

**OFFICE ERGONOMICS ASPECTS AND THEIR EFFECTS ON EMPLOYEE
PRODUCTIVITY IN SELECTED PARASTATALS IN NAKURU COUNTY,
KENYA**

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Fulfillment of the Requirement for the Award of Master of Business Administration
(Human Resource Management Option) Kabarak University**

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DECLARATION AND APPROVAL

Declaration

This project is my original work and has not been presented for a degree in any other University or institution of higher learning and this is to the best of my knowledge.

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Approval

This project has been submitted for examination with our approval as University supervisors

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DEDICATION

I dedicate this project to my spouse, (Ben Aketch), my child Katie, and my parents for believing and supporting me in all ways. I am and will be forever grateful.

ACKNOWLEDGEMENTS

My great appreciation and thanks goes to the Almighty God for his grace and good health. Secondly, to my supervisors Dr. MainaWaiganjo and Mr. Philip Ragama who passionately encouraged and guided me. I equally salute the staff of Kabarak University library for their services. I am also indebted to my dear friends and family who encouraged and stood with me on many occasions. I also feel quite much indebted to my colleagues at Kabarak University MBA Human ResourceManagementgroup for their continuous support.

ABSTRACT

Ergonomics is about how key components of an office, for example, physical work settings, unique characteristics of an employee, organizational characteristics and workstation equipment are customized to fit and improve representative wellbeing and execution. The relationship between office ergonomics and employee productivity has not been exhaustively explored and research already done has not shown how these ergonomic aspects influence productivity. This study therefore sought to investigate the effects of office ergonomics aspects on employee's productivity in selected parastatals in Nakuru County, Kenya. More specifically, the study investigated the effect of physical work settings, work station equipment, organizations characteristics, and employee's unique characteristics on employee productivity. The study adopted a descriptive survey design approach to establish whether there's a link between office ergonomics aspects and employee productivity. It considered a population of 385 employees in ten parastatals in Nakuru County, from which a sample of 113 was selected using stratified random sampling with probability proportional to sample size technique. Structured questionnaires were used in data collection. The key limitations of the study were; small sample size, time span of the study and conclusions which were based on primary data. However all these were prudently managed to ensure consistent results. Multiple regression and correlation analyses were applied in the analysis of the data to determine the relationship between the variables. The study established a strong positive correlation, 0.651 with significance of $p=0.000<0.05$ between physical work environment and employees productivity, Further finding indicated established a strong positive correlation 0.456 with significance of $p=0.000<0.05$ between workstation equipment and employees productivity. In terms of individual unique characteristics, the study established strong positive significant correlation 0.612 with significance of $p=0.00<0.05$, whereas results indicated strong positive significant correlation 0.256 with significance of $p=0.007<0.05$ between organizational characteristics and employees productivity. The analysis was done with the help of Statistical Package of Social Science and the results presented in tables, graphs and pie charts for better understanding. The study established that physical work environment factors and individual worker's unique characteristics factors had significant effect on employee productivity whereas work station equipment and organizational characteristics had insignificant effect on employee productivity in selected parastatals in Kenya. The study concluded that physical work settings, work station equipment, unique characteristic of an individual and the organizations characteristics influenced productivity of employees. The study recommended that parastatals should carry out workstation ergonomics evaluation to establish the items in the workstations that need adjustment and those which need replacement so that they can fit the ergonomics standards of their work force. The Parastatals should re-design the jobs further with flexible time to allow for personal and family activities.

Key words: office ergonomics, office ergonomics aspects, Physical work settings, Workstation equipment, Individual worker's unique characteristics, Organizational characteristics, Employee productivity.

