	4.02	(1.27)	4.26	(1.36)	4.59	(1.51)	5.20	(1.55)					

†: Bonferroni method; *P < 0.05.

of working hours on negative emotions, fatigue, and concentration/activity levels.

There was a significant main effect of the number of working hours on negative emotions (F (3, 1099) = 18.04, P < 0.05) and Concentration/ Activity Levels (F (3, 1099) = 26.62, P < 0.05). For negative emotions, multiple comparisons with *Bonferroni* method indicated that respondents in the “12 h or more” group displayed a higher level of negative emotions than those in the “8 - 10 h” group, and respondents in the “10 to 12 h” group displayed a higher level of negative emotions than those in the “8 h or less” group. For concentration/activity levels, multiple comparison indicated that respondents in the “10 to 12 h” and “12 h or more” groups displayed a lower concentration/activity levels than those in the “8 h or less” group, and the respondents in the “12 h or more” group displayed a lower concentration/ activity levels than those in the “8 to 10 h” group. There was no significant main effect of occupation on negative emotions, fatigue, or concentration/ activity levels.

Same results were found when ANCOVA adjusted for gender, age, smoking, alcohol consumption, employment type and length of service was conducted. The interaction between the number of working hours and occupation had a significant effect on fatigue. Post hoc comparisons for each occupation indicated that the fatigue scores in each working-hour group were significantly different among the service workers, whereas the office workers in the “12 h or more” group displayed a higher level of fatigue than those in the “8 h or less” and “8 to 10 h” groups (Figure 1).

DISCUSSION

Longer working hours were associated with a higher level of negative emotions and lower concentration/activity levels, irrespective of the occupation. A dose-response relationship was found between the number of working hours and fatigue among the service workers. However, there was no significant difference among the three lowest working-hours groups (8 h or less, 8 to 10 h and 10 to 12 h) in the office workers. Therefore, our hypothesis that long working hours are more strongly associated with psychological ill-health among service workers than among office workers was partly supported.

Increased working hours were associated with higher level of negative emotions and lower concentration/activity levels, independent of occupation. These findings are principally consistent with previous research findings in many countries (Grosch et al., 2006; Nagashima et al., 2007; Otsuka et al., 2009; Park et al., 2001; Proctor et al., 1996; Sasaki et al., 1999a, b). Our study thus provides additional evidence to validate the inverse health effects of the number of working

