【総合福祉科学研究】 創刊号 131–138 頁

【論文】

Differential Job Stress in Japanese Male Workers: Assessments by The Effort-Reward Imbalance Model and The Demand-Control Model

Makiko Nagami, Akizumi Tsutsumi and Kanehisa Morimoto

努力ー報酬不均衡モデルおよび仕事の要求度ーコントロールモデルによる職業性ストレス評価結果の比較

長見まき子，堤 明純，森本兼曩

01

2010年3月

総合福祉科学研究

Journal of Comprehensive Welfare Sciences

【論文】

Differential Job Stress in Japanese Male Workers: Assessments by The Effort-Reward Imbalance Model and The Demand-Control Model

Makiko Nagami *·**, Akizumi Tsutsumi *** and Kanehisa Morimoto **

Abstract

To compare the Effort-Reward Imbalance with Job Strain (Demand-Control) in terms of occupational types, and to examine the effects of each job stress index on mental health, we administered the two standardized job stress questionnaires and the General Health Questionnaire to 565 Japanese male workers. The prevalence obtained for high job stress by type of occupation was quite different between the two models. A logistic analysis showed that each stress index was positively associated with mental ill health independently with each other. The two job stress models assess job stress from different angles and the health effects are independent of each other, which suggest the complementary role of the two stress models.

Key words Demand-Control Model ／ Effort- Reward Imbalance Model ／ Job Stress ／ Mental Health

Introduction

Today's economic globalization and technological advances have had an unprecedented impact on the speed of workplace change. A countermeasure that would act to improve the stress issues related to work environment and organization is needed. As the premise, sophisticated assessment of job stress factors is required.

The job content questionnaire (JCQ) developed by Karasek [1] is one of the most commonly used scales to assess environmental job stressors. Karasek found that adverse health effects of workload were different among occupational groups and pointed out that adverse health effects of workload could be buffered by job control. This observation has been conceptualized as the Demand-Control (D-C) model. According to this model, a combination of high job demand and low job control, named "job strain", predicts adverse health effects[2]. Job demand relates to mental workload, organization constraints on task completion, and conflicting demands. Job control means a worker's control over the performance of his or her own job. Job control is measured by two sub dimensions of decision latitude: skill discretion and decision authority. Skill discretion relates to the level of skill and creativity required on the job and the flexibility to decide what skills to use. Decision authority assesses the possibilities for a worker to make decisions about his or her work. Social support at work was added as a third dimension of the D-C model [3]. Job strain as defined in this model has been linked to various kinds of health problems, such as coronary heart disease/its risk factors and depression [2) 4)].

* Department of Health Sciences, Kansai University of Welfare Sciences ／ ** Depertment of Social and Environmental Medicine, Osaka University Graduate School of Medicine ／ *** Occupational Health Training Center, University of Occupational and Environmental Health

Siegrist [5] proposed another theoretical model of job stress. He focuses on reciprocity of exchange in occupational life where high-cost/low-gain conditions are considered particularly stressful. This model is named the Effort-Reward Imbalance（ERI）model. In this model, two different sources of effort at work are defined; an extrinsic source such as demands of the job and an intrinsic source such as critical coping patterns of the individual worker in a demanding situation, i.e., level of over-commitment. Reward at work is distributed by three sources: money（i.e., salary）, esteem（i.e., respect, adequate support）, and status control（i.e., promotion prospects, job security）. In particular, importance is attached to the related negative conditions of low reward of career, such as forced occupational change, downward mobility, and lack of promotion prospects. These conditions are commonly observed in economic recessions and unstable employment environments, so the ERI model can sensitively reflect the current social and economic circumstances that cause job stress. The ERI model assumes that an imbalance between high effort and low reward at work is a stressful condition and that overcommitment is a personal pattern of coping that reinforces the risk of job stress. According to the ERI model, the combined effects of high effort and low reward predict a coronary heart disease/its risk factors [6) 7) 8)], physical symptoms of illness [9)], and sick days [10)].

