

Workplace Environment towards Emotional Health

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Abstract

Workplace ergonomics, such as air quality, lighting, furniture and tools, acoustics and building's general environment, have a significant relationship between worker's satisfaction and performance. Poor workplace ergonomics or organization comfort level has significant economic implications for the organizations through employee dissatisfaction, lowered productivity and lowered emotional and physical health of the employees. Lower emotional health leads to psychological distress, depression and anxiety, whereas lower physical health leads to heart disease, insomnia, headaches, and infections. A field study of 40 academicians through questionnaire explored selected workplace ergonomics design and their effects on physical and emotional health. Research finding shows that there is a significant relationship between building's general environment of the organizations and the health complaints from the employees. The findings also confirmed that there is significant relationship between the workplace ergonomics and the health complaints from the employees. This study will support a better evaluation of development policies of workplace ergonomics design by management. In the long term such action taken by management authorities to increase organizations comfort level (air quality, lighting, furniture and tools, acoustics and building's general environment) would produce benefits for the institution in terms of improved physical and emotional health.

Keywords: Workplace ergonomics, emotional health, physical health, environment, organizational comfort level.

Introduction

Ergonomics workplace is designed to permit and encourage the person to make the best use of his or her abilities. An ergonomically design workplace was very important in making the human-machine-environment interface as efficient, safe and comfortable. The effective application of ergonomics in workplace design can accomplish a balance between worker characteristics and task demands. This will lead to improve worker productivity and to decrease health problems of employees. According to Tarcan *et al.* (2004), if the organization provides a good working environment and taking ergonomics consideration in designing workplace, it will increase the employee's loyalty level. Based on the literature, most of the researchers agree that ergonomically designed workplace is the significant factors in explaining the employees' physical and emotional health (Preiser, 1997). An ergonomically deficient workplace can cause physical and emotional stress, low productivity and poor quality of work (Ayoub, 1990). Poor ergonomics design has significant economic implications for the organizations through employee dissatisfaction, lowered productivity and lowered emotional and physical health of the employees. Dua (1994) stated that lower emotional health is manifested as psychological

distress, depression and anxiety, whereas lower physical health is manifested as heart disease, insomnia, headaches, and infections. These health problems will lead to organizational symptoms such as job dissatisfaction, absenteeism, and poor work quality. Irritated, sore eyes and throat, hoarseness, stuffy congested nose, excessive mental fatigue, headache and unusual tiredness are all sign of the negative workplace environmental conditions (Tarcan *et al.*, 2004). These kinds of problems will affect the physical and emotional health. If these symptoms are not taken seriously it will affect the organizational productivity and lead to diminish the country development.

Ergonomics is known to be the solution of having good working conditions and to improve quality, productivity, occupational health and safety and cost reductions (Yeow and Nath Sen, 2003). According to our study of the literature on characteristics of ergonomically workplace design, it is seen that the indoor air quality, lighting, acoustics, furniture and tools, and building's general environment are among the important aspects to determine the physical and emotional health of individual. The improvement efforts related to these workplace designs significantly affect the performance of organizations. Tarcan, *et al.* (2004) stated improving workplace design and so health standards assures employee performance. Workplace environmental conditions, such as lighting, indoor air quality, and acoustics have a significant relationship between worker's satisfaction and performance (Tarcan, *et al.*, 2004; Marshall *et al.*, 2002; Fisk, 2000).

Ergonomics is a basic understanding of how this science applies to fit the physical aspects of the work environment to the human body. People come in all shapes and sizes with varying capabilities and limitations in strength, speed, flexibility and skills. All of these factors need to be taken into consideration for appropriate workplace design and function. When the physical environment isn't suited to the physical capacity of the person to perform required tasks, musculoskeletal disorders (MSDs) can result. MSDs are injuries and disorders of the soft tissues (muscles, tendons, ligaments, joints, and cartilage) and nervous system. Risks for the potential development of MSDs are identified as repetitive and forceful exertions, exposure to vibration, frequent or heavy lifting, pushing, pulling, or carrying, prolonged awkward positions, prolonged hours of computer use, contact stress, and work organization (Martin *et al.* 2003). Ergonomic design of the workplace is the strategy for reducing the incidence and severity of musculoskeletal injuries (Westgaard, 1999; Bohr, 2000). According to De Croon (2005), the workplace design may directly or indirectly result in physiological and psychological reactions such as crowding stress, psychological state of inadequacy of space, occupationally induced fatigue, job satisfaction and increased levels of blood pressure. In addition, the long term reactions include decreased performance (Cotton and Hart, 2003), and negative health outcomes, such as psychosomatic health complaints including chronic fatigue, burnout and musculoskeletal disorders (De Lange *et al.* 2002; Sluiter *et al.* 2003.)

