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ASSOCIATION BETWEEN OCCUPATIONAL STRESS AND STRESS BIOMARKERS AMONG LECTURERS AT UNIVERSITI SELANGOR, SHAH ALAM

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Abstract

Occupational stress is a worldwide serious risk factor to the worker's physical and mental condition, which triggers the workers to be poorly motivated and less productive. The objective of the study is to determine the association between occupational stress and stress biomarkers level among lecturers in Universiti Selangor. This cross-sectional study used a purposive sampling, which involved 45 lecturers from various faculties. The instrument used in this study was Job Content Questionnaire (JCQ) which is a Psychosocial Job Assessment Instrument designed by Karasek et al., (1998). The questionnaire had been translated to Malay version by Edimansyah et al., (2006). 10ml of blood sample was collected from each respondent by certified phlebotomist. Results from the statistical analysis showed that occupational stress prevalence is 24.4%. 54.5% of male respondents in high strain condition compare to female respondents which is 14.7%. There was significant association between occupational stress prevalence with gender (p=0.008) and no significant association with marital status (p=0.535). While there was no significant association between occupational stress prevalence with age, number of children, working duration, educational level and designation of work. The study also revealed significant difference mean of lymphocytes between high strain and non-high strain respondents (p=0.015). In addition, the test indicated there is no significant difference mean of cortisol, C-reactive protein, total white blood cell, neutrophils, eosinophils, monocytes and basophils. As a conclusion, the study identified only gender and lymphocyte reaction has significant effect on occupational stress.

Keywords: occupational stress, white blood cell, neutrophils, lymphocytes

1 INTRODUCTION

Job stress, also known as occupational stress, has been defined as the experience of negative emotional states such as frustration, worry, anxiety and depression attributed to work related factors (Kyriacou, 2001). According to Adeyemo & Ogunyemi (2005), several studies have examined occupational stress in the teaching profession which the teachers experience disproportionately high level of stress.

Cheri Cheng (2014) reported that researchers from Massachusetts General Hospital and Harvard Medical School recruited 29 medical employees who worked at a hospital's intensive care unit where stress levels can get very high. The team discovered that the white blood cell (WBC) counts were a lot higher when the workers were on duty as opposed to being off duty.

A study done by Nakanishi *et al.* 2003, found that WBC count is a convenient and useful marker to capture inflammatory responses because it is economical compared to other inflammatory markers such as interleukin-6 (IL-6). Increment of WBC count has been shown to have a positive relationship with stressors.

This research will determine the occupational stress prevalence among the lecturers and this will be supported by stress biological markers and socio-demographic factors.

2 METHODOLOGY

A cross-sectional study from September 2015 until January 2016 was conducted in Universiti Selangor (UNISEL) Shah Alam campus. The sample size was calculated using Snedecor and Cochran 1989's formula in reference to study by Nur Aqilah et al. (2012) resulting in 50 subjects and they were recruited via purposive sampling based on the namelist of lecturers obtained from the Human Resource Department. The inclusion criteria were Malaysian fulltime lecturers with at least one year working experience in UNISEL while exclusion criteria include lecturers with any type of disease, smokers, pregnant and on study leave.

2.1 Questionnaire

This self-administered questionnaire consists of three parts:

Part I

The first part of the questionnaire consists of socio-demographic status of the respondents which include age, gender, ethnicity, marital status, number of family members, number of children, educational level, monthly salary and length of services.

Part II

The second part of the questionnaire consists of Job Content Questionnaire (JCQ) which is a Psychosocial Job Assessment Instrument designed by Karasek *et al*., (1998).

This questionnaire has been translated to Malay version by Edimansyah *et al*., (2006). This part consists of four domains which are decision latitude, psychological demands, social support and job insecurity. Each of the domains was rated on four point Likert scales which are very disagree (1), disagree (2), agree (3) and very agree (4).

2.2 Blood sampling

Blood collection of 10ml was performed by certified phlebotomists. The C-reactive protein was analysed using particle enhanced turbidimetric assay and differential white blood counts was analysed using the hematology analyzer.

2.3 Statistical Analysis

Data was entered, cleaned and analyzed using SPSS version 22.0 for Windows. Mean and standard deviation was used to describe the stress biomarkers of the lecturers for continuous data, whereas percentage was used for categorical data. Chi square test analysis was conducted to determine the association between the occupational stress and socio-demographic data. Independent sample t-test was done to compare mean of stress biomarkers among high strain and non-high strain respondents.

2.4 Ethical Consideration

Ethical approval was obtained from the Ethics Committee of UNISEL (Ethics protocol no. : Q000042E) and written consent was obtained from the respondents.

3 RESULT

Fifty lecturers were selected to participate in this study. However, only forty five of them were willing to participate which contribute to 90% response rate. Majority of the respondents were female (75.6%), aged below forty years old (82.2%), married (77.8%) and have a masters degree (68.9%).

Among the 45 respondents in this study, 11 of them are in high strain group which having low decision latitude and high psychological job demand (refer to Table 1).

TABLE 1. Prevalence of job strain among lectures in UNISEL (n=45)

Job Strain	No. (%)
UNISEL	
High strain	11 (24.4)
Non high strain	34 (75.6)
Total	45 (100)

The result in table 2 showed the association between socio-demographic data and prevalence of job strain. 54.5% of male respondents in high strain condition compare to female respondents which is 14.7%. Pearson correlation test showed that there was significant association between occupational stress prevalence with gender (p=0.008) and no significant association with marital status (p=0.535). While there was no significant association between occupational stress prevalence with age, number of children, working duration, educational level and designation of work. Independent sample t-test revealed significant difference mean of lymphocytes between high strain and non-high strain respondents (p=0.015). The test also indicated there is no significant difference mean of cortisol, C-reactive protein, total white blood cell, neutrophils, eosinophils, monocytes and basophils.

