

RELIABILITY AND CONSTRUCT VALIDITY OF THE MALAY VERSION OF THE JOB CONTENT QUESTIONNAIRE (JCQ)

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Abstract. The JCQ has been shown to be a valid and reliable instrument to assess job stress in many occupational settings worldwide. In Malaysia, both the English and validated Malay versions have been employed in studies of medical professionals and laboratory technicians, respectively. The present study assessed the reliability and construct validity of the Malay version of the JCQ among automotive workers in Malaysia. Fifty workers of a major automotive manufacturer in Kota Bharu, Kelantan consented to participate in the study and were administered the Malay version of the JCQ. Translation (English-Malay) and back translation (Malay-English) of the JCQ was made to ensure the face validity of the questionnaire. Reliability was determined using Cronbach's alpha for internal consistency, whilst construct validity was assessed using exploratory factor analysis (principal component with varimax rotation). The results indicate that the Cronbach's alpha coefficients were acceptable for decision latitude (job control or decision authority) (0.74) and social support (0.79); however, it was slightly lower for psychological job demand (0.61). Exploratory factor analysis showed 3 meaningful common factors that could explain the 3 theoretical dimensions or constructs of Karasek's demand-control-social support model. In conclusion, the results of the validation study suggested that the JCQ scales are reliable and valid for assessing job stress in a population working in the automotive industry. Further analyses are necessary to evaluate the stability and concurrent validity of the JCQ.

INTRODUCTION

Among the instruments designed to assess the psychosocial work environment, the JCQ, based on Karasek's demand-control model, has been the most popular (Hurrell *et al*, 1998). It is currently the most widely used workplace environment questionnaire, and is now available in over 12 languages (Joanna and Michael, 2002). Since the demand-control model was first formulated by Karasek in 1979 (Karasek, 1979), it has been shown that 3 cardinal factors – psychological job demand, decision latitude, and social support - are important determinants of job stress, which in turn have significant effects on health, in particular cardiovascular health (Theorell and Karasek, 1996). Numerous studies have explored the predictive effects of these three and other associated factors on health

outcomes. The validity of the JCQ in various languages has been assessed in some recent works using the English, Dutch, and Japanese versions (Karasek *et al*, 1998). There is an urgent need to initiate systematic studies of occupational stress using a valid and reliable JCQ as an instrument designed to assess the psychosocial work environment in Malaysia. The purpose of our present study was to assess the reliability and construct validity of the Malay version of the JCQ in automotive assembly workers in Kota Bharu, Kelantan.

MATERIALS AND METHODS

Study design and sample size

This study was cross-sectional and designed to validate the JCQ among automotive assembly workers. It was conducted in the conference room of the School of Dental Sciences, Universiti Sains Malaysia, Health Campus, Kota Bharu, Kelantan. Workers from a major automotive assembly plant in Kota Bharu were invited to participate in this study. All workers gave writ-

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ten informed consent before participating in the study. Self-administered Malay versions of the JCQ were distributed to 50 workers at the assembly plant on 11 June 2004 and a trained research officer checked the returned questionnaires onsite to assure completeness. An average of 30 minutes was utilized to complete the JCQ. The response rate was 100%.

Questionnaire

Twenty-one items of the JCQ were selected from the full recommended version of 49 items (Karasek, 1985). These items constituted a minimum set of questions for three major scales of the JCQ: decision latitude (8 items), psychological job demand (7 items), and social support (6 items). For each of the scales of decision latitude, psychological job demand, and social support, the scores were calculated using Karasek's recommended format. The 21-items of the JCQ were translated into Malay by two trained research officers who were fluent in both Malay and English, and back translated into English by one of the authors who was not shown the original English text to ensure high face validity. Items in the scales were recorded using the Likert scale, ranging from 1 (strongly disagree) to 4

(strongly agree). Information on education, marital status, job title, and work history was also obtained from the participants.

Statistical analysis

Data entry and analysis was done using the Statistical Package for Social Sciences (SPSS) version 11.0.1. Means and standard deviations were calculated for continuous variables, and frequencies and percentages for categorical variables. Internal consistency was evaluated using Cronbach's alpha coefficients for each scale. The construct validity of the instrument was examined using exploratory factor analysis (principal components with varimax rotation).