Hypotheses Development

Indoor Air Quality

Air quality is a very important factor to determine organizational comfort level. Indoor air quality has a direct impact on health problems and leads to uncomfortable workplace environments (Czubaj, 2002; Shiaw-Fen Ferng, 2002; Wilson, 2001). A good indoor air quality will improve production qualities and helps to increase worker productivity by maintaining a healthful work environment (Martin, 1999). Research in ergonomics field has demonstrated the negative effects of hotness and coldness and extreme temperature with the decrements in performance (Ellis, 1982) and others linking with fatigue and moods (Nelson, Nillson and Johnson, 1984). Griffitt (1970) also stated that uncomfortable temperatures or air quality has significant effect on social-psychological.

Lighting

There is significant relationship between the lighting systems and the eyes, headache and nervousness complaints. Workplace lighting contributes to lower worker absenteeism, higher quality and safety improvements. It is also difficult to make specific statements about levels of lighting since their appropriateness depends heavily on the nature of a task (Sutton and Rafaeli, 1987). But there is agreement among scholars that high levels of glare, lack of natural light, and levels of lighting that are too low for a given task can have negative effects on performance and well-being (Sutton and Rafaeli, 1987). Negative relationship has been found by Oldham and Rotchford (1983) between darkness and employees' reactions including job satisfaction and well-being.

Acoustics

Exposure to occupational noise, that is, unwanted sound, has been linked with variety of adverse effects upon well-being and obvious relationship with hearing loss (Leather, Beale and Sullivan, 2003). Noise exposure has been found to be associated with a range of indicators of physical and emotional health such as cardiac problems, sickness-related absenteeism, self reported fatigue and psychological distress (McDonald, 1989; Cuesdan *et al.*, 1977). Most of the researchers have agreed that the sources of noise in the organizations comes from telephone ringing, piped-in background music, office machines, people talking and street noise. There are several researchers gave the opinions that the efforts for decreasing the noise level are not necessary because of the high capability of human beings to adapt to difficult conditions. Noise did not have any direct effect upon physical and emotional health to the research studies reporting by McDonald (1989), Miller (1974) and Hedge (1982).

Furniture and Tools

The efficiency level of the employees is also based on the ergonomics consideration taken into furniture and tools such as armchairs, desks, computers, and apparatus. Taking ergonomics concern for the existing and new instruments will decrease the problems of muscles and articulation (Tarcan, Varol and Ates, 2004). If the organization doesn't provide a good working environment to employees such as buying the best-fitting apparatus, furniture and tools, the risk of becoming ill related to the workplaces are increasing.

Building's General Environment

Investment made by the company to foster safety cultures in their organizations may reduce personal injury rate, improve physical and emotional health and builds worker loyalty (Mearns, Whitaker and Flin, 2003). Job insecurity, vague job descriptions and lack of general facilities in the organizations will direct to depression and mental health (Antoniou, Davidson and Cooper, 2003).

Research Objectives

The main objective of this research is to look at the effects of workplace ergonomics design such as indoor air quality, lighting, furniture and tools, acoustics and building's general environment on health complaints. Moreover, this research also looks into the perception of respondents towards the workplace ergonomics design.

The Research Hypotheses

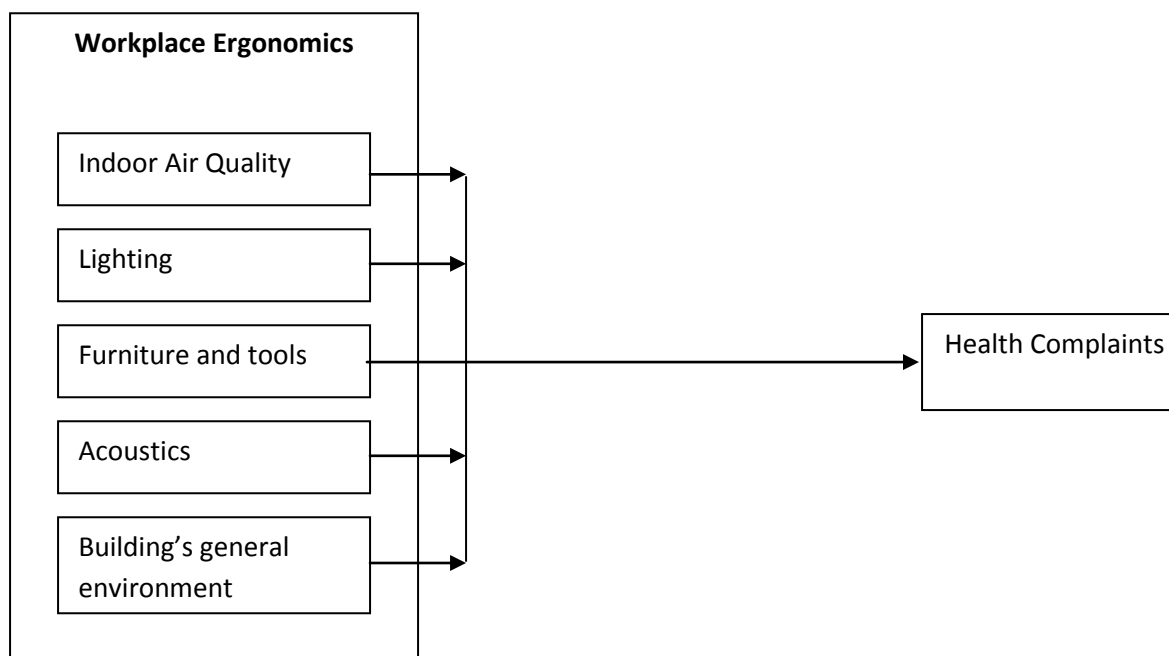
To fulfill the research objectives and based on the literature review done, the researchers have developed six hypotheses. They are:

- H1. There is a significant relationship between indoor air quality of the organizations and the health complaints from the employees.
- H2. There is a significant relationship between lighting of the organizations and the health complaints from the employees.
- H3. There is a significant relationship between furniture and tools provided by the organizations and the health complaints from the employees.
- H4. There is a significant relationship between acoustics of the organizations and the health complaints from the employees.
- H5. There is a significant relationship between building's general environment of the organizations and the health complaints from the employees.
- H6. There is a significant relationship between the workplace ergonomics of the organizations and the health complaints from the employees.

Methodology

For this research purposes, the workplace ergonomics was defined by five factors i.e. the indoor air quality of the organizations, lighting of the organizations, furniture and tools used by the employees of the organizations, acoustics of the organizations, and the building's general environment. From these five factors, the researchers build up the research model shown in Figure 1. This model is adapted from Tarcan *et. al* (2004).

FIGURE 1: The research model



The questionnaire, according to the research model contains 23 items related to independent variables and 15 items on dependent variables. Specifically, 7 items related to indoor quality, 3 items about lighting, 3 items on furniture and tools, 4 items on acoustics and 6 items on building's general environment. Answers to the questions use the Five-point Likert scale. This instrument is adapted from Tarcan, Varol and Ates (2004).

Questionnaires were distributed to 60 individuals working as lecturers in two higher learning institutions – Kolej Universiti Islam Antarabangsa Selangor (KUIS) and Universiti Kebangsaan Malaysia (UKM). The data was summarized for subsequent analysis. After a thorough review, only 40 questionnaires could be used for further analysis.

Results

Descriptive statistics (i.e. frequency and percentage) were computed to gain an understanding of respondents' demographic factors. To obtain further understanding on the respondents'

perceptions towards their workplace ergonomics, the researchers administered the MCT, specifically to check on the mean and standard deviation. In addition, regression analyses were performed to test the hypotheses. The alpha level for all hypotheses testing is 0.05.

Table I provides the details of the respondents' demographic factors. The sample is inclusive of 11 male and 29 female. They are at about 25 – late 50s. Most of them are Masters' holders and have been working with the organizations for less than 5 years. Majority of the respondents work for 40 – 49 hours per week.

TABLE 1: Respondents' Demographic Information

Gender	Freq	%
Male	11	27.5
Female	29	72.5
Age Category		
≤ 30	18	45.0
31 – 40	20	50.0
41 – 50	01	02.5
51 – 60	01	02.5
Tertiary Education		
Degree	06	15.0
Masters	30	75.0
PhD	04	10.0
Tenure of Service		
≤ 5	25	62.5
6 – 10	13	32.5
11 – 15	01	02.5
16 – 20	01	02.5
Working hour per week		
< 39	01	02.5
40 – 49	33	85.0
50 – 59	04	10.0
60 – 69	02	05.0

Table II reports the summary results of the Cronbach's alpha reliability analysis administered for each category in the research model. The minimum recommended value of Cronbach's alpha to satisfy reliability is 0.7 (Nunally, 1978). The reliability coefficient of the furniture and tools category was raised from 0.52 to 0.86 by deleting the "I have enough information about ergonomics" item. The reliability for building's general environment was raised from 0.62 to 0.76 by deleting three items related to healthy working environment, safety working environment, and building cleanliness. This instrument is said to be reliable as the Cronbach's alpha for all categories exceed 0.70. All of the items are included for the analyses.

TABLE 2: Reliability Analysis – Cronbach’s alpha

Category	Number of items	Cronbach’s alpha deleted)	Number of items (if item deleted)	Cronbach’s alpha if item
Indoor air quality	7	0.88	7	0.88
Lighting	3	0.39	2	0.78
Furniture and tools	3	0.52	2	0.86
Acoustics	4	0.85	4	0.85
Building’s general environment	6	0.62	3	0.76
Health complaints	15	0.93	15	0.93

Table III illustrates the mean and standard deviation of the respondents’ perceptions towards the workplace ergonomics. From the table, we can note that the respondents perceived negatively on the indoor air quality of the organization (except for the ‘too little air movement’ item), furniture and tools provided by the organizations, and acoustics. Most of the mean for these items are approaching 4.00 and there are two items score more than 4.00 by most of the respondents (study of noise level done and study of acceptable noise level done). This mean indicates that the organizations nearly never take any effort to investigate the acoustics level that suits their employees. The respondents however, perceived positively towards the building’s general environment category. Most of the means (except for building cleanliness item) are less than 3.00.

TABLE 3: Mean and Standard Deviation for Workplace Ergonomics

Category	Item	Mean	Std. Deviation
Indoor air quality	temperature too cold	3.7000	.72324
	temperature too warm	3.7000	.72324
	too little air movement	2.8500	1.14466
	air too dry	3.2750	1.01242
	unpleasant odour in air	3.3750	.95239
	air too stale	3.3500	.94868
	air too dusty	3.4750	.93336
Lighting	please with lighting system	2.6000	1.05733
	flexible lighting system	3.5500	1.01147
	benefit of daylight	2.7000	1.15913
Furniture and tools	suitable furniture/ tools	3.4500	.84580
	adjustable furniture/ tools	3.2000	1.04268
	enough ergonomics information	3.9250	1.09515
Acoustics	no in-noise problem	3.3000	1.34355

	no out-noise problem	3.5000	1.15470
	study of noise level done	4.1500	1.00128
	study acceptable noise level done	4.0750	1.04728
Building environment	healthy work environment	2.7250	.90547
	safe work environment	2.8500	.89299
	building effect on performance	2.9000	.90014
	building effect on image	2.9250	1.18511
	building support social activity	2.8500	.80224
	building cleanliness	3.0750	1.07148

Table IV reports the mean and standard deviation of the health complaints reported by the respondents. From the information in the table, the respondents felt that they either never or only one to three times facing the health complaints listed (all means of the health complaints' items are $1.7750 \leq x \leq 2.3500$).

TABLE 4: Mean and Standard Deviation of Health Complaints

Item	Mean	Std. Deviation
I feel irritated sore eyes	2.1000	.81019
I feel sore, irritated throat	2.1250	.75744
I feel hoarseness	1.9250	.76418
I feel stuffy, congested nose	2.1750	.81296
I feel excessive mental fatigue	2.1750	1.00989
I feel headache	2.0250	.69752
I feel unusual tiredness	2.1750	.74722
I feel pain on the back, backbone, neck, articulation and muscular	2.3500	.89299
I feel emotionally drained by my job	2.1250	.72280
I feel burnt-out by out	2.0250	.83166
I feel frustrated about my job.	1.8250	.95776
I lose my appetite because of my job-related problem	1.8000	.79097
Job-related problems keep me awake at night	1.9500	.93233
Job-related problems make my stomach upset	1.7750	.91952
Job-related problems make my heart faster beat faster than usual	1.9000	.87119

Table V summarizes the hypotheses testing results from the regression analyse and t-value and associated significance levels for each category. From the table we can note that only H5 and H6 support the research hypotheses while for the others, the decisions are fail to reject Ho. The R^2 for the building's general environment and workplace ergonomics are 0.136 and 0.306 respectively.

TABLE 5: Summary of hypotheses, F value, and significance levels

Hypotheses	F	Sig. F
H1. Indoor air quality – health complaints	1.36	0.25
H2. Lighting – health complaints	3.12	0.09
H3. Furniture and tools – health complaints	1.83	0.19
H4. Acoustics – health complaints	0.56	0.46
H5. Building’s general environment – health complaints	6.06*	0.02*
H6. Workplace ergonomics – health complaints	7.29*	0.01*

Notes: *Correlation is significant at the 0.05 (two-tailed).

Discussions And Conclusion

Ergonomics consideration in the organization is to ensure that the working situation is in harmony with the activities of the worker. Ergonomics is the systematic study of people at work with the objective of improving the work situation, the working conditions and the tasks performed. From the literature review, it shows that the implementation of ergonomics principles in organizations has proven to be highly beneficial. Ergonomically designed workplace simply refers to minimizing the amount of energy expended during the completion of any given task. In offices, ergonomics has relevance not just to furniture choice (chairs and desks), but also to communications within the workplace, team working, hot desk policies, layout, lighting, noise control and many other aspects of the working environment (Brooks, 1998). Based on the literature, most of the researchers agree that ergonomically designed workplace is the significant factors in explaining the employees’ physical and emotional health (Ayoub, 1990; Preiser, 1997; Tarcan *et al.*, 2004). Poor ergonomics design has significant economic implications for the organizations through employee job dissatisfaction, health symptoms and problems, absenteeism, poor work quality and lowered productivity (Dua, 1994; Yeow and Nath Sen, 2003). When the physical environment isn’t suited to the physical capacity of the person to perform required tasks, musculoskeletal disorders (MSDs) can result (Westgaard, 1999; Bohr, 2000; De Lange *et al.*, 2002; Martin *et al.*, 2003; Sluiter *et al.*, 2003). MSDs may directly or indirectly result in physiological and psychological reactions such as crowding stress (psychological state of inadequacy of space), occupationally induced fatigue, job satisfaction and increased levels of blood pressure.

Based on the literature review, workplace ergonomics design such as indoor air quality, lighting, furniture and tools, acoustics, and building’s general environment are among the important aspects in determining physical and emotional health. From the regression analysis on table V, it shows that only hypothesis 5 and 6 support the research hypothesis, whereas for the others, the decisions are fail to reject null hypothesis. From the results of hypothesis 5, we conclude that there is a significant relationship between building’s general environment of the organizations and the health complaints from the employees. This finding has been supported from the research done by Mearns *et. al* (2003) and Antoniou *et al.* (2003). They stated that building’s general environment like safety culture and general facilities may reduce personal

injury rate, improve physical and emotional health and construct worker loyalty. It proves that the important of building's general environment such as healthy and safe work environment, building image, building cleanliness and etc. towards employee health and it will lead to enhance productivity.

Hypothesis testing for the overall components of workplace ergonomics and health complaints (hypothesis 6) confirmed that there is significant relationship between the workplace ergonomics of the organizations and the health complaints from the employees. It shows that workplace ergonomics works as a combination of several components such as indoor air quality, lighting, furniture and tools, acoustics and building's general environment towards the employee physically and emotionally health. This is supported by the statements made by Preiser (1997), Yeow and Nath Sen (2003), and Tarcan, *et al.* (2004). They stated that ergonomically designed workplace is the significant factors in explaining the employees' physical and emotional health. It is proven that workplace environment and ergonomics consideration can be beneficial to employee health and increase productivity.

For the hypothesis 1, 2, 3 and 4, the regression analysis do not support the research hypothesis, therefore we can't say that there is a significant relationship between indoor air quality, lighting, furniture and tools, acoustics and health complaints from the employees. The result for hypothesis 1 shows the contrary from the statements made by Czubaj (2002), Shiao-Fen Ferng, (2002), Wilson (2001) and Martin (1999) and Griffitt (1970). They said that a good indoor air quality will improves worker productivity by maintaining a healthful work environment. The contradictory findings might be caused by the unawareness of Malaysian towards the importance of indoor air quality. This finding in hypotheses 1 might be different if we tested with the larger sample size and involved many kind of industries. Results for hypothesis 2 also do not support the statements made by Oldham and Rotchford (1983), and Sutton and Rafaeli (1987). They are agreeing that levels of lighting can have negative effects on employees' health and well-being. The contradictory findings might cause by the nature of employees task It is difficult to make specific statements about levels of lighting since their appropriateness depends heavily on the nature of a task (Sutton and Rafaeli, 1987).

The results for hypothesis 3 also disagree with the findings of Cuesdan *et al.* (1977), McDonald (1989), and Leather *et al.* (2003). Even though, the opposition is aligned with the findings by Miller (1974), Hedge (1982), and McDonald (1989). They believed that noise did not have any direct effect upon physical and emotional health. The efforts for decreasing the noise level are not necessary because of the high capability of human beings to adapt to difficult conditions. The regression analysis for hypothesis 4 as well is not supported by Tarcan *et. al* (2004). They have the same opinion that taking ergonomics consideration for the existing and new instruments will decreases the health problems.

The opposition results from the research hypothesis 1, 2, 3 and 4, might be caused by the unawareness of Malaysian towards the importance of ergonomically workplace designed. They just do whatever task given by the employers and as long as the task completed, they have assumed as high achievers and money compensate them. All of organizations should aware

that, office is an investment in the company, not just a place for employees to work. It is proven that workplace environment and ergonomics consideration can be beneficial to employee morale, satisfaction, and productivity (Tarcan, *et al.*, 2004; Marshall *et al.*, 2002; Fisk, 2000). Authenticity, it is important to create awareness about the important of ergonomics in Malaysian workforce. It will improve health and performance of workers and leads to higher organizational productivity. An essential component of all solutions is education and training. Ergonomic problems will continue in even the best designed jobs if employees do not know how to use the equipment properly, or if they do not have a basic knowledge of ergonomic principles.

This research finding is restricted by the Malaysian workplace environment, where the awareness of workplace ergonomics is still low. The findings might be different if we tested the hypotheses in different countries. The results also might be different if we increase the sample size and involve different industries. It will improve health and performance of workers and leads to higher organizational productivity. From the introduction and hypotheses development, it shows that ergonomically designing workplace can produce huge benefits. The payoffs come in terms of reduced costs for compensation and insurance, greater productivity and enhance employee morale. Even more important it can help employees avoid injuries that cause pain and improve the health outcomes. Those organizations which to have a competitive edge in today's challenging environment, with emphasis on quality and excellence, must embrace the application of ergonomics in their establishments. A proper ergonomics management will give valuable competitive advantage to organization such as cost reduction, quality improvement, performance augmentation based on healthy workers and productivity enhancement. These are the almost reasons why organizations should think to adopt ergonomics application in their businesses especially in the *Era of Free Trade*. This phenomenon will engender more competitive businesses in a global environments, which entail organizations to focus on quality and productivity. These aspiration can be achieved through human capital and it is important to make sure that the human resources in the organization are physically and emotionally fit.

This study will support a better evaluation of development policies of workplace ergonomics design by management. In the long term such action taken by management authorities to consider ergonomically workplace designed (air quality, lighting, furniture and tools, acoustics and building's general environment) would produce benefits for the institution in terms of improved physical and emotional health, increased job satisfaction, and improved morale of the employees. These kinds of benefits would be followed by increased productivity in terms of quality and quantity of work.

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