*Original Article*

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# Validity and Reliability of Malay Version of the Job Content Questionnaire among Public Hospital Female Nurses in Malaysia

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## Abstract

**Background:** The Job Content Questionnaire (M-JCQ) is an established self-reported instrument used across the world to measure the work dimensions based on the Karasek's demand-control-support model.

**Objective:** To evaluate the psychometrics properties of the Malay version of M-JCQ among nurses in Malaysia.

**Methods:** This cross-sectional study was carried out on nurses working in 4 public hospitals in Klang Valley area, Malaysia. M-JCQ was used to assess the perceived psychosocial stressors and physical demands of nurses at their workplaces. Construct validity of the questionnaire was examined using exploratory factor analysis (EFA). Cronbach's α values were used to estimate the reliability (internal consistency) of the M-JCQ.

**Results:** EFA showed that 34 selected items were loaded in 4 factors. Except for psychological job demand (Cronbach's α 0.51), the remaining 3 α values for 3 subscales (job control, social support, and physical demand) were greater than 0.70, indicating acceptable internal consistency. However, an item was excluded due to poor item-total correlation ($r<0.3$). The final M-JCQ was consisted of 33 items.

**Conclusion:** The M-JCQ is a reliable and valid instrument to measure psychosocial and physical stressors in the workplace of public hospital nurses in Malaysia.

**Keywords:** Job content questionnaire; Validity; Reliability; Nurses; Malaysia

## Introduction

As the main workforce in health care settings, nurses have important responsibilities in patient care while dealing with physically and emotionally demanding working environment. Numerous studies have shown that high psychological job demand, low decision latitude (job control) and poor social support contributed to greater health risks[1,2] including mental distress,[3,4] work-related musculoskeletal disorders (WRMSDs)[5-7] and cardiovascular diseases[2] among affected

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workers. Review of literature has suggested that the interaction of psychosocial stressors and physical exhaustion[8] have potentially increased the risk of musculoskeletal pain among nurses.[6,9] A number of instruments have been utilized to assess the psychosocial stressors perceived in the workplace including the General Health Questionnaire (GHQ),[10] Nursing Stress Scale (NSS),[11] and Job Content Questionnaires (JCQ)[12]. As reported earlier, JCQ appeared to be the most suitable instrument to measure psychosocial stressors and physical demand in the workplace in relation to the occurrence of WRMSDs.[7,13]

The original English version of JCQ is an established self-reported instrument used globally to measure work conditions based on the demand-control-support model (JDSC)[8] and job strain.[1,14] Four constructs of the English version of JCQ (*ie*, psychological job demand, job control, social support, and physical demand) have been extensively validated for use in many populations and languages.[15,16] The psychological job demand refers to the workload, organizational constraints, and mental preparedness faced by the worker, to complete the work task and conflicting demands. Job control or decision latitude refers to the freedom given to the workers to perform tasks at their best by being creative and developing new skills while fulfilling the job demand and is assessed through skill discretion and decision authority.[8] Whereas, the social support denotes the support and social interaction at the workplace among workers, colleagues, and supervisors.[12] Trinkoff, *et al*,[17] introduced 12 items of the physical demand subscale in which describes related physical risks such as awkward body posture, poor manual handling, and repetitive movement when performing nursing task.

To date, JCQ has been validated in Western[2,14,16] and Asian[15,18-21] countries and translated into several languages to meet the needs of the target populations. Although numerous validation studies have been carried out in diverse working populations in Asian countries,[15,19,20,22,23] the need for further validation in similar working populations is necessary due to changing working conditions across time spans and in response to changes in the culture and lifestyle of the new generations in these countries.[24] Indeed, the validation process is an ongoing effort to ensure that the JCQ is a valid and reliable instrument to measure psychosocial and physical stressors in diverse working populations such as nursing.[25]

In Malaysia, only a few studies have been undertaken to validate the JCQ in Malay language.[19,23] To the best of our knowledge, the psychometric properties of Malay version of JCQ has not been validated among nurses. We therefore, conducted this study to assess the validity and reliability of Malay version of JCQ (M-JCQ) as a tool to evaluate the psychosocial work environment of nursing personnel in four public hospitals in Malaysia.

