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Original Article

Job Dissatisfaction as a Contributor to Stress-related Mental Health Problems among Japanese Civil Servants

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Abstract: Although studies on the association of job dissatisfaction with mental health have been conducted in the past, few studies have dealt with the complicated links connecting job stress, job dissatisfaction, and stress-related illness. This study seeks to determine how job dissatisfaction is linked to common mental health issues. This study surveyed 3,172 civil servants (2,233 men and 939 women) in 1998, taking poor mental functioning, fatigue, and sleep disturbance as stress-related mental health problems. We examine how psychosocial risk factors at work and job dissatisfaction are associated independently with poor mental functioning, fatigue, and sleep disturbance after adjustment for other known risk factors, and how job dissatisfaction contributes to change in the degree of association between psychosocial risk factors at work and mental health problems. In general, psychosocial risk factors were independently associated with mental health problems. When adjusted for job dissatisfaction, not only was job satisfaction independently associated with mental health problems but it was also found that the association of psychosocial risk factors with mental health problems declined. Our results suggest that, although longitudinal research is necessary, attitudes toward satisfaction at work can potentially decrease the negative effects of psychosocial risk factors at work on mental health.

Key words: Job dissatisfaction, Mental health problems, Psychosocial risk factors, The JACS study, Japan

Introduction

That high levels of psychosocial risk at work are widespread in working populations is well known. When we look at changes occurring in the work environment from a global economic perspective, work conditions have worsened, especially in developed countries; the negative changes include, but are not limited to, organizational restructuring, the 24-h economy, and adoption of, and adaptation to, mechanisation and automation[1, 2]. These changes in general also expose workers to unfavourable working environments that may impact workers' health, increasing psychosocial risk factors. Furthermore, trends such as a faster work pace or the demand for higher skills have contributed to an increase in stress-related mental health problems among workers[3].

Psychosocial work factors can be associated with the incidence of many health problems, as described by Karasek and Theorell, whose model of psychosocial work characteristics is the most influential and successful in assessing such issues. According to Karasek, stressful conditions stem from demand and control conditions[4, 5]. This original

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model was later modified to include support at work as a third criterion[6]. As findings in past studies demonstrated, the condition of low control, low support, and high demand at work relate to many health problems; health risk behaviours[7], metabolic syndrome[8], coronary heart disease[9], depression and other mental health problems, and health-related quality of life in general[10–12]. While the two-dimension model (the combination of job control and job demand) used in previous studies addresses mental diseases such as depression and poor mental functioning, factors such as low control, high demand, and low support at work have also been shown to independently impact mental functioning. Moreover, job control contributed more strongly and independently to the SES (Socio Economic Status) health gradient with regard to depression and mental functioning[13–15].

On the other hand, since many people spend a considerable proportion of their waking hours at work, job dissatisfaction is another important factor associated with organizational health. Meta-analysis revealed an association with poor health and job dissatisfaction, especially in terms of mental health problems such as, burnout, anxiety, and depression[16, 17]. Job dissatisfaction is also considered to be one of predictors for absenteeism, turnover rates, occurrences of the common cold, absences due to illness, and early retirement[18–20], as well as coronary heart disease (CHD) and mortality from CHD[21, 22]. In the NIOSH job stress and health model, job dissatisfaction, along with depression, is treated as one of the acute reactions caused by job stressors. It is considered to be one of the factors causing work-related disabilities, including unexplained physical symptoms[23]; past research has proven the validity of this argument[18]. Thus, the management of satisfied versus dissatisfied on the job is a crucial factor for occupational health.

Previous studies have also revealed an association between job dissatisfaction and job stress factors[5, 18, 24]. Still, the results of interactions among work characteristics including job dissatisfaction have not been consistent because, for example, psychosocial risk measured according to the demand/control combination model may have been an oversimplification[25]. Additionally, while meta-analysis reveals that job dissatisfaction is an important factor influencing the health of workers[16], we are not so far able to identify the factors that contribute to the reduction of risk for psychosocial influences at work in the context of health problems, except for cases of health behaviours and work-family conflicts[14, 26].

Furthermore, as for the relations between job dissatisfaction and health, very few previous studies examine other possible 'stress-related problems', including unexplained physical symptoms[27], while many studies examined depression and burnout as mental problem outcomes[18, 28–30]. Few studies have dealt with evaluating job dissatisfaction in relation to minor symptoms (fatigue, sleep disorder, etc.) that have a strong association with stress-related illnesses[3, 18], in the context of these symptoms and psychosocial risk factors at work. To counter these health issues, the proper approach would be to evaluate stress factors at work (e.g. long working hour, difference in job type, and psychosocial risk factors) and job dissatisfaction separately, and explore to what extent association between stress factors at work and health problems declines when filtered through a framework that posits 'job satisfaction and job dissatisfaction', the definition of which is based on Weiss's "(job satisfaction) is a positive or negative evaluative judgment one makes about one's job or job situation"[17, 31, 32].