The two alternative job stress models briefly described above assess conceptually different aspects of job stress. The D-C model focuses attention more on the objective psychosocial work environment and job control assessed by the JCQ is implicated in control over ordinary tasks. On the other hand, the ERI model looks at more macro-economic job characteristics（Reward）and attaches importance to individual perception and appraisal of adverse work conditions. However, there have been no studies to empirically show that the two models assess different aspects of stress. Comparing the prevalence of job stress indices by occupational type and a key demographic factor would provide this picture. In this study, we compared the prevalence of stress indices as assessed by the two job stress models both for several occupations and age groups, and examined the effects of the job stress indices on mental health in a single company.

Methods

1. Subjects

On July 1999, the survey in the form of a self-administered questionnaire carried out as part of occupational health management by the health and safety section of an electric device manufacturing company in Japan. We supported the execution and analysis of the survey as a staff of the *Employee Assistance Program* organization that has contracted with this company. The analysis in this study was based on the survey conducted in the company that, at that time, employed 913 full-time employees. The analysis was carried out with employees' informed consent and the whole procedure guaranteed full confidentiality of the information gathered. A total of 712 employees（78%）responded. Because of their small number, 147 female employees were excluded from the analysis. The subjects of this study were 565 male employees（mean age = 38.6, SD = 11.2）.

2. Demographic variables

Information on basic demographic factors（gender, age, educational years, marital status, living form, and type of occupation）was collected. Age was classified into two groups: under 39 or over 40. The younger group accounted for 55.4%（n = 313）of the employees taking part and older group for 44.6%（n = 252）. Educational years were classified into two groups: less than 12（n = 276, 48.8%）or 13 and over（n = 289, 51.2%）. Marital status was classified into married（n = 351, 62.1%）and single（including divorced and separated for death, n = 213, 37.7%）. Living form was classified into two groups: with family（n = 485, 85.8%）or away from family（n = 80, 14.2%）.

3. Scales used for job stress factors

1）The Japanese version of the Effort-Reward Imbalance Model Questionnaire（ERIQ）

The ERIQ is based on the effort-reward imbalance model. The Japanese version of the ERIQ was developed

by Tsutsumi et al.[11]. The questionnaire's internal consistency reliability and factorial validity have been tested. The ERIQ consists of three subscales: effort (6 items), reward (11 items), and over-commitment (29 items). On the subscales of "effort" and "reward", the respondents were asked about whether stressful environmental conditions exist. If they agree, they were then asked to indicate the level of distress on a four-point scale, which is based on intensity and ranges from "not at al distressed" to "very distressed". The score was determined by separating the answers to each item - the worst two categories versus the rest - and adding them together. The further analyses focused only on items with a prevalence of at least 10% answers for a stressful category. Therefore, seven items on the reward scale were excluded from our analysis. The total scores of effort, reward, and over-commitment were computed. High total scores for effort and reward indicated high effort and high reward. The median was used as the cut-off point between high and low. The effort/reward ratio was computed so that the total effort score was divided by the total reward scores adjusted for unequal numbers of items included in the two total scores. The ratio of 1.0 indicated effort/reward balance, whereas the ratio >1.0 indicated critical conditions of effort/reward imbalance. As for over-commitment, the scores 0 and 1 were assigned to the category of "strongly disagree/disagree" answers and "strongly agree/agree", respectively, and the total scores of over-commitment were computed. The upper tertile of frequency distribution of the total scores is considered critical in terms of a high level of over-commitment.

2) The Japanese version of the Job Content Questionnaire (JCQ)

The JCQ is based on the job demand-control or demand-control-support model. The Japanese version of the JCQ was developed by Kawakami [12) 13)] and its factor-based construction validity and internal consistency reliability have been established. The JCQ consists of three subscales: job demands (5 items), job control (9 items), and social support (4 items on supervisor support and 4 items on coworker support). Each item is rated on a four-point Likert-type scale (1 = strongly disagree, 4 = strongly agree). High scores indicate high job demands, high job control, and high social support. The median was used as the cut-off point between high and low for all subscales. Using these classifications, job strain of the JCQ was determined—a combination of high job demands and low control. All other classifications were assigned to the "no strain" category.

