A STUDY ON THE RELATIONSHIP BETWEEN OFFICE ERGONOMIC PRACTICES AND JOB PERFORMANCE AMONG POST-SERVICE DIVISION'S EMPLOYEE IN PUBLIC SERVICE DEPARTMENT

By

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Abstract

This research paper presents the potential factors related to ergonomics system and practices in the workplace that could influence employee's job performance. The paper also focuses on physical, psychological, and functional affects to the office ergonomics of the employee in Public Service Department (PSD). As companies struggle to meet the financial demands of today's market, they tend to lose sight of the potential for productivity and performance when faced with the initial and operational costs of the facility in which they work. Instead of trying to bring in an overabundance of employees to compensate for the lack of quality and production, employers should consider what can be done to unveil the potential of the current employees and increase their productivity. There are many factors that affect the productivity of people within their work environment.

Ergonomics system and practices plays a significant role on the productivity levels of the employees that work in PSD. It could be done by ensuring the employees have proper workstations to meet their needs, comfortable and healthy work conditions, and spaces that they enjoy to work in aids in their work performance. The building typology as well as the unique programmatic demands would challenge any designer to create a space that increases productivity for the workers and inspires their minds to create for themselves.

This research had used various analysis to determine influence between independent variables and dependent variables such as correlation analysis, multiple regression

analysis and coefficient of determination. From the analysis, all the independent variables influenced the dependent variable.

Keyword: public service department, ergonomic, job performance, ergonomic system, ergonomic practices

Abstrak

Kertas penyelidikan ini membentangkan tentang faktor potensi yang berkaitan dengan sistem dan amalan ergonomik di tempat kerja yang boleh mempengaruhi prestasi seseorang pekerja. Penyelidikan ini juga memberi tumpuan kepada fizikal, psikologi, dan fungsi yang memberi kesan kepada ergonomik pekerja pejabat di Jabatan Perkhidmatan Awam (JPA). Sebagai syarikat yang menempuh cabaran untuk memenuhi permintaan kewangan pasaran hari ini, ia cenderung untuk mengenepikan potensi bagi produktiviti dan prestasi apabila berhadapan dengan kos permulaan dan kemudahan operasi di tempat mereka bekerja. Daripada mencuba untuk membawa lebihan pekerja bagi mengimbangi hal kekurangan kualiti dan pengeluaran, majikan perlu mengambil kira apa yang boleh dilakukan untuk memperbaiki potensi pekerja yang sedia ada dan meningkatkan produktiviti mereka. Terdapat banyak faktor yang mempengaruhi produktiviti seseorang di dalam persekitaran kerja mereka.

Sistem dan amalan ergonomik memainkan peranan yang besar ke atas tahap produktiviti pekerja yang bekerja di JPA. Ia boleh dilakukan dengan memastikan pekerja mempunyai ruang kerja yang sesuai untuk memenuhi keperluan mereka, keadaan kerja yang selesa dan sihat, dan juga ruang yang mereka gemari untuk bekerja dalam membantu menaikan prestasi kerja mereka. Bentuk bangunan serta permintaan pengubahsuaian yang unik akan mencabar pereka bangunan untuk mewujudkan ruang yang mampu meningkatkan produktiviti pekerja dan memberi inspirasi kepada minda mereka untuk mencipta yang terbaik bagi diri mereka sendiri.

Kajian ini telah menggunakan pelbagai analisis untuk menentukan pengaruh antara pembolehubah bebas dan pembolehubah bersandar seperti analisis korelasi, analisis regresi berganda dan pekali penentuan. Daripada analisis, semua pembolehubah bebas mempengaruhi pembolehubah bersandar.

Kata - kunci: jabatan perkhidmatan awam, ergonomik, prestasi kerja, sistem ergonomik, amalan ergonomik.

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LIST OF ABBREVIATIONS

Abbreviations	The name
AAOHN	American Association of Occupational Health Nurses
CHSWC	California Commission on Health and Safety and Workers' Compensation
DGPS	Director-General of Public Service
HFE	Human Factors and Ergonomics
IAQ	Indoor Air Quality
JPA	Jabatan Perkhidmatan Awam
NIOSH	National Institute of Occupational Safety and Health
NRC	National Research Council
OSHA	Occupational Safety and Health Administration
PERKIM	Pertubuhan Kebajikan Islam Malaysia
PKNS	Perbadanan Kemajuan Negeri Selangor
PSD	Public Service Department
SPSS	Statistical Package for Social Science
IV	Independent Variables
DV	Dependent Variables
JP	Job Performance
ES	Existing Ergonomic System
WD	Workplace Design
EQ	Office Equipment
AW	Awareness on Office Ergonomics

CHAPTER 1

INTRODUCTION

1.0 Background of Study

In addition to lowering the costs of goods and services, companies are now taking a closer look at lowering overhead costs. In addition to downsizing, methods include risk management practices that promote organizational profitability by protecting organizational assets. Options embrace a partnership with the employee, who is often regarded as the company's most essential asset. Accordingly, employers are examining opportunities to reduce costs by reviewing areas that affect the productivity of their employees (Ergonomics Society, 2006). Two areas that relate to the productivity and well-being of employees and have major economic implications are experienced organizational job performance and ergonomics. Job performance and ergonomics both affect employee productivity through employee well-being. Organizational stress increases the costs of illness, accelerates lost time at work and lowers productivity. Conversely, there was evidence that ergonomics can reduce medical costs, lower absenteeism, and improve worker satisfaction and productivity. This study extends the work on ergonomics and employee job performance by examining the conceptual and empirical linkages between aspects of ergonomics and employee job performance (De Fabio, 2005).

Loisel et al. (2000) indicated that loss in job performance occurs when an environmental situation is perceived by an individual as presenting a demand that threatens to exceed the individual's capabilities and resources for meeting that demand. The Occupational Safety and Health Administration (2000) defines ergonomics as adapting jobs and workplaces to the worker by designing tasks, workstations, tools and equipment that are within the worker's physical capabilities

and limitations. Prior management research on job performance has concentrated on the consequences of stressful situations and has neglected the antecedents to perceived stress. Moreover, research on job performance has focused on how the implementation of ergonomic programs improves physical conditions and lower costs. Lower costs are of particular interest to risk management professionals especially in the realm of workers' compensation (Christopher, 2002). Management research has yet to link these two streams of research. This study will examine the impact that the physical work environment has on employee's job performance in the workplace. More specifically, "What is the role of ergonomics in relation to employee performance at workplace?" It is proposed that the implementation of ergonomic programs and training can enhance working performance. Thereby, allowing organizations to improve morale and productivity, while reducing costs (e.g. medical, workers' compensation, absenteeism) through the risk management control practice of minimizing loss frequency and severity (Rosenmann et al., 2000).

1.0.1 Company Information

Public Service Department (PSD) was located in Parcel C, Putrajaya. Figure 1.1 is organizational chart of PSD. Its history started when it was established from the year 1934. It starts from 22nd August 1934, when Malayan Establishment Office was organized in Singapore and later moved to Kuala Lumpur following the formation of the Malayan Union. In 1st July 1954, Federal Establishment Office was established through the merger of the Malaya Establishment Office, Service Branch of the Chief Secretary's Office and the Establishment Division, Federal Treasury. In 1967, the organization changes its name to Establishment Office of Malaysia.

After the formation of Malaysia, the Establishment Office of Malaysia changes its name to Public Service Department (PSD). When the administration shifted to Malaya in 1954, the office was relocated to Kuala Lumpur at the Federal House, Jalan Sultan Hishamuddin. The increase in functions and size required the PSD to move to a new location at the UMBC Building, Jalan Sulaiman and then to Sulaiman Building, Jalan Damansara and later on to Wisma Bernama, Jalan Tun Razak. At the same time, several divisions providing counter services were placed at Consultancy and Record Division at Wisma PKNS, Jalan Raja Laut; Pensions Division at KWSG Building, Jalan Kampong Attap and the Training and Career Development Division at PERKIM Building, Jalan Raja Laut. Only in 1993, where all of the divisions successfully placed under one roof when the PSD moved to their own building at the PSD Complex, JalanTun Ismail, Kuala Lumpur. To improve service delivery to customers in East Malaysia, branches of the Pension Division were established in Kota Kinabalu, Sabah and Kuching, Sarawak. In 2001, the PSD moved to Complex C at the Federal Government Administrative Centre in Putrajaya, following the Government's decision to centralize all federal government offices in one location. The Competency Management Branch was located at Sapura Building at Mines, Seri Kembangan. Following the reorganization of the PSD in 2009, three divisions were moved to the MKN-Embassy Techzone Building, Cyberjaya.

The divisions are the Information Management Division, the Psychological Management Division and the Remuneration Division. Throughout its 75 year history of contributing to the national's development, 19 leading figures have been at the helm of the Public Service Department. Since 1934, many titles have been used to signify their positions such as Malayan Establishment Officer (1934), Federation Establishment Officer (1 July 1954), Federal Establishment Officer (1959), Principal

Establishment Officer (1 July 1967), Malayan Establishment Director (1968), Malaysian Establishment Director (1968) and Director-General of Public Service (15 August 1968 until today).

Apart from the Director-General of Public Service (DGPS) who serves as the pillar and leader of the Public Service Department, the second most important position and one that helps to ensure the vision and mission of the DGPS are translated into actions is the Deputy Director-General of Public Service or Deputy DGPS. Based on records, the posts of Deputy DGPS were established from as early as the establishment of the Malayan Establishment Office in 1934. At the time, the title was Deputy Malayan Establishment Officer. In 1954, the title was changed to Deputy Federation Establishment Officer, Federal Establishment Officer (1959) and Deputy Principal Establishment Officer (1967). The title was again changed to Deputy Director-General of Public Service in 1968. The four earliest Divisions that were established in the Public Service Department were Establishment Division, Service Division, and Training Hall for Government Officers and General Administration Division.

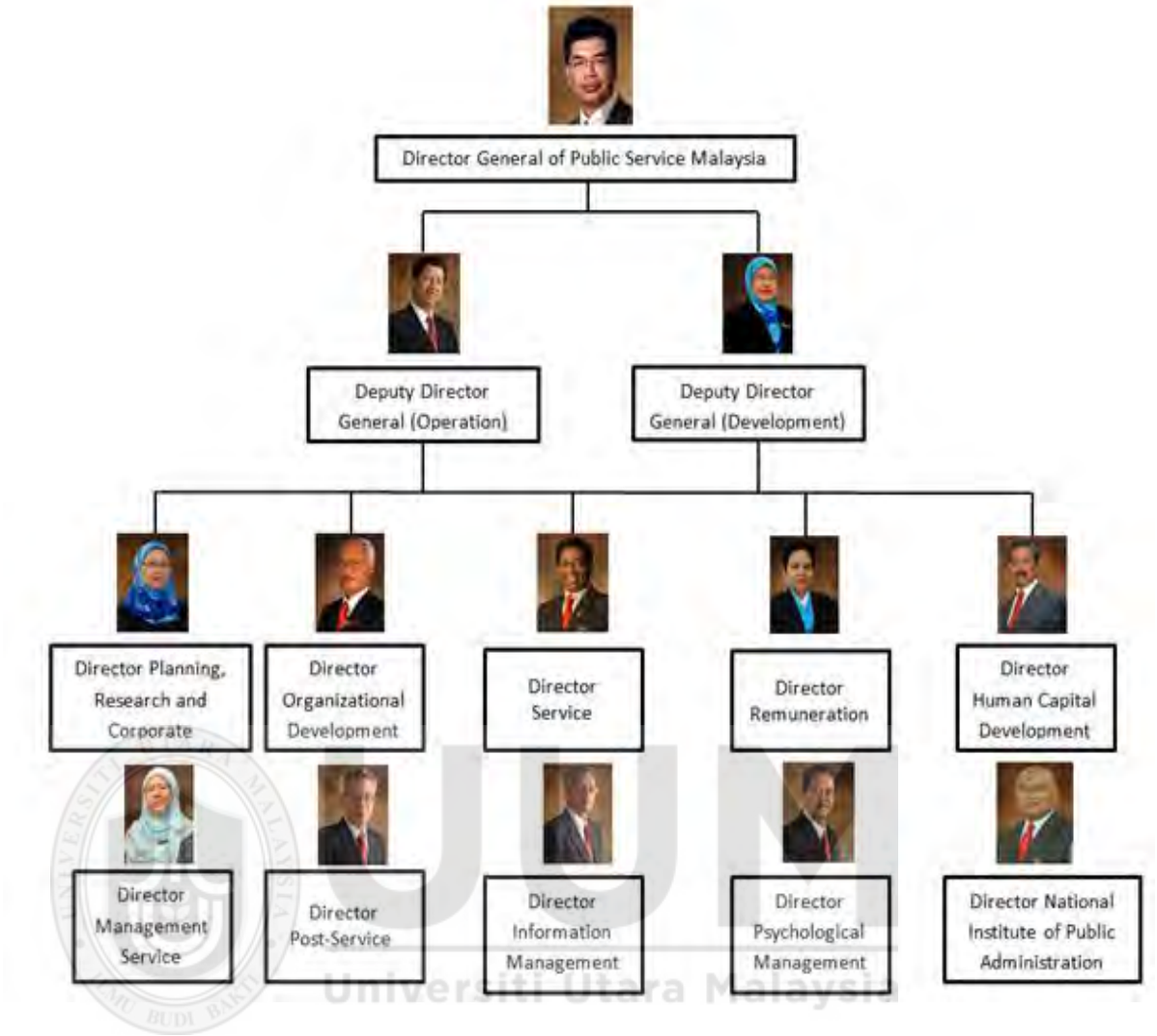

Figure 1.1
Organizational chart of Public Service Department (PSD)
Source: www.jpa.gov.my, 2012

1.1 Problem Statement

The Occupational Safety and Health Act (OSHA 1994) were obviously planned to protect the health and safety of employees. Other than that, OSHA 1994 also encourages employers and employees to reduce workplace hazards and implement new or improve existing safety and health programs. (Bohlander & Snell, 2004). Employers and workers have chances impose to ergonomic hazards. Inappropriate workplace design, awkward body mechanics or postures, repetitive movements, and other ergonomic hazards contribute to a staggering number of cumulative trauma

disorders (American Association of Occupational Health Nurses [AAOHN], 1994). According to McKeown (2008), ergonomics' point of view has been changed from simply as an academic subject into a dependent tool in generating safe, comfortable and productive working environments. Organizations that can create a good surrounding and make their employees happy will produce more good effect to the performance of the employees (Al-Ahmadi, 2009). Regarding to that, productivity and performance is a degree of the output of goods or services related to the participation of labour, capital and equipment. The more productive of an industry, the better its competitive position because its unit costs are lowers (Paul & Ochsman, 1988). When productivity increases, businesses can pay higher wages without boosting inflation.