Taking into account the fact that previous studies have not pursued the complicated links among psychosocial factors at work, job dissatisfaction, and stress-related illness, our objective is therefore to examine 1) the different psychosocial risk factors at work as related to each of mental health problems (with respect to different symptoms such as, poor mental function, fatigue, or sleep disturbance), 2) the association of job dissatisfaction with these health problems after adjustment for known risk factors, and 3) how job dissatisfaction contributes to changes in the degree of association between psychosocial risk factors at work and mental health problems.

Subjects and Methods

Participants

Data in support of this paper came from the Japanese Civil Servants (the JACS) study, which was conducted in collaboration with the British civil servant study (the Whitehall II Study), with Phase 1 of the JACS study being conducted between 1998 and 1999. The JACS study subjects were local government civil servants working in western Japan, consisting mainly of administrative workers, professional workers (technicians, teachers, and hospital workers), clerical workers, and office support staff. Subjects were aged 18–69 yr at the time of the survey, which was administered via a questionnaire delivered to the participants by the local government human resources departments, and returned in sealed envelopes. The questionnaire was sent to 6,090 subjects, 4,933 of which

responded (81.0% response rate). Questionnaires in which subjects failed to answer one or more questions about age, sex, marital status, long standing illness, job type, work characteristics, job satisfaction, or health outcomes were excluded from the analysis, resulting in data from 3,172 subjects (2,233 men and 939 women) being used for the final analysis. The mean ages of the subjects were 42.3 yr (SD: 9.8) for men and 39.8 (SD: 10.5) for women.

This study was conducted as a part of annual health checks mandated by the Japanese Industrial Safety and Health Law. An ad hoc committee of the civil service, which included a member of the Safety and Health Committee, as well as labour and personnel representatives, approved the contents and ethical aspects of this study. Informed consents were obtained from all participants, who all took part in the study voluntarily.

Questionnaire

The questionnaire items, which were chosen from the Whitehall II study, were first translated into Japanese, and then checked for accuracy by being translated back into English by an individual with no knowledge of the original Whitehall II Study. Questions relating to job types were surveyed according to the major groups of occupations of the census in Japan, grouped into 4 categories; administrative (the number of valid response, 152), professional (1,672), clerical (1,076) and office support workers (272). With administrative, professional, and clerical workers corresponding to the census classification, with a separate job category 'office support' for the local civil servants population, representing full-time 'security', 'transport and machine operation' and 'non-classify-able' workers of the census.

To assess overall job satisfaction, the questionnaire also asked about "jobs as a whole taking everything into consideration." Participants rated their satisfaction according to one of four response categories, consisting of "very satisfied", "satisfied", "dissatisfied", "very dissatisfied". According to theoretical definition of Weiss[32], the job satisfaction item was dichotomized into "satisfied" or "dissatisfied" for analysis. Also, a previous report showed that the reliability of single-item measure of job satisfaction is 0.68[33].

In this study, the work characteristics of the subjects were measured by psychosocial risk factors at work, work hours, and job types. Psychosocial risk factors at work were evaluated using three job stress (job control-demand-support) variables, relative to 25 self-reported at work items, which included 15 control items, 4 demand items, and 6 at-work social support items[9], with response categories ranging from 0 (often) to 3 (never). All items were calculated by summing the item scores as a stress score respectively. The reliability coefficient (Cronback's alpha was 0.77 for control, 0.70 for demand, and 0.81 for support) in this study implied that the questionnaire had sufficient internal consistency. In general, low control, high demand, and low support are associated with poor health[7–9, 12, 13, 26, 34]. Therefore stress scores of control, demand, and support were grouped into tertiles, which were rated as high, medium, and low[34]. With respect to working hours, the subjects were asked to answer how many hours a day they had worked in the past month.

Health outcomes were measured using 3 stress-related mental health symptoms: poor mental health, subjective fatigue, and disturbed sleep.

The civil servants' mental health functioning was measured using Japanese version of Short Form 36 (SF-36), which consists of 36 items and generates 8 subscales[35]. Aggregate mental component summary SF36 (MCS) scores were obtained by multiplying each z-score by its mental factor score coefficient and adding the eight products. Finally, each aggregate component score was transformed to a norm-based score with a Japanese population mean of 50 and standard deviation of 10[36]. A Japanese version of the SF-36 has been validated, and widely used in Japan. The higher scores represent better health. Poor mental functioning was defined as having a MCS score below the 25th percentile.

