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Background
Information on job strain exposure among Malaysian workers in multinational companies is limited.

Aims
To investigate the prevalence and factors associated with high job strain among office workers of a multinational company in Malaysia.

Methods
A cross-sectional study was conducted in November 2007 among 470 eligible workers. Respondents self-administered the Job Content Questionnaire downloaded from the company’s intranet. A median-split procedure was applied to create four groups according to the Job Demand–Control Model: active, passive, high and low job strain. Logistic regression models were used to investigate the associations between socio-demographic, occupational and psychosocial factors and high job strain.

Results
A total of 356 questionnaires were received (response rate 76%). Twenty-one per cent of respondents were in the high job strain group, 35% were in the passive group, whereas 26% and 17% of workers were in the low strain and active groups, respectively. After controlling for confounders, three factors were found to be associated with high job strain: male workers (adjusted OR 1.94, 95% CI 1.04–3.64), working >48 h per week (adjusted OR 2.51, 95% CI 1.44–4.39) and job insecurity (adjusted OR 1.14, 95% CI 1.02–1.27). One protective factor for high job strain was the scale ‘created skill’, which is part of skill discretion (adjusted OR 0.70, 95% CI 0.57–0.86).

Conclusions
About one in five workers in this study experience high job strain. Work improvement measures include reducing long working hours and job insecurity and giving workers the opportunity to learn, use creativity and develop abilities.

Key words
Cross-sectional study; Job Content Questionnaire; job strain; Malaysia; office workers; multinational company.

Introduction
In Malaysia, the services sector (and the financial services subsector) makes a significant contribution to the country’s economic development, contributing more than half of its gross domestic product [1,2]. As a consequence of globalization, more Malaysian workers are being employed in, or interacting with, multinational companies [3]. These workers are exposed to increased internationalization and competition, increased utilization of information and communication technology and new working styles as well as cross-cultural differences as they collaborate with colleagues from other countries [3,4]. Workers are expected to adapt to different cultures, languages and rules and regulations of international trade, resulting in increased workloads, pressure to enhance job skills and long working hours [5]. In an unpredictable economic environment, there are increasing pressures on workers associated with career development, job insecurity and redundancy [2,6].

Consequently, work-related stress is a growing concern to workers, the business community and society in developing countries, such as Malaysia [3]. Published studies on work-related stress in Malaysian office workers in the past 10 years have been limited and somewhat fragmented [3,7,8]. In one study, the prevalence of work-related stress among executives and managers in the furniture industry was reported to be 36% [5]. However, this estimate was based only on the respondents answering ‘agree’ or ‘strongly agree’ to one question on overall perception of work-related stress. Another study in an
international tobacco company reported the prevalence of work-related stress among its management staff as 68% [9]. This estimate was based on respondents’ reported symptoms of stress (scores ≥36) when responding to the Personal Stress Inventory questionnaire, without information on the reliability/validity of the scores [9].

Other Malaysian studies conducted in the management setting have reported on the perception of stress levels in terms of responses to work-related stress scales. For example, one study concluded that work-related stress levels (gauged using six items on a 5-point scale) among financial security workers in a northern Malaysian state were relatively high with a mean value of 3.77 [2]. Another study reported that Malaysian workers in commercial banks have generally low levels of work-related stress because of low mean stress scores [1]. Although these studies reported significant relationships between work-related stress and various socio-demographic, occupational or organizational factors, none of them reported the magnitude of the associations with work-related stress.

Work-related stress is conceptualized and measured using psychological models in which such stress is viewed in terms of dynamic interactions between individuals and their work environment [10]. One of the leading theoretical work-related stress models in the occupational psychology and management literature is the Job Demand–Control (or Job Strain) Model [11,12]. This model is widely used internationally [13] and has received sufficient empirical support to provide a useful framework for interventions at work [14]. In this model, there are four possible combinations of demand and control, namely high and low strain and active and passive jobs [15]. High strain jobs, characterized by high job demands and low job control, are perceived to cause the most adverse psychological reactions [16]. Many prospective studies have supported this hypothesis, although some studies have reported otherwise [13].

One study in Malaysia reported a prevalence of high job strain of 21% among female clerical workers of government agencies using the Job Content Questionnaire (JCQ) [17]. However, this study only compared the prevalence of high job strain between nurses and office workers, without information on the associated factors among the office workers.