According to Omar (2011), workplace ergonomics has become crucial for every organization. Workplace ergonomics is said to have a close relationship with employee's job performance and productivity. From a research by Salina Ibrahim in 2010 which titled relationship between office ergonomics and job performance, level awareness of office ergonomics practices is the strongest contribution to explaining the job performance variable. It was followed by factors that contribute to the existing of ergonomics program. Yeow and Sen (2002) found out that there are few promoters in ergonomics in Malaysia, thus it is crucial to conduct more study regarding ergonomics especially in the context of relationship between office ergonomics practices and job performance among the employees of government sector.

Bernama (2006) stated that every year, estimated 10,000 employees in Malaysia that has routine job working with computer experienced upper body injuries. Hence,

Institute of Occupational Safety and Health (NIOSH) had suggest to promote ergonomic in every workplace. Latest statistic in 2007 from Social Security Organization (SOCSO) shown that total of cases involving upper body injuries especially fingers and hands, had almost reached to 10,000 cases every year and while cases related to back injuries almost reached to 2,000 cases. Other than that, research by NIOSH shown that 61.4 percent among employees that using computer at workplace experienced lower back, shoulder and neck injury while 70.6 percent among them complaining got fatigue eyes (Amirul et al., 2015). In 2004, SOCSO already spent more than RM722.4 million for compensation. However, the figures can be reduced if proactive measures taken to increase safety awareness in workplace.

1.2 Research Questions

Based on the problem statement described, this study attempts to answer the following questions:

1. Does existing of ergonomics system influence job performance?
2. Does ergonomic practices on workplace design influence job performance?
3. Does ergonomic practices on office equipment influence job performance?
4. Does awareness on office ergonomics practices influence job performance?

1.3 Research Objectives

Based on the research questions above, the following research objectives are derived.

1.3.1 General Objective

The general objective of this study is to determine whether existing of ergonomic system, ergonomic practices on workplace design, ergonomic practices on office equipment and awareness on office ergonomics practices give most significant relationship to job performance.

1.3.2 Specific Objective

The specific objective is to determine whether there is any influence between independent variables collectively with dependent variables as defined below:-

i. To examine whether existing of ergonomics system will affect job performance of the Post-Service Department's employees from Public Service Department (PSD).

ii. To examine whether ergonomic practices on workplace design will affect job performance of the employees.

iii. To examine whether ergonomic practices on office equipment will affect job performance of the employees.

iv. To examine whether awareness on office ergonomics practices will affect job performance of the employees.

1.4 Scope of Study

Employees of Post-Service Department from Public Service Department (PSD) were chosen as respondent for this research. The respondents consist of two groups which are professional and support group. From the respondents, researcher would like to study job performance level of the employees whom spend a lot of time in front of their computer and their workstation. There was researched by NIOSH shown that

61.4 percent employees that using computer at workplace experienced shoulder, lower back and neck injury (Bernama, 2010).

The implications of this research focus on how ergonomics can increase experienced organizational performance for employees. The contribution encompasses theoretical, methodological, and practical managerial aspects. First, theoretically, it has been noted that perceived job performance is an individual phenomenon and most suitable to subjective measures. This research examines perceived job performance, and also provides evidence that objective performance issues are indeed critical to the examination of productivity due to human-machine systems has tied to many office and industrial workers. Cumulative health problems could be created by repetitive of work such as the often reported visual strains, mental stress and physical injury (Kroemer & Grandjean, 2007). Most ergonomic measures have been designed to identify the need for ergonomic intervention. Methodologically, this study attempts to establish ergonomic measures that are applicable to management research. The practical implications of the research provide information to management on how ergonomics can increase job performance and productivity: thereby, identifying preventative techniques that ultimately lower medical expenditures, workers' compensation costs and absenteeism, in addition to improving worker job satisfaction and sustainability.

1.5 Summary and Organization of the Thesis

In this study, survey design was used to determine if the existing of ergonomic system, ergonomic practices on workplace design, ergonomic practices on office equipment and awareness of office ergonomics practices will influence job performance of PSD employees.

In chapter 1, the discussion is on the overall concept of the study's framework. In chapter 2, the discussion is on the literature related to this research and support the need for the study.

Focus on research methodology is in chapter 3 while the analyses of the results and the recommendations of findings are presented in chapters 4 and 5 respectively.

CHAPTER 2

LITERARTURE REVIEW

2.0 Introduction

The purpose of the review of literature is to examine and evaluate literature which is relevant to the ergonomic practices and office equipment and correlation with the job performance among the workers. The literature review is categorized into the following items which are ergonomics, awareness on office ergonomic practices, existing ergonomic system, ergonomic practices on office equipment, Ergonomic practices on work place design and job performance.

2.1 Ergonomics

2.1.1 Definition of Ergonomics

Ergonomic is widely known as the study of work. The term of ergonomic is coming from the Greek words which are *ergo* (work) and *nomos* (laws). Based on its term, it shows that ergonomic is about the study of work in relation to the physiological and psychological capabilities and limitations of people. Ergonomics is the applied science of designing and constructing devices or instruments that people need so that they can use these materials with high level of efficiency and safety (Urlings et al., 2000). Hence, the objective of ergonomics is to fit the task to the worker, rather than force the person to adapt to the work environment.

Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the employees. Common examples of ergonomic risk factors are found in jobs that require repetitive motions, heavy lifting, awkward postures of the wrists, hands, back, neck, and shoulders. Vibrations, impact stress, and cold temperatures may add to the risk of ergonomic related injury. Overall, there is a lack

of information as it pertains to ergonomic related injury within the industry (Morse et al., 2008).

2.1.2 History of Work in Ergonomics (Pre-World War)

The primary focus of the field of ergonomics is to reduce injuries, accidents and fatigue in order to improve work conditions and performance. This goal can theoretically be accomplished by designing machines, equipment and installations that can be operated safely, accurately and efficiently by people and providing general guidelines for the worker environment interaction. Additionally, the proportions and conditions of the actual workstation need to be carefully selected to ensure correct body posture. The environmental conditions, such as lighting, noise and temperature, have to suit the physical requirements of people (Rankin & Stallings, 2006).

The field of Human Factors and Ergonomics (HFE) as practiced today traces its roots back only to the American Industrial Revolution of the late 1800's and early 1900's. Its continuing evolution is inextricably bound with the technological evolution. Despite these origins, the foundations for the transformation of HFE into a recognized division of science are primarily due to the lasting influences of research performed during World War I (WWI) and World War II (WWII) (Schurman et al., 2004).

The term ergonomics was coined in 1857 by Wojciech Jastrzebowski to mean the "laws of work," but researchers in the field of Ergonomics or Human Factor Engineering (HFE) trace the origins of the field back to the time when early humans first began to fashion simple tools and utensils. A doctor, Bemardion Ramazinni, was

documenting work-related complaints as far back as 1713. Ergonomics, as a science, was conceived to apply the knowledge culled from life sciences to work performance. It bases itself on diverse theories such as physiology, anthropometry and engineering. While the terms HFE and ergonomics are often used interchangeably, HFE tends to narrow its focus to just the human-machine interaction, while ergonomics focuses on the interaction of people with their work by examining the variables associated with being human and the factors related to work requirements (Schurman et al., 2004).

Prior to WWII there was little to no interest in designing machines to fit humans. Rather trial and error methods were utilized to try and fit the human to the already designed machine. This resulted in a rather Darwinian selection process of survival of the fittest. A small but significant change in concern for the human in the human-machine equation was noted during the American Civil War but did not result in any noticeable changes. Machine domination in the human-machine equation lasted many years (Rankin & Stallings, 2006).

During the late 1900's a new view of the human's role in machine operation came to the forefront. An American inventor named Simon Lake began testing submarine operators for various psychophysical characteristics, particularly concentrating on their ability to withstand various environmental conditions. He viewed humans as potential glitches in system operations, a view that still prevails today amongst many professions (Schurman et al., 2004).

In 1898 F. W. Taylor performed a number of experiments to try and increase the workplace efficiency of humans, initiating the scientific study of workers in what is now called "Taylorism". He manipulated and redesigned workstations and work-rest

schedules to see the various effects on productivity. He is also responsible for initiating the formalized methods of data collection and statistical analysis currently utilized by HFE professionals (Schurman et al., 2004).

Taylor's work was continued through the work of his students Frank Gilbreth and his wife Lillian. Through careful study of the skilled performances in bricklaying, surgical procedures and the handicapped in the early 1900's, the Gilbreth's introduced the basis for formal time and motion studies based on Taylor's work. The Gilbreth's work in this area is considered one of the antecedents to what is now referred to as human factors. They advocated for careful examination and classification of manual tasks to better fit the person to the task and minimize fatigue and maximize productivity. Additionally, they initiated the study of micro-motion to categorize the individual motions involved in various tasks and then initiated paper and pencil simulations to see how these characteristics could be manipulated. Despite their early discoveries, that adapting equipment and procedures to fit humans would be beneficial the idea was not exploited (Rankin & Stallings, 2006).

The advent of WWI led to the creation of the first aero medical research facilities to test the effects of a variety of environmental conditions and factors on air force pilots. The National Research Council (NRC) established a Committee on Psychology during WWI to test the intelligence of soldiers to try and appropriately match operators with equipment. This agency was the predecessor to what is now called the Human Factor Committee of the NRC. No marked advances in the field of HFE were made during the period between WWI and WWII. However, with the increasing popularization of driving, some studies were performed on the behavioural aspects of driving an automobile (Schurman et al., 2004).

WWII saw a massive influx of people into the workforce to help with the war effort. Taylorism was not capable of handling this sudden increase number of workers and therefore, it was abandoned. Instead, results from studies carried out at aero medical bases on pilots and their limits under certain conditions, led to an evolution in the HFE thought process. These new thought processes led to the realization that equipment had to be designed to maximize the potential in humans and limit the negative qualities. This became obvious during the war with the realization that careful selection and training of personnel would not be adequate, as some of the more complex equipment surpassed the capabilities of their operators. Both these advances helped propel the new theory of fitting the equipment to the person and not the person to the equipment (Rankin & Stallings, 2006).

2.1.3 History of Work in Ergonomics (Post-World War)

Almost all HFE research post war was sponsored by the military and conducted at University laboratories. Wartime efforts in HFE had concentrated primarily on the design of small equipment while the post war efforts began focusing on the design of entire workstations and large spaces. In 1945 the US Army Air Corps and US Navy established engineering psychology laboratories (Putz-Anderson, 1988).

With this refocusing of energy in the post-war era, HFE slowly began its entrance into the private sector, though primarily in fields such as aviation, electronics and communications. Around the same time the army was establishing its laboratories, one of the first civilian companies, Dunlap & Associates, was forming to do contract work in engineering psychology. Great Britain saw similar efforts in HFE being spearheaded by the Medical Research Council and the Department of Scientific and Industrial Research. This integration into the private sector began the transformation

of HFE from a purely research oriented field to a more application minded science (California Commission on Health and Safety and Workers' Compensation [CHSWC], 2003).

Though post war HFE research was being conducted to a limited extent in the private sector, the years in between 1960-1980 saw a major transformation of HFE from a military based science to a broadly applicable science. HFE began expanding into areas such as pharmaceuticals, computers and automobiles and industries began acknowledging the importance of human factors in the design of workplaces and products. Throughout all this, outside industrial circles, the field of HFE remained relatively unknown to the average consumer (Putz-Anderson, 1988).

Propulsion of HFE into the public realm came almost hand in hand with the computer revolution. Arenas outside those of large product based industrial companies saw aspects of HFE crop up in everyday areas. It was introduced into litigation about personal injury and product liability, defective product design and the effectiveness of warnings and instructions on products. In the current era, the majority of the average man on the street knows the term HFE, or ergonomics (CHSWC, 2003).

2.1.4 Modern Day Workplace Ergonomics

The office, environment can be conceptualized as a dynamic socio-physical system, and can be differentiated from the office as a place, a physical setting, or an organizational unit. This can highlight the interdependency between the physical systems (that is, the designed environment, technology, work requirements and activities) and the social system (people, their values, expectations and needs,

people's relationships to colleagues, work perceptions and meaning, and corporate culture). According to Menozzi et al., (1999), this interdependency is complex and relationships between the two systems are often indirect and counterintuitive.

Bohr (2000) argue that many important and interesting topics that concern environmental psychologists and designers are based upon amorphous, hard-to-define, rather abstract concepts, which in the context of research are often characterized as constructs.

2.2 Awareness on Office Ergonomics Practices and Job Performance

Generally, the meaning of "awareness" has been kept utilized synonymously with the term "consciousness", which has been known as a "mongrel" idea, inferable from the assortment of its definitions (Block, 1995). In addition, Hameed & Amjad (2009) characterizes office as "an area in which business, administrative, or professional tasks are practiced". From the definition, the researcher summarize the definition of awareness on office ergonomic practices means the consciousness of work in relation to the physiological and psychological capabilities of people in an area in which business, administrative or professional tasks are practiced. A particular view of person - environment relations is one that assumes human reactions to environments are fixed and unchanging. It is a mechanistic model, and takes for granted the idea that performance of human beings can be measured and generalized in the same way as the performance of physical components of the environment. However, it seems that human reactions are variable and inconsistent; few rules or generalities are to be found. In particular, it is apparent that people's reactions to environmental stimuli are

affected by their perception of the social situations in which they find themselves. In the model of symbolic interactionism, the physical environment is viewed not as an independent variable that evokes human responses, but as a medium for symbolic communication in the course of social interaction (Loisel et al., 2000). The basis of the model is that individuals engage in symbolic transactions or interactions with each other in the course of pursuing their day-to-day goals and objectives. A variety of media, both verbal and nonverbal, may be used in such social communication, and the physical environment is an important nonverbal medium of communication. As such, it acquires symbolic value, in addition to its purely functional significance, because of the role it plays in social interaction (Wickens, 2002).

The symbolic aspect of ergonomics is likely to be of particular significance when novel forms of lighting are considered. People often feel threatened by new technology, and are suspicious of its origins and possible effects. This makes them more likely to question the design management process and to seek some involvement in that process. Such feelings will influence the way they react to and use the ergonomics. Design researchers cannot afford to ignore this organizational context: first, it provides a key to understanding the reasons behind users' expressions and feelings; and second, through an understanding of the organizational context, designers may be able to influence it, in order to increase the probability that the design will be accepted and effectively use (LeClaire et al., 2006).

Several studies (Baldwin et al., 2009; DeFabio, 2005; Morse et al., 2001) conclude that the direct effects of ergonomics have been extensively studied, resulting in a useful but incomplete collection of knowledge. The most developed areas are visual performance, colour perception, and visual search. Somewhat less developed are the

link between visual performance and task performance, the effect of ergonomics on the occurrence of fatigue, and the influence of age. The indirect effects of ergonomics have not been studied extensively and, consequently, research into this area is at an early stage of development. The only indirect effects that are established are the modification of behaviour that occurs in response to poor ergonomics, and the influence of ergonomics on hormone balance. Other indirect effects such as impression, perception, satisfaction, and comfort are plausible, but the factors that influence their occurrence and the stability of the effects remain to be established. The relationship between ergonomics and worker satisfaction and performance is still subject to much uncertainty. Given the economic significance of even small changes in these factors, this is a disturbing situation; therefore, it must be remedied by careful research directed at salient issues.