As for fatigue and sleep disturbance, the self-administered questionnaire was used to detect whether the subjects had health problems. To measure subjective fatigue symptoms, we asked "have you had any symptoms of unexplained fatigue during the last two weeks?" to ascertain the subjects' perceived aspects of general fatigue[37]. To measure sleep disturbance symptoms, we asked "have you had any symptoms of sleep disturbance during the last two weeks?" This item inquired as to the type of sleep disturbance, which is independent from other "not rested", or "difficulties awaking"[38].

We also used age, gender, marital status and longstanding illness variables as a confounder associated between psychosocial factors at work and mental health except work characteristics according to previous civil servant studies[26, 34].

Statistics

To evaluate possible non response biases in this study, a comparison was made between the subjects studied and

Table 1. Characteristics of the participants by gender

		Men (n=2,233) (%)	Women (n=939) (%)	χ^2-test *p*-value
Age	–24	2.4	9.7	
	25–34	25.3	26.2	
	35–44	28.0	29.2	
	45–54	34.2	26.7	
	55–	10.1	8.2	<0.001
Married	Yes	81.1	69.2	
	No	18.9	30.8	<0.001
Control at work	Low	34.1	41.2	
	Intermediate	33.5	36.3	
	High	32.4	22.5	<0.001
Demand at work	Low	42.1	30.5	
	Intermediate	29.9	30.5	
	High	28.0	39.1	<0.001
Support at work	Low	37.8	38.8	
	Intermediate	31.2	29.5	
	High	31.0	31.7	0.633
Job types	Administrative	6.6	0.5	
	Professional	47.5	65.1	
	Clerical	35.2	30.9	
	Office support	10.7	3.5	<0.001
Work hours	≤8 h	55.9	52.5	
	8–9 h	21.0	29.5	
	9–11 h	19.0	16.8	
	11 h<	4.0	1.2	<0.001
Job satisfaction	being satisfied	66.1	61.7	
	being dissatisfied	33.9	38.3	0.017
Longstanding illness	Yes	27.9	26.6	
	No	72.1	73.4	0.463

Pearson's χ^2 tests were used to examine whether there were differences in the proportions between men and women.

those excluded with regard to differences in age, sex, and health outcomes (e.g., prevalence of poor mental functioning, feelings of fatigue, and experiencing sleep disturbance). There were no significant differences in health outcomes between included and excluded subjects, although the excluded subjects tended to be older and women.

The age-adjusted percentage of job dissatisfaction by the levels of job stress was calculated using 10 yr age groups of the lowest levels of each job stress as the standard population. χ^2-tests were used to evaluate the existence of gender and job stress differences at work in job satisfaction.

Logistic regression analysis was performed to examine 1) whether there were different psychosocial risk factors at work related to stress-related illness (e.g., poor mental functioning, feelings of fatigue and having sleep disturbance), and 2) whether job dissatisfaction was associated with stress- related illness after being adjusted for other known risk factors, and 3) how job dissatisfaction contributed to change in the degree of association between psychosocial risk factors at work and stress-related illness.

The odds ratios (ORs) and 95% confidence intervals (95%CI) were calculated. Statistical analyses were performed using SPSS (20.0.J). A two-tailed *p* value of less than 0.05 was considered to be significant.

Results

Table 1 lists all subject characteristics by gender.

Table 2. Age-adjusted percentages of job dissatisfaction by different levels of psychosocial risk at work

		Psychosocial risks at work			age-adjusted χ^2-test
		Low (%)	Intermediate (%)	High (%)	*p*-value
Men	Job dissatisfaction % (33.9%: prevalence among men)				
	Control at work	30.5	31.1	17.0	<0.001
	Demand at work	16.7	29.8	47.3	<0.001
	Support at work	26.9	31.4	18.9	<0.001
Women	Job dissatisfaction % (38.3%: prevalence among women)				
	Control at work	35.4	37.5	26.5	0.024
	Demand at work	23.4	33.9	49.3	<0.001
	Support at work	32.4	35.4	24.8	0.017

Pearson's χ^2 test for age-standardized values by the direct method using 10-yr age groups of each gender with low levels of psychosocial risk at work as the standard population.

Women were found to be relatively younger than men, and women were less likely to be married by a significant margin. While there was no significant gender difference in the level of social support at work, women outnumbered men in low control, while there were more men than women in high demand. The majority of women were professional workers, while very few women were administrative and office support workers. Men were more likely to work longer hours (>9 h). More than 60% of both men and women reported being satisfied with their jobs. Less than 30% of subjects had any longstanding illness. The MCS mean score was 46.6 (standard deviation: 6.31) for men and 47.5 (7.11) for women (p<0.001). The number of subjects reporting poor mental functioning was 22.7% for men and 30.0% in women. 11.6% for men and 18.3% for women (p<0.001) reported fatigue, and those experiencing sleep disturbances were 8.8% of the men and 12.9% of the women.