4. Mental health status

Mental health status was measured by using the 28-item version of the General Health Questionnaire (GHQ-28). The GHQ-28 is one of the most commonly used screening instruments to detect current and diagnosable psychiatric disorders[14]. The GHQ-28 was scored by using "GHQ scoring", and the cut-off point was 6/7 for this study[15]. Subjects with higher scored (>= 7) were defined as with poor mental health status.

5. Statistical analysis

Means, standard deviations, and Cronbach's alpha coefficients for the two job stress scales were computed. Pearson's correlation coefficients were computed between scales of the ERIQ and the JCQ. The percentages obtained for high-risk groups such as those with effort/reward imbalance, high level of over-commitment, and job strain were calculated by age group and type of occupation.

The differences of prevalence of low mental health status by demographic factors and job stress indices were examined by the χ 2-test. Multivariate logistic regression analyses were conducted to determine the relationship between job stress scales and low mental health status. This model was adjusted for age, marital status, and living form, all of which were related to low mental health status significantly (Model-1). Then, all the job stress indices were adjusted (Model-2). The analyses were conducted by using the SAS computer program.

Results

Table 1 shows summary measures and Pearson's correlation coefficients for the two job stress scales. Cronbach's alpha co-

efficients were moderate for scales of effort, reward, over-commitment, job demands, and job control; they were relatively lower for scales of supervisor support and coworker support. Effort was significantly correlated with reward negatively and with over-commitment and job demands positively. Reward was significantly correlated with job demands negatively and with supervisor support positively. Supervisor support had significant positive correlation with coworker support.

Table 2 shows the effect of age group on job stress scales by analysis of variance. For the ERIQ, reward and over-commitment had a significant positive association with age group, whereas effort had a significant negative association with age group. As for the JCQ, job demands, supervisor support, and coworker support had a significant negative association with age group, whereas job control had a positive association with age group.

Table 3 shows the number and percentage of effort-reward imbalance, high over-commitment, and job strain by age group and type of occupation. The percentage of effort-reward imbalance was 10.8% in all subjects. The percentage in the younger group was higher than that in the older

Table 1. Means, Standard Deviations, Cronbach's Alpha, and Coefficients for Correlation Matrix[a] of Seven Scales Included in Two Job Stress Questionnaires

Scales (number of items)	Mean±SD	α	1	2.	3.	4.	5.	6.	7.
ERIQ[b]									
1. Effort (6)	7.1± 1.7	0.80	1.00	−.41 ***	.31 ***	.51 ***	.05	−.27 ***	−.08
2. Reward (4)[c]	7.2± 1.1	0.83		1.00	−.29 ***	−.37 ***	.12 **	.38 ***	.18 ***
3. Over−commitment (29)	12.4± 4.7	0.68			1.00	.23 ***	.20 ***	−.11 *	.01
JCQ[d]									
4. Job Demands (5)	35.3± 5.3	0.77				1.00	.11 *	−.19 ***	.04
5. Job Control (9)	68.2±10.8	0.65					1.00	.20 ***	.18 ***
6. Supervisor Support (4)	10.9± 2.4	0.49						1.00	.50 ***
7. Coworker Support (4)	11.5± 1.8	0.46							1.00

[a] Pearson's correlation coefficients
[b] Effort/Reward Imbalance Model Questionnaire
[c] There are 11 items in the original subscale. But according to the manual, seven items are omitted from analysis.
[d] Job Content Questionnaire
*p<0.05 **p<0.01 ***p<0.001

Table 2. Difference of Scores by Age Group and Type of Occupation by Analysis of Variance