Haines et al., (2002) further discusses that scientific evidence on the effects of ergonomics on wakefulness, vigilance, and mood has been accumulating for the last 25 years. Researchers find that the daily and seasonal rhythms of sleep and activity can be influenced by ergonomics which related to system and awareness. No less important are the claimed effects of ergonomics on mental tasks. Ergonomic levels, as well as work environment geometry and colour, affect people's perceptions of a space. The perception of a lighted space might affect a person's ability to perform cerebral tasks and also widget-production tasks. Haines et al., (2002) notes that very recent research by Baron and his colleagues implicates lighting as an environmental cue for inducing what is termed positive affect. People with positive affect are those more likely to help others, volunteer for more work, take greater risks, and see the big picture. Such attributes can undoubtedly affect productivity in workplaces.

Most of the useful literature about person - environment systems comes from the industrial and occupational fields. Nevertheless, a great majority of this information is applicable in many other settings. People and their physical environment exert mutual influence, and form independent systems. Relationships between people and physical settings differ, depending on whether the unit of analysis is the individual, the interpersonal relationships, or the entire organization. The three units of analysis are interrelated in that individuals participate in interpersonal relationships and interpersonal relationships are elements of organizations (Lindell, 2004).

Both distraction and arousal can be considered as aspects of a more general experience, the mood state. One of the most widely held beliefs about ergonomics is that good ergonomics puts people in a good mood and will encourage them to work harder. There is no doubt that ergonomics can give an interior a particular appearance, and that mood state can influence performance. The weak link is the consistency and duration of the relationship between appearance and mood. Many other factors besides the visual appearance affect mood. This fact, together with the phenomenon of habituation to environmental stimuli, makes any consistent effect of visual appearance on performance very hard to measure and prove (as in the case of stress). Rather, more credible is the conviction that ergonomics which creates discomfort will lead to a reduction in performance, although this too has been difficult to demonstrate in laboratory settings. The interesting point here is not the increase in performance with comfort, but rather the maintenance of the maximum level of performance even when the ratings of comfort are decreasing. Moreover, several studies (Rosenmann et al., 2000; Haslam et al., 2002; Faucett et al., 2002) conducted in the mid and late 1920's in the USA, showed that the job performance of

experimental subjects did not decrease when lighting levels were considerably lowered for their tasks. These results could suggest that there is no association between the comfort level and job performance; however, the truth lies with motivation. In a laboratory experiment, people are usually highly motivated to succeed, and will ignore many discomforts. It is doubtful if the same degree of motivation occurs outside the laboratory, in which case ergonomics that causes discomfort may lead to a decline in performance. There can be no doubt that motivation affects performance, and little doubt that ergonomic conditions can affect motivation, but so do many other factors. These other influences ensure that while lighting may sometimes affect performance by changing motivation, it is unlikely to have any effect that is consistent across individuals or even across time for the same individual.

There are several studies that show the relationship between ergonomic environments with job performance. Works that need high physical demand can show how greatly dependent the job performance to ergonomic environment. A research had been conducted among the assembly workers to prove it. The result showed that the quality deficiency together with job performance was increased by three times for conducting daily works with ergonomic problem (Eklund, 1995). Workers with bad physical body condition were directly caused the quality issues as they were doing their daily routine assembly works. This bad physical body condition was caused by the bad ergonomic environment. Daily routine works means repetitive works; hence contribute to the ergonomic problem like illness. Repetitive, forceful work and the development of musculoskeletal disorders of the tendons and tendon sheaths in the hands and wrists can cause illness that lead to low job

satisfaction and performance (Stock, 1991). This proves that ergonomic problem can cause illness that directly influences the job performance.

It can be conclude that by decreasing the ergonomic problem, the job performance will be increase. Improving the part shelves for better accessibility, reduce walking distance in production to get assembly parts more easily do lessen the strain on the muscle. This can be obtained by allowing workers to choose their own workstation layout, they can test various new ways of working and work stations, and see the positive result on their job performance (Vink et al., 2006). Based on previous studies, it is worth to invest in improving the ergonomic. Improving ergonomic would mean increasing job performance which resulting low quality deficiency. Based on this, a positive relationship can be established which is, a reduction in ergonomic problems implies better quality records (González, Adenso-Díaz, & Torre, 2003).

According to Fernandez (n.d.), late advancements in the administrative field plainly appear that comprehension of ergonomics and applying great ergonomic practices is vital to successful management of Human Resource. Numerous organizations are realizing that making ergonomic improvements before significant issues happen (proactive ergonomics) is more practical than basically reacting to work-related injuries (reactive ergonomics). Furthermore, Mumford (1972) explained that there is direct relationship between work pressure with the organization's needs and demand. Occupational awareness and knowledge has a positive relationship with the organization's needs. This could be seen when an organization prioritize factor of safety, comfort and worker safety. With these, workers can produce output at its optimal and thus can increase the productivity of the organization as a whole. Other

than that, Boubekri (1991) had studied on relationship between light and job performance. He found evidence that supports the study which may strengthen the relationship between lighting and ergonomic awareness among workers. In his study, he found that the relationship between lighting and awareness of ergonomics is not significant. De Rango (2003) confirmed that ergonomic interventions could impose to low pain levels and increase job performance among office employees. The result are important to legislators in considering the social expenses and advantages of ergonomic work principles. This also reliable to the any occupational safety and health agencies in considering proper work guidelines in an office setting, business managers whom looking to enhance the performance of their employees, and to economist whom intrigued by the relationship between wellbeing and monetary results. It is vital to make mindfulness with respect to ergonomics, its rules for different occupations and additionally its practices by the employees and experts over the fields for better, health and job performance (Pandve, 2016).

Based on the articles that have been gathered, researcher conclude that employees whom had an awareness on office ergonomics practices could enhance their productivity and performance in task given by adapting to the suitable and comfortable posture to prevent body injury and also occupational disease.

2.3 Existing of Ergonomic System and Job Performance

According to Wilson (2014), ergonomics system is that system ergonomics analyzes, represents and improves the configuration of a framework, and individuals' interactions with it, instead of concentrating on an individual part of it. That framework can be an artefacts, facility, environment, building, work site, group,

community, association or society. Assessing ergonomics not only from physical, but also from psychosocial perspectives requires an understanding of some recurring issues in the evolution of those environments (offices, factories, other worksites). These issues involve problems that people have as they try to adapt to any working environment. They include comfort and efficiency, communication and interpersonal relationships among workers, impressions on the environment and of course, the productivity and effectiveness of the organization. The question here is how lighting influences the dynamics of these interrelated issues (Rankin & Stallings, 2006).

Although some of the issues have been linked directly to lighting, others may only have indirect relationships to the ergonomic system. For instance, it is reasonable to assume that if an environment is uncomfortable, it may affect people's attitudes, performance, effectiveness, and thus the productivity of an organization. This in turn could have an effect on interpersonal relationships, the image of a workplace, and the impressions people have about that workplace and consequently about the whole organization. Rejecting these associations on the grounds that reliable scientific data do not exist is not a helpful approach. With a more humanistic and intuitive view, a designer can (and should) take into account some of the controversial soft data when creating lighting and/or any other environmental components. Naturally, these design criteria and solutions must be balanced with economic and technical feasibility (Morse et al., 2001).

Ergonomics does more than just make things visible. Comfortable in a space inevitably contributes to people's impressions of that space. The impression may be good or bad, appropriate or inappropriate, firm or vague, but it will exist. There are

positive and negative aspects to the influence of ergonomics on impression. The negative perspective is dominant when there are complaints of discomfort. The positive perspective is apparent when feelings of pleasure are experienced. But discomfort and pleasure are not the only impressions ergonomics can give (Ergonomics Society, 2006). The topic is much more complicated. Ergonomics can give an interior (or exterior) a character. This character may be dramatic, inviting, depressing, boring, relaxing, interesting, or functional. It is the subtlety of the various impressions that can be evoked, and the practicality of evoking these impressions that makes lighting such an important means of manipulation. No specific visual task is required for lighting to create an impression. Lighting can be effective in influencing the impression given by the spaces used for a wide range of human activities, regardless of what the extent of the visual system's interest in those activities (Stahl, 2007).

The impression created by ergonomics can influence the actions of people. This does not refer to the job performance, but rather to the way in which the space is used. Behavioural studies related to lighting have revealed some interesting associations. For example, most people prefer to use passages and corridors that are brightly lit (safety), or people talk more loudly when high level and even lighting patterns are present, and are more quiet in low luminance levels with uneven patterns (low arousal and distraction). The attention span of school children when they were presented a display card was measured when it was the same luminance as the rest of the room, and when its luminance was much higher. Their attention span was much greater for the highlighted display (contrast - arousal and motivation), the attitudes and behaviour appear to be rather tenuously linked, but for a full understanding of

how we regard lighting they need to be considered. There is no doubt that lighting can influence the way in which people use a space (DeFabio, 2005).

According to Kroemer and Grandjean, (2007), the different ways in which ergonomics makes its impact on the individual user can be divided broadly into functional and aesthetic factors. Functional factors refer to those characteristics of the ergonomics that affect conditions of adequate illumination of the work task, and avoidance of user discomfort. The chief functional factors are comfort, uniformity of luminance, glare, veiling reflection, colour properties, and luminance ratio of the work surface to the surroundings. Aesthetic factors refer to non-functional characteristics that nevertheless appear to significantly impact general evaluation of ergonomics. Aesthetic factors that do not instrumentally affect task visibility or user comfort includes colour appearance and general room appearance.

Veitch (1998) found out dim light and bright have a significant impact on productivity and he discovered the positive effects of bright lighting on employees in offices compared with dim lighting in the workspace. A positive environment is an ideal complement to the work. With the result, it would be a positive impact on occupational safety and health as well as the impact on employees' psycho-social themselves. Space design and organizations' environment also clearly have the relationship between awareness and knowledge. The study found out that good workplace integrated with the ergonomic concept could give big changes on working conditions and also, directly or indirectly to the employees. According to Foby (1987), employees whom working in the field of high technology were easy to accept new technology and task which involves the use of high skills. They also had more

awareness on ergonomics system compared with employees who are not involved with the use of technology in task. Saklani and Jha (2011) revealed that ergonomic changes could bring an improvement in job accuracy together with job performance by over 25% in the mistake committed by employees which is quite high. The impact of workplace environment with performance was found to be in the shape of inferior accuracy meanwhile some researchers accept that on the task rate only may suffer. Not only human body could be in disaster due to improper working conditions, it also will influenced the performance unfavourably. A result from a study by Kingsley (2012) confirmed that lack of office ergonomics at the Petroleum House produced negative impact to the employees' performance. From the findings of the study, which recognizes big office ergonomic mistakes, for example, deficient office illumination, utilization of un-ergonomic furniture, considerable noise levels and safety hazards, it was blatantly shown that Ghana National Petroleum Corporation (GNPC) was yet to give influence on its workplace environment as a method for motivating and improving the performance of its employees. Furthermore, based on study by Zainudin (2010), 70.1% of his respondents whom Administrative Support staff were reported that their employers did not focus or emphasis on office ergonomics. In addition, the respondents were asked if they had experienced any of stress consequences. The result shown that highest percentage which is 23.9% was belong to respondents with lower job performance. From the result, he concluded that there was significant between existing ergonomics system with job performance.

By establishing a proper ergonomic system, employees' motivation and performance are believe could be improved significantly. From the articles, researcher conclude that most of the study had resulted with none or improper ergonomic system in an

organization will resulted to lower job performance and productivity among the employees.

2.4 Office Equipment and Job Performance

Public Works and Government Services Canada (2012) defined office equipment as characterized as equipment procured by the Government of Canada (GC) for the each day utilization of employees in their official capacities. This equipment is usually involved with handling of paper such as printing, copying, scanning, shredding and other related services. Each person has a finite capacity or span of attention that he or she allocates according to priority. A distraction subtracts attention from that given task. Consequences may include lapses in job performance during the distractions and shortly afterward, before the individual can shift attention back to the task. Theories of overload describe distractions as demands that exceed a person's capacities. Equipment overload refers to excessive stimulation that contains no specific meaning for the individual, such as the flickering of a fluorescent bulb, and information overload refers to sources of stimulation that carry meaning and call for response. In this case, overload occurs when the information comes faster than it can be assimilated and dealt with (Johnston et al., 2004). The tendency for physical settings to contribute to overload probably depends on the worker's job and abilities. In a simple, repetitive job well within the worker's capacities, extra demands created by physical conditions can even aid efficiency if the distractions add to the worker's arousal. But if the job challenges the worker's abilities, any demands added by the environment should lead to decreased job performance. When confronted with sources of overload, a person can cope in several ways, such as filtering (selection of only certain signals, usually according to priority), approximation (simplified

response), queuing (letting work accumulate during periods of demand and catching up during lulls), omission (failing to respond to certain signals), error in processing, or escape from the situation (Loisel et al., 2000).

Any lighting conditions which are novel, transient, and unpredictable have the potential to cause distraction. Furthermore, flickering or highly intense lights seen directly or by reflection are good candidates for causing distraction (Ergonomics Society, 2006). This was due to the rest of the visual world is stable, a flickering light source will be a source of distraction, especially as detection of flicker is much better in the far periphery than most other visual functions. As for high luminance light sources, this is simply the matter of differences in intensities of stimulation in the visual field (contrast). It can be concluded that some features of conventional lighting are likely to be distracting, and hence may affect the job performance. The extent to which job performance is affected will depend on the nature of the task (Haines et al., 2002).

Office equipment was also one of the factor that directly influencing the job performance. There were variety of the office equipment such as chair, desk, photocopy machine, printer and computer. They are all used as the basic job tools to increase the job performance. In proving the relationship between the office equipment and job performance, (Kingsley, 2012) conducted a research at the Ghana National Petroleum Corporation (GNPC). In this company, nearly all employees had the basic office tool to smoothen their work. However, based on the finding, there were 18.2 percent and 11.4 percent respectively were dissatisfied and very dissatisfied with their office equipment. Although mostly of the employees were

provided with the basic office tools, they were still dissatisfied and it had affecting their job performance.

There is also office equipment that need safety precaution. For example, laboratory workers are constantly using laboratory tools in their daily work. Therefore, the equipment that they use in their work must be functional and correctly to avoid injuries at work. Injury at work will reduce the job performances. It is important that workers were trained how to work with the equipment because inadequate equipment handling can result in accidents or deviations in job performance no matter how much equipment was proper (Bakotić & Babić, 2013). In addition to prove the relationship between office equipment and job performance, (Vink et al., 2006) conducted a study by allowing the employees to buy or make new equipment. The employees feel satisfied with the bought or made items and their job performance are increasing. Therefore, this shown that office equipment directly influence the job performance.