Table 2 illustrates age-adjusted percentage of those with job dissatisfaction by different levels of job stress factors at work. In both men and women, all stress variables related significantly to job dissatisfaction, while higher control and support at work were likely to lower the number of those reporting dissatisfaction with their jobs. Approximately one third of all subjects having intermediate control and support were dissatisfied with their job, though dissatisfaction was slightly higher among those having low control and support. The demand levels of work was associated strongly with job dissatisfaction and showed a dose-response relationship in men and women.

Table 3 notes job stress differences in poor mental functioning before and after adjusted for job dissatisfaction. In multivariate Model 1, age- and sex-adjusted ORs in low control, intermediate and high demand, and low support were significantly associated with mental functioning (ORs were 1.87, 1.52, 2.27 and 1.41 respectively). When adjusted for occupation and work hours in model 2, the adjusted OR in low control at work was attenuated slightly in comparison with that of high control, although job types and work hours did not associate with mental health problems. When further adjustments were made for job dissatisfaction, the adjusted ORs of job stress at work in poor mental functioning were attenuated in all variables. At that point low support at work was no longer significantly associated with poor mental functioning, while job dissatisfaction was strongly related to poor mental functioning (OR=2.06). The association of both job stress difference and job dissatisfaction with poor mental functioning changed little after applying adjustments for marital status and longstanding illness. Furthermore, the statistical significance of sex and age remained the same in all models.

Table 4 shows job stress differences in fatigue before and after being adjusted for job dissatisfaction. When adjusted for sex, age, and job stress, high demand and low support were significantly associated with fatigue (ORs=1.96 and 1.48 respectively). Although fatigue was not related to control at work in Model 1, the increase in adjusted OR in low control was significantly associated with outcome after adjusted for job types and work hours (OR=1.33). When further adjusted for job dissatisfaction, the adjusted ORs of job stress in fatigue were attenuated in all variables. At that point, low control and support at work were no longer significantly associated with fatigue, while job dissatisfaction was strongly related to variables in fatigue (OR=1.81). The association of both job stress differences and job dissatisfaction with feeling fatigue

Table 3. The association with job characteristics in poor mental functioning before and after adjustment for job dissatisfaction

	Prevalence of poor mental functioning %	Model 1		Model 2		Model 3		Model 4	
		OR	(95%CI)	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)
Sex									
Men	22.7	1.00		1.00		1.00		1.00	
Women	30.0	**1.25**	(1.04–1.49)	**1.28**	(1.06–1.54)	**1.31**	(1.08–1.58)	**1.30**	(1.08–1.57)
Age									
55–	13.9	1.00		1.00		1.00		1.00	
45–54	22.1	**1.64**	(1.14–2.36)	**1.57**	(1.08–2.27)	**1.55**	(1.06–2.25)	**1.61**	(1.11–2.35)
35–44	28.9	**2.18**	(1.51–3.13)	**2.06**	(1.41–3.00)	**1.95**	(1.33–2.85)	**2.11**	(1.43–3.10)
25–34	27.2	**2.17**	(1.50–3.15)	**2.00**	(1.36–2.95)	**1.86**	(1.26–2.76)	**1.97**	(1.31–2.97)
–24	29.7	**2.38**	(1.44–3.94)	**2.24**	(1.33–3.75)	**2.20**	(1.30–3.70)	**2.23**	(1.27–3.91)
Control at work									
High	18.4	1.00		1.00		1.00		1.00	
Intermediate	22.9	1.19	(0.95–1.49)	1.15	(0.92–1.44)	1.04	(0.83–1.31)	1.04	(0.82–1.31)
Low	32.1	**1.87**	(1.50–2.32)	**1.75**	(1.39–2.20)	**1.43**	(1.13–1.81)	**1.42**	(1.12–1.80)
Demand at work									
Low	18.3	1.00		1.00		1.00		1.00	
Intermediate	24.3	**1.52**	(1.23–1.89)	**1.53**	(1.23–1.90)	**1.45**	(1.16–1.81)	**1.44**	(1.15–1.78)
High	33.6	**2.27**	(1.86–2.78)	**2.27**	(1.81–2.85)	**1.96**	(1.56–2.47)	**1.95**	(1.55–2.45)
Support at work									
High	21.9	1.00		1.00		1.00		1.00	
Intermediate	23.4	1.10	(0.89–1.38)	1.10	(0.89–1.37)	0.99	(0.80–1.24)	1.00	(0.80–1.24)
Low	28.6	**1.41**	(1.14–1.75)	**1.45**	(1.17–1.79)	1.21	(0.98–1.51)	1.21	(0.97–1.51)
Job types									
Administrative	13.8			1.00		1.00		1.00	
Professional	24.1			1.06	(0.64–1.75)	0.99	(0.60–1.65)	0.99	(0.60–1.64)
Clerical	29.3			1.38	(0.83–2.30)	1.33	(0.80–2.23)	1.33	(0.79–2.23)
Office support	18.8			0.88	(0.49–1.57)	0.86	(0.48–1.54)	0.89	(0.50–1.61)
Work hours									
≤8 h	22.7			1.00		1.00		1.00	
8–9 h	24			0.90	(0.72–1.11)	0.87	(0.70–1.09)	0.88	(0.71–1.10)
9–11 h	31			1.03	(0.81–1.30)	1.03	(0.81–1.30)	1.04	(0.82–1.32)
>11 h	33.7			1.14	(0.72–1.81)	1.11	(0.70–1.77)	1.12	(0.70–1.78)
Job satisfaction									
Yes	18.3					1.00		1.00	
No	37.1					**2.06**	(1.72–2.47)	**2.04**	(1.70–2.44)
Married									
Yes	23.6							1.00	
No	29.4							1.15	(0.91–1.46)
Longstanding illness									
No	23.7							1.00	
Yes	27.9							**1.37**	(1.13–1.66)