For more information on reliability and validity of Persian version of JCQ in health care workers in Iran see http://www.theijoem.com/ijoem/index.php/ijoem/article/view/144

## Materials and Methods

### Study Design and Participants

A cross-sectional study was carried out at four public hospitals in Klang Valley area, Malaysia. The participants were voluntarily recruited among female nurses who were working in shifts at clinical units and with working experience of at least one year. Females were selected to avoid any gender confounding due to the exceedingly small number of male nurses. Informed consents were obtained from the participants and permissions were obtained from the respective hospital administrators to conduct the study. Ethics approval was granted by the Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia (NMRR-12-234-11176) and the

Monash University Human Research Ethics Committee (MUHREC) (CF12/506-2012000809).

## Materials and Procedures

The research team, in collaboration with the Matron's office at the respective hospitals arranged briefing sessions for potential nursing participants and Nurse Managers. During these sessions, information leaflets and informed consent forms were distributed. Interested nurses were to submit the consent forms by the end of the briefing session. Additional information leaflets and informed consent forms were distributed to nurses who were not at the briefing sessions by the Nurse Managers. The self-administered Malay version of the questionnaire (Section 1: Socio-demographic information and Section 2: JCQ)[19] was distributed to those who agreed to participate in the study with the help of the Nurse Managers at the respective clinical units. The completed questionnaires were sealed in envelopes and placed in a locked box located in the Matron's office at the respective participating hospitals.

Similar to other studies,[15,18,20] in the present study, we selected 34 items from the JCQ's fully recommended format consisting of four subscales: (1) job control/decision latitude (9 items), (2) social support (8 items), (3) psychological job demand (5 items), and (4) physical demand (12 items). The items in the scales were scored using a Likert scale ranging from '1' (strongly disagree) to '4' (strongly agree) and the total score for each scale was computed using Karasek's recommended formulae.[12] The score for four items were reversed as recommended: one item for decision authority (Q8: "little decision freedom"), and three items for psychological job demand (Q22: "no excessive work," Q23: "enough time," and Q26: "conflicting demands"). The total scores for each scale ranged as follows: job control/decision latitude (24–96), psychological job demand (12–48), social support (8–32),[12] and physical demand (0–12)[17]. Higher scores indicate better working condition for job control/decision latitude and social support; however, higher scores indicate higher psychosocial and physical stressor for psychological job demand and physical demand, respectively.[12]

**TAKE-HOME MESSAGE**

- The Job Content Questionnaire is an established self-reported instrument used across the world to measure the work dimensions based on the Karasek's demand-control-support model (JDSC).
- Job Content Questionnaire is a reliable and valid tool to be used to measure the psychosocial workplace exposures among female nurses in Malaysia.

## Statistical Analysis

Data entry and analysis were done by IBM® SPSS® Statistics ver 22.0 (IBM, Armonk, NY, USA). Data were checked for completeness and examined for normality using the stem-and-leaf plot and the Kolmogorov-Smirnov test. The construct validity of the questionnaire was examined by Exploratory Factor Analysis (EFA). The principal component analysis (PCA) was used to generate a scree plot and eigenvalues to decide the number of factors obtained. A scree test was used to determine the number of significant factors to be retained for rotation. Loadings >0.30 were considered for categorization under the respective subscales.[26] The loadings were rotated to maximize high loadings and minimize low loadings. Therefore, the simplest possible structure was achieved using the varimax (orthogonal) rotation, assuming that the factors were uncorrelated with one another. In the case of correlated factors, an oblique rotation (*eg*, the oblimin, promax or direct quartimin) would be pre-

ferred. Following EFA (construct validation), the reliability of each subscale was examined using Cronbach's α, with a cut-off value of 0.70 reflecting adequate internal consistency.[27]

## Results

### Socio-demographic Profiles

Table 1 summarizes the socio-demographic profiles of the participants. In summary, 83.3% (550 of 660) of the questionnaires distributed were returned. Of these, 376 were eligible for further analysis. Assuming all non-respondents were qualified for the study, the response rate was estimated at 77.4% by dividing the number of completed questionnaires (n=376) by the number of qualified nurses for the study (486=376+110). Majority of respondents were Malays and married with a mean age of 30.6 (SD 5.3) years; 96.5% had tertiary education. More than half of the nurses had been in service for more than five years with a mean service length of 7.4 (SD 4.9) years. They worked a mean of 45.0 (SD 5.40) hours/week. All studied continuous variables had normal distribution.