Age Group/ Type of Occupation	ERIQ[a]			JCQ[b]			
	Effort Mean ±SD	Reward Mean ±SD	Over− Mean ±SD	Job Demands Mean ±SD	Job Control Mean ±SD	Supervisor Mean ±SD	Coworker Mean ±SD
Total							
age<=39 (N=312)	7.3 ±1.8	7.1 ±1.1	11.8 ±4.6	36.1 ±5.9	66.4 ±10.1	11.0 ±2.4	11.7 ±1.8
age>=40 (N=250)	7.0 ±1.5	7.3 ±1.1	13.3 ±4.6	34.3 ±4.3	70.5 ±11.2	10.7 ±2.3	11.2 ±1.7
Manager							
age<=39 (N=1)	8.0 .	8.0 .	8.0 .	39.0 .	72.0 .	12.0 .	12.0 .
age>=40 (N=78)	7.1 ±1.6	7.7 ±0.7	13.5 ±4.5	34.0 ±4.4	77.1 ±9.3	11.2 ±2.1	11.6 ±1.7
Clerk							
age<=39 (N=28)	8.0 ±1.8	7.0 ±0.9	12.7 ±4.1	37.3 ±6.0	73.4 ±9.0	11.4 ±1.6	11.7 ±2.1
age>=40 (N=11)	7.1 ±1.9	7.5 ±1.2	15.0 ±6.0	33.2 ±4.0	71.5 ±15.5	10.6 ±2.6	11.4 ±1.1
Sales							
age<=39 (N=18)	7.9 ±2.0	7.3 ±1.0	12.6 ±4.6	35.8 ±5.9	69.1 ±10.2	10.4 ±2.7	11.6 ±0.7
age>=40 (N=17)	7.6 ±1.9	6.9 ±1.3	15.0 ±4.3	34.9 ±2.1	74.9 ±8.4	11.1 ±1.8	11.5 ±1.4
Plant/circuit planner							
age<=39 (N=97)	7.6 ±2.0	7.0 ±1.2	12.1 ±4.0	38.2 ±5.5	68.0 ±10.4	11.0 ±2.6	12.1 ±1.7
age>=40 (N=58)	6.8 ±1.4	7.3 ±0.9	12.9 ±4.4	35.4 ±3.8	71.2 ±10.7	10.6 ±2.0	11.2 ±1.3
Assembler							
age<=39 (N=150)	6.8 ±1.5	7.2 ±1.1	11.3 ±4.9	34.9 ±5.6	63.1 ±9.2	11.1 ±2.4	11.6 ±2.0
age>=40 (N=76)	6.8 ±1.3	7.1 ±1.3	12.7 ±4.8	34.0 ±4.6	62.1 ±8.2	10.1 ±2.6	10.7 ±2.0
Others							
age<=39 (N=18)	6.8 ±1.5	7.1 ±1.0	12.2 ±5.2	33.6 ±7.0	70.2 ±9.6	10.8 ±2.2	10.9 ±1.5
age>=40 (N=10)	6.6 ±1.3	7.3 ±1.3	12.4 ±4.1	32.3 ±5.1	72.0 ±7.5	10.4 ±2.6	10.2 ±2.4
F Value							
Effect of age group	4.12*	4.55*	13.43***	17.63***	25.16***	3.45	11.85***
Effect of type of occupation	4.51***	3.28**	2.68*	6.8***	30.82***	0.62	2.53*
Interactive effect of age group and type of occupation	1.59	0.36	0.00	0.25	0.00	1.61	1.62

[a] Effort/Reward Imbalance model Questionnaire
[b] Job Content Questionnaire
*p<0.05 **p<0.01 ***p<0.001

one. The percentage of high level of over-commitment was 41.4% in all subjects and was higher in the older group than in the younger one. The percentage of job strain was 24.6% in all subjects and was higher in the younger group.

Table 2 and 3 also show the effect of type of occupation on job stress scales by analysis of variance. For the ERIQ, in the younger group, effort was higher in clerks and sales than in assemblers. Reward was higher in sales than in clerks and plant/circuit planners. Over-commitment was higher in clerks than in assemblers. As for the JCQ, the level of job demands of plant/circuit planners was higher than that of assemblers. The job control level of clerks was higher than that of assemblers and the coworker support level of plant/circuit planners was higher than that of others. In the older group, effort was higher in sales than in assemblers and plant/circuit planners. Reward was higher in managers than in sales. Over-commitment was higher in clerks and sales than in assemblers. As for the JCQ, the level of job demands of plant/circuit planners was higher than that of clerks. Job control and coworker support of managers were higher than for assemblers. An interactive effect of age group and type of occupation was not found.