RESULTS

Socio-demographic characteristics

Table 1 summarizes the demographic characteristics of the study population. The average age, income per month, and duration of present job for the workers were 30 years, RM 1,783.8 and 48 month, respectively. The mean duration of working life was 12 years. The majority were males (92%), married (74%), and has completed at least upper secondary school (90%).

Table 1
Socio-demographic characteristics of 50 automotive assembly plant workers.

Variable	Mean (SD)	Median (IQR)	Freq (%)
Age (years)		30.0 (12.3) ^a	
Income per month (RM)		1,783.8 (1,008.8) ^a	
Duration of present job (month)		48.0 (107.8) ^a	
Total duration of working life (years)	12.1 (6.9)		
Working hours per week	48.8 (13.0)		
Gender			
Male			46 (92)
Female			4 (8)
Marital status			
Single			11 (22)
Married			37 (74)
Divorced			2 (4)
Education level			
Lower Secondary			5 (10)
Upper Secondary			39 (78)
Diploma			5 (10)
Degree			1 (2)

SD = Standard deviation; IQR = Interquartile range; Freq = Frequency

^aThe distribution is skewed to the right.

Table 2
Item-total correlations and Cronbach's alpha coefficients for the JCQ scales.

Scale	Item	Item-total correlation	Cronbach's alpha
Decision latitude	Q3 Learn new thing	0.39	0.74
	Q5 Requires creativity	0.44	
	Q6 Allows own decisions	0.67	
	Q7 High skill level	0.53	
	Q8 Little decision freedom	0.23	
	Q9 Variety	0.48	
	Q10 Lots of say	0.35	
Psychological job demand	Q11 Develop own abilities	0.41	0.61
	Q19 Work fast	0.36	
	Q20 Work hard	0.38	
	Q26 Conflicting demands	0.26	
	Q27 Intense concentration	0.16	
	Q28 Task interrupted	0.37	
	Q29 Hectic job	0.38	
Social support	Q32 Wait on others	0.45	0.79
	Q49 Supervisor pays attention	0.59	
	Q51 Helpful supervisor	0.70	
	Q52 Supervisor good organizer	0.55	
	Q53 Co-workers competent	0.43	
	Q54 Co-workers interest in me	0.56	
	Q58 Co-workers helpful	0.42	

Table 3
Exploratory factor analysis of 21-items of the JCQ using principal component extraction with varimax rotation.

Scale	Item	Loading on 3 factors		
		F1	F2	F3
Decision latitude	Q3 Learn new thing	0.40	0.37	
	Q5 Requires creativity			0.43
	Q6 Allows own decisions			0.70
	Q7 High skill level			0.38
	Q8 Little decision freedom		-0.319	0.54
	Q9 Variety			0.59
	Q10 Lots of say			0.70
Psychological job demand	Q11 Develop own abilities	0.33	0.70	
	Q19 Work fast		0.52	
	Q20 Work hard	0.37	0.48	
	Q26 Conflicting demands		0.46	
	Q27 Intense concentration		0.41	-0.36
	Q28 Task interrupted		0.65	
	Q29 Hectic job		0.58	
Social support	Q32 Wait on others		0.52	
	Q49 Supervisor pays attention	0.72		
	Q51 Helpful supervisor	0.84		
	Q52 Supervisor good organizer	0.76		
	Q53 Co-workers competent	0.50		
	Q54 Co-workers interest in me	0.61		0.39
	Q58 Co-workers helpful	0.54	0.40	

Only items with factor loading >0.30 are shown.

Reliability (internal consistency)

The item-total correlations and Cronbach's alpha coefficients for all 21 items of the JCQ scales are given in Table 2. Values for all item-total correlations for the social support scale were greater than 0.4 (range: 0.42-0.70) indicating that each scale of the items had good correlation with the other items comprising the overall scale score. Whereas, the values of the decision latitude and psychological job demand scales were moderate - internal consistencies of the item-total correlations were more than 0.23. However, the value of one item-total correlation for psychological job demand scale - intense concentration - had poor internal consistency with other items (item-total correlation of 0.16). In general, the Cronbach's alpha coefficients were acceptable for decision latitude (0.74), psychological job demand (0.61) and social support (0.79).