Previous study shown that employees who conducted the job without proper and clear job description is not guaranteed to his health and safety. Employees who did not have the appropriate equipment to their jobs are expose to risk that could extend to injury. Among the most common injury is *carpo tunnels syndrome*. This occupational disease occurs due to the ergonomically, every machine used by the employees are not by appropriate design such as a keyboard. The study was conducted by Buettner (1951) and Lele (1954).

In conclusion, injuries that occur naturally have an impact on productivity. Productivity and job performance will decrease and thus affect the safety and health

of workers who affected. The injuries will affect the morale of the workers. Bad health for example will cause decreased in performance. Furthermore, interior design of the office also affected the employees' performance. The major influence of various factors has demonstrated that furniture influences the job performance of most employees; due to that, it is advised that we have to consider ergonomic furniture while purchasing office furniture. The information moreover uncovered that the dominant part of respondents lent weight to the visibility of plants and flowers (El-Zeiny, 2013). From the studies, researcher concluded that selection of office equipment that comfortable and suitable to the employees would prevent from any occupational disease and in other hand would increase the job performance.

2.5 Work Place Design and Job Performance

Hameed & Amjad (2009) defined workplace design as "the course of action of workspace so that work can be performed in the most effective way". Workplace design consolidates both ergonomics and work process, which observe path in which work was performed with a specific order to enhance layout. Workplace design was a vital factor in job performance. It influences the way in which the staff work, and numerous associations have implemented open-plan workplaces to support cooperation.

One aspect of the relationship between ergonomics and environment, and/or comfort and workplace that always causes arguments was individual differences. When viewing the same scene, different people were looking through different eyes. The way that information was interpreted will be affected by his or her experience and

knowledge. In these circumstances it was hardly surprising that there were large differences in levels of performance that can be achieved on the same task under the same workplace conditions by different people. This variability, in turn, leads to firmly held differences in opinion, based on personal experience, as to what were the minimum or optimum workplace conditions necessary for a task. In some practical applications this difference of opinion does not matter, because each individual can be provided with workplace under his or her own control. Intelligent application of this user control could be one of the most beneficial recommendations for anybody whose main design consideration was people, and not money or simplicity for its own sake. It was important to recognize the types of workplace dysfunctions aging adults experience since many of their performance problems may be inappropriately attributed to cognitive deficits or attitudes, when in fact workplace impairment may be the primary causative factor. For example, the crystalline lens in an older adult undergoes some degree of increased density and pacification (Silverstein et al., 2007).

Comfort (physical, psychological, and functional) was the number one most essential area in creating a productive and efficient workplace. Silverstein et al., (2007) recommended accomplishing a few things when designing for a productive environment. Providing a superior acoustic environment, maintaining optimal thermal comfort, creating a high quality visual environment (lighting, day-lighting, and visual interests), providing equipment that enhances worker comfort and performance, and providing users the ability to have control over these advantages are inclusive of these recommendations. Silverstein et al., (2007) also stated that integrating sustainable design principles can help accomplish a comfortable workplace.

Acoustics can be placed in the physical comfort category established by Stahl (2007). However, Stahl (2007) explanation of acoustic comfort limits the category to safe noise levels, and does not include distractive noise levels. The most distracting types of noise in an office facility were the traffic outside the building, nearby mechanical equipment, noise from copiers and phones, and voices from nearby co-workers. Some suggested a system that projects a slightly audible sound called white noise to avoid the feeling of being alone.

Ventilation was also essential to environmental comfort. Ventilation, in regards to comfort, refers to natural ventilation as opposed to forced ventilation. Natural ventilation was required to replenish oxygen, reduce unwanted odours, and regulate thermal comfort. Wind causes positive pressure on the windward side of a facility and negative pressure on the leeward side forcing air into any opening on the windward side and ventilating the space within, then pulling the air back out the leeward side. Stack ventilation was an effect that occurs when higher temperatures rise from a lower level to a higher point and were pulled out of an opening in the top of the building. Another variation of this system was to include a cool tower that brings cool air to the lower level and forces the warm, humid air upwards. The biggest factor that natural ventilation had on a structure was the ability to reduce mechanical systems and lower cooling costs (Silverstein et al., 2007).

Natural day-lighting was another major factor in improving both comfort and productivity within an office building. The benefits of day-lighting as described by the Townsend (2008) on day-lighting are as follows; improved life-cycle cost, increased user productivity, reduced emissions, and reduced operating costs. As mentioned by Versloot et al., (2002) in regards to day-lighting, there were areas that

need to be addressed when applying natural day-lighting to a building. Designers need to be aware of the unwanted reflections that can be produced by direct sunlight entering a window or skylight. Distribution of the light was also very important. Ensuring that the light was penetrating as deep into the space as possible is ideal.

Light that reaches a tasks surface indirectly by reflecting off another surface was generally better than direct light on a task surface because direct light was typically too bright for comfort. Reducing or eliminating glare from computer screens and highly reflective surfaces helps ensure visual comfort. In addition, it was noted that the human eye can adjust to different light levels as long as they are in different fields of view (Rankin & Stallings, 2006). However, human eyes did not adjust well to areas of too much contrast between bright and dark areas. Furthermore, make sure that correct luminance levels are met for the correct type of task being performed. Lights that were too bright or dim for the task being performed are not beneficial to visual and user comfort. Interior and exterior shading devices can be used to block direct light from reaching unwanted surfaces and reflect light deeper into desirable spaces. In other hand, it also available to reduce heat gain in a building are numerous types of glazing that are either tinted or glazed to block sunlight from entering unwanted spaces (Versloot et al., 2002).

Indoor Air Quality (IAQ) is another dynamic considered in the comfort of an office facility. Ensuring that the air in the building, whether brought in mechanically or naturally, was fresh and free of pollutants and allergens is essential to indoor air quality. It also necessary to ensure that the air is free of bacteria and mould. This would help produce a more comfortable working environment (Johnston et al., 2004)

A study by O'Reilly (2007) demonstrated that 76% of staff fulfilment is influenced by salary, technology, administration and work-life balance, 24% is impacted by solace, air quality, temperature, noise, lighting and office layout. This discoveries likewise bolstered by the study made by Taiwo (2010) which is 29.51% of the respondents need conducive and better workplace to enhance their job performance and 70.49% of the respondents said that high pay, favourable and better workplace design are the elements that can prompt change in employee's efficiency.

Moreover, Hameed & Amjad (2009) had analyzed that office design substantially affects the employees' job performance. The general impact of various elements demonstrated that lighting influences the productivity and indirectly to job performance of most employees. The overall mean of all the elements shown that female employees are more concerned about their work environment surroundings, while, the male employees are less worried about it. The overall feedback, according to gender, showed differences amongst the feedback for various elements in the workplace. Male respondents' outcomes shown that they are more worried about the lighting in their workplaces, followed by the spatial arrangement. There is a direct relationship between office design and job performance. The Relationship between Office design and performance was dictated by utilizing the Pearson's Correlation in SPSS. A solid relationship exists between components of office design and performance of office design. From the articles, researcher concluded that workplace design could influence employees in term of job performance and productivity.

2.6 Job Performance

Campbell, J. P. (1990) characterizes performance as behaviour which is something done by the employee themselves. This idea separates performance from results. Results were the consequence of a man's performance, additionally, there are numerous elements that evaluate results than just employee's behaviours and action. Whenever Campbell (1990) characterizing performance as behaviour, he considered exemptions. For instance, he expressed that performance does not must be straightforwardly observable activities of a personnel. It can comprised of mental preparations, for example, answers or decisions.

The term job or worker satisfaction refers to the worker's evaluation of his or her job as a whole, and of the general quality of life at work. According to Christopher (2002), this satisfaction can be defined also as a pleasurable or positive emotional state resulting from the appraisal of one's job or work experience. It represents an amalgamation of many factors of satisfaction, including the physical environment, equity, and adaptation. One impetus for studying job satisfaction was the long-standing idea that comfortable and satisfied workers perform best on the job. The relationship between job satisfaction and performance has been investigated extensively, but no consistent correlation has emerged. One of the theorized connections can be seen in the path analysis of Figure 2.1, developed in the Pascarelli et al., (2009) studies. Here, reward was a positively perceived return for the worker's efforts and performance; satisfaction was considered as a result in itself; motivation was a concept we created for helping us to explain various behaviours we cannot directly see; and the relation between motivation and reward is a reinforcement connection.

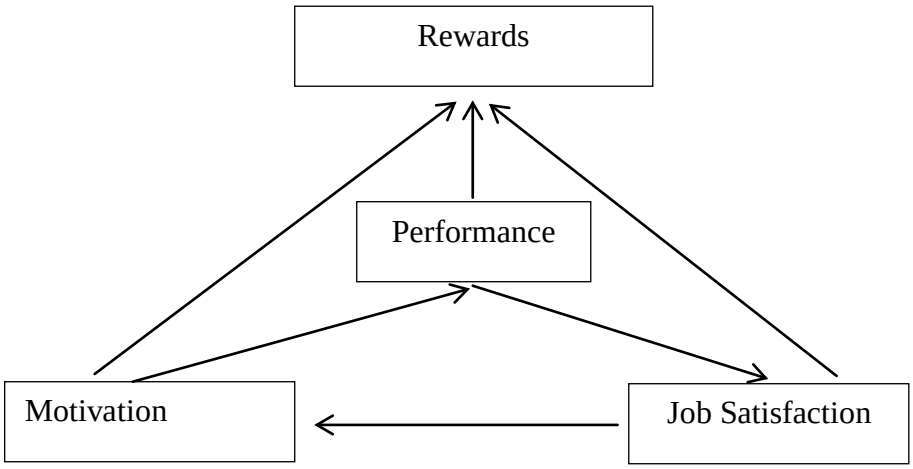

Figure 2.1
Path analysis of connections among satisfaction, performance, motivation and rewards.
Source: Pascarelli et al., (2009)

To complicate these already complex relations, satisfaction itself can be further analyzed. According to Herzberg's Two factor theory, worker satisfaction can be explained by motivators, such as achievement (accomplishing something), advancement (a noticeable consequence, e.g., promotion), recognition (from colleagues), increased responsibility, and the work itself (the intrinsic values of work). On the other hand, dissatisfaction can be described by hygiene factors, such as work conditions (including the physical environment), supervision (the management of the organization), interpersonal relations, and company policy (e.g., pay or promotion).

Often overlooked is the fact that motivation and hygiene, rather than being negatively correlated, are two independent variables. To express this relationship with an analogy, garbage collection (a hygiene factor) does not make someone healthy, but it prevents the person from becoming ill.

2.7 Theories Relevant to the Variables

Recently, research on ergonomics and environmental psychology have found out that the connection between humans and their environment were main part of the research. Workplace design, ergonomic system and office equipment were the relevant variables related to connection between humans and their environment. According to Herzberg et al. (1959), there were two types of impacts that regulate the employees' sentiments and mentalities towards their occupation. First was motivators which work on the 'the more the better' approach. That means, in the event that the Working task, the Responsibilities of the Possibilities for advancement increase, there was a positive result in employees' behaviour. Second was hygiene factors only resulted decrease of satisfaction. In the situation when there was no issue with the Leadership style, the Relationship between associates, Status safety and Work environment, it had no impact development on performance and satisfaction. Table 2.1 shown the Herberg's two factors theory on work motivation.

Table 2.1
Herzberg's two factors theory on work motivation

Motivators	**Hygiene factors**
Performance	Leadership style
Acceptance of individual performance	Employment policies
The working task	Working environment
Responsibility	Social relation with superiors and peers
Possibilities of development	Status
	Work safety
	Individual work related characteristics

Source: Herzberg et al. (1959)

In these conditions, it was by all accounts sensible to make improvements and enhancement on the Motivations so to make more delight and empowering working

conditions. As illustrations show the Hygiene factors were just contemplated at the point when major complaints suddenly showed up.

Based on final results of study by Rozlina, S. et al. (2012), three important components on awareness of ergonomics that will had critical impact on safety culture estimated by using three measurement factors. The finding is vital to demonstrate the level of ergonomics awareness and its part in shaping safety culture. Three critical variables related to ergonomics awareness at working environment were recognized and they are implication and improvement, suitability of workplace to workers and ergonomics basic considerations. Figure 2.2 shown the relation between all of those variables. According to Vanwonterghem, K. (2009), employer needs to be alert with the implications of not being alert with the ergonomics risk. By that, implication and development is crucial. Conformity of the task to the employees was the guidelines of ergonomics because it is related to human body system and workplace design which is fit to the task and attitude of the employees. It was one of the underlying presumptions that can be indicated that the task can be outlined for any job (Bridger, 2009). In other hand, ergonomics basic considerations are a few issues of mindfulness that focused on the reliability of ergonomics identified with the physical such as consideration of tool's design fit to the employees' during obtaining a tools (Kroemer et al., 2001).

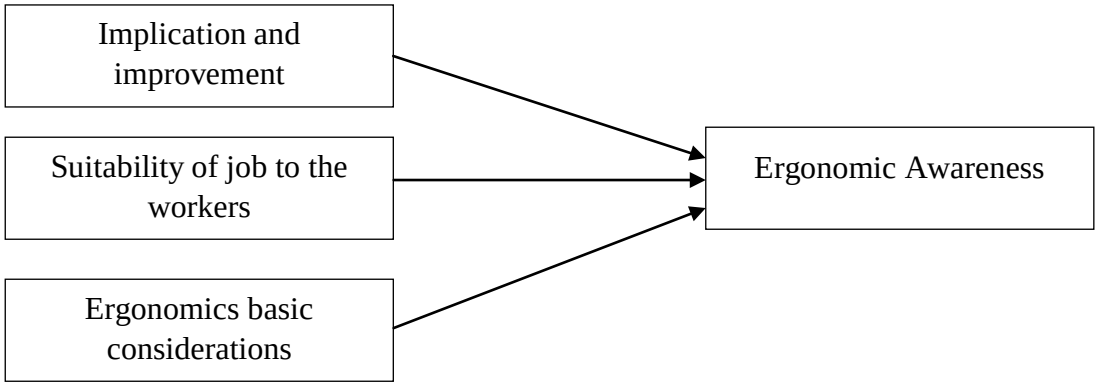

Figure 2.2
Ergonomic Awareness Factor
Source: Rozlina, S. et al. (2012)

Safety culture components that was identified are commitment and leadership, motivation and safety management system practice. Figure 2.3 shown the relation between all of those variables. Commitment and leadership influence employee contribution and responsibility by top management in this manner would give an impact to the employee strengthening. It is also involve in attending and chair safety and health committee, assist in development and execution of safety activities by physical and profound, affirming financial and innovation that been utilized in order to persuade the employee to be involved and engaged in safety activities. Leadership perspective incorporates the way top management control the standard operating system, demonstrate the safe working procedure, listen and communicate frequently with management team. Furthermore, motivation part was accentuated by job satisfaction by consolation of conducting what they got in practical. Safety culture can be successful if top management value the employees and give reward for the safe act which in turns the employee will feel free to talk, transparently, without boundary on safety activities, risk or any issue related to safety and health. Safety management system was one of the factor that can increase safety culture which is

evaluate by policy, procedures, safe working instructions, capital expenses and continual improvement (Rozlina, S. et al., 2012).