As part of good employment practice, a subsidiary of a European multinational company in Malaysia is addressing work-related stress as a health and safety issue. This subsidiary provides finance, accounting, business and customer services to all subsidiaries of the parent company in the region. The workers encompass three main white-collar groups, ‘assistants’ (or clerical workers), executives and team leaders from various backgrounds including accountants, auditors, business and taxation specialists, computer and information specialists, analysts and customer services.

This present study is the first to attempt to investigate the prevalence of high job strain and its associated factors using the JCQ, a reliable validated questionnaire, among Malaysian office workers serving regional clients of a European multinational company.

Methods

This cross-sectional self-administered questionnaire study was approved by the Medical Ethics Committee of the University of Malaya Medical Centre in 2007 [Institutional Review Board (IRB) Ref No: 572.1]. The study was conducted in November 2007. All the office workers in the company during the data collection period were invited to participate. Consent forms and questionnaires were published on the company’s intranet, accessible to all study subjects, during the study period. All respondents were asked to return consent forms to confirm their willingness to participate in the study. Those who consented to participate were asked to download and self-administer the questionnaires. The main author collected all consent forms and checked the received questionnaires.

Respondents who fulfilled the inclusion criteria (being a permanent office worker) were selected for the study. Managers and expatriates were excluded because they were on a different salary scale from the other workers. For reasons of practicality, contract or temporary workers and those away from the company during the study period were also excluded. Two workers with a self-reported history of psychiatric illness were also excluded to remove any influence of psychiatric illness on the association between psychosocial job factors and job strain.

The respondents completed a structured self-administered questionnaire containing two parts. The first part sought socio-demographic and occupational information, such as age, gender, ethnicity, education level, job types, marital status, number of children at home, smoking status, average working hours per week and current job tenure. The second part comprised the JCQ scales that measure factors, such as psychological job demands (PD), decision latitude (DL), job insecurity, created skill, supervisor support, coworker support, customer relationships and self-identity through work. The created skill scale is a part of skill discretion, which refers to the opportunity to learn new things, use creativity and develop personal abilities [18].

The JCQ is an instrument used to measure the various components of the Job Strain Model, which has been validated and frequently applied in work-related stress research [16]. Previous Malaysian investigators have used both the English and the validated Malay versions of the JCQ in various occupational groups [19]. For this particular group of office workers, face validity plus the estimated internal consistency–reliability was satisfactory for the three main scales of the JCQ. Cronbach’s alpha for the job demands, DL and workplace social support scales was found to be acceptable (0.64, 0.76 and 0.79, respectively) with item–total correlations of >0.3 [20]. The lower Cronbach’s alpha for the job demands scale
may be due to the very small sample size in the pilot study (30 respondents) [20] but is still within international norms of reliability [21,22].

Job strain was defined as a combination of two scales: DL and PD, dichotomized at their respective medians into high and low groups. The workers were then cross-classified into four exposure groups: (i) high strain (exposed to low DL and high PD), (ii) low strain (high DL and low PD), (iii) passive (low DL and low PD); and (iv) active (high DL and high PD). Logistic regression analysis was conducted to determine the factors associated with high job strain. In the analysis, the high strain group is taken as the main outcome measure, ‘high job strain’, whereas the other three groups were grouped together as the ‘non-high job strain’ group following the practice of several previous researchers [15,21,23]. The socio-demographic and occupational characteristics were treated as categorical variables, whereas all the JCQ scales were treated as continuous variables. The level of significance was taken as $P < 0.05$. The adjusted odds ratios (ORs) were estimated with a 95% confidence interval (CI). The final model of factors associated with high job strain was checked for fit using the Hosmer-Lemeshow goodness-of-fit test and found to fit as the $P$ value was not significant. There were no significant interactions between the variables in the main effect model.

Results

A total of 356 questionnaires were received from 470 eligible workers in the company, a response rate of 76%. There was no significant difference in age, sex and ethnicity between respondents and non-respondents. The majority of the respondents were <31 years of age (80%), female (79%) and single (63%), had either a diploma or degree education (93%) and worked as assistants or clerical workers (77%). The respective medians and interquartile ranges for the average working hours per week and current job tenure were 45 (8) h and 12 (18) months.