**Table 1:** Socio-demographic characteristics of respondents (n=376)

| Variable | Mean (SD) or n (%) |
|---|---|
| Age (yrs) | 30.6 (5.3) |
| Years of employment (yrs) | 7.4 (4.9) |
| Working hours/week | 45.0 (5.4) |
| Household income (US$) | 940 (390) |
| Marital status | |
| Not married | 288 (76.6%) |
| Married (single/widow/divorced) | 88 (23.4%) |
| Race | |
| Malay | 354 (94.1%) |
| Non-Malay | 22 (5.9%) |
| Level of education | |
| Tertiary (certificate/diploma/degree: 12 years or more of formal education) | 330 (87.8%) |
| Non-tertiary (lower and upper secondary: less than 12 years of formal education) | 46 (12.2%) |

### Construct Validity

The construct validity was assessed using EFA on the 34 items of M-JCQ using PCA. Initially, the sampling adequacy measure of Kaiser-Meyer-Okin (KMO) criterion was examined to determine the matrix appropriateness for the factor analysis. The value of 0.80 suggested sufficient correlation to conduct the analysis.[28] Visual inspection of the scree plot and eigenvalues (≥1) confirmed that the items were loaded onto four factors (F1, F2, F3 and F4), in agreement with the theoretical construct.[14] Through PCA, factor extraction with loadings was generated using orthogonal (varimax) rotation and loading matrices, in which factor loadings values >0.30 indicated significant factorial contribution (Table 2).[26] All items of the job control/decision latitude subscale except for Q8, "little decision freedom," was loaded onto the first factor (F1), with factor loading ranging between 0.46 and 0.72. All items of psychological job demand were represented by the second factor (F2) with all items loadings between 0.35 and 0.70. Meanwhile, the social support and physical demand subscales were grouped in the third (F3) and fourth (F4) factor, respectively, with loadings between 0.41 and 0.79. Therefore, a total of 33 items of the M-JCQ was available for further analyses.

For more information on Malay version of the questionnaire see the online version of the article.

### Reliability

Table 3 shows the item-total correlations and the Cronbach's α coefficients for the 33 items of M-JCQ. Job control/decision latitude (α 0.71), social support (α 0.83)

and physical demands (α 0.84) showed Cronbach's α values >0.70, indicating satisfactory internal consistency. However, psychological job demand showed a moderate α value of 0.51.[27]

The obtained scores for the four subscales were not normally distributed. The associations between M-JCQ subscales were statistically significant (Table 4). Decision latitude demonstrated direct correlation with physical demand (Spearman's $\rho$ 0.21). Job control and social support were also correlated (Spearman's $\rho$ 0.29). Meanwhile, psychological job demand was inversely correlated with job control (Spearman's $\rho$ -0.10) and social support (Spearman's $\rho$ -0.12). Supervisor support and co-worker support showed strong correlation with social support (Spearman's $\rho$

**Table 2:** Construct validation: exploratory factor analysis of the M-JCQ (n=376)

| Scale | Item* | Factor loading | | | |
|---|---|---|---|---|---|
| | | F1 | F2 | F3 | F4 |
| Job control | Q3: Learn new things | 0.60 | | | |
| | Q4: Repetitive job | 0.46 | | | |
| | Q5: Requires creativity | 0.72 | | | |
| | Q6: Allows own decisions | 0.64 | | | |
| | Q7: High skill level | 0.62 | | | |
| | Q9: Various work | 0.49 | | | |
| | Q10: Lots of say | 0.52 | | | |
| | Q11: Develop own abilities | 0.56 | | | |
| Job demands | Q19: Work fast | | 0.37 | | |
| | Q20: Work hard | | 0.35 | | |
| | Q22: Conflicting demand | | 0.68 | | |
| | Q23: Hectic work | | 0.69 | | |
| | Q26: Wait on others | | 0.70 | | |
| Social support | Q52: Supervisor is a good organizer | | | 0.77 | |
| | Q49: Supervisor pays attention | | | 0.73 | |
| | Q51: Helpful supervisor | | | 0.79 | |
| | Q48: Supervisor is a good organizer | | | 0.78 | |
| | Q53: Co-workers competent | | | 0.54 | |
| | Q54: Co-workers interest in me | | | 0.65 | |
| | Q56: Friendly co-workers | | | 0.49 | |
| | Q58: Co-workers helpful | | | 0.59 | |