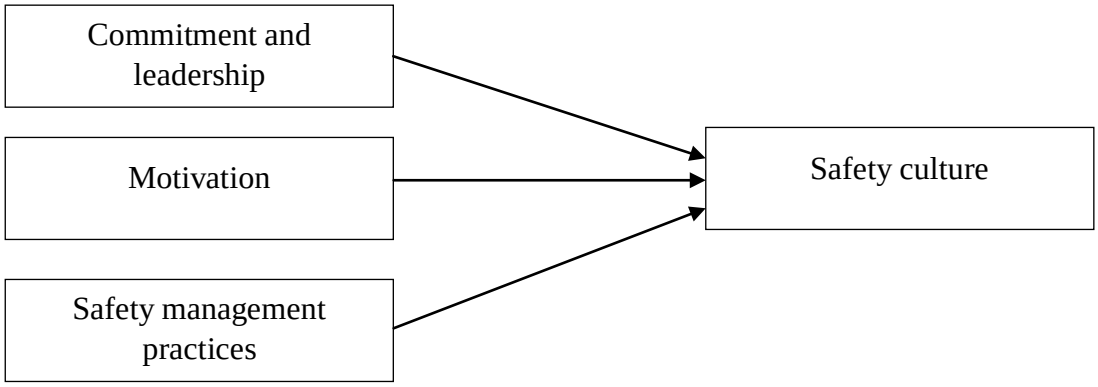

Figure 2.3
Safety culture factor
Source: Rozlina, S. et al. (2012)

This research study outline and execution regarding ergonomic awareness was guided by a theory of change which was delineated graphically in figure 2.4 which is the model of change (Amick et al., 2002). The theory recommends that office ergonomics training improve the employee's knowledge on ergonomics and motivates them to practice attitude that improve work effectiveness and decrease psychosocial and biomechanical strains (Robertson et al., 2002). Lessened postural stacking and muscle weakness ought to decipher into enhancing health-related work role functioning, and therefore increased performance and productivity. Beside, office ergonomics training can lead to development in performance and productivity through different courses other than enhanced health, for example enhanced efficiency and satisfaction leading to enhanced employees' motivation.

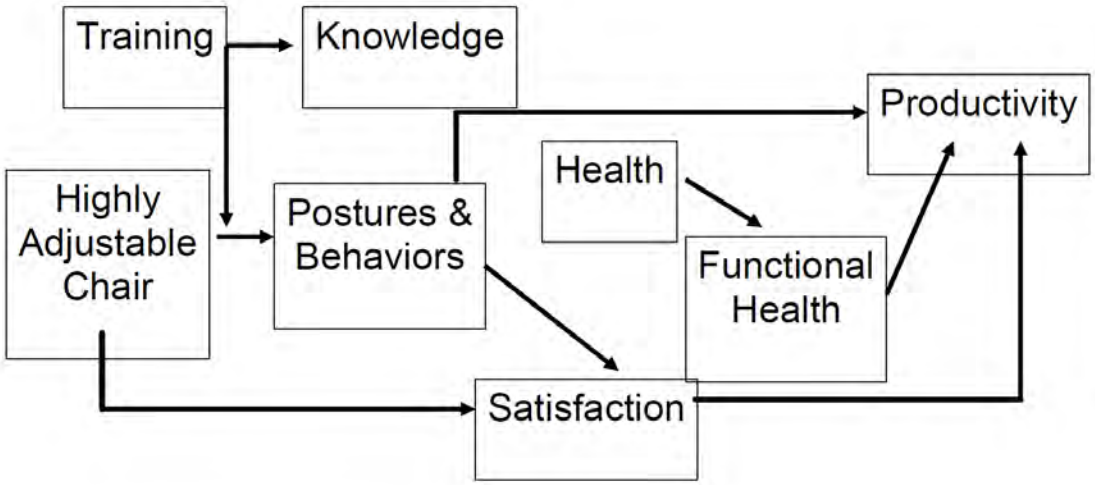

Figure 2.4
The model of change
Source: Amick et al., 2002

2.8 Summary of the Study

This chapter discusses the constructs most relevant to this thesis. As identified in the literature review, these were the existing ergonomic system, workplace design, office equipment and awareness on office ergonomics practices. These constructs were multidimensional concepts; they were often interrelated, influence each other, and blend into the various domains of human behaviour and ergonomics. For instance, although the phenomena of arousal, stress, effort and fatigue, motivation, and individual differences are dealt with under the concept of performance, they can also be considered as aspects of comfort and/or work place design.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

This chapter first introduces the hypotheses and research design to be tested. Then, the research methodology including the questionnaire design and measurement of the research variables (including existing ergonomics system, ergonomic practices on workplace design, ergonomic practices on office equipment, awareness on office ergonomics practices), sampling and data analysis procedures are described.

3.1 Research Frame Work and Hypothesis of the Study

Figure 3.1 is the research framework of this study where job performance is the dependent variable and existing ergonomic system, ergonomic practices on workplace design, ergonomic practices on office equipment and awareness on office ergonomics practices are the independent variables.

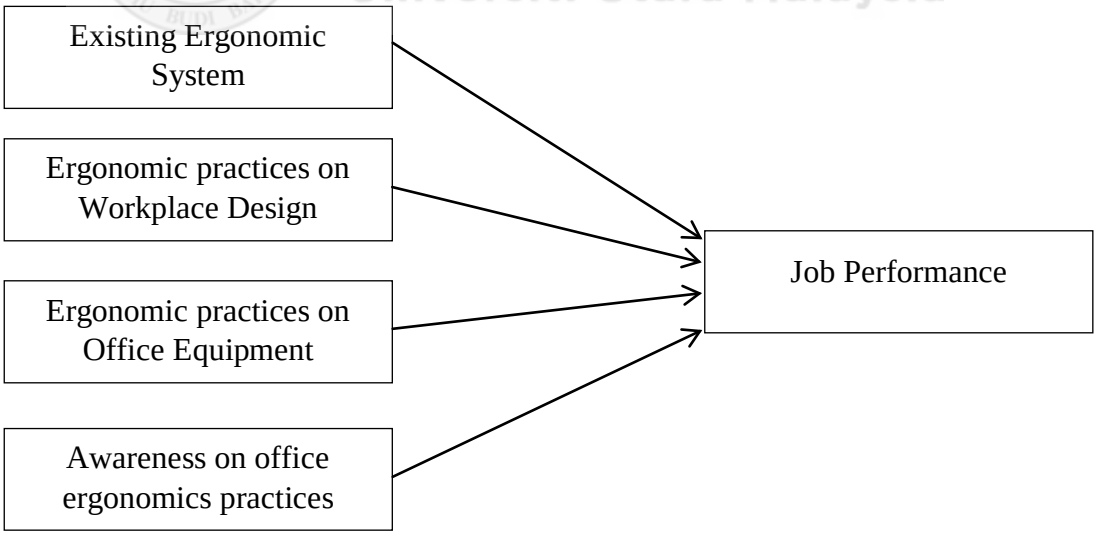

Figure 3.1
Research Framework

Based on independent variables and dependent variable above, influence between both variables could be determined by using certain methods such as correlation analysis, regression analysis and etc. At first, researcher had determined hypotheses for this study as per below:

HA1: Existing of ergonomics system will affect job performance

HA2: Ergonomic practices on workplace design will affect job performance.

HA3: Ergonomic practices on office equipment will affect job performance.

HA4: Awareness on office ergonomics practices will affect job performance.

3.2 Research Design

In this study, quantitative research was used. The researcher tries to solve an ongoing problem within some organizational framework by collecting factual information of the results of job performance. A research design is the overall plan or program of research. It is a general blue print for the collection, measurement and analysis of data. The literature on this study was qualitatively examined and the information was collected by using the questionnaires. Firstly, the research process has been identified and the research problems were formulated. Then, there were also discuss about the instruments to be used and the decisions that should be taken for achieving the purpose of the research were thoroughly analyzed. Later on, the research design was created to answer the research objectives or hypotheses (Pascarelli et al., 2009).

In the preliminary stage, the literature of this subject was examined. As a quantitative study, conclusions are based on the questionnaires distributed to respondents. Statistical data used as a medium to obtain needed information. This study aims to determine the relations between independent (Existing ergonomic system, ergonomic practices on workplace design, ergonomic practices on office equipment and

awareness on office ergonomics practices) and dependent variable (Job performance). The findings and the conclusion of the study will solely depend on the utilization of the statistical data collected (Johnston et al., 2004).The author have focused on methodology for this study in terms of research design, research instrument, preparation and administration of questionnaire, the statistical method for this study.

3.3 The Sampling Procedure

3.3.1 Population and Sample Size of the Study

Population of post-service employees of public service department (PSD) is the target group. There were 149 employees that work under the division. The sample taken for the study is 109 employees which is 74 percent than the total population. The population considered for the study is finite. The sampling unit is the basic unit containing the elements of the population. According to the sample determination table provided by Krejcie & Morgan (1970), if the population is 150, a sample of 108 was sufficient to represent the entire population. For this study, data were collected by distributing questionnaires to 109 samples.

3.3.2 Questionnaire Design

In gathering the data, the instrument used in this research was adapted from questions developed by Menozzi et al. (1999), Likert Scale questionnaire is suitable to gather data from large group of respondents. Structure of the questionnaire could be referred at Appendix 1. Basically the respondent will easy to understand and answer the Likert Scale questionnaire. The Questionnaire was divided into two sections that are section A and Sections B, which are illustrated in Appendix 1.

Section A will be item of demographic factor of respondent, Section B consist items of independents variables and dependent variables.

3.4 Selection of Survey Instruments

According to ergonomics questions by Menozzi et al. (1999), the researcher formulate questionnaire. While a wide range of instruments are used for measuring training impact, section A asked respondents to ticket out the information. Section B required respondents to rate items based on 6 points rating scale response format which related to ergonomics and the factors affecting employees' job performance.

Likert scale technique which is a psychometric scale that commonly used in questionnaires, was used in the research and it is the most widely used scale in survey research. The rating scale from 1 to 6 was used where 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Slightly Disagree", 4 = "Slightly Agree", 5 = "Agree" and 6 = "Strongly Agree".

3.5 The Pilot Study

A pilot study was conducted on June 2012. The questionnaires together with consent letter were distributed by researcher to 30 respondents in Post-Service Department and all the samples were returned to the researcher on the same day. The aim of the pilot test was to gauge the understanding of the participants and respondents on the words and sentences structure in questionnaire according to the feedback and suggestion by the respondent during the pilot test. Reliability test refers to the degree to which a test is consistent and stable in measuring what it is intended to measure. This study has also tested the consistency of respondents' answers to the entire items in adopted questionnaire. If each item of independent variables measures the same

concept, they were correlated with one another. The most common consistency measure is Cronbach's alpha. The Cronbach's alpha will increase when the correlations between the items increased. Rankin and Stallings (2006) stressed that the close Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. In addition, Rankin and Stallings (2006) provide the following rules of thumb:

"_> .9 – Excellent, _> .8 – Good, _> .7 – Acceptable, _> .6 – Questionable, _> .5 – Poor, and _< .5 – Unacceptable"

Hence, all variables measured in this study are reliable as the alpha value for all variables are more than 0.7. A pre-test was conducted prior to the actual data collection to make sure that the questions fit the purpose of the study and are easy to follow by the respondents. It was done to recognize the difficulties that may confront the researcher when implementing the study.

3.6 The Administration of the Survey Instruments

The questionnaire was used as an instrument to collect data and obtain information in this research survey. Before survey was conducted, a letter was send by researcher to the PSD's management for a study approval. Once the permission granted, the researcher had visit the department's management to secure permission to carry out the study in Post-Service Division since their nature of jobs were mostly seating in front of computer for prolonged time. Hence, the division's employees were suitable to the research study related to office ergonomics. In other hand, with assistance by a manager from the said division, the researcher had identify possible practical procedures in administering the research instrument to the sample. Furthermore, the

researcher managed getting a staff list of the division and later code number on the header of the questionnaire sheets was done to ease the tracking process. The researcher was provided with a meeting room and managed to assemble group of staff from various unit of the division. There was 6 sessions conducted with approximately 18 staff in each session. By gathering the respondents, it gave an opportunity to the researcher to introduce and briefly explain the research objective and topic to answer any doubts. Respondents were informed all the data will be kept private and confidential, only to be used for research purposes. The questionnaire provided were included with consent letter and contact information should they require further information regarding the study conducted or feel need to have a conversation with researcher after completing the questionnaire. The questionnaire was distributed together with token of appreciation to the respondents by manager with researcher's assistance. Figure 3.2 shows a flowchart for the data collection as briefed previously. With good support from division's manager, the researcher managed to get as satisfactory number of returned questionnaires.

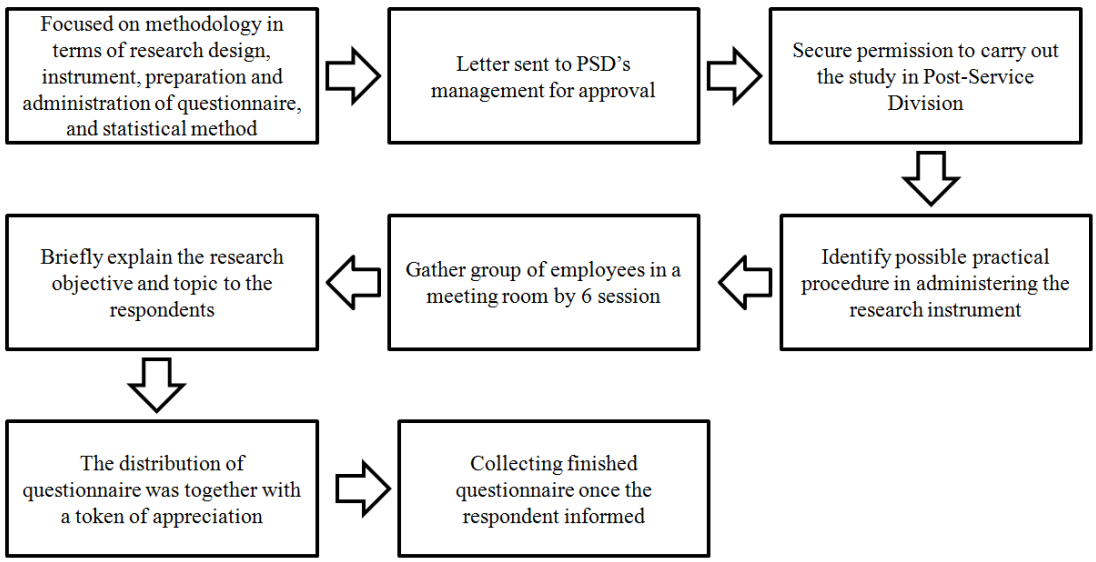

Figure 3.2
Data collection flowchart

3.7 Analysis of the Data

The researcher analyzed the data using the Statistical Package for Social Science version 16 (SPSS 16.0). SPSS is used to obtain the descriptive and frequency analysis of each demographic variables. It is also used to run the correlation analysis, coefficient of determination and multiple regression analysis,.

a) Correlation analysis: Correlation analysis is the study of the relationship between variables. Correlation measure the strength of the linear relationship between independent and dependent variable. The aim in correlation is to evaluate the degree of relationship of co-variation that exists between them. The value of correlation coefficient can be interpreted as below:

- When value of correlation coefficient (r) is close to + 1, it shows a very strong positive relationship between two variables.
- When value of correlation coefficient (r) is close to - 1, it shows a very strong negative relationship between two variables.
- When value of correlation coefficient (r) is 0, it shows no relationship between two variables.
- When value of correlation coefficient (r) is > 0.7, it shows strong relationship between two variables.
- When value of correlation coefficient 0.5 < r > 0.69, it shows moderate relationship between two variables.
- When value of correlation coefficient 0.1< r > 0.5, it shows weak relationship between two variables.

b) Multiple Regression analysis: In statistics, multiple regression analysis includes any techniques for modelling and analyzing several variables, when the focus is on the relationship between a dependent variable and independent variables more than one. More specifically, regression analysis helps one understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed (Rankin and Stallings, 2006).

c) Coefficient of determination: The coefficient of determination, R Square, is the proportion of variation in the dependent variable (Y) that is explained by the variation in the independent variable (X).