In the younger group, the percentage of effort-reward imbalance was highest in plant/circuit planners and lowest in assemblers. The percentage of high level of over-commitment was highest in sales and lowest in plant/circuit planners. The percentage of job strain was highest in assemblers and lowest in clerks. In the older group, the percentage of effort-reward imbalance was highest in sales and lowest in assemblers. The percentage of high level of over-commitment was highest in clerks and lowest in managers. The percentage of job strain was highest in assemblers and lowest in sales.

Table 4 shows the relationship of mental health status with demographic factors and job stress measured by the two scales. The percentages of poor mental health status (high GHQ score) were significantly higher in workers who were younger, single and living away from the family, as well as in groups having high effort, low reward, high level of over-commitment, high job demands, low supervisor support, and low coworker support.

Table 5 shows that all ERIQ scales have strong and sig-

Table 3. Number and Percentage of Effort/Reward Imbalance, High Over-commitment and Job Strain by Age Group and Type of Occupation

Age Group/Type of Occupation	Number	ERI Model		D-C Model
		Effort/Reward Imbalance[a] N (%)	High Over-commitment[b] N (%)	Job Strain[c] N (%)
Total	565	61 (10.8)	234 (41.4)	139 (24.6)
age<=39				
Manager	1	0 (0.0)	0 (0.0)	0 (0.0)
Clerk	28	4 (14.8)	10 (35.7)	3 (10.7)
Sales	18	2 (11.1)	8 (44.4)	4 (22.2)
Plant/circuit planner	97	20 (20.8)	20 (20.6)	32 (33.0)
Assembler	150	16 (10.7)	32 (21.3)	57 (38.0)
Others	18	2 (11.1)	4 (22.2)	2 (11.1)
Chi-Square (D.F.)		5.46 (5)	7.821(5)	13.308 (5)*
age>=40				
Manager	79	2 (11.8)	25 (31.7)	5 (6.3)
Clerk	11	1 (9.1)	6 (54.6)	2 (18.2)
Sales	17	4 (23.5)	9 (52.9)	1 (5.9)
Plant/circuit planner	58	2 (3.45)	23 (39.7)	9 (15.5)
Assembler	76	7 (9.9)	26 (34.2)	24 (31.6)
Others	10	1 (10.0)	1 (10.0)	0 (0.0)
Chi-Square (D.F.)		11.163 (5)*	7.797 (5)	20.077 (5)***

[a] Effort/Reward Imbalance ratio >1
[b] Over-commmitment score in the upper tertile of the frequency distribution
[c] High job demands and low job control
*p<0.05 **p<0.01 ***p<0.001

Table 4. Demographic Characteristics and Job Stress Factors by GHQ-28[a] Total Scores

	GHQ-28 total scores				
	High[b] (N=233)		Low[c] (N=332)		
	Number	%	Number	%	Chi-Square
Demographic Characteristics					
Age					
-39	144	46.0	169	54.0	6.58**
40-	89	35.3	163	64.7	
Marital Status					
Single	111	52.1	102	47.9	16.68***
Married	121	34.7	230	65.3	
Educational Years					
9-12yr	122	44.2	154	55.8	1.96
13+ yr	111	38.4	178	61.6	
Living Form					
With family	187	38.6	298	61.4	10.17***
Away from family	46	57.5	34	42.5	
ERIQ[d]					
Effort					
Low	85	26.3	238	73.7	69.30***
High	148	61.2	94	38.8	
Reward					
High	96	30.4	220	69.4	34.89***
Low	137	55.0	112	45.0	
Effort/Reward Ratio					
Balance[e]	204	41.6	286	58.4	30.01***
Imbalance[f]	48	78.7	13	21.3	
Over-commitment					
Low	138	34.5	262	65.5	25.67***
High	95	57.6	70	42.4	
JCQ[g]					
Job Demands					
Low	96	34.3	184	65.7	11.08***
High	137	48.1	148	51.9	
Job Control					
High	107	38.8	169	61.2	1.36
Low	126	43.6	163	56.4	
Job Strain[h]					
Others	185	43.4	241	56.6	3.49
Strain	73	52.5	66	47.5	
Supervisor Support					
High	137	36.4	239	63.6	10.70***
Low	96	51.6	93	48.4	
Coworker Support					
High	107	34.7	201	65.3	11.80***
Low	126	49.0	131	51.0	