Correlations evaluated simultaneously using multiple logistic regressions and expressed as odds ratios with 95% confidence intervals. Abbreviations: OR, odds ratio; 95%CI, 95% confidence interval. Statistically significant odds ratios are shown in bold. Model 1 is adjusted for psychosocial risk factors at work (control, demand and support), sex and age. Model 2 is adjusted for model 1 plus job types and work hours. Model 3 is adjusted for model 2 plus job dissatisfaction. Model 4 is adjusted for model 3 plus marital status and longstanding illness.

changed little after being adjusted for marital status and long standing illness. Furthermore, the statistical significance of sex and age remained the same in all models.

Table 5 shows job stress differences in sleep disturbance before and after being adjusted for job dissatisfaction. When adjusted for sex, age, and job stress, high demand

Table 4. The association with job characteristics in fatigue before and after adjustment for job dissatisfaction

	Prevalence of fatigue %	Model 1		Model 2		Model 3		Model 4	
		OR	(95%CI)	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)
Sex									
Men	11.6	1.00		1.00		1.00		1.00	
Women	18.3	**1.56**	(1.26–1.94)	**1.59**	(1.24–1.95)	**1.59**	(1.27–1.99)	**1.58**	(1.26–1.98)
Age									
55–	8.90	1.00		1.00		1.00		1.00	
45–54	15.1	**1.75**	(1.13–2.70)	**1.76**	(1.13–2.75)	**1.74**	(1.27–1.99)	**1.85**	(1.18–2.90)
35–44	15.0	**1.63**	(1.05–2.55)	**1.68**	(1.06–2.65)	**1.59**	(1.01–2.53)	**1.79**	(1.12–2.86)
25–34	11.7	1.32	(0.83–2.10)	1.35	(0.84–2.18)	1.26	(0.78–2.05)	1.40	(0.84–2.32)
–24	15.2	1.64	(0.88–3.06)	1.67	(0.88–3.16)	1.63	(0.86–3.10)	1.73	(0.87–3.46)
Control at work									
High	11.6	1.00		1.00		1.00		1.00	
Intermediate	12.8	1.05	(0.80–1.39)	1.07	(0.81–1.41)	0.99	(0.74–1.31)	0.98	(0.74–1.30)
Low	16.1	1.31	(1.00–1.71)	**1.33**	(1.00–1.76)	1.13	(0.84–1.51)	1.12	(0.83–1.50)
Demand at work									
Low	10.2	1.00		1.00		1.00		1.00	
Intermediate	12.6	1.29	(0.99–1.69)	1.28	(0.97–1.68)	1.22	(0.92–1.61)	1.21	(0.91–1.60)
High	18.8	**1.96**	(1.53–2.51)	**1.94**	(1.47–2.56)	**1.71**	(1.28–2.27)	**1.68**	(1.27–2.24)
Support at work									
High	11.4	1.00		1.00		1.00		1.00	
Intermediate	12.2	1.08	(0.82–1.43)	1.08	(0.82–1.43)	1.00	(0.75–1.32)	1.00	(0.75–1.32)
Low	16.6	**1.48**	(1.14–1.93)	**1.50**	(1.15–1.96)	1.31	(1.00–1.61)	1.30	(0.99–1.71)
Job types									
Administrative	12.5			1.00		1.00		1.00	
Professional	14.1			0.74	(0.43–1.27)	0.70	(0.41–1.20)	0.70	(0.41–1.20)
Clerical	13.9			0.80	(0.46–1.38)	0.77	(0.44–1.38)	0.77	(0.44–1.34)
Office support	10.3			0.61	(0.32–1.18)	0.60	(0.31–1.16)	0.64	(0.33–1.23)
Work hours									
≤8 h	12.5			1.00		1.00		1.00	
8–9 h	14.6			1.03	(0.79–1.33)	1.01	(0.77–1.31)	1.03	(0.79–1.34)
9–11 h	16.1			1.07	(0.80–1.43)	1.06	(0.79–1.43)	1.08	(0.80–1.45)
>11 h	10.9			0.73	(0.37–1.43)	0.70	(0.36–1.38)	0.72	(0.37–1.41)
Job satisfaction									
Yes	10.3					1.00		1.00	
No	19.7					**1.81**	(1.44–2.26)	**1.78**	(1.42–2.23)
Married									
Yes	13.4							1.00	
No	14.5							1.17	(0.87–1.59)
Longstanding illness									
No	12.0							1.00	
Yes	18.0							**1.60**	(1.24–2.01)