3.8 Summary

This chapter has discussed the methodology of this research, which comprised the design of study, measurement, questionnaire design, sampling design, data collection and data analysis. The following chapter will discusses the findings of this study.

CHAPTER 4

RESEARCH FINDINGS

4.0 Introduction

This chapter comprises of six sections which organizes the findings of the survey, presents the research results and discussion of the findings. The first section is about overview of data that been collected. Second section shown demographic respondents profile and third section explaining about pilot survey that been conducted. In fourth section, reliability of the final study instrument was covered and sixth section covers hypothesis testing.

4.1 Overview of Data Collection

Study had examined relationship between office ergonomics practices and job performance. This was a correlation study which involves independent variables such as factors that contribute to the existing of ergonomics system, ergonomics practices in workplace design, ergonomics practices in office equipment and level awareness of ergonomics system. The outcome of this research determined whether the independent variables contribute or not contribute to a job performance.

There were 149 employees that work under post-service division in Public Service Department (PSD). The sample taken was 109 employees which is 73 percent than the total population.

4.2 Demographic Respondents

4.2.1 Participant's Age

Most participants in this study are the adult generations, 40 respondents (37%). This continues with those who are over 50 years old group with 24 respondents (22%),

26-35 years old group with 23 respondents (21%) and 18-25 years old group with 22 respondents (20%). Adult employees are likely to be more ergonomically sophisticated at workplace. Their participation is likely to influence the finding of this study.

4.2.2 Participant's Gender

In this study, 68 respondents were male (62%). Female consist of the remaining 41 respondents (38%). This implies that the research is male dominated and reflect the previous findings that male is prone to ergonomic issues than female in this studies related to ergonomics.

4.2.3 Participant's Length of Service

All the participants responded to this question (109 responses or 100%). Participants were asked to indicate their length of service by placing a tick next to the relevant option provided. 50% of the respondents were in the 2-7 years working experience category (54 responses) and constituted the bulk of the sample. 29% of the respondents were in less than 2 years working experience category (31 responses). 17% of the respondents were in the 7 to 15 years working experience category (19 responses). 5% of the respondents were in the over 15 years working experience (5 responses) in public service department.

4.2.4 Participant's Highest Level of Education

All the participants responded to this question (109 responses or 100%). Participants were asked to indicate their education level by placing a tick next to the relevant options provided. 71% of the respondents had college degree (77 responses) and constituted the bulk of the sample. 20% of the respondents were graduate (21

responses). 5% of the respondents were post graduate (5 responses). 5% of the respondents were from school (6 responses).

4.2.5 Participant's Awareness of Ergonomics

All the participants responded to this question (109 responses or 100%). Participants were asked to indicate their awareness on ergonomics by placing a tick next to the relevant options provided. 77% of the respondents were positive (84 responses) and constituted the bulk of the sample. 23% of the respondents were negative (25 responses). This illustrates that most of the participants were aware of ergonomics and its issues at workplace.

4.3 The Pilot Survey

The purpose of performing the pilot study was to determine whether or not the respondents understood the items in the instrument. By performing a pilot study, the feasibility of the study was investigated; hence the potential problems could be identified and resolved before commencing with the actual study. The information gained was used to improve the methods or instruments in which the researcher could remove the questions that were considered to be unclear to the participants. Referring to table 4.1, the Cronbach's Alpha value for all variables are greater than 0.8. Therefore, the reliability of the questionnaires was acceptable. In addition, Rankin & Stallings, (2006) provide the following rules of thumb:

"_> .9 – Excellent, _> .8 – Good, _> .7 – Acceptable, _> .6 – Questionable, _> .5 – Poor, and _< .5 – Unacceptable"

Table 4.1
Cronbach's Alpha values for Pilot Study

Variables	No of Items	Cronbach's Alpha
Existing Ergonomics System	5	.840
Workplace Design	5	.872
Office Equipment	5	.826
Awareness of Ergonomics	5	.841
Job Performance	5	.825

4.4 The Reliability of the Final Study Instrument

Reliability test was conducted to confirm the consistency and stability of the instruments. This reliability analysis was conducted to determine the reliability of all items that are used to measure the research variables and the data analysis was shown in Appendix 2. Cronbach's Alpha statistic shows the internal reliability of all instruments used in this study as per table 4.2.

Table 4.2
Cronbach's Alpha Values for Actual Study

Variables	No of Items	Cronbach's Alpha
Existing Ergonomics System	5	.830
Workplace Design	5	.879
Office Equipment	5	.843
Awareness of Ergonomics	5	.821
Job Performance	5	.837

4.5 Relationship between Variables

Determining relationship between variables could be done by using various method. Pearson correlation which is one of it is an analysis method to test the strength of relationship between variables. It also measure the strength of the linear relationship

between independent and dependent variable. The aim in correlation is to evaluate the degree of relationship of co-variation that exists between them. Hence, Pearson correlation was used to determine the relationship between those variables. The data analysis of the correlation could be seen in Appendix 3.

Table 4.3
Correlation Test

Correlations						
		JP	ES	WD	EQ	AW
Pearson Correlation	JP	1.000				
	ES	.809*	1.000			
	WD	.802*	.714	1.000		
	EQ	.717*	.652	.951	1.000	
	AW	.895*	.828	.841	.790	1.000

Existing ergonomic system (ES) has positive correlation on 109 participant's job performance practice with the score of .809. The significance (1-tailed) score is 0. This implies that existing ergonomic system is one of crucial factor of job performance in public service department. The 1-tailed positive score also implies that a positive change in existing ergonomic system will positively affect job performance in public service department.

Work design (WD) has positive correlation on 109 participant's job performance practice with the score of .802. The significance (1-tailed) score is 0. This implies that work design is one of crucial factor of job performance in public service department. The 1-tailed positive score also implies that a positive change in work design will positively affect job performance in public service department.

Office equipment (EQ) has positive correlation on 109 participant's job performance practice with the score of .717. The significance (1-tailed) score is 0. This implies that office equipment is one of crucial factor of job performance in public service

department. The 1-tailed positive score also implies that a positive change in office equipment will positively affect job performance in public service department.

Awareness of ergonomics (AW) has positive correlation on 109 participant's job performance practice with the score of .895. The significance (1-tailed) score is 0. This implies that awareness of ergonomics is one of crucial factor of job performance in public service department. The 1-tailed positive score also implies that a positive change in awareness of ergonomics will positively affect job performance in public service department.

4.5.1 Summary of Hypotheses

Table 4.4
Hypothesis Result of Correlation

	Hypothesis	Outcomes
HA1	Existing of ergonomics system will affect job performance	Accepted
HA2	Ergonomic practices on workplace design will affect job performance.	Accepted
HA3	Ergonomic practices on office equipment will affect job performance.	Accepted
HA4	Awareness on office ergonomics practices will affect job performance.	Accepted

4.6 Influences of Independent Variables (IV) to Dependent Variables (DV)

Multiple regression was used to assess the ability of four variables (existing of ergonomics system, ergonomics practices on workplace design, ergonomics practices on office equipment and awareness on office ergonomics practices) to predict the level of job performance. The data analysis was shown in Appendix 4.

Table 4.5
Model Summary of DV vs. IV

Model	Model Summary			
	R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.959[a]	.919	.916	.17523

a. Predictors: (Constant), ES, WD, EQ, AW.

Table 4.5 shows the model summary of multiple regression analysis discussed in the next chapter. R Square value of 0.919 can be interpreted as 91.9% of the total variation in Job Performance is explained by ES, WD, EQ and AW. The balance of 8.1% is explained by the other factors. Values of R Square near 0 indicate that the regression equation is not very useful for making predictions, whereas values of R^2 near 1 indicate that the regression equation is very useful for making predictions; R Square will equal 1 if there is an exact linear relationship between y and x_1, x_2, . . . ,x_k.

Table 4.6
Regression Analysis

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.156	.131		-1.192	.236
	ES	.264	.105	.276	2.515	.013
	WD	.219	.087	.235	2.370	.015
	EQ	.239	.092	.259	2.604	.011
	AW	.923	.127	.829	7.294	.000

Note: R square = 0.919 Sig = 0.05

From the table 4.6, it is visible that the constant variable is negative value (-0.156) which validates that without the independent variables, the dependent variable cannot be a success. Practically Existing ergonomic system (ES), Work design (WD), Office equipment (EQ), Awareness of ergonomics (AW) being accepted. This strengthens the presence of all independent variables of the study.

Existing ergonomic system (ES) has an unstandardized coefficient score of 0.264 from which it is understandable that if ES is changed for a unit, there will be 0.264 unit of change in job performance provided that all other variable remains unchanged. Work design (WD) has an unstandardized coefficient score of 0.219 from which it is understandable that if WD is changed for a unit, there will be 0.219 unit of change in employee job performance provided that all other variable remains unchanged. Office equipment (EQ) has an unstandardized coefficient score of 0.239 from which it is understandable that if EQ is changed for a unit, there will be 0.239 unit of change in job performance provided that all other variable remains unchanged.

Awareness of ergonomics (AW) has an unstandardized high coefficient score of 0.923 from which it is understandable that if AW is changed for a unit, there will be 0.923 unit of change in job performance provided that all other variable remains unchanged.

The complete model of the relationship between IVs and DV could be draws as below:

Job performance (JP) = -0.156 + 0.264 * Existing ergonomic system (ES) + 0.219 * Work design (WD) + 0.239 * Office equipment (EQ) + 0.923 * Awareness of ergonomics (AW)

ES significance value is 0.013, which is lesser than the minimum value of 0.05 that verifies ES has influence on job effectiveness. Although the coefficient score is .264, ES is less strongly related on job performance in office ergonomic practice at public service department. WD significance value is 0.015, which is lesser than the

minimum value of 0.05 that verifies WD has influence on job performance. Furthermore, EQ significance value is 0.011, which is lesser than the minimum value of 0.05 that verifies EQ has influence on job performance. Although the coefficient score is .239, EQ is less strongly related on job performance in office ergonomic practice at public service department. In addition, AW significance value is 0.000, which is lesser than the minimum value of 0.05 verifies that AW has strongest influence on training effectiveness. The coefficient score is .923, AW is strongly related on job performance in office ergonomic practice at public service department.

Thus, the alternative hypothesis was accepted for all independent variables (existing of ergonomics system, ergonomics practices on workplace design, ergonomics practices on office equipment and awareness on office ergonomics practices).

4.6.1 Summary of Hypotheses

The summary of the hypothesis test are displayed in the table 4.7. From the analysis of the study, it is summarized that all of the hypothesis can be accepted when the significance value is less than 0.05.

Table 4.7
Hypothesis Result of Regression

	Hypothesis	Outcomes	Significance
HA1	Existing of ergonomics system will affect job performance	Accepted	0.013 (Strong)
HA2	Ergonomic practices on workplace design will affect job performance.	Accepted	0.015 (Strong)
HA3	Ergonomic practices on office equipment will affect job performance.	Accepted	0.011 (Strong)
HA4	Awareness on office ergonomics practices will affect job performance.	Accepted	0.000 (Very Strong)

CHAPTER 5

DISCUSSION, RECOMMENDATION AND CONCLUSION

5.0 Introduction

This chapter is discussed about the research discussion, contribution and limitations of research. Besides that, recommendation and future research direction are also given to organizations.

5.1 Hypothesis Testing Result

The discussion of this study was based on the research objectives that been developed together with literature review that had been mentioned in the previous chapter.

5.1.1 Existing Ergonomic System and Job Performance.

The research objective for this result was "to examine significant relationship between existing of ergonomics system and job performance of the Post-Service Department from Public Service Department (PSD) employees". From this study, there was positive correlation between existing ergonomics system and job performance. This shown that, existing ergonomics system will effect job performance of employees.

From previous study by Foby (1987), employees whom working in the field of high technology were easy to accept new technology and task which involves the use of high skills. They also had more awareness on ergonomics system compared with employees who were not involved with the use of technology in task. Saklani and Jha (2011) revealed that ergonomic changes could bring an improvement in job accuracy together with job performance by over 25% in the mistake committed by employees

which is quite high. The impact of workplace environment with performance is found to be in the shape of inferior accuracy meanwhile some researchers accept that on the task rate only may suffer. Not only human body could be in disaster due to improper working conditions, it also will influence the performance unfavourably. Thus, this study was consistent with studies by them where there is relationship between Existing Ergonomic System and Job Performance.

Furthermore, a result from a study by Kingsley (2012) confirmed that lack of office ergonomics at the Petroleum House producing negative impact to the employees' performance. From the findings of the study, which recognizes big office ergonomic mistakes, for example, deficient office illumination, utilization of un-ergonomic furniture, considerable noise levels and safety hazards, it was blatantly shown that Ghana National Petroleum Corporation (GNPC) was yet to give influence on its workplace environment as a method for motivating and improving the performance of its employees. In addition, based on study by Zainudin (2010), 70.1% of his respondents whom Administrative Support staff were reported that their employers did not focus or emphasis on office ergonomics. In addition, the respondents were asked if they had experienced any of stress consequences. The result shown that highest percentage which was 23.9% consists of respondents with lower job performance. From the result, he concluded that there was significant between existing ergonomics system with job performance. As in Post-Service Department, every employees shall collect seven days of training to fulfil their Key Performance Indicator (KPI) which will be evaluated end of the year. One of the training that been conducted by the organization is related to ergonomics system in the workplace which was conducted by external training provider.