[a] 28-item version of General Health Questionnaire
[b] GHQ-28 total score>=7. [c] GHQ-28 total score<=6
[d] Effort/Reward Imbalance Model Questionnaire
[e] Effort/Reward Ratio <=1.0. [f] Effort/Reward Ratio >1.0
[g] Job Content Questionnaire. [h] High job demands and low job control
**p<0.01 ***p<0.001

nificant associations with low mental health status. The JCQ scales were not consistently related to poor mental health status; however, the association between job demands or coworker support and poor mental health status was significant.

Table 5. Odds Rations (ORs) and 95% Confidence Intervals (CIs) of Poor Mental Health Status[a] by Job Stress Scale Scores of ERIQ[b] and JCQ[c]

		Model-1[d] OR	95% CI	Model-2[e] OR	95% CI
ERIQ					
Effort					
	Low	1.00		1.00	
	High	3.57	2.44-5.22***	3.59	2.39-5.39***
Reward					
	High	1.00		1.00	
	Low	1.74	1.19-2.54**	1.67	1.13-2.48*
Effort/Reward Ratio					
	Balance[f]	1.00		1.00	
	Imbalance[g]	4.43	2.94-6.66***	3.54	1.79-7.01***
Over-commitment					
	Low	1.00		1.00	
	High	2.14	1.40-3.26**	2.39	1.55-3.69***
JCQ					
Job Demands					
	Low	1.00		1.00	
	High	1.45	1.02-2.06*	1.21	0.80-1.82
Job Control					
	High	1.00		1.00	
	Low	1.03	0.72-1.47	1.24	0.84-1.82
Job Strain[h]					
	Others	1.00		1.00	
	Strain	1.15	0.77-1.74	0.89	0.57-1.40
Supervisor Support					
	High	1.00		1.00	
	Low	1.45	0.98-2.13	1.09	0.71-1.68
Coworker Support					
	High	1.00		1.00	
	Low	1.64	1.10-2.45*	1.64	1.10-2.45*

[a] Mental health status was classified according to the total GHQ scores.
GHQ >8: Mental health status was poor (1, N=233).
GHQ <7: Mental health status was high (0, N=332).
[b] Effort/Reward Imbalance Model Questionnaire
[c] Job Content Questionnaire
[d] Each questionnnaire separately adjusted for age, marital status, and living form
[e] Adjusted for age, marital status, living form, and all job stress indices
[f] Effort/Reward Ratio <=1.0
[g] Effort/Reward Ratio >1.0
[h] High job demands and low job control
*p<.05 **p<.01 ***p<.001

Discussion

The prevalence of job stress indices assessed by the two job stress models - effort-reward imbalance from the ERIQ and high job strain from the JCQ - were quite different among occupations. After controlling for possible confounders and each stress index as well, the key components of the two stress models were found to be significantly associated with poor mental health. This study indicates that the two stress models cover different aspects of job stress and implies that it is more appropriate and desirable to assess job stress by using these two models complementarily. For assemblers, whose task is machine-paced, low control was well reflected in their task level. Karasek observed that blue-collar workers were easily stressed by a slight increase in workload and he indicated that job stress could be buffered by job control[16]. On the other hand, high level of effort-reward imbalance for sales (particularly for the older group) may be related to the fact that performance of their task is evaluated more often than the other occupational types. The prevalence of high level of over-commitment—indicative of the personal coping pattern—was high in sales and plant/circuit planners, and this finding may be partly associated with their high ERI prevalence.

Observed age trends were also well indicated for the different groups the two models covered. The prevalence of effort-reward imbalance was higher in the younger group. This result corresponds to high job strain in the younger group as assessed by the JCQ. The percentage of high level of over-commitment was high in the older group. This tendency may reflect the workaholic lifestyle that is characteristic of Japanese middle-aged workers or the Japanese lifetime employment and seniority-constrained wage and promotion system. The economic reward received by employees with fewer career years is lower, while commitment to work is built on longer employment. In contrast, control over the task increases with age in the seniority system, which leads to decreasing strain with age.

