HOSTED BY unisel UNIVERSITI SELANGOR

Selangor Science &Technology Review
Vol. 2, No. 1, (2018)

Perceived Indoor Climate and Building-Related Illnesses Among Staff at Universiti Selangor Shah Alam Campus

Mohammad Adam Adman, Sahrul Kassim, Mohd Amir Arshad, Mohd Zubairy Shamsudin, Mohd Jamalil Azam Mustafa

Faculty of Engineering and Life Science, Universiti Selangor (UNISEL)
adam@unisel.edu.my

Abstract. A cross-sectional study was conducted among 132 staff in Universiti Selangor (Unisel) Shah Alam City Campus consisting of 44.7% academic and 55.3% non-academic respectively. Overall, 43.1% male and 56.9% female was enrolled as a respondent. The aim of this study is to determine indoor climate factors and building-related illness or general symptoms occurrence among the Unisel staff. Environmental risk factors to consider in the study are temperature, air quality and physical factors. Result shows the ambient temperature of the workplace, varying room temperature was the highest feedback by the respondents with 51.9%, followed by too high room temperature 46.2%, too low room temperature 36.5% and the draught 34% respectively. The air quality characteristics, unpleasant smell contribute to the highest respond with 36.9% followed by stuffy bad air 35.2% and dry air 31.5% respectively. The prevalence of general symptoms, such as fatigue (50.8%), heavy headedness (42.3%), nausea/dizziness (36.2%), and difficulties concentrating on working (42.3%) were also recorded. A significant relationship was found between workplace environment and present symptoms among the Unisel staff. The result shows that non-conducive working environment contributed to general symptoms of building-related illness among the Unisel staff.

Keywords: Indoor climate; building-related illnesses; environmental ergonomics, learning institutional.

1. Introduction

Influences of indoor climate on building-related illnesses are the issues related to the occupational diseases that are emphasized lately. They are no exceptional in any industry especially among higher learning institutions staff, which are also potentially to expose to the unhealthy working environment (Lim et al., 2015). According to section 4(C) of OSHA 1994 the purpose of this act is to promote an occupational environment for the persons at work which is adapted to their physiological and psychological needs. In Malaysia, sick building syndrome (SBS) has become common issues in Malaysia recent years due to the construction of buildings designed to be energy-efficient with air conditioning system (Berardil, 1991). A study conducted by Syazwan et. al. (2009) indoor climate played a role in building-related illnesses either new buildings or old buildings in Malaysia.

Statistics around the world also showed about 1.2 million workers have been injured and more than 160 million workers fall ill as a result of work condition such as indoor climate that is unsafe, unhealthy and inappropriate (Kamarulazman A., 2012). Therefore this study aims to evaluate the indoor climate and general symptoms of building-related illnesses in the Unisel's building office in Shah Alam Campus.

2. Materials & Methods

This study assessed the indoor climate factors at workplace, which involves academic and non-academic staff and to investigate the relationship between the effect of indoor climate factors to human health, comfort and job performance. Data collection through an adaptation of a standardized questionnaire (Andersson, K, 1998) and this questionnaire distributed to academic and non-academic staffs who worked in Unisel Shah Alam Campus.

From the 172 questionnaires that randomly distributed, 132 were returned. The 40 questionnaires were left by unwillingness of respondents to participate in this study. Therefore, this analysis was based on 132 respondents consisting of academic and non-academic staff. Result of analysis was divided into four sections which were the socio-demographic background, workplace environment, past and present of general symptoms.

Statistical Package for Social Science (IBM SPSS®) version 19 was used to analyze the data. Descriptive analysis demonstrated the frequency, percentage. For analytical analysis, Spearman correlation test was applied to explain the findings.

3. Results

1. Socio-Demographic Background of Participants

Gender

As shown in Table 1, it was found that a total of 56 (43.1%) respondents were male and 74 (56.9%) respondents were female.

Age

Table 1 shows the distribution of respondents by age. Majority of respondents 49 (37.1%) were in the range of 28 to 33 years old group. A total of 38 (28.8%) respondents were in the range age group that less than 27 years old. While a total of 25 (18.9%) of respondents were in the range age group between 34-39 years old. Age group of 40-46 years old indicated the 11 (8.3%), and the lowest age group represented by the 47 years old and above 9 (6.8%) respondents.