This research paper was fuelled by multiple questions regarding the ability of ergonomics practice in effectively job performance. Interest was geared specifically to understanding what discrepancies were common amongst various ergonomics designs and whether they could be implemented without requiring a complete system overhaul. Literature review was utilized to establish specific relationships between certain workplace design features and tasks and job performance. Review of the pertinent research appears to support the supposition that there is a connection between office ergonomics practice and employee job performance. Various researches by Urlings et al. (2000) indicate an association between the multiple work postures and tasks required of modern employees and the development of pain and discomfort in workplace. When taken the organization's ergonomic system into account, there was a system has been established to mitigate ergonomic hazard that could influence job performance of its employees. This was also one of the organization's initiative to reduce number of employees could experience Carpal Tunnel Syndrome (CTS) due to prolonged work task involving keyboard typing.

5.1.2 Ergonomics Practices on Workplace Design and Job Performance.

The research objective for this result was "to examine significant relationship between Ergonomics Practices on Workplace Design and Job Performance of the Post-Service Department from Public Service Department (PSD) employees". From this study, there was positive correlation between ergonomics practices on workplace design and job performance. This shown that, ergonomics practices on workplace design will effect job performance of employees.

Previous study by O'Reilly (2007) demonstrated that 76% of staff fulfilment was influenced by salary, technology, administration and work-life balance, another 24% was impacted by solace, air quality, temperature, noise, lighting and office layout. This discoveries likewise bolstered by the study made by Taiwo (2010) which is 29.51% of the respondents need conducive and better workplace to enhance their job performance and 70.49% of the respondents said that high pay, favourable and better workplace design are the elements that can prompt change in employee's efficiency. In the organization, most of the employees satisfied with their workplace design which had adequate space for them to do their task and also proper arrangement of sitting between employees with the same task.

Moreover, Hameed & Amjad (2009) had analysed that office design substantially affects the employees' job performance. The general impact of various elements demonstrated that lighting influences the productivity and indirectly to job performance of most employees. Other than that, the results of this study shown that workers paid a lot more attention to private offices and to natural lighting than to the various artificial ambient lighting systems. It is important to note, however, that in the case of this study, and likely in the case of most real life workplace studies, there could be an inherent bias in the employee-workstation distributions. Usually, private and windowed offices were occupied by the managerial and professional staff, and the lower paid clerical and secretarial workers are located in the less favourable interior workstations. People in lower rank positions usually perceive, or in fact, have less control over their work conditions, including their environmental systems, such as lighting, ventilation, temperature, and noise. Moreover regarding perceived control, it has been found in other environmental studies to be very significant

contributors to people's perceptions of their physical environments. Therefore, it is not surprising that workers in lower positions tend to be less comfortable and feel less satisfied with their conditions. Also, they were the people who spend most of their time chained to their workstations, unlike the managers and professionals who visit each other, have meetings in conference rooms, travel more frequently, and enjoy a higher level of control and power in their job (De Fabio, 2005). As in the organization, the workplace design are almost the same as stated above where the professional staff was situated in private and windowed office. Whereas the support staff was located at open space with wide clearance walkways for movement. Other than that, there was a room for photocopy machine for every staff.

The intervention of ergonomics between job performances offers theoretical, methodological, and practical implications. First from a theoretical perspective, the intervention of ergonomics fills a void in research by offering a practice to prevent or reduce job performance. In addition, this research provides evidence that objective job performances are critical to the examination of performance as suggested by (Wickens, 2002). The ergonomic design component of body positioning, although self-reported, is still considered an objective performance. Its relationship to the strains of job induced tension and somatic complaints signal the importance of objective stressors. This research also continues the support of subjective performance via the effects of work area design, a subjective ergonomic measure, on perceptions of person-environment fit and control (Wickens, 2002).

5.1.3 Ergonomics Practices on Office Equipment and Job Performance.

The research objective for this result was "to examine significant relationship between Ergonomics Practices on Office Equipment and Job Performance of the Post-Service Department from Public Service Department (PSD) employees". From this study, there was positive correlation between ergonomics practices on office equipment and job performance. This shown that, ergonomics practices on office equipment will effect job performance of employees.

From previous study by Buettner (1951) and Lele (1954), employees who did not have an appropriate equipment to their jobs are expose to risk that could extend to injury. Among the most common injury is *carpo tunnels syndrome*. This occurs due to the ergonomically, every machine used by the employees are not by appropriate design such as a keyboard. Injuries that occur naturally have an impact on productivity. Productivity and job performance will decrease and thus affect the safety and health of workers who affected. The injuries will affect the morale of the workers. Bad health for example will cause decreased in performance. Furthermore, interior design of the office also affected the employees' performance. The major influence of various factors has demonstrated that furniture influences the job performance of most employees; due to that, it is advised that we have to consider ergonomic furniture while purchasing office furniture. The information moreover uncovered that the dominant part of respondents lent weight to the visibility of plants and flowers (El-Zeiny, 2013). From the findings, the organization provide every staff with proper office equipment such as height adjustable chair that could be adjusted by staff according to their sitting height. For instance, adjusting the height of a chair

relieved leg discomfort. Also, there was additional perk that ergonomic practices such as the ergonomic workstation and training programs will be perceived as an employee benefit; thereby, improving morale as workers conclude that employers care about them. This was evidenced by the appreciation expressed by the public service department employees. The study implies that PSD should continuously raising awareness among employees.

Furthermore, the organization provided chair with back support to prevent staff from experiencing Musculoskeletal Disorder (MSD). In addition, this mean the organization really concern on the office equipment provided to its employees. To prove the relationship between the office equipment and job performance, (Kingsley, 2012) conduct a research at the Ghana National Petroleum Corporation (GNPC). In this company, nearly all employees have the basic office tool to smoothen the work. However, based on the finding, there are 18.2 percent and 11.4 percent respectively were dissatisfied and very dissatisfied with their office equipment. Although mostly of the employees were provided with the basic office tools, they were still dissatisfied and it affected their job performance.

The managerial benefits are numerous. Cost reduction can be achieved through lower medical costs and fewer workers' compensation claims. Absenteeism is lowered and productivity is improved as debilitating aspects of stress are limited for the worker. In addition, the implementation of programs will have a lasting impact on workers' physical and mental health. The physical impact would be in the form of fewer physical debilitators such as eye strain, back strain, neck strain, and carpal tunnel syndrome: while the psychological side would realize fewer strains such as tension,

depression, and job dissatisfaction. Again, these benefits were noted with the public service department services employees who experienced physical comfort improvements with minor workstation adjustments that were made by the researcher during the interview process.

5.1.4 Awareness on Office Ergonomics and Job Performance.

The research objective for this result was "to examine significant relationship between Awareness on Office Ergonomics and Job Performance of the Post-Service Department from Public Service Department (PSD) employees". From this study, there was positive correlation between awareness on office ergonomics and job performance. This shown that most of the PSD's staff thought that adequate awareness training and briefing on ergonomic practices will improve staff knowledge on ergonomics. Employees that been assigned with poor ergonomics daily routine task which means repetitive works will tend to experience job performance depreciation. According to Stock (1991), Repetitive, forceful work and the development of musculoskeletal disorders of the tendons and tendon sheaths in the hands and wrists can cause illness that lead to low job satisfaction and performance. This proves with poor ergonomics awareness among employees, it will cause them having illness that directly influences the job performance. Furthermore, every employee had setup their workstation according to their own tastes, where each office equipment that been often used such as stapler, paper puncture and telephone were easily accessible and was not placed far from their seats. Improving the part shelves for better accessibility, reduce walking distance in production to get assembly parts more easily do lessen the strain on the muscle. This can be obtained

by allowing workers to choose their own workstation layout, they can test various new ways of working and work stations, and see the positive result on their job performance (Vink et al., 2006).

However, there were several studies by Rosenmann et al. (2000), Haslam et al. (2002) and Faucett et al. (2002) which was conducted in the mid and late 1920's in the USA, showed that the job performance of experimental subjects did not decrease when lighting levels were considerably lowered for their tasks. These results could suggest that there was no association between the lighting levels (one of ergonomics influence in workplace) and job performance; however, the truth lies with motivation. In a laboratory experiment, people are usually highly motivated to succeed, and will ignore many discomforts. It is doubtful if the same degree of motivation occurs outside the laboratory, in which case ergonomics that causes discomfort may lead to a decline in performance. There can be no doubt that motivation affects performance, and little doubt that ergonomic conditions can affect motivation, but so do many other factors. With the finding from the study above, there were several studies that support and shown that there was relationship between ergonomic environment with job performance. Some PSD's staff had thought that by improvement in ergonomics awareness among organization's staff will decrease the number of occupational health illness. Works that need high physical demand can show how greatly dependent the job performance to ergonomic environment. A research had been conducted among the assembly workers to prove it. The result showed that the quality deficiency together with job performance was increased by three times for conducting daily works with ergonomic problem (Eklund, 1995). Furthermore, Mumford (1972) explained that there was direct relationship between

work pressure with the organization's needs and demand. Occupational awareness and knowledge has a positive relationship with the organization's needs. This could be seen when an organization prioritize factor of safety, comfort and worker safety. With these, workers can produce output at its optimal and thus can increase the productivity of the organization as a whole.

Although in this study, the subjective variables of ergonomic awareness and job performance showed a significant and very high correlation, it would be interesting to attempt to find ways to differentiate between them. None of the previous studies, as far as the researcher knows, has tried to do this. Although it sounds logical that workers in comfortable environments, positions, and situations feel satisfied, and vice versa, and in cases of performance (a hygiene factor by Herzberg) people experience discomfort, the meanings of these constructs are still not fully clear. One way of trying to grasp the possible difference between them is that job performance is more of a psychological construct while comfort, perhaps, is more of a physiological one, because of its strong association with ergonomic practices. By constructing practical and valid testing batteries, such as questionnaires and interviews with specific ergonomics and performance contents, one might be able to achieve this interesting distinction (Le Claire et al., 2006).

As noted previously most ergonomic measures had been designed to identify needs for ergonomic intervention. In this study, methodologically, it was attempted to establish more suitable ergonomic measures for management research. Findings revealed that more research is required on these measures. It became clear, that the components of ergonomic design and ergonomic training appear to be critical to

perceived strain and the perceptions of person-environment fit and control. It may not be suitable to combine the individual components. Nevertheless, this study provides a genesis for ergonomic measures suitable for management research (Bohr, 2000).

5.2 Research Contribution

Prior research has demonstrated that quality deficiency together with job performance was increase by three times for conducting routine task with ergonomics problem (Eklund, 1995). Present study is designed as a findings that could represent as part of ergonomics practices in a government sector. With routine work of the government's employees are mostly occurred in the office, they are a lot of activities related to office ergonomics. From previous study by Buettner (1951) and Lele (1954), employees who do not have the appropriate equipment to their jobs are expose to risk that could extend to injury. Among the most common injury is *carpo tunnels syndrome*. Thus, present research is therefore intended to make contributions to other researcher in literature of office ergonomics practices.

5.3 Limitations and Future Research Directions

There were some limitations had been captured during the study and this section will emphasize on the limitations and suggestion for future research.

5.3.1 Limitations

Undoubtedly, this thesis study had its limitations. The sample size was moderate and may have constrained some of the findings particularly with the employee performance analysis. For instance, a larger sample size may have allowed the data

to converge and to allow the model to fit the data. In addition, differences between the sample regarding the ergonomic design and performance measures may have affected relationships.

Further, all measures were cross-sectional and self-reported. Self-report data has the potential to inflate the observed relationships spuriously, thus, introducing common method variance as an alternative explanation for the findings. However, according to Putz-Anderson (1988), common method variance should be considered seriously when there appears to be a general and pervasive influence that operates in a systematic fashion to inflate the observed relationships. In addition, qualitative should be undertaken to reduce common method variance.

Although pilot studies were conducted to determine the measures' usefulness, all of the scales did not perform well in this study. Perhaps the analysis would have had more success with individual items and not scales, or there were inadequate items in the study (Lindell, 2004).

Other limitations include the presentation's minimal attention to how individual differences job performance and the subsequent outcomes, and its concentration primarily on physical performance and job demands. However, these limitations offer numerous considerations for future research in the ergonomic-stress area (Haslam et al., 2002).

5.3.2 Suggestion for Future Research

In future, the research should be expanded towards relative study of other areas or elements which could contribute to job performance. Firstly, this study only focused

on small sample of employees in Post-Service Department which is one of various department in Public Service Department (PSD). It would be beneficial for future research expansion to other department in PSD. Better ergonomics system and awareness will improve the employees' productivity and job performance. Due to that, the study will be a good benefit to the organization. Lastly, even though the organization was mainly employees that mostly spend their time in the office, there were some employee work as a driver. Future research may consider ergonomic study for the driver that involve in prolong sitting posture include with continuous vibration from the vehicle that could become ergonomics hazard to them.

5.4 Recommendation

Based on literature review, the findings and conclusions from the study, the following recommendations are put forward. Firstly, the study found that there are safety and health concerns affected employees in the form of un-ergonomic office equipment, poor lighting and lack of ergonomic awareness. The establishment and development of safety and health policy to provide safe working environment to the employees at Post-Service Department is strongly advisable. Furthermore, the adoption of risk assessment management by the department to systematically identify risk factors in the office and come out with a proper risk control to deal with them is recommended by this study.

Secondly, employees should be given a periodic training relevant to office ergonomics which emphasize on do’s and don’ts while doing office work activities, the right way to utilize and adjust computer monitor to avoid neck, back and eye strain, correct sitting posture, how to cope with stress in repetitive motion and how to prevent ergonomic related injury in the workplace. The training module should be

consisted of major issues, challenges and detailed knowledge of ergonomic matter so that it could be a medium to enlighten employees indirectly could contribute meaningfully to the improvement of office ergonomic interventions.

Although the scope of this study was limited to workers in the office environment, it is highly stress that ergonomic design and programs are applicable to every job in every industry. It is applicable to those who work in production, construction, and in the service, technical and healthcare industries. It is applicable to those that sit, stand, twist, turn, think, walk, run, and work with heavy equipment. In other words, ergonomics is applicable to every worker who uses a tool (Bohr, 2000).

5.5 Summary

In the previous chapter, results based on specific analyses were presented. Out of which, four hypotheses were accepted. Through regression analysis, a regression equation was derived. Finally, yet importantly, the regression test had managed to confirm the relationship of ergonomic practices towards employee job performance. Inevitably, there needs to be more research on the application, performance and user perceptions of ergonomic practices. A good reason for finding out if ergonomic practice indeed makes a significant difference in workers' performance in real life conditions is that companies could see whether expensive electrical/illumination retrofits really make sense or not.

Most of the previous studies on this matter point to the direction of very positive outcomes. On the other hand, engineers and scientists of the technical fields must keep an open mind when approaching areas that involve human factors,

psychological and other health issues in their relationships with physical environments and environmental systems of ergonomics.

In summary, ergonomics has become an important practice in the workplace as it lowers health costs and affects absenteeism, job performance, and productivity through its role as a stressor preventer. The results from this study indicate that work areas designed to minimize uncomforting should be participative from both employers and employees. Furthermore, evidence suggests that proper ergonomically designed work areas and satisfying ergonomic practice that allows one to understand how to adjust ergonomic practice improves perceptions of person-environment fit and perceptions of control. Lack of these aspects has been linked to low job performance. Accordingly, the implementation of ergonomic practices by management could reduce organizational expenses and increase productivity.