Correlations evaluated simultaneously using multiple logistic regressions and expressed as odds ratios with 95% confidence intervals. Abbreviations: OR, odds ratio; 95%CI, 95% confidence interval. Statistically significant odds ratios are shown in bold. Model 1 is adjusted for psychosocial risk factors at work (control, demand and support), sex and age. Model 2 is adjusted for model 1 plus job types and work hours. Model 3 is adjusted for model 2 plus job dissatisfaction. Model 4 is adjusted for model 3 plus marital status and longstanding illness.

and low support were significantly associated with sleep disturbance (ORs=1.86 and 1.59 respectively). When variables of job types and work hours were added to Model 1, the adjusted OR in high demand decreased (OR=1.59) and that of low support increased (OR=1.62), although both ORs were significantly associated with sleep disturbance.

Table 5. The association with job characteristics in sleep disturbance before and after adjustment for job dissatisfaction

	Prevalence of sleep disturbance %	Model 1		Model 2		Model 3		Model 4	
		OR	(95%CI)	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)
Sex									
Men	8.8	1.00		1.00		1.00		1.00	
Women	12.9	**1.39**	(1.09–1.79)	**1.32**	(1.02–1.71)	**1.34**	(1.03–1.73)	**1.32**	(1.02–1.72)
Age									
55–	12.9	1.00		1.00		1.00		1.00	
45–54	10.1	0.71	(0.48–1.06)	0.67	(0.44–1.00)	**0.65**	(0.43–0.99)	0.70	(0.46–1.06)
35–44	11.3	0.77	(0.52–1.16)	0.71	(0.46–1.08)	0.67	(0.44–1.02)	0.78	(0.51–1.20)
25–34	7.0	**0.49**	(0.32–0.77)	**0.44**	(0.28–0.70)	**0.41**	(0.26–0.66)	**0.49**	(0.30–0.81)
–24	12.4	0.89	(0.48–1.66)	0.77	(0.41–1.47)	0.75	(0.39–1.43)	0.89	(0.44–1.82)
Control at work									
High	8.6	1.00		1.00		1.00		1.00	
Intermediate	10.4	1.22	(0.90–1.67)	1.26	(0.92–1.72)	1.18	(0.86–1.62)	1.18	(0.86–1.62)
Low	10.9	1.22	(0.89–1.66)	1.32	(0.96–1.83)	1.15	(0.82–1.61)	1.14	(0.82–1.60)
Demand at work									
Low	7.8	1.00		1.00		1.00		1.00	
Intermediate	9.3	1.25	(0.92–1.67)	1.13	(0.83–1.55)	1.09	(0.79–1.50)	1.08	(0.79–1.49)
High	13.5	**1.86**	(1.40–2.47)	**1.59**	(1.16–2.18)	**1.42**	(1.03–1.96)	**1.41**	(1.02–1.94)
Support at work									
High	7.6	1.00		1.00		1.00		1.00	
Intermediate	10.0	1.33	(0.97–1.84)	1.34	(0.97–1.85)	1.26	(0.91–1.74)	1.26	(0.91–1.75)
Low	12.1	**1.59**	(1.16–2.16)	**1.62**	(1.19–2.20)	**1.44**	(1.05–1.98)	**1.43**	(1.04–1.96)
Job types									
Administrative	7.9			1.00		1.00		1.00	
Professional	11.4			1.40	(0.73–2.66)	1.36	(0.71–2.60)	1.36	(0.71–2.59)
Clerical	8.8			1.13	(0.58–2.21)	1.12	(0.57–2.19)	1.11	(0.57–2.18)
Office support	7.4			0.89	(0.41–1.93)	0.89	(0.41–1.93)	0.95	(0.44–2.08)
Work hours									
≤8 h	8.8			1.00		1.00		1.00	
8–9 h	11.6			1.25	(0.93–1.68)	1.24	(0.92–1.66)	1.29	(0.96–1.73)
9–11 h	11.7			1.24	(0.88–1.73)	1.24	(0.88–1.74)	1.26	(0.90–1.77)
>11 h	8.9			1.02	(0.49–2.14)	0.99	(0.47–2.08)	1.03	(0.49–2.15)
Job satisfaction									
Yes	7.9					1.00		1.00	
No	13.9					**1.62**	(1.25–2.09)	**1.59**	(1.23–2.05)
Married									
Yes	10.1							1.00	
No	9.8							1.10	(0.77–1.57)
Longstanding illness									
No	8.1							1.00	(1.47–2.43)
Yes	15.0							**1.89**	(1.47–2.43)