*Continued*

**Table 2:** Construct validation: exploratory factor analysis of the M-JCQ (n=376)

| Scale | Item* | Factor loading | | | |
|---|---|---|---|---|---|
| | | F1 | F2 | F3 | F4 |
| Physical demand | Q21: Lots of physical effort | | | | 0.41 |
| | Q24: Moving/lifting heavy loads | | | | 0.55 |
| | Q25: Rapid physical activity | | | | 0.47 |
| | Q30: Awkward body posture | | | | 0.52 |
| | Q31: Awkward arms positions | | | | 0.45 |
| | Q77: Lifting and lowering to or from the floor | | | | 0.64 |
| | Q78: Lifting and lowering objects to or from shoulders height | | | | 0.73 |
| | Q79: Bending or twisting waist while working | | | | 0.72 |
| | Q80: Pushing or pulling patients or objects | | | | 0.71 |
| | Q81: Standing in same position | | | | 0.67 |
| | Q82: Repetitive movements with hands or wrists | | | | 0.73 |
| | Q83: Applying pressure with hands/fingers | | | | 0.50 |

*Only items with factor loading >0.30 are shown.

0.76 to 0.88). Similarly, excellent correlation was observed between two subscales of decision latitude; skill discretion and decision authority (Spearman's $\rho$ 0.80 to 0.88).

## Discussion

The findings were generally comparable to what has been found in other Asian countries[15,18-20,22] followed by Western countries[14,16,29]. The construct validity of M-JCQ was performed using EFA, in which the cut-off value of at least 0.30 appeared to be a strong factor loading coefficient.[27] As a result, after factor extraction and orthogonal (varimax) rotation for a four-factor solution (F1, F2, F3, and F4) as recommended,[12] the findings were in agreement with those suggested by the Job Demand-Control-Support model[12] and further confirmed by previous validation studies.[19,20,29] Eight items of job control/decision latitude were clearly loaded onto factor one (F1) with loadings ranging between 0.46 and 0.72 that was in agreement with the

report of Cheng, *et al*.[15] However, the findings were in contradiction to those reported by Li, *et al*,[22] and Eum, *et al*,[20] reflecting the presence of multi-dimensional items in the subscale (for example, Q4: "repetitive work," and Q3: "learn new things"). Similarly, Edimansyah, *et al*,[19] reported that Q3, "learn new things," was also multi-dimensional. All items in the psychological job demand subscale were uni-dimensional and in agreement with those reported in a Korean study.[20] However, in other local validation studies, Edimansyah, *et al*,[19] reported that Q20, "work hard," was cross-loaded with social support. All items in social support were obviously loaded under the same factor (F3), as in other studies,[15,22,23] however, Niedhammer identified the discrepancy between subscales and also reported that all items of physical demand subscales were grouped under one factor (F4).[16]

**Table 3:** Item-total correlations and Cronbach's α coefficients for M-JCQ (n=376)

| Subscales | Items | Corrected item-total correlations | Cronbach's α |
|---|---|---|---|
| Job control | Q3: Learn new things | 0.42 | 0.71 |
| | Q4: Repetitive job | 0.30 | |
| | Q5: Require creativity | 0.54 | |
| | Q6: Allow own decision | 0.44 | |
| | Q7: High skill level | 0.44 | |
| | Q9: Various of work | 0.34 | |
| | Q10: Lots of says | 0.37 | |
| | Q11: Develop own abilities | 0.40 | |
| Psychological job demand | Q19: Work fast | 0.30 | 0.51 |
| | Q20: Work hard | 0.35 | |
| | Q22: Conflicting demand | 0.32 | |
| | Q23: Hectic work | 0.33 | |
| | Q26: Wait on others | 0.33 | |
| Social support | Q48: Supervisor is concerned | 0.49 | 0.83 |
| | Q49: Supervisor pays attention | 0.40 | |
| | Q51: Helpful supervisor | 0.45 | |
| | Q52: Supervisor is a good organizer | 0.40 | |
| | Q53: Co-workers competent | 0.40 | |
| | Q54: Co-workers interest on me | 0.34 | |
| | Q56: Friendly co-workers | 0.48 | |
| | Q58: Helpful co-workers | 0.50 | |