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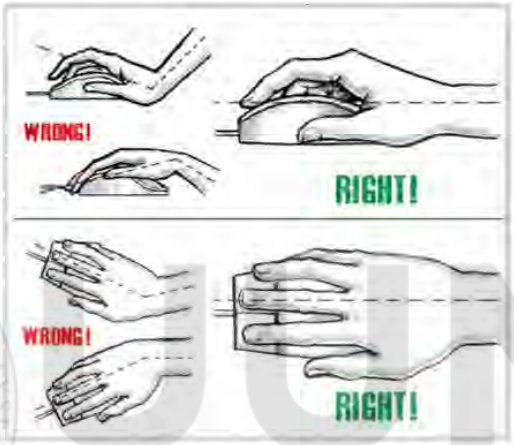
APPENDIX 1

KERTAS MAKLUMAT RESPONDEN

PENGENALAN

Ergonomik adalah sains untuk membuat sesuatu kerja atau perkara dengan selesa atau erti kata lain, ia menjadikan pergerakan lebih selesa dan efisien. Pada definisi mudah, ergonomik bermaksud sains kerja. Maka, ergonomist iaitu pengamal ergonomik telah melakukan kerja-kerja kajian seperti bagaimana kerja dilakukan dan bagaimana untuk bertindak melakukan pergerakan dengan lebih baik.



Contoh cara ergonomik bagi memegang tetikus

Ergonomik meliputi semua aspek pekerjaan berkaitan tekanan fizikal yang meliputi sendi, otot, tendon dan tulang. Alam sekitar juga boleh menjadi faktor penyumbang memberi kesan kepada pendengaran, penglihatan dan keselesaan keseluruhan. Tekanan fizikal termasuk gerakan kerja yang berulang seperti memutar pemutar skru manual secara berterusan atau mengangkat kotak dari bawah ke atas rak berulang kali untuk tempoh masa yang lama. Selain itu, bekerja di kedudukan yang janggal, seperti meletakkan dan menahan telefon ke telinga dengan bahu anda, juga boleh menyebabkan penyakit berkaitan ergonomik.Antara kecederaan yang boleh dialami ketika melakukan perbuatan tersebut adalah seperti tegang otot di bahagian leher.

APA YANG ANDA PERLU LAKUKAN ?

Setiap responden perlu membaca dan memahami perkara di dalam kertas maklumat ini. Kemudian, responden perlu membaca soalan-soalan yang diberikan di bawah dan jawab dengan jujur. Jika anda mempunyai sebarang pertanyaan, anda boleh bertanya terus kepada penyelidik, dan penyelidik akan membantu untuk memberi maklumat lanjut. Butiran penyelidik disediakan pada akhir lembaran ini.

IDENTITI DAN MAKLUMAT RESPONDEN

Semua maklumat yang diberikan oleh responden adalah sulit dan akan dirahsiakan daripada orang lain. Semua maklumat responden hanya diketahui oleh penyelidik dan ia akan digunakan untuk tujuan penyelidikan sahaja.

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Seksyen A : Demografi Responden

ARAHAN : Seksyen ini mengandungi maklumat berkenaan latarbelakang responden. Sila tandakan (/) di dalam kotak yang sesuai.

1. Umur

☐ 18 - 25 tahun ☐ 26 - 35 tahun

☐ 36 – 50 tahun ☐ Lebih dari 50 tahun

2. Jantina

☐ Lelaki ☐ Perempuan

3. Jumlah tahun berkhidmat

☐ Kurang dari 2 tahun ☐ 2 - 7 tahun

☐ 7 - 15 tahun ☐ Lebih dari 15 tahun

4. Apakah tahap akademik anda?

☐ Sekolah Menengah ☐ Diploma

☐ Ijazah Sarjana Muda ☐ Ijazah Sarjana dan keatas

5. Adakah anda mempunyai kesedaran tentang ergonomik dan isu berkaitan dengannya ?

☐ Ya ☐ Tidak

Seksyen B: Prestasi Kerja

ARAHAN: Berikut adalah enam (6) kenyataan yang mana anda mungkin bersetuju atau tidak bersetuju. Menggunakan skala 1-6 di bawah, sila bulatkan satu nilai skala yang menyatakan persetujuan anda terhadap kenyataan yang diutarakan. Sila jawab dengan jujur dan terbuka. Skala 6 point adalah seperti berikut:

1	2	3	4	5	6
Sangat Tidak Setuju	**Tidak Setuju**	**Sederhana Tidak Setuju**	**Sederhana Setuju**	**Setuju**	**Sangat Setuju**

JP1	Persekitaran tempat kerja yang baik memberi impak yang besar terhadap produktiviti pekerja.	1	2	3	4	5	6
JP2	Satu susunan ruang kerja yang sesuai mendorong pekerja menjana output kerja yang efektif.	1	2	3	4	5	6
JP3	Reka bentuk ruang kerja yang terkini adalah penting untuk memastikan produktiviti para pekerja.	1	2	3	4	5	6
JP4	Ruang kerja yang dipengaruhi oleh ergonomik yang sesuai boleh menambahkan produktiviti para pekerja.	1	2	3	4	5	6
JP5	Perubahan reka bentuk sesuatu ruang kerja yang mengandungi alat-alat berteknologi baru amat penting di dalam peningkatan produktiviti para pekerja	1	2	3	4	5	6

Seksyen C: Faktor-faktor yang Menyumbang kepada Pengwujudan Program Ergonomik

ARAHAN: Berikut adalah enam (6) kenyataan yang mana anda mungkin bersetuju atau tidak bersetuju. Menggunakan skala 1-6 di bawah, sila bulatkan satu nilai skala yang menyatakan persetujuan anda terhadap kenyataan yang diutarakan. Sila jawab dengan jujur dan terbuka. Skala 6 point adalah seperti berikut:

1	2	3	4	5	6
Sangat Tidak Setuju	**Tidak Setuju**	**Sederhana Tidak Setuju**	**Sederhana Setuju**	**Setuju**	**Sangat Setuju**

ES1	Ergonomik adalah amat penting dalam memastikan satu persekitaran tempat kerja yang sihat.	1	2	3	4	5	6
ES2	Ergonomik digunakan bagi mengelak kecederaan atau kemalangan di tempat kerja.	1	2	3	4	5	6
ES3	Penubuhan Akta Keselamatan dan Kesihatan Pekerjaan (OSHA 1994) dan Institut Keselamatan dan Kesihatan Pekerjaan (NIOSH) nerupakan satu faktor yang menyumbang kepada kewujudan program ergonomik di dalam organisasi ini.	1	2	3	4	5	6
ES4	Keperluan perundangan Malaysia iaitu Akta Keselamatan dan Kesihatan Pekerjaan 1994, merintis pengwujudan program ergonomik di dalam organisasi ini.	1	2	3	4	5	6
ES5	Perubahan teknologi sebagai contoh, penggunaan komputer, menyumbang kepada kewujudan program ergonomik di dalam organisasi ini.	1	2	3	4	5	6

Seksyen D: Jenis-jenis Amalan Ergonomik di dalam Organisasi Sedia Ada

ARAHAN: Berikut adalah enam (6) kenyataan yang mana anda mungkin bersetuju atau tidak bersetuju. Menggunakan skala 1-6 di bawah, sila bulatkan satu nilai skala yang menyatakan persetujuan anda terhadap kenyataan yang diutarakan. Sila jawab dengan jujur dan terbuka. Skala 6 point adalah seperti berikut:

1	2	3	4	5	6
Sangat Tidak Setuju	**Tidak Setuju**	**Sederhana Tidak Setuju**	**Sederhana Setuju**	**Setuju**	**Sangat Setuju**

A. Rekabentuk Ruang Kerja

WD1	Saya merasakan ruang kerja yang diberikan mencukupi untuk saya menjalankan tugas saya dengan mudah	1	2	3	4	5	6
WD2	Saya merasakan ruang kerja yang diberikan mencukupi untuk saya menjana tugas menggunakan peralatan yang disediakan	1	2	3	4	5	6
WD3	Ruang untuk percetakan di tempat kerja saya diletakkan berasingan daripada kawasan ruang kerja pekerja.	1	2	3	4	5	6
WD4	Di tempat kerja saya, pekerja yang berkongsi proses kerja yang sama diletakkan bersebelahan antara satu sama lain	1	2	3	4	5	6
WD5	Telefon di ruang kerja saya diletakkan di tempat yang mudah dicapai	1	2	3	4	5	6

B. Peralatan Pejabat

EQ1	Kerusi saya selesa dan boleh dilaraskan.	1	2	3	4	5	6
EQ2	Kerusi-kerusi di dalam pejabat ini boleh dilaraskan mengikut kesesuaian setiap pengguna.	1	2	3	4	5	6
EQ3	Kerusi saya menyediakan sokongan belakang yang mencukupi.	1	2	3	4	5	6
EQ4	Meja di ruang kerja saya bersesuaian dengan tugasan yang sedang dilaksanakan.	1	2	3	4	5	6
EQ5	Saya berpuas hati dengan peralatan pejabat saya	1	2	3	4	5	6

Seksyen E: Tahap Kesedaran Amalan Ergonomik di Pejabat

ARAHAN: Berikut adalah enam (6) kenyataan yang mana anda mungkin bersetuju atau tidak bersetuju. Menggunakan skala 1-6 di bawah, sila bulatkan satu nilai skala yang menyatakan persetujuan anda terhadap kenyataan yang diutarakan. Sila jawab dengan jujur dan terbuka. Skala 6 point adalah seperti berikut:

1	2	3	4	5	6
Sangat Tidak Setuju	**Tidak Setuju**	**Sederhana Tidak Setuju**	**Sederhana Setuju**	**Setuju**	**Sangat Setuju**

AW1	Latihan ergonomik harus dihadiri oleh setiap pekerja sekurang-kurangnya sekali dalam tempoh perkhidmatan.	1	2	3	4	5	6
AW2	Latihan ergonomik membantu para pekerja mengambil berat tentang kesejahteraan diri mereka sendiri.	1	2	3	4	5	6
AW3	Prinsip-prinsip keselamatan seharusnya digabungkan di dalam program orientasi pekerja-pekerja baru.	1	2	3	4	5	6
AW4	Latihan diadakan bagi memastikan pengetahuan dan kemahiran yang diajar diaplikasikan secara konsisten dan betul oleh setiap pekerja.	1	2	3	4	5	6
AW5	Saya merasakan saya menerima latihan ergonomik yang secukupnya.	1	2	3	4	5	6

Terima kasih kerana meluangkan masa untuk mengisi soal selidik ini.. Maklumat yang anda berikan di sini akan dianggap sebagai sulit. Semua maklumat responden hanya diketahui oleh penyelidik dan ia akan digunakan untuk tujuan penyelidikan sahaja.

APPENDIX 2

```
RELIABILITY
  /VARIABLES=AW1 AW2 AW3 AW4 AW5
  /SCALE('AW') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE.
```

Reliability

[DataSet1] C:\Users\U\Data Analysis.sav

Scale: AW

Case Processing Summary

		N	%
Cases	Valid	109	100.0
	Excluded[a]	0	.0
	Total	109	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.821	5

```
RELIABILITY
  /VARIABLES=EQ1 EQ2 EQ3 EQ4 EQ5
  /SCALE('EQ') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE.
```

Reliability

[DataSet1] C:\Users\U\Data Analysis.sav

Scale: EQ

Case Processing Summary

		N	%
Cases	Valid	109	100.0
	Excluded[a]	0	.0
	Total	109	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.843	5

```
RELIABILITY
  /VARIABLES=ES1 ES2 ES3 ES4 ES5
  /SCALE('ES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE.
```

Reliability

[DataSet1] C:\Users\U\Data Analysis.sav

Scale: ES

Case Processing Summary

		N	%
Cases	Valid	109	100.0
	Excluded[a]	0	.0
	Total	109	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.830	5

```
RELIABILITY
  /VARIABLES=WD1 WD2 WD3 WD4 WD5
  /SCALE('WD') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE.
```

Reliability

[DataSet1] C:\Users\U\Data Analysis.sav

Scale: WD

Case Processing Summary

		N	%
Cases	Valid	109	100.0
	Excluded[a]	0	.0
	Total	109	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.879	5

```
RELIABILITY
  /VARIABLES=JP1 JP2 JP3 JP4 JP5
  /SCALE('JP') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE.
```

Reliability

[DataSet1] C:\Users\U\Data Analysis.sav

Scale: JP

Case Processing Summary

		N	%
Cases	Valid	109	100.0
	Excluded[a]	0	.0
	Total	109	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.837	5

APPENDIX 3

```
CORRELATIONS
 /VARIABLES=JP ES WD AW EQT
 /PRINT=ONETAIL NOSIG
 /STATISTICS DESCRIPTIVES
```

Correlations

[DataSet1] C:\Users\U\Data Analysis.sav

Correlations

		JP	ES	WD	AW	EQT
JP	Pearson Correlation	1	.809**	.802**	.895**	.717**
	Sig. (1-tailed)		.000	.000	.000	.009
	N	109	109	109	109	109
ES	Pearson Correlation	.809**	1	.714**	.828**	.652**
	Sig. (1-tailed)	.000		.000	.000	.001
	N	109	109	109	109	109
WD	Pearson Correlation	.802**	.714**	1	.841**	.951**
	Sig. (1-tailed)	.000	.000		.000	.000
	N	109	109	109	109	109
AW	Pearson Correlation	.895**	.828**	.841**	1	.790**
	Sig. (1-tailed)	.000	.000	.000		.000
	N	109	109	109	109	109
EQT	Pearson Correlation	.717**	.652**	.951**	.790**	1
	Sig. (1-tailed)	.009	.001	.000	.000	
	N	109	109	109	109	109

**. Correlation is significant at the 0.01 level (1-tailed).

APPENDIX 4

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT JP
  /METHOD=ENTER ES WD AW EQT.
```

Regression

[DataSet1] C:\Users\U\Data Analysis.sav

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EQT, ES, AW, WD[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: JP

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2
1	.959[a]	.919	.916	.17523	.919	190.239	4	104

a. Predictors: (Constant), EQT, ES, AW, WD

Model Summary

Model	Change Statistics
	Sig. F Change
1	.000

a. Predictors: (Constant), EQT, ES, AW, WD

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.094	4	5.273	190.239	.000[a]
	Residual	2.883	104	.028		
	Total	23.977	108			

a. Predictors: (Constant), EQT, ES, AW, WD

b. Dependent Variable: JP

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.156	.131		-1.192	.236
	ES	.264	.105	.276	2.515	.013
	WD	.219	.087	.235	2.370	.015
	AW	.923	.127	.829	7.294	.000
	EQT	.239	.092	.259	2.604	.011

a. Dependent Variable: JP