4 DISCUSSION

The prevalence of occupational stress among lecturers in UNISEL was 24.4%. This is similar with a study done by Nada, Anita and Emilia (2014) among the community college lecturers in Malaysia where they reported that prevalence was 25.9%. Another study done by Nur Aqilah and Juliana (2012) at Universiti Putra Malaysia showed the prevalence among lecturers was 26.2%.

There is significant association between genders where men scored significantly higher than women on the occupational stress. This is in contradict with finding by Triantoro *et al*. (2011), where there was significant difference in the stress experience by female and male lecturers. The gender variable has influences on job stress, which women academic staff has a higher job stress level than male academic staff. Furthermore, according to Pillar (2004) in his interview of 2816 people (1566 women and 1250 men) between 18 and 65 years old, showed that women scored significantly higher than the men on somatic symptoms and psychological distress. The study carried out also demonstrated that women suffer more stress than men and their coping style is more emotion-focused than men.

Another finding by Peter *et al*. (2002) showed male lecturers facing work-stress was more strongly related to concerns about their role in the power structure of an organization, whereas female employees reported experiencing more severe stress when there was a conflict between job requirements and family relationships.

This study identified that age, marital status, number of children, educational level and designation of job has no significant association on job stress. This condition happened may be because of the organizational culture, task diversity, workload and ratio between lecturer and student are given fairly by top management. However, the findings of this study was in disagreement with the study done by Triontoro (2011) where he identified that gender, academic rank and employment status has significant effect on job stress.

This study indicated that there was significant lower mean of lymphocytes among high strain compared to non-high strain respondents. The test also indicated there is no significant difference mean of cortisol, C-reactive protein, total white blood cell, neutrophils, eosinophils, monocytes and basophils. This is supported by the theory from Kiecolt-Glaser *et al.* (1984) saying that stress hormone corticosteroid

can suppress the effectiveness of the immune system which lowers the number of lymphocytes.

TABLE 2. Association between socio-demographic data and prevalence of job strain

Variables	High strain Mean (SD)	Non-high strain Mean (SD)	High strain n (%)	Non-high strain n (%)	p-value
Gender					**0.008***[a]
Female	-	-	5 (14.7)	29 (85.3)	
Male	-	-	6 (54.5)	5 (45.5)	
Age					0.382[b]
<40 years	-	-	8 (21.6)	29 (78.4)	
>40 years	-	-	3 (37.5)	5 (62.5)	
Marital Status					0.535 [a]
Married	-	-	9 (25.7)	26 (74.3)	
Single	-	-	2 (20)	8 (80)	
No. of Children					0.641 [b]
>3	-	-	2 (25)	6 (75)	
<3	-	-	9 (24.3)	28 (75.7)	
Duration of Work (years)					0.488 [b]
1-5	-	-	3 (33.3)	6 (66.7)	
6-10	-	-	2(11.8)	15(88.2)	
11-15	-	-	4(30.8)	9(69.2)	
>16	-	-	1(25)	3(75)	
Cortisol	253.22(89.72)	208.26(76.14)	-	-	0.112[c]
C-reactive protein	3.64(3.88)	2.46(2.40)	-	-	0.237[c]
Total white blood cell	8.07(2.65)	7.26(1.86)	-	-	0.265[c]
Neutrophils	61.45(8.13)	54.66(11.47)	-	-	0.077[c]
Lymphocytes	28.45(6.8)	34.09(6.27)	-	-	**0.015***[c]
Eosinophils	2.73(2.05)	2.61(1.37)	-	-	0.824[c]
Monocytes	6.73(1.42)	6.45(1.77)	-	-	0.646[c]
Basophils	0.64(0.67)	0.61(0.50)	-	-	0.874[c]
Educational level					0.358[b]
Diploma			0(0)	1(100)	
Degree			4(36.4)	7(63.6)	
Master			6(19.4)	25(80.6)	
PhD			1(50)	1(50)	
Designation					0.411[b]
Assistant lecturer			5(38.5)	8(61.5)	
Lecturer			5(20.8)	19(79.2)	
Senior lecturer			1(12.5)	7(87.5)	

a Pearson Chi Square
b Fisher Exact Test
c Independent Sample T-Test
*significant at p<0.05

5 CONCLUSION

Findings of this study show that prevalence of occupational stress among lecturers at UNISEL was 24.4%. The study identified that gender and lymphocyte reaction has significant effect on occupational stress. Male lecturers

suffered more occupational stress than female lecturers. For parameters such as age, marital status, number of children, duration of work, educational level, and designation had no significant association with occupational stress. There was no significant difference of mean between high strain and non-high strain respondents for cortisol biomarker.

This finding then recommends several actions to take place to manage and reduce the level of stress. Male lecturers have more burden in their work and life due to responsibility as the bread winner while female lecturers have a multitasking job in their work and life and increase their coping capability of this burden. The university has to create a good working environment to enhance quality of life by conducting a stress management seminar, flexible work time, reasonable workload and equal opportunities for career advancement. These recommendations should be done with full support from the management, so that the goal to work in a healthy environment can be optimally achieved.

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