Years of working experience

Table 1 shows the distribution of respondents by working experience at Unisel. The data shows the majority of respondents 54 (40.9%) were have served approximately 4-7 years at Unisel. Followed by the respondents have been working for at least 3 years at Unisel with a total of 49 (37.1%). While 21 (15.9%) respondents have worked for 8-11 years and a total of 8 (6.1%) respondents have served for 12 years and above.

Educational background

Table 1 shows the distribution of respondents by level of education. The analysis shows that each of 51 (38.6%) and 34 (25.8%) respondents had education at Masters/PhD and Degree level respectively. Meanwhile, a total of 26 (19.7%) and 21 (15.9%) respondents have Diploma and SPM/STPM correspondingly as their highest level of education.
Job position

Table 1 shows the distribution of respondents by job position. The analysis shows a total of 73 (55.3%) respondents are non-academic staff and 59 (44.7%) respondents are an academic staff.

Table 1 – Descriptive of the respondents (N=132)

		Frequency	Percentage (%)
Gender			
	Male	56	43.1
	Female	76	56.9
Age			
	Less than 27 years	38	28.8
	28 to 33 years	49	37.1
	34 to 39 years	25	18.9
	40 to 46 years	11	8.3
	47 years and above	9	6.8
Years of working experience			
	Less than 3 years	49	37.1
	4 to 7 years	54	40.9
	8 to 11 years	21	15.9
	12 years and above	8	6.1
Education			
	SPM/STPM	21	15.9
	Diploma	26	19.7
	Bachelor degree	34	25.8
	Master/PhD	51	38.6
Job position			
	Academic staff	59	44.7
	Non-academic staff	73	55.3

4. Workplace Environment

Indoor climate factors consist of several parameters such as temperature and air quality. According to the temperature questions that have been responded, varying room temperature shows the number of respondents said "yes, sometimes" was the highest number of respondents 67 (51.9%). Air quality condition like stuffy bad air, dry air and unpleasant smell each recorded number of respondents indicated "yes, sometimes" was major contribution to the prevalence 45 (35.2%).

5. Past General Symptoms

The illness or symptoms experienced in the past by the respondents for asthma indicates that 14 (10.6%) have experienced the symptoms, while 118 (89.4%) respondents have never experienced it. Meanwhile, a total of 43 (32.6%) respondents who have experienced fever and allergies, and 89 (67.4%) respondents have reported none or no experienced any symptom of allergies and fever. In addition, a total of 17 (13.1%) and 113 (86.9%) respondents reported have experienced and no experienced the symptom of eczema respectively. There were 41 (31.5%) respondent who have family members that has allergic diseases, (asthma, fever, allergies and eczema), while a total of 89 (68.5%) respondents who do not.

6. Present Symptoms

Present symptoms are divided into three types of symptoms; 1) general symptoms, 2) mucous membrane symptoms and 3) skin symptoms. For general symptoms, a total of 66 (50.8%) respondents have experienced fatigue. Second general symptom that contributes to the prevalence was heavy headedness represented by 55 (42.3%) respondents. Meanwhile, nausea or dizziness represented by 47 (36.2%) respondents that experienced seldom. Fourth general symptom contributes to the prevalence was difficulties to concentrate with 55 (42.3%) respondents that had experienced seldom symptom. Further, a mucous membrane symptom consists of itching or burning or irritation of the eyes. For this sub-category there were 57 (43.8%) respondents have not experience any such symptom. For sub-category of irritated / stuffy or runny nose indicated 44 (33.8%) respondents experienced sometimes. For sub-category of hoarse / dry throat indicated 49 (37.7%) respondents experienced seldom. For sub-category of cough indicated 57 (43.8%) respondents experienced seldom. For sub-category of dry skin or symptoms involving skin facial flushed indicated 56 (43.1%) respondents have no experienced any symptom. For sub-category of scaling / itching scalps / ears, a total of 75 (57.7%) respondents also have no experienced any symptom. For sub-category of hand dry / itching / red skins a total of 72 (55.4%) have no experienced any symptom.

7. Discussion

Spearman coefficient test was used to evaluate the correlation between workplace environment and present symptoms among staff at work in Unisel Shah Alam. Based on the Table 2, the results shows there were significant positive correlation between workplace environment and present symptoms.