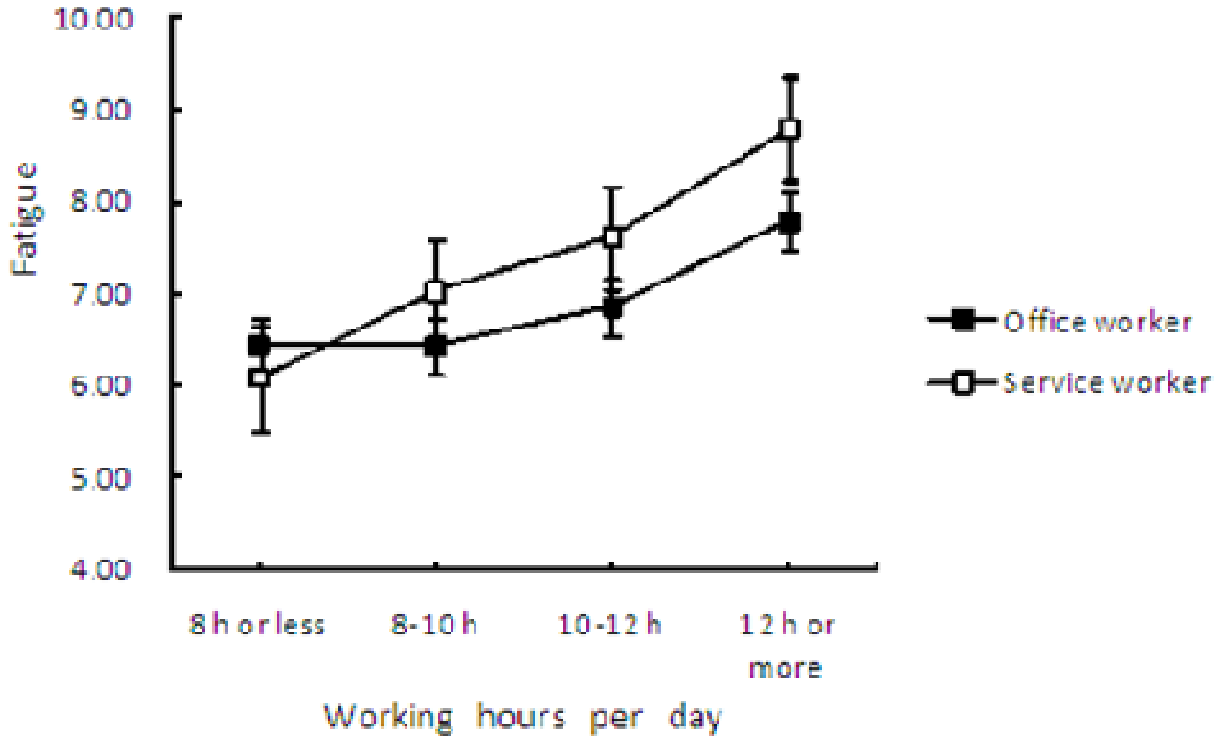

Figure 1. Interaction effects between the number of working hours per day and occupation on fatigue, adjusted for gender, age, smoking, alcohol consumption, employment type and length of service.

hours with respect to negative emotions and concentration/activity levels.

There were no significant differences in fatigue among the three lowest working-hours groups (8 h or less, 8 to 10 h, and 10 to 12 h) in the office workers, suggesting that the negative association with fatigue is present when working 12 h a day. Working 12 h a day is approximately equal to working 80 overtime hours a month. In Japan, the Comprehensive Program for the Prevention of Health Impairment Due to Overwork (Japan International Center for Occupational Safety and Health, 2002) prescribes that if the number of overtime hours exceeds 80 h per month and an employee requests health guidance from a physician or if the number of overtime hours exceeds 80 h per month for 2 to 6 consecutive months, the employer should make an effort to provide the employee with health guidance through interviews from a physician. The results of this study are supporting the adequacy of this criterion.

The number of working hours and level of fatigue showed a linear association among the service workers. The reasons for this finding may be related to intrinsic work characteristics (e.g., high reliance on part-time workers) and work schedules (e.g., long working hours and night work). In fact, the service workers in the present study were primarily part-time workers who basically worked longer hours than office workers. Part-time workers are generally willing to work longer hours because they want to make more money; however, they are also likely to suffer from fatigue. Otsuka and Tatemaru (2009) analyzed the stressors described by full-time restaurant services workers, and pointed out that some distinguishing stressors such as suddenly being asked to come to work when on vacation because of absenteeism of part-time workers, high psychological demand because there were no other full-time workers in the same restaurant, and low support from one's supervisor, seemed to exist among the full-time workers. These stressors may also be worsening their fatigue.

Several limitations of this study should be noted. First, the cause-effect relationship between the number of working hours and psychological health could not be determined due to the limitation of the method of the study. Long working hours may have led to high levels of psychological ill health, but it is also possible that workers with high levels of psychological ill health tend to work long hours. A longitudinal cohort study will be required in the future to determine cause-effect relationships. Second, those not responding to the survey may have represented a population who suffered from more health problems than the respondents, or they might have been unavailable at the time of the study owing to their long working hours. The possibility exists that some workers who had serious health problems or who worked long hours were unable to answer the questionnaire; thus, we cannot disregard the healthy worker effect in our results. Third, information on psychological health was obtained

by self-report measures, which may introduce recall/reporting bias. Fourth, in this cross-sectional study, although office workers in the restaurant industry were considered as the comparison group, another group such as a nationally representative sample should be considered in future studies. Fifth, although working hours were by nature a continuous variable, we failed to have continuous hours work data. Sixth, more thorough measures of psychological health should be incorporated in the future study. Seventh, shift pattern differences among the office workers and services workers did not consider. Circadian disruption associated with shift work, particularly night work, has been reported in the literature to have a negative impact on fatigue (Boivin et al., 2007).

With these limitations, it is concluded that reducing the number of working hours is essential to maintain employees' health, especially restaurant services workers' subjective fatigue, although a further study is warranted.

ACKNOWLEDGEMENT

This study was supported by The Japan Society of Foodservice Studies.

REFERENCES

Boivin DB, Tremblay GM, James FO (2007). Working on atypical schedules. Sleep Med., 8: 578-589.