Multiple logistic regression analysis adjusted for age, marital status, and living form (Model-1) revealed that all stress factors of the ERIQ had significant effects on poor mental health status, while for the JCQ, only job demands and coworker support had significant effects on poor mental health status. Job control had no significant effect, which is inconsistent with previous studies [17]. Sakano[18] reported that the relationship between fatigue in middle-aged workers and job stress factors could be better investigated in a worksite environment in which job demands were not too high, because job control could be effective only when job demands were not too high.

Multiple logistic regression analysis, in which the subscale of the JCQ was not included in (Model-1) or added to (Model-2), revealed that all subscales of the ERIQ had significant effects on poor mental health status. In particular, effort elevated the risk of low mental health status. Because effort and the JCQ's job demands were highly correlated,

the effect of job demands may have been reduced. Bosma et al.[6] pointed out that possible conceptual overlap between the ERI model and the D-C model needs to be explored, i.e., effort from the ERI model and job demands from the D-C model.

High level of over-commitment from the ERIQ had strong significant effects on poor mental health status. Because the component of over-commitment is conceptually common to the Japanese type A behavior pattern fixed by Hayano et al.[19], the over-commitment score in the ERIQ can widely predict adverse health effects in Japanese workers.

Although this study provides some interesting results, it has the following limitations. The study population was obtained from full-time employees of one medium-sized Japanese company and the participation rate was high. However, they did not represent Japanese whole working populations and their types of occupations were limited. The cross-sectional study design precludes causal interpretation of the findings. Furthermore, because the study uses only self-reported data, the validity of findings is restricted. Moreover, although the analysis was guided by hypotheses derived from a theoretical model, the problem of a possible inflation of "true" correlations cannot be ruled out [20]. However, several studies report that this problem of common method variance should not be considered a major obstacle [21) 22)]. Finally, the findings cannot, of course, necessarily be extrapolated to female employees.

Acknowledgments

We express our sincere appreciation to all the participating employees.

References

1) Karasek, R. A. (1985). *Job Content Questionnaire and User's Guide*. University of Massachusetts at Lowell, Lowell.

2) Karasek, R. A., & Theorell, T. (1990). *Healthy Work*: Stress, productivity, and the reconstruction of working life. Basic Books, New York.

3) Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health* **78**, 1336-1342.

4) Schnall, P.L., Landsbergis, P.A., & Baker, D. (1994). Job strain and cardiovascular disease. *Annual Review of Public Health* **15**, 381-411.

5) Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology* **1**, 27-41.

6) Bosma, H., Peter, R., Siegrist, J., & Marmot, M. (1998). Two alternative job stress models and the risk of coronary heart disease. *American Journal of Public Health* **88**, 68-74.

7) Peter, R., Alfredsson, L., Hammer, N., Siegrist, J., Theorell, T., & Westerholm, P. (1998). High effort, low reward, and cardiovascular risk factors in employed Swedish men and women: baseline results from the WOLF study. *Journal of Epidemiology Community Health* **52**, 540-547.

8) Siegrist, J., Klein, D., & Voigt. K.H. (1997). Linking sociological with physiological data: the model of effort-reward imbalance at work. *Acta Physiologica Scandinavica*, special issue November, 112-116.

9) Rothenbacher, D., Peter, R., Bode, G., et al. (1998). Dyspepsia in relation to Helicobacter pylori infection and psychosocial work stress in white-collar employees. *American Journal of Gastroenterology* **93**, 1443-1449.

10) Peter, R., & Siegrist, J. (1997). Chronic work stress, sickness absence and hypertension in middle managers: General or specific sociological explanations? *Social Science and Medicine* **45**, 7, 1111-1120.

11) Tsutsumi, A., Ishitake, T., Peter, R., Siegrist, J., & Matoba, T. (2001). The Japanese version of the Effort-Reward Imbalance Model Questionnaire: a study in dental technicians. *Work & Stress* **15**, 86-96.