Twenty-one percent of respondents fell within the high job strain group (95% CI 17–26%). A high proportion (35%) of the workers were classified in the passive group (95% CI 30–40%), whereas 26% (95% CI 22–31%) and 17% (95% CI 14–22%) of workers were in the low strain and active groups, respectively.

Cross tabulations of the socio-demographic characteristics of the workers according to the four job strain groups are presented in Table 1. The associations of the socio-demographic, occupational and psychosocial factors with high job strain among the office workers are presented as crude ORs with 95% CIs in Table 2. The final logistic regression model for the factors associated with high job strain among the office workers is presented in Table 1. The associations of the socio-demographic and occupational characteristics were treated as categorical variables, whereas all the JCQ scales were treated as continuous variables. The level of significance was taken as $P < 0.05$. The adjusted odds ratios (ORs) were estimated with a 95% confidence interval (CI). The final model of factors associated with high job strain were found to be significantly associated with high job strain: two categorical variables, i.e. male gender (adjusted OR 1.9, 95% CI 1.0–3.6) and working $>$48 h per week (adjusted OR 2.5, 95% CI 1.4–4.4), and two continuous variables, i.e. created skill score (adjusted OR 0.7, 95% CI 0.6–0.9) and job insecurity score (adjusted OR 1.1, 95% CI 1.0–1.3).

Discussion

We found the proportion of Malaysian office workers of this multinational company with high job strain to be 21% (95% CI 17–26%). Aside from one study in another Malaysian city that found a similar prevalence among female clerical workers [17], it is difficult to make comparisons with the prevalence of job stress in other Malaysian studies [1,2,5,7,9] not based on the Job Strain Model paradigm. However, the respondents in this study were of mixed ethnicity and job types and were younger and of higher education level. Similarly, a high proportion of the workers (35%) were classified in the passive group and only 17% of office workers in this multinational company were in the active group. In comparison with two European studies of white-collar workers, the prevalence of high job strain in this study is slightly lower than that among Whitehall study participants (22%) [24] and Dutch municipal employees (24%) [25].

In the multivariate analysis, after adjusting for possible confounding factors, male workers appear twice as likely to experience high job strain as females. A literature review on the role of gender in job stress found more studies reporting women as having higher stress levels than men or no difference in stress perceptions between the genders [26]. However, firm conclusions are difficult because the review included studies from various occupational groups and different job stress measurements.

This study found that workers who have long working hours, defined as $>$48 h per week [27], were 2.5 times more likely to experience high job strain compared to those who work shorter hours. Interestingly, research has found that men tend to work long hours and do so to ensure adequate earnings [27].

A psychosocial factor, job insecurity, was also found to be associated with high job strain. Job insecurity may involve the threat of losing the job or the loss of valued job features, such as deterioration of working conditions, demotion, lack of career opportunities and decreasing salary progression [6]. In contrast, this study found a psychosocial factor that is a part of skill discretion to be protective against high job strain in this group of workers.

A strength of this study is that it was the first to describe job strain and its associated factors in the study population concerned using an internationally validated and reliable questionnaire. Consequently, its findings can be used to compare with those in similar groups of workers.
Furthermore, the study was able to quantify the magnitude of association for the significant independent factors identified. In an attempt to minimize selection bias, respondents were selected from workers fulfilling specific inclusion and exclusion criteria. However, selection bias from a healthy worker effect is possible since workers absent during data collection because of stress-related illness may have been excluded. There may also be workers who have changed jobs in order to reduce exposure to high job strain. As a self-administered cross-sectional study, its limitations include an inability to infer causal associations and the possibility of information bias. Nevertheless, cross-sectional studies are acknowledged as the first step in identifying risk exposures and risk groups, provided that the findings are interpreted with caution [28].

The main conclusion of this study is that high job strain is present in this organization. The Job Strain Model posits that workers exposed to high job strain are at risk of psychological strain and consequent adverse effects on mental and physical health [21]. An organization’s business costs and overall competitiveness can be adversely affected by workers’ poor health as a result of lost workdays, low productivity and high turnover rates [21]. In contrast, high-performance organizations may also be concerned if there are many workers in the passive exposure group, which may carry a risk of loss of skill and psychological atrophy [29].