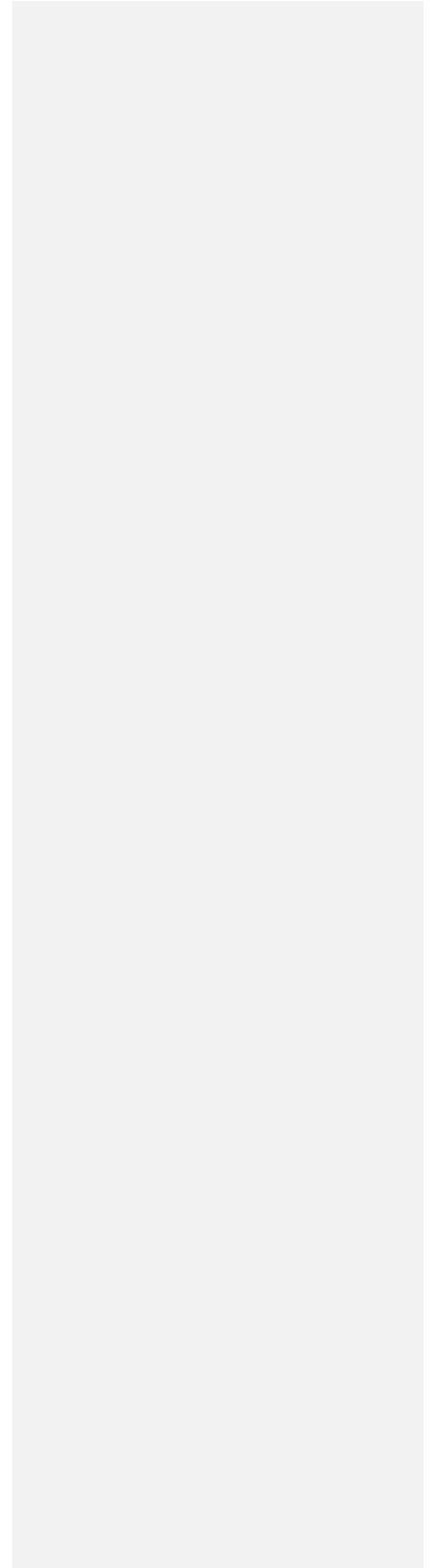
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LIST OF ABBREVIATIONS

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CTD	Cumulative Trauma Disorders
MSD	Musculoskeletal Disorders
VDU	Video Display Units
VDT	Video Display Terminals
WRMSD	Work Related Musculoskeletal Disorder

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

An office is understood to be a place where clerical work is performed and where all kinds of paper work is maintained and dealt with. The details of the work depend on the type of business that are involved in, but will usually include using computers, communicating with others by telephone or fax, keeping records and files. It is a central place where all sorts of clerical work are done to coordinate and control all the affairs of the organization. The main purposes of an office are to direct and co-ordinate the activities of the various departments and to plan the policies of the business and ensure their implementation. Features of an office such as people, space, equipment, furniture and the environment, must fit together well for workers to feel healthy and comfortable and to be able to work efficiently and productively (Chopra, 2009).

In the late 19th century, commercial offices for conducting business first appeared in the United States, The railroad; telegraph and then the telephone were invented allowing for instant remote communication, Ismaila and Samwel(2014). Wherever manufacturing existed, for example in a mill or factory, the administrative office could now be placed at a distance. Other inventions that promoted the office included: electric lighting, the typewriter, and calculating machines. By the 20th century, nearly 100,000 people in the United States were working as secretaries, stenographers, and typists in an office. The average worker was employed for sixty hours per six-day work week. Specialized training was now available for people who wished to study office skills (Ismaila& Samuel, 2014).

The birth of the white collar worker and the office meant that for many hours a day office workers would be sitting and conducting tasks. Ergonomics is the optimizing of the experience between human beings, and the designed objects and environments they interact with, and has played a large role in the design of objects used in the modern

office. It is the applied science of equipment design intended to reduce operator fatigue or discomfort (Roper and Yeh, 2007).

Ergonomics emerged as a scientific discipline in the 1940s as a consequence of the growing realization that, as technical equipment became increasingly complex, not all of the expected benefits would be delivered if people were unable to understand and use the equipment to its full potential. Initially, these issues were most evident in the military sector where high demands were placed on the physical and cognitive demands of the human operator. As the technological achievements of World War 2 were transferred to civilian applications, similar problems of disharmony between people and equipment were encountered, resulting in poor user performance and an increased risk of human error. The analysis of poor performance, of what became known as man-machine systems, now human-machine systems, provided a growing body of evidence which could be linked to difficulties faced by the human operator. This stimulated research by senior academic and military physiologists and psychologists and led to further investigations of the interactions between people, equipment and their environments (Ismaila& Samuel, 2014).

The need for the natural fit between the humans and their tools is assumed to have started in the early stages of the development of the human species. Pre-historic men discovered and engineered many different tools to fit their needs of bare necessities like hunting and eating. In fact, the science of ergonomics appears to have gained momentum in ancient Greece as some piece of evidence indicates that Hellenic civilization in the fifth century BC used ergonomic principles in the design of their tools, jobs, and workplaces. For example, Hippocrates gave a description of not only how a surgeon's workplace should be designed but also how the tools he uses should be arranged (Ismaila&Samwel 2014).

The archaeological records of the early Egyptians dynasties also showed that tools, household equipment, among others were made using ergonomic principles.

In the nineteenth century, Frederick Winslow Taylor started the Scientific Management method when he proposed a way to find the optimum method for carrying out a given task. Taylor found that he could, for example, triple the amount of coal that workers were

shoveling by reducing the size and weight of coal shