KNOWLEDGE OF ERGONOMICS AMONG TECHNICAL STAFF IN UNIVERSITY TECHNOLOGY OF MARA PENANG MALAYSIA

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ABSTRACT

Ergonomics is the scientific study of human work. Ergonomics knowledge helps in its right application and contributes significantly to the general wellbeing and safety of workers at the workplace. Even though ergonomics in Malaysia was introduced in 1992, but it is a relatively new concept and yet to be considered an essential component of most enterprises. The aim of this study is to evaluate the level of ergonomics knowledge among technical staff in University Technology of MARA, Penang (UiTMP) Malaysia. A questionnaire was developed and distributed to all technical staff of UiTMP and the responses were analyzed using SPSS version 15. The evaluation showed that the score of the average mean and standard deviation obtained are 3.16 and 0.96 respectively. The result shows that their level of ergonomic knowledge is moderate. The mean score obtained from the awareness of the effect if the ergonomics aspects are not practiced in the workplace is 4.37 which is a high level. It means that they don`t want to get injured and experience an unhealthy condition in the workplace. Regular ergonomic educations and practices in UiTMP are advocated to increase ergonomics knowledge and practice to a better level.

***KEYWORDS**: Ergonomic; UiTM Malaysia; awareness; productivity; knowledge*

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1.0 INTRODUCTION

The word ergonomics is derived from the Greek words `ergon` which means `work` and `nomos` which means `rules`, hence, the lateral definition of ergonomics is `the rules of work` (Macleod, 1994). The term Ergonomics is used in Europe and other countries in the worlds and the phrase Human Factors or Human Engineering is more commonly used in America. Ergonomics is the field of study aims to find the design of tools and tasks that can be compatible with human capabilities and limitations. Ergonomic is, therefore, fitting the task to the person either in the workplace or with a consumer product and provides opportunities for business by reducing costs, improving human well-being, quality and productivity (Macleod, 1994).

The main purpose of ergonomics is to design (Helander, 2006). In designing a workstation or workplace, the existing condition must first be analyzed, new design solutions must be synthesized, and these design solutions must be analyzed again until it reaches the level of satisfaction. Obtaining an effective match between the workstation and users to improve working efficiency, safety, health, comfort and ease of use are the objectives of ergonomics. The main effort of ergonomics is to reduce the risk of injury to the workers as well as to improve the productivity which will benefit the organization (Ismaila, 2010).

International Labour Organization (ILO, 1996) defined ergonomics as the study of work in relation to the environment in which it is performed (workplace) and those who perform it (workers) and is used to determine how the workplace can be designed or adapted to the worker in order to prevent a variety of health problems, reduce injury and increase efficiency. In other words, its goal is to make the job fits the worker, instead of forcing the worker to conform to the job. Ergonomics is also a systems-oriented discipline that extends across all aspects of human activities either at work or at home. Ergonomic practices are not solely for occupational safety and health purposes, but it can help strengthen business strategies to maintain a competitive advantage with other companies (Dul & Newmann, 2009).

The International Ergonomics Association (IEA) define the ergonomics or human factors as the design and evaluation of the products, tasks, jobs, environments and system in order to make them as the scientific discipline

concerned with the understanding of interactions among humans and other elements of a system and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance (IEA, 2017). Ergonomists contribute to the compatibility between the needs, abilities, and limitations of people.

Although the ergonomics term has been in existence since 1940, it is relatively new to the Malaysians, and other developing countries and most of them are unaware of ergonomics contributions to national well-being and economic development (Shahnavaz, 1996). Ergonomics in Malaysia has been introduced over a decade ago with the establishment of the ergonomics division at the National Institute of Occupational Safety and Health Malaysia (NIOSH) on 1st December 1992.

In Malaysia, ergonomics awareness is still at an early stage due to the limited knowledge of ergonomics (Sen, 1998). Ergonomic in Malaysia is in the infant stage and developing at a relatively slow pace in the field of research, education and community practice (Loo, Richardson & Alam, 2012). Therefore, it should be promoted and disseminated to various industries so that the employers and employees become aware of the design concepts of ergonomic workplace and workstation. The level of ergonomics awareness among companies and employers in Malaysia is low and they have not taken the ergonomic issues seriously, therefore NIOSH will continue to strive to provide awareness and understanding among the employers and companies on what ergonomic means as well as its benefits (Lee, 2015).

On average, most working individuals spend more than 8 hours a day in a work environment that can affect thoughts, emotions, and actions. Various types of daily activities are conducted by University Technology of MARA, Penang (UiTMP) technical staff in laboratories, workshops, and kitchens while undergoing practical work by students, assisting students' and lecturers' projects. The examples of these activities are; lifting and moving workpieces whether solid or liquid; sitting and standing facing computers, machines, and various equipment; bending and squatting while doing work and packing laboratories, workshops and kitchens.

The knowledge and practices appear lacking in the account for the discomfort and health hazards plaguing the technical staff personnel. Therefore, the main purpose of this study was to find out the ergonomic knowledge and awareness level of the technical staff of UiTMP and the importance of ergonomics practices at work. The results of this study can be used to carry out further studies on the health issues contributed by ergonomic factors and to determine the steps that must be taken by the management of UiTMP to ensure that all workers enjoy a better working environment. The indicator of the level of awareness of ergonomic can be known or measured from the knowledge of the workers and the display of their behaviour during work activities (Musonda & Smallwood, 2008).

An organization should provide designs and work environment as well as a workstation to meet the good level of safety and health and be able to increase the employees' level of satisfaction and comfort. The implementation of ergonomic principles can provide a security in terms of health, comfort, effectiveness, quality, and the well-being of the employees. The management should provide the knowledge, skills, and information related to ergonomics activities. Their supervision is very important to ensure that the daily work is done correctly, safely and comfortably.

It is frequently heard that the word ergonomic is from the manufacturing sector that involves the use of machines or equipment to produce a product but rarely do we hear about it from other sectors such as farming and services. The implementation of the ergonomic aspect is vast and not limited to, work activities in the industry and office, but also at home and other activities such as recreation, exercise, and entertainment (MacLeod, 1998). All such daily human activities will either with or without the use of equipment.

Failure to educate and provide the proper ergonomic equipment, space and work schedule can result in injury which can lead to the loss of work or job and causes permanent disability. Injuries can be caused by working too long at a task without a break or not knowing the proper way to sit at a workstation and other activities. Pains or injuries to wrists, arms, shoulders, feet, knees, ankle, fingers, upper and lower back, and eyes can result in unhealthy condition for the workers as well as a decrease in productivity.

2.0 METHODOLOGY

The study was performed on 60 technical staff who work in the laboratories, workshops, and kitchens at Faculty of Mechanical Engineering, Civil Engineering, Chemical Engineering, Electrical Engineering, Hotel Management, and Tourism and Department of Applied Science, Permatang Pauh campus of UiTM Penang. The staff is selected as respondents in this study because they are directly involved with many activities or actions that require making ergonomic knowledge and implementation at work a priority.

The data collection process involves the use of a questionnaire distributed by the researcher to the respondents to be completed. The questionnaire consists of two parts which are Part A, used to get the background information of the respondents such as age, gender, and faculty or department. Part B which highlights the respondent's knowledge and awareness of ergonomics are divided into 4 sections, namely knowledge, benefits, consequences, and steps related to ergonomic issues at work. In this study, the Likert scale used is from 1 to 5 with 1 being strongly disagree and 5 being strongly agree. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 15.0 and presented in descriptive statistics such as percentage, frequency and mean. This method is used to understand the level of knowledge and awareness of the workers.

The purpose of the pilot study was to test the validity and reliability of question items selected in the questionnaire before the actual survey was conducted. In addition, it can identify problems that may arise during the questionnaire. The reliability of the measurements was measured using Cronbach`s Alpha values, also known as coefficient alpha (α). This pilot study was conducted on 10 actual respondents from the Faculty of Mechanical, Civil and Chemical Engineering. As a result, the value of the alpha coefficient obtained is 0.9 which shows that questionnaires have high reliability and the variables in this study can be measured well. If the value of the alpha coefficient is less than 0.6, i.e. low-value reliability, it is necessary to improve the items in the research instrument to increase the value of the coefficient (Zaidatun & Mohd, 2003).

3.0 RESULTS AND DISCUSSIONS

Table 1 shows the personal characteristics according to gender, age and years of service for 60 respondents involved in the study. According to descriptive statistics, it was found that 66.7% (40 people) of the respondents is male and 33.3% (20 people) is female. The percentage of males is higher than female due to the field of works which are sciences and engineering, which made up the total of 76.7% (46 people).

Table 1 Personal characteristics

No	Characteristics	No of respondents	Percentage (%)
1	Gender		
	Male	40	66.7
	Female	20	33.3
2	Age (years)		
	20 – 30	5	8.3
	31 – 40	51	85.0
	More than 40	4	6.7
3	Years of service (years)		
	Less than 3	3	5.0
	4 – 8	12	20.0
	9 -14	39	65.0
	15 – 20	5	8.3
	More than 20	1	1.7
4	Field of works		
	Engineering	46	76.7
	Non-engineering	14	23.3

Most of the respondents aged between 31 - 40 years (85% @ 51 people) and 75% (45 people) have been with UiTM for more than 10 years showing that they are mature and have had a lot of experience in their respective jobs. UiTMP has been operating for 22 years since 1996 and 15 years at Permatang Pauh campus.

Table 2 shows the distribution of the responses based on their knowledge of ergonomics. It was found that the score of the average mean and standard deviation obtained are 3.16 and 0.96 respectively. The result shows that their

level of ergonomic knowledge is moderate. Item 1 recorded the highest mean score of 3.58 which showed high while moderate in item 5, having the lowest mean score of 2.80.

Respondents who have seen and heard of the ergonomic term in various media are 58.4% and more than 56% who have read an issue related to ergonomics. However, only 30% have attended ergonomics discussions and more than 55% of the respondents know and understand the ergonomics of which 25% of them acquire the reading and listening from the media. One of the reasons why their level of ergonomic knowledge is moderate is that the employers are less likely to play a role in explaining ergonomics because not more than 28.3% have seen the ergonomic word on the notice board in the UiTMP. Those who know about ergonomics are the result of their own initiative whose information obtained is in their laboratories, workshops, and kitchens.

The number of respondents who are neutral in answering the questions is slightly larger with an average of 31.4%. It illustrates that some of them are less concerned about what happens to themselves as well as in their working environment. Such attitudes can be detrimental to organizations or employers because their productivity will be difficult to improve apart from affecting their safety and contributing to their health problems.

Table 2 Ergonomics knowledge (percentage)

Statement	1	2	3	4	5	Mean	Standard deviation
I have seen and heard the word ergonomics on billboards, TV, radio, magazines & newspaper.	3.3	5.0	33.3	46.7	11.7	3.58	0.89
I have read an issue related to ergonomics.	10.0	11.6	20.0	56.7	1.7	3.28	1.04
I know and understand the meaning of ergonomics.	5.0	13.3	23.3	55.0	3.4	3.38	0.94
My friend has told/informed me about ergonomics.	3.3	25.0	40.0	30.0	1.7	3.02	0.87
I have attended a discussion on ergonomics.	10.0	30.0	30.0	30.0	0.0	2.80	0.99
I've seen the word ergonomics on poster/notice board in UiTMP.	15.0	15.0	41.7	25.0	3.3	2.87	1.06
Average			31.4			3.16	0.96

The level of ergonomics knowledge either high or low occurred not only among support staff at UiTMP but also elsewhere in either government or non-government sectors within Malaysia or in developing countries abroad. Azhar (2009) found that Sultanah Bahiyah's library staff had high ergonomic awareness with respect to the working environment and equipment layout with an average mean of 4.77. A study conducted in Malaysia showed that 35.6% of manufacturing industries have a high level of ergonomics awareness, while 51.1% with moderate levels (Shaliza, Shahrul, Zalinda & Mohzani, 2009). Ismaila (2010), who studied ergonomic awareness in Nigeria, found that the level is very low which is only 34% of the respondents are aware of the need to practice ergonomics in the workplace in the sector of transport, manufacturing, education, medicine, construction, banking, communication, and broadcasting service.

According to the study by Rakhshaan, Ambreen, Rehana, and Umar (2012), 52% of the computer users in Pakistan heard about ergonomics, while 92% were aware of its importance. Most of the information technology professionals in India had limited ergonomics knowledge and were unaware of the need for ergonomic practice at work (Sirajudeen, Pillai, & Vali, 2013). The level of knowledge and awareness of ergonomic practice among medical students and physiotherapists in Pakistan was very low where only 28.67% have heard ergonomic words (Muhammad, Kashmala, Sumaira & Sana, 2013). Deros, Daruis, and Basir (2015) studied the construction workers in Malaysia while conducting manual handling activities and found that they had moderate ergonomics awareness level with an average mean score of 2.97. A study conducted by Sholihah, Hanafi, Bachri, and Fauzia (2016) found that 52.5% of the fishermen in Indonesia have a moderate level knowledge of ergonomics.

Table 3 The effects of not practicing ergonomics (percentage)

Statement	1	2	3	4	5	Mean	Standard deviation
Inappropriate way of lifting up items can result in back pain.	0.0	1.7	3.3	43.3	51.7	4.45	0.65
Incorrect way of sitting can lead to back pain.	0.0	1.7	3.3	45.0	50.0	4.43	0.65
Discomfort body position between the chairs and desks while performing work can result in fatigue and lethargy.	0.0	1.7	3.3	55.0	40.0	4.33	0.63
Incorrect eyes position while looking/facing the computer can result in fatigue, sore neck, and headache.	0.0	0.0	6.7	50.0	43.3	4.37	0.62
Uncomfortable tables and chairs at the workstation can result in a decrease in productivity, efficiency, and quality of work.	0.0	0.0	6.7	55.0	38.3	4.32	0.60
Lighting less or too light on the workstation can result in fatigue and pain in the eyes.	0.0	0.0	5.0	53.3	41.7	4.37	0.58
Loud working environment and the poor air conditioning system can reduce concentration and productivity.	0.0	0.0	5.0	55.0	40.0	4.35	0.58
Average						4.37	0.62

Analysis of the effects of not practicing ergonomics in the workplace was rated based on items as shown in Table 3 with the mean result 4.37 and a standard deviation of 0.62. The results showed that the studied group has a high level of awareness of the effects of not practicing the ergonomics in the workplace. It means that they don`t want to get injured and bad health in the workplace. With this result, 95% of the respondents agreed due to the incorrect way of sitting and lifting up items can result in back pain. It was observed that more than 93% were aware of the fatigue while doing work at the workstation because of discomfort body position between chairs and desks and incorrect position between the eyes and computers, similarly if the lighting in the workplace is

either too strong or insufficient. The majority of the respondents (95%) agreed that the uncomfortable tables and chairs, noisy and poor air conditioning system can reduce the productivity and quality of their work.

The knowledge and practice of good body posture in the workstation are important to provide a comfortable body position as well as increase the efficiency and productivity. According to the study by Rakhshaan et al. (2012), more than 50% of the computer users in Pakistan knew the importance of the height of the chair to keep them in a comfortable position. These effects are also shown in the result of this study and also by Muhammad et al. (2013) in which 82% of the respondents agreed that good body posture and ergonomic equipment (65.33%) can increase the productivity. A study conducted by Zakerian, Monazzam, Dehghan, Mohraz, Safari, and Asghari (2013) in Iran found that the nurse's awareness of ergonomic principles was moderate and the level of their knowledge about working conditions is low while work-related injuries are weak.

Deros et al. (2015) studied that the construction workers in Malaysia while conducting manual handling activities have a moderate level of ergonomics application at a workstation with a mean score of 2.81. Oladeinde, Ekejindu, Omoregie, and Aguh (2015) found that the ergonomics knowledge and awareness among the medical laboratory scientists in Nigeria are poor where only 25.5% of the respondents have heard the terms of ergonomic. Furthermore, the knowledge of risk factors for the development of musculoskeletal disorders(MSD) was reported by only 29.6% person who claimed to be aware of ergonomics.

If the workers don`t know or refused to follow and practice the ergonomics principles, the potential for ill health at work, such as aches, stresses, pains and damage to the wrists, shoulders, and back, noise-induced hearing loss and work-related asthma can`t be reduced. According to Dockrell, Bennett, and Culleton (2015), 52.8% of the health science undergraduate university students in Ireland found that the most frequently reported sites of pain and discomfort caused by computer use were their neck and upper back. The study to the auditors in Nigeria showed that the more the level of stress reduced through ergonomics inputs and design, the higher the performance among the employees (Omoneye, 2016).

It is hard to be productive when the body is experiencing discomfort. Anything that makes the employees uncomfortable including chairs, desks, workstation, lighting, temperature and noise levels can affect productivity. The study on the employees in the banking sector in Pakistan by Hameed and Amjad (2009) found that a comfortable and ergonomic office design motivates employees and substantially increases their performance. A study conducted by Manjunatha and Mohan Ram (2016), for an individual workplace intervention of workplace evaluation among workers in the factory in India, found that the productivity was increased by reducing shoulder and wrist injury and fatigue.

4.0 CONCLUSION

Ergonomics is a science concerned with the fit between people and their work. It puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that equipment, information, task, workstation, and the environment fit each worker. This study highlighted the knowledge of ergonomic among technical staff in University Technology of Mara, Penang and the survey results showed that they possess a moderate knowledge level of ergonomics. This can be seen by the mean score which shows a moderate level at 3.16. Mean score obtained from the awareness of the effect if not practicing the ergonomics in the workplace is 4.37 which is high level. Hence the management should take full responsibility to increase the worker's ergonomics knowledge to a higher level as well as in providing the ergonomics workstation and workplace. One of the intensified efforts of the organization is to organize the ergonomics education and training program for the workers. This is important to ensure the workers are able to maximize the practice of ergonomics in the daily activities.

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