*Continued*

**Table 3:** Item-total correlations and Cronbach's α coefficients for M-JCQ (n=376)

| Subscales | Items | Corrected item-total correlations | Cronbach's α |
|---|---|---|---|
| Physical demand | Q21: Lots of physical efforts | 0.33 | 0.84 |
| | Q24: Moving/lifting heavy loads | 0.47 | |
| | Q25: Rapid physical activity | 0.41 | |
| | Q30: Awkward body posture | 0.46 | |
| | Q31: Awkward arms positions | 0.39 | |
| | Q77: Lifting and lowering patients/objects to or from the floor | 0.51 | |
| | Q78: Lifting and lowering objects to or from shoulders' height | 0.61 | |
| | Q79: Bending or twisting waist while working | 0.61 | |
| | Q80: Pushing or pulling patients or objects | 0.58 | |
| | Q81: Standing in same position | 0.56 | |
| | Q82: Repetitive movements with hands or wrists | 0.61 | |
| | Q83: Applying pressure with hands/fingers | 0.39 | |

With regards to the item-total correlations, all remaining items of M-JCQ showed values >0.30, suggesting that the respective items have good internal consistency.[27] Generally, the Cronbach's α coefficients showed acceptable values for social support and job control/decision latitude subscales. The findings were similar to those found in Chinese and Korean female health care workers (Cronbach's α 0.71 to 0.79).[20,22]

Social support showed the highest reliability (α 0.83), whereas psychological job demand showed moderate internal consistency (α 0.51).[27] The Cronbach's α value of psychological job demand was similar to those borderline values reported in other studies,[14,15,22] and slightly better than those reported in a study from Thailand (α 0.23)[21]. This discrepancy indicated that the items of the psychological job demand scale need to be refined in future studies in order to validate and improve the internal consistency/reliability of the psychological job demand scale among Malaysian nurses. For job control/decision latitude, both skill discretion, and decision authority subscales showed satisfactory Cronbach's α of 0.72, and 0.67, respectively. In contrast, studies among Chinese female health care workers reported low internal consistency (α<0.6) for both subscales.[22] The α for all 12 items of physical demand yielded a satisfactory value of 0.84 but slightly lower than those observed in another study (α 0.89).[17]

Psychological job demand showed positive correlation with physical demand as

**Table 4:** Median (IQR) and Spearman's $\rho$ matrix of eight working condition variables (n=376)

| No. | Variables | Median (IQR) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Psychological job demand | 19 (4) | 1 | | | | | | |
| 2 | Job control | 64 (8) | -0.10 | 1 | | | | | |
| 3 | Skill discretion | 34 (4) | 0.10 | 0.80† | 1 | | | | |
| 4 | Decision authority | 32 (4) | -0.15* | 0.88† | 0.88† | 1 | | | |
| 5 | Social support | 24 (1) | -0.12* | 0.29† | 0.29† | 0.18† | 1 | | |
| 6 | Supervisor support | 12 (0) | -0.20* | 0.25† | 0.32† | 0.18† | 0.88† | 1 | |
| 7 | Co-worker support | 12 (0) | -0.10 | 0.22† | 0.22† | 0.14† | 0.76† | 0.78† | 1 |
| 8 | Physical demand | 10 (3) | 0.21† | 0.10 | 0.10 | 0.10 | -0.11 | -0.11* | 0.10 |

IQR: Interquartile range
*p<0.05, †p<0.01

observed in previous studies.[14,16] Job demands was inversely correlated with social supports in agreement with some studies,[16,20] but in sharp contrast to another report.[14] Social support was found to be positively correlated with decision latitude as confirmed in other studies.[14,16,22]

The current study had some limitations: the study findings were restricted to female nurses only; therefore, there was a strong possibility for gender bias. The psychological aspect is usually related to gender; females have lower job control/decision latitude than men in most populations.[14] The data were obtained through self-administrated questionnaires. Therefore, the participants would be inclined to provide socially acceptable responses rather than reporting real life experiences, thereby, introducing a cultural bias into the study.[30]

In conclusion, the results suggested that all scales of the M-JCQ are reliable and valid for evaluating psychosocial and physical work environment among Malaysian public hospital female nurses. In future more studies should be conducted to further refine the job control/decision latitude and psychological job demand. JCQ should also be validated for a wider group of nurses, such as those working in private hospitals and clinics, as well as those working in rural hospitals and clinics.

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**Conflicts of Interest:** None declared.

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