Correlations evaluated simultaneously using multiple logistic regressions and expressed as odds ratios with 95% confidence intervals. Abbreviations: OR, odds ratio; 95%CI, 95% confidence interval. Statistically significant odds ratios are shown in bold. Model 1 is adjusted for psychosocial risk factors at work (control, demand and support), sex and age. Model 2 is adjusted for model 1 plus job types and work hours. Model 3 is adjusted for model 2 plus job dissatisfaction. Model 4 is adjusted for model 3 plus marital status and longstanding illness.

When further adjusted for job dissatisfaction, the adjusted ORs of job stress in sleep disturbance were attenuated in all variables. At that point high demand and low support at work were significantly associated with sleep disturbance, while job dissatisfaction was significantly related to sleep disturbance (OR=1.62) independently. Although long-

standing illness was significantly associated with sleep disturbance, the association of both job stress differences and job dissatisfaction with sleep disturbance changed little after being adjusted for marital status and longstanding illness. Furthermore, the statistical significance of sex and age remained the same in all models except for those aged 45–54.

Discussion

This paper set out to examine the role of being satisfied-dissatisfied on the job as a relative factor in stress-related mental health problems and as a contributor to change in the strength of the association between psychosocial risks at work and these health problems. In mental functioning, the associations with psychosocial risks at work declined significantly after being adjusted for job dissatisfaction, especially with low job control and low job support. In relation to subjective fatigue symptoms, association with psychosocial risks at work was attenuated significantly in subjects experiencing low job control. In sleep disturbance, the associations with psychosocial risks at work were attenuated in high demand and low support at work, though not significantly. Additionally, job dissatisfaction was independently and strongly associated with stress-related mental health problems, and contributed a substantial degree to the change of association between psychosocial risks at work and stress-related mental health problems.

This study also found that psychosocial risk factors at work, in which job control, demand, and support were measured, has association with poor mental functioning, feelings of unexplained fatigue, and sleep disturbance. In the Japanese cohort, the same result was obtained; psychosocial risk factors at work were associated with poor health in our previous study of Japanese civil servants[12, 26, 34]. In addition, unlike the results found in other health outcome models, the oldest age group, 55 and older, generated poor results in the sleep model, which may be an age effect of that category. This result was also consistent with previous studies[26, 37–39]. Additionally, job dissatisfaction was associated with each health outcome independently. This result is also consistent with various other studies including meta-analysis, which measured the association between job dissatisfaction factors and stress-related health problems[16, 28]. Most importantly, the differences in the 'job satisfied − job dissatisfied' subjective category was the strongest contributor to attenuate the association between stress-related problems and psychosocial risks at work (e. g. control, demand and support at work).

The strength of associations of psychosocial risk factors (especially, control and support at work) with mental health problems attenuated significantly when adjusted for job satisfaction in this study. Among all work characteristics (e.g. job type, work hours, psychosocial risk factors, and job dissatisfaction) that we examined in connection with mental health problems, we found that job dissatisfaction affected the associations between psychosocial risk factors and mental health problems more than other work characteristics, such as work hours or job types. This result may reflect a specific range of psychosocial risk factors at work, that is, whether they are low, intermediate, or high, they may serve as a suppresser to interest and motivation at work, which can be inferred from Table 2[25, 29]; previous studies revealed no significant 'satisfied' or 'not satisfied' state at work based on job types and work hours[40]. In these cases, "job dissatisfaction" may be estimated to not only be an independently relevant factor to stress-related health, but may serve as a contributor to decrease the risk of psychosocial factors at work as well[16, 23, 28].