Cho JJ, Kim JY, Chang SJ, Fiedler N, Koh SB, Crabtree BF, Kang DM, Kim YK, Choi YH (2008). Occupational stress and depression in Korean employees. Int. Arch. Occup. Environ. Health, 82: 47-57.

Collins S (2009). Occupational factors, fatigue, and cardiovascula disease. Cardiopulm. Phys. Ther. J., 20: 28-31.

Dembe AE, Delbos R, Erickson JB (2008). The effect of occupation and industry on the injury risks from demanding work schedules. J. Occup. Environ. Med., 50: 1185-1194.

Grosch JW, Caruso CC, Rosa RR, Sauter SL (2006). Long hours of work in the U.S.: associations with demographic and organizational characteristics, psychosocial working conditions, and health. Am. J. Ind. Med., 49: 943-952.

Hannerz H, Tüchsen F, Kristensen TS (2002). Hospitalizations among employees in the Danish hotel and restaurant industry. Eur. J. Pub. Health, 12: 192-197.

Iwasaki K, Sasaki T, Oka T , Hisanaga N (1998). Effect of working hours on biological functions related to cardiovascular system among salesmen in a machinery manufacturing company. Ind. Health, 36: 361-367.

Japan Industrial Safety and Health Association (2004). Heisei 14 nenndo roudousha no hiroutikusekido jikoshindan chekkurisuto sakuseiiinnkai houkokusho. Japan Industrial Safety and Health Association, Tokyo.

Japan International Center for Occupational Safety and Health (2002). Announcement of Comprehensive Program for the Prevention of Health Impairment Due to Overwork. http://www.jniosh.go.jp/icpro/jicosh-old/english/guideline/OverworkMeasures.html Accessed November 16, 2009

Japan International Center for Occupational Safety and Health (2004). Self-diagnosis check list for assessment of worker's accumulated fatigue.http://www.jniosh.go.jp/icpro/jicosh-old/english/topics/AccumulatedFatigueCheckList/AccumulatedFatigueCheckList.html Accessed November 16, 2009

Kompier MA (2006). New systems of work organization and workers' health. Scand. J. Work Environ. Health, 32: 421-430.

Maruyama S, Morimoto K (1996). Effects of long workhours on life-style, stress and quality of life among intermediate Japanese managers. Scand. J. Work Environ. Health, 22: 353-359.

Nagashima S, Suwazono Y, Okubo Y, Uetani M, Kobayashi E, Kido T , Nogawa K (2007). Working hours and mental and physical fatigue in Japanese workers. Occup. Med., 57: 449-452.

Nakata A, Takahashi M, Ikeda T, Hojou M, Nigama JA, Swanson NG (2008). Active and passive smoking and depression among Japanese workers. Prev. Med., 46: 451-456.

Otsuka Y, Sasaki T, Iwasaki K, Mori I (2009). Working hours, coping skills, and psychological health in Japanese daytime workers. Ind. Health, 47: 22-32.

Otsuka Y, Tatemaru M (2009) Occupational Stress in the restaurant services workers. Nihon Foodservice Gakkai Nenpo, 14: 76-94 (In Japanese).

Park J, Kim Y, Chung HK, Hisanaga N (2001). Long working hours and subjective fatigue symptoms. Ind. Health, 39: 250-254.

Proctor SP, White RF, Robins TG, Echeverria D, Rocskay AZ (1996). Effect of overtime work on cognitive function in automotive workers. Scand. J. Work Environ. Health, 22: 124-132.

Sasaki T, Iwasaki K, Oka T, Hisanaga N (1999). Association of working hours with biological indices related to the cardiovascular system among engineers in a machinery manufacturing company. Ind. Health, 37: 457-463.

Sasaki T, Iwasaki K, Oka T, Hisanaga N, Ueda T, Takada Y, Fujiki Y (1999). Effect of working hours on cardiovascular-autonomic nervous functions in engineers in an electronics manufacturing company. Ind. Health, 37: 55-61.

Uehata T (1991). Long working hours and occupational stress-related cardiovascular attacks among middle-aged workers in Japan. J. Hum. Ergol., 20: 147-153.

Van AA, Halfens R, Hasman A, Imbos T (1994). Likert or Rasch? Nothing is more applicable than good theory. J. Adv. Nurs., 20: 196-201.