Table 2 – Correlation between workplace environment and the present of symptoms among staff in Universiti Selangor City Campus.

	General symptoms	Mucuos membrane symptoms	Skin problem
Temperature	.314**	.273**	.176*
Indoor air quality	.321**	.344**	.288**

*p< 0.05; **p<0.01

This study was also found that a disturbing workplace environment, several indoor climate and physical factors attracted most of the respondent attention. As an example, too high and varying room temperature were among the factors complaint by the respondents. Beside, air quality and physical factors such as stuffy bad air, unpleasant smell, noise and glare also contributes to discomfort. This situation occurs in a workplace that exposed to dampness due to water leakage from the air conditioning systems in the office. Some of other studies also could linked this situation by looking to the age of the buildings and type of ventilation (Skov, Valbjom, & Pedersen, 1990).

Present symptoms was been categorized into three, which were general symptoms, mucous membrane and skin problem symptoms. Most of the symptoms experienced by respondents were in the general symptoms. General symptoms were indentified as fatigue, heavy headedness, headache, followed by mucous membrane symptoms such as runny nose. There were less complaint regarding skin irritation symptoms among the respondents. However, some studies even showed an adverse effect of facial skin symptoms among the office workers which has a very close relationship with sick building syndrome (Stenerg, Mild, Sandstrom, Sundell, & Wall, 1993).

Part from those findings, this study has clearly indicated that workplace environment such as temperature and indoor air quality have a significant positive correlation with the symptoms experienced among staff at the Unisel Shah Alam. The positive correlation means when the severity of environmental risk factors is increased, the symptoms experienced is also increased. A study also supported that inadequaet ventilation will decrease the quality of indoor air, thus will possibly leading to health symptoms (Daisey, Angell, & Apte, 2003).

8. Conclusions

The findings from this study have extended our knowledge of the indoor climate factors and building-related illnesses among staff in Unisel Shah Alam Campus. We found that the workplace environment do have a significant relationship with present symptoms in Unisel staff. These findings provide an important basis for improving the condition of working environment in the university, and generally will encourage a healthy and productive working culture. More study should be conducted specifically to compare health effects among the staff between different building in Unisel in both campuses.

9. Acknowledgments

We would like to thank all subjects who volunteered to participate in this study. The authors declare that there are no conflicts of interest.

10. References

Andersson, K. (1998). Epidemiological Approach to Indoor Air Problems. Indoor Air 1998, Suppl. 4, 32-39.

Berardil B. M., Leoni E., Marchesini B., Cascella D., and Raffil G.B. (1991). Indoor climate and air quality in new offices: effects of a reduced air-exchange rate. *International Archives of Occupational and Environmental Health* 63, pp. 233 – 239.

Daisey, J. M., Angell, W. J., & Apte, M. G. (2003). Indoor air quality, ventilation and health symptoms in schools: an analysis of existing information. *Indoor Air*, *13*(1), 53–64.

Kamarulazman Ahmad. (2012). 57,639 kemalangan di tempat kerja. Utusan Malaysia, 2.

Lim, F.-L., Hashim, Z., Md Said, S., Than, L. T.-L., Hashim, J. H., & Norbäck, D. (2015). Sick building syndrome (SBS) among office workers in a Malaysian university — Associations with atopy, fractional exhaled nitric oxide (FeNO) and the office environment. *Science of The Total Environment*, *536*, 353–361.

Skov, P., Valbjom, O., & Pedersen, B. (1990). Influence of indoor climate on the sick building syndrome in an office environment. *Journal of Work Environment Health*, *16*.

Stenerg, B., Mild, K. H., Sandstrom, M., Sundell, J., & Wall, S. (1993). A Prevalence Study Of The Sick Building Syndrome (SBS) And Facial Skin Symptoms In Office Workers. *Indoor Air*, *3*(2), 71–81.

Syazwan, A., I., Juliana, J., Norhafizalina O., Azman Z. A., & Kamaruzaman J. (2009). Indoor Air Quality and Sick Building Syndrome in Malaysian Buildings. Global Journal of Health

Science, 1(2), 126-135.

Social Security Organization (2010). Annual Report.

Occupational Safety and Health Act 1994 (Act 514).