Construct validity

Table 3 presents the results of exploratory factor analysis. All 21 items of the 3 scales of social support, psychological job demand and decision latitude were included in this analysis. Exploratory factor analysis showed the first factor was associated with the scales of social support. All items of this scale were loaded with the greatest loading factor with the load ranging from 0.54 to 0.84. The second factor was associated with all items of psychological job demand scale with the greatest load ranging from 0.41 to 0.65. The third factor more accurately reflects the decision latitude scale with the load ranging from 0.38 to 0.70 except for two items (Q3 "learn new thing" and Q11 "develop own abilities") which might reflect factors one and two.

DISCUSSION

The present study is an attempt to validate the psychometric properties of the Malay version of selected scales of the JCQ in automotive assembly plant workers. The selected scales - decision latitude, psychological job demand and social support - showed acceptable and satisfactory internal consistencies. Cronbach's alpha coefficients for decision latitude and social support were 0.74 and 0.92, respectively,

and therefore confirmed the adequacy of the internal consistencies of these scales. However, the internal consistency for the psychological job demand scale was the lowest of the three (Cronbach's alpha = 0.60) but comparable to those obtained in the United States, Canada, the Netherlands and Japan (Cronbach's alpha = 0.59-0.71) (Kawakami *et al*, 1995; Karasek *et al*, 1998). The value of the Cronbach's alpha for the psychological job demand scale in our study was higher compared to those obtained in the Chinese (Cronbach's alpha = 0.56) (Li *et al*, 2004) and Taiwanese (Cronbach's alpha = 0.55) (Cheng *et al*, 2003) populations. Thus, our results seem to be comparable to those obtained in developed nations but higher than those in developing countries. Interestingly, many of the reported alpha coefficients for psychological job demand from national and international studies, as well as those from the quality of employment data, fell below 0.70 recommended by Kline (1979).

The results of exploratory factor analysis showed that three factors were clearly associated with the dimensions of decision latitude; psychological job demand, and social support. Our results show that the first factor was associated with all items of the social support scales, followed by all the items of the psychological job demand scales clearly associated with factor two. Meanwhile, two items of decision latitude were loading onto another factor - "learn new thing" and "develop own abilities".

A major limitation of our study was that the sample size was rather small and a clear gender bias in the sample size selection was present. In our sample, the percentage of female workers was only 8%, whereas those in the United States (41%), Europe (51%) and Japan (19%) were clearly higher (Kawakami *et al*, 1995).

In conclusion, this study demonstrated that the three scales of JCQ were reliable and valid for assessing the psychosocial work condition of Malaysian automotive assembly workers, although further studies will be needed to improve the psychological job demand scale. It should be emphasized that the current study offers only preliminary findings. Complete validation demands the application of the psychometric scales in larger samples and more sophisticated

methodology, including the use of test-retest reliability, confirmatory factor analysis to test the fit of the model, and convergent validity of the equipment.

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REFERENCES

- Cheng Y, Guo YU, Yeh WY. A national survey of psychosocial job stressors and their implications for health among working people in Taiwan. *Int Arch Occup Environ Health* 2001; 74: 495-504.
- Hurrell JJ, Nelson DL, Simmons BL. Measuring job stressors and strains: where we are, and where we need to go. *J Occup Health Psychol* 1998; 3: 368-89.
- Joanna EMS, Michael SK. The psychometric properties of Karasek's demand and control scales within a single sector: data from a large teaching hospital. *Int Arch Occup Environ Health* 2002; 75: 145-52.
- Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Admin Sci Q* 1979; 24: 285-308.
- Karasek R. Job Content Instrument Questionnaire and User's Guide, Version 1.1. Los Angeles: Department of Industrial and Systems Engineering, University of Southern California, 1985.
- Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* 1998; 3: 322-55.
- Kawakami N, Kobayashi F, Araki S, Haratani T, Furui H. Assessment of job stress dimensions based on the job demand-control model of employees of telecommunication and electric power companies in Japan: reliability and validity of the Japanese version of the job content questionnaire. *Int J Behav Med* 1995; 2: 358-75.
- Kline P. Psychometrics and psychology. London: Academic Press, 1979.
- Li J, Yang W, Liu P, Xu Z, Cho SI. Psychometric evaluation of the Chinese (Mainland) version of job content questionnaire: A study in university hospitals. *Ind Health* 2004; 42: 260-7.
- Theorell T, Karasek RA. Current issues relating to psychosocial job strain and cardiovascular disease research. *J Occup Health Psychol* 1996; 1: 9-26.