It is worth noting that the odds ratio of job dissatisfaction was high in mental functioning, fatigue, and sleep disturbance in descending order, and the contribution to decline association between psychosocial risk factors at work and the health outcomes weakened in the same order. These differences in relation to the three health outcomes may be indicative to the differences in the impact of "physical" and "psychological" symptoms on job (dis) satisfaction factors. According to related reports, the measures of mental health that had a stronger association with job satisfaction factors than did the measures of physical health[16, 18]. In this study, the association of psychosocial risks at work and job satisfaction with the health outcomes showed almost no change after being adjusted for longstanding illnesses. This may suggest that the health outcomes used in this study (i.e., mental function, fatigue, and sleep disturbance), were associated more with mental health problems than with physical problems[37, 39]. Yet, the fact that job dissatisfaction contributed to poor mental functioning, fatigue, and sleep disturbance in descending order may indicate that job dissatisfaction has a stronger association with particular poor health problems that are vulnerable to the dynamics of psychological mechanisms[23, 41].

Interestingly, after adjusted for being satisfied-dissatisfied on the job, even though the adjustment did not affect the level of association between age and gender differences and health outcomes, the strength of the association of psychosocial risk factors at work (e.g. control, demand,

and support in this study) alone with each outcome was specifically attenuated. This may be considered reasonable given that being satisfied at work generally works as a buffer against negative impact of job stressors, while elements of "job satisfaction" in work characteristics is an independently relevant factor in mental health problems[18, 28]. Sekine *et al.* suggests that differences between men and women in the association with mental functioning can be explained by "work-family conflict"[34]. In our results, however, although gender differences were relevant to mental health problems, there was no difference between men and women in the association of job satisfaction with psychosocial work characteristics.

It should be mentioned that there are several limitations that may affect the interpretation of the results of this study. First, there were issues with the concept and measurement of job satisfaction per se. Theoretically an individual may be satisfied with many facets of their job but still be dissatisfied with the job overall. Previous studies examined how different facets of job satisfaction contributed to overall job satisfaction, demonstrating that overall job satisfaction was strongly associated with facets of job satisfaction, especially with intrinsic factors[40]. Also in this study, measurement using single items alone revealed that overall job satisfaction was associated strongly with each different stress-related outcome. This result therefore delivers an important finding in which we relied on index dichotomized for an overall "being satisfied or dissatisfied" rating using a single variable that provided a more manageable measurement[32, 33]

Second, we used 4 job types, Administrative, Professional, Clerical, and Office Support following the major groups of Japan's census. Each job type may include a variety of occupations; Professional, for example, includes technicians, teachers and hospital workers. While, our study set a frame based on the four job types of the census, we found that difference that existed among the four job types in association with mental health problems disappears when adjust for age and psychosocial risk factors at work. This result was consistent with previous studies[26], which led us to conclude that the difference in association that existed among the four job types and mental health problems is explained rather by differences in psychosocial risks at work. If we examine job types in medium or minor groups, we may find a particular job has more association with mental health problem. Though this is not the framework of present study, we would assume a more detailed study specifically focused on certain occupations would reveal more specific mental health associations.[28].

Third, the present study is a cross-sectional study, which makes it hard to determine the causality of the associations of job satisfaction or psychosocial work characteristics with stress-related symptoms, though this study did reveal a weak relationship between job dissatisfaction and job stress factors. However, previous studies found little evidence of a factor that positively changes association between job stress and mental health[26, 34]. Since job dissatisfaction, job stress, and mental health are intertwined in their relations in a complex way, longitudinal research is necessary to clarify the causal nature of these associations.

Forth, since the subjects of this study are all civil servants, it may be difficult to generalize the results. For example, compared to private sector workers, civil servants tend to work under uniform conditions in some aspects of work: these conditions include high education levels, stable wages, and guaranteed job stability with no threat of unemployment until the age of retirement[42, 43]. In addition, although the civil service does include manual workers such as office support workers, drivers, protective service workers, and other blue-collar occupations, civil servants tend to include more white-collar workers than the general occupational population. This result showed that being satisfied on the job may play a role in contributing to not only the level of job control and support but also the level of demand to which non-manual workers were more exposed when compared to white collar workers with regard to mental health problems[44]. Therefore this result may have applicability to general work population.

Conclusion

Job dissatisfaction was independently associated with different stress-related mental health problems (i.e., poor mental functioning, fatigue, and sleep disturbance) among Japanese civil servants. In addition, being satisfied on the job tended to attenuate the association of psychosocial risk factors at work with mental health problems singularly. Although longitudinal research is necessary, the factor of satisfaction at work may play an important role for the maintenance and the improvement of employees' mental health under stressful work conditions.

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