Reducing high job strain in the company should involve a comprehensive approach to job stress interventions [11]. For example, training can be provided for workers to improve their knowledge, skills and resources. Besides increasing coping skills through various stress management strategies [11], training provides opportunities for workers to learn new skills and develop their own special abilities in their field of work. Job redesign strategies should include modifying work schedules and allowing flexibility of working hours to better accommodate the non-work commitments of workers [11]. Other recommendations include involving workers in decision-making and improving relationships at work through employee engagement programs and recreational club activities [11]. Reducing the potential adverse effects of job insecurity requires measures, such as providing accurate information, enhancing communication, providing training and improving perceptions of fairness and social support [6].

Several unanswered questions arise from this study. Researchers have found associations between long working

| Table 1. Socio-demographic characteristics of office workers according to four job strain groups |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Age groups (years)                               | Passive, n (%)                                 | Low strain, n (%)                                | Active, n (%)                                    |
| ≥25 (n = 94)                                     | 39 (42)                                         | 20 (21)                                         | 16 (17)                                         |
| 26–30 (n = 191)                                  | 63 (33)                                         | 57 (30)                                         | 29 (15)                                         |
| ≥31 (n = 71)                                     | 22 (31)                                         | 17 (24)                                         | 17 (24)                                         |
| Gender                                          | Male (n = 74)                                   | 24 (32)                                         | 14 (19)                                         |
|                                                 | Female (n = 272)                                | 100 (36)                                        | 80 (28)                                         |
| Ethnicity                                       | Malay (n = 136)                                 | 48 (36)                                         | 49 (29)                                         |
|                                                 | Chinese (n = 105)                               | 38 (36)                                         | 20 (19)                                         |
|                                                 | Indian (n = 92)                                 | 29 (31)                                         | 26 (28)                                         |
|                                                 | Others (n = 23)                                 | 9 (39)                                          | 8 (35)                                          |
| Education level                                 | High school (n = 8)                             | 2 (25)                                          | 2 (25)                                          |
|                                                 | Diploma (n = 90)                                | 35 (39)                                         | 24 (27)                                         |
|                                                 | Degree (n = 242)                                | 83 (34)                                         | 66 (27)                                         |
|                                                 | Postgraduate (n = 16)                           | 4 (25)                                          | 2 (13)                                          |
| Job types                                       | Assistants (n = 272)                            | 108 (40)                                        | 70 (26)                                         |
|                                                 | Executives (n = 44)                             | 10 (23)                                         | 13 (30)                                         |
|                                                 | Team leaders (n = 40)                           | 6 (15)                                          | 11 (28)                                         |
| Marital status                                  | Single (n = 221)                                | 84 (38)                                         | 53 (24)                                         |
|                                                 | Married (n = 132)                               | 40 (30)                                         | 39 (29)                                         |
|                                                 | Divorced/widowed (n = 3)                        | 0                                               | 2 (67)                                          |
| Have children at home                           | No (n = 273)                                    | 96 (35)                                         | 74 (27)                                         |
|                                                 | Yes (n = 83)                                    | 28 (34)                                         | 20 (24)                                         |
| Smoking status                                  | No (n = 316)                                    | 114 (36)                                        | 82 (26)                                         |
|                                                 | Yes (n = 40)                                    | 10 (25)                                         | 12 (30)                                         |
| Total                                           | 124 (35)                                        | 94 (26)                                         | 62 (17)                                         |

from other regional offices of this multinational company. Furthermore, the study was able to quantify the magnitude of association for the significant independent factors identified. In an attempt to minimize selection bias, respondents were selected from workers fulfilling specific inclusion and exclusion criteria. However, selection bias from a healthy worker effect is possible since workers absent during data collection because of stress-related illness may have been excluded. There may also be workers who have changed jobs in order to reduce exposure to high job strain. As a self-administered cross-sectional study, its limitations include an inability to infer causal associations and the possibility of information bias. Nevertheless, cross-sectional studies are acknowledged as the first step in identifying risk exposures and risk groups, provided that the findings are interpreted with caution [28].

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Several unanswered questions arise from this study. Researchers have found associations between long working
hours or job insecurity and adverse health effects, job dissatisfaction and turnover intention among workers [4,6]. Future research should explore associations between high job strain and workers’ physical and/or psychological health, absenteeism and job turnover because they may affect worker productivity. In addition, future research should include all the workers in the company, assess the contribution of other factors unrelated to work [3] and include more objective measurements of job stress [28] to adequately monitor psychosocial work conditions.

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### Conflicts of interest

None declared.
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