12) Kawakami, N., Kobayashi, F., Araki, S., Haratani, T., & Furui, H. (1995). Assessment of job stress dimensions based on the Job Demands-Control model of employees of telecommunication and electric power companies in Japan: reliability and validity of the Japanese version of Job Content Questionnaire. *International Journal of Behavioral Medicine* **2** (4) , 358-375.

13) Kawakami, N., & Fujigaki, Y. (1996). Reliability and validity of the Japanese version of Job Content Questionnaire: replication and extension in computer company employees. *Industrial Health* **34**, 295-306.

14) Goldberg, D. P. (1972). *The detection of psychiatric illness by questionnaire. A technique for the identification and assessment of non-psychiatric illness*. Oxford University

Press, London.
15) Fukunishi, I.（1990）. Nihonban General Health Questionnaire（GHQ）no cut-off point[The assessment of cut-off point of the General Health Questionnaire（GHQ）in the Japanese version]. *Shinri Rinsyo* **3**, 228-234.
16) Karasek, R. A.（1979）. Job demand, job decision latitude, and mental strain: implications for job redesign. *Administrative Science Quarterly* **24**, 285-308.
17) Kawakami, N., Haratani, T., & Araki, S.（1992）. Effects of perceived job stress on depressive symptoms in blue-collar workers of an electrical factory in Japan. *Scandinavian Journal of Work Environmental Health* **18**, 195-200.
18) Sakano, J., Tamazaki, Y., Sekiya, E., & Uehata, T.（1995）. The relation between job stress characteristics, job-related stress, and health related symptoms among middle-aged male workers in Japan. *The Journal of Science of Labor* **71**（1）, 1-12.
19) Hayano, J., Kimura, K., & Hosaka, T.（1997）. Nihonjin no coronary-prone behavior: Scale C no tyusyutu [Japanese coronary-prone behavior in Japan: JCBS Scale C]. *Type A* **8**, 39-45.
20) Spector, P.E., & Jex, S.M.（1998）. Development of four self-report measures of stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology* **3**, 356-367.
21) Semmer, N., Zapf, D., & Greif, S.（1996）. 'Shared job strain': A new approach for assessing the validity of job stress measurements. *Journal of Occupational and Organizational Psychology* **69**, 293-310.
22) Spector, P.E.（1992）. A consideration of the validity and meaning of self-report measures of job conditions. In C.L. Cooper & I.T. Robertson（Eds.）, *International Review of Industrial and Organizational Psychology*（pp. 123-151）. Wiley & Sons, Chichester.

努力－報酬不均衡モデルおよび仕事の要求度－コントロールモデルによる職業性ストレス評価結果の比較

長見まき子 *,**，堤　明純 ***，森本兼曩 ****

要　旨

産業保健分野において、職業性ストレスは最も重要な健康障害因子として注目され、様々なモデルに基づく評価法が開発されている。代表的な2つの職業性ストレスモデルである「努力－報酬不均衡モデル」および「仕事の要求度－コントロールモデル」を同時に用いて、ストレス指標の評価結果と精神的健康度との関係性の違いを検討した。対象は日本の某製造業企業の男性労働者565名であった。2つのモデルによるストレス指標の評価では、職種や年代によって異なる結果が得られた。また、それぞれのストレス指標は精神的健康度と独立的に関連していた。本研究では2つのストレスモデルは仕事のストレスの異なる側面を評価していること、精神的健康度への影響は独立的であることが示唆された。より適切な職業性ストレス評価のためには、これらのストレスモデルを相補的に用いることが望まれる。

● ● ○ **Key words**　要求度－コントロールモデル／努力－報酬不均衡モデル／ストレス／精神的健康度

* 関西福祉科学大学　健康福祉学部　准教授／** 大阪大学大学院　医学系研究科　予防環境医学専攻　社会環境医学講座　環境医学／*** 産業医科大学　産業医実務研修センター　教授／**** 大阪大学大学院　医学系研究科　予防環境医学専攻　社会環境医学講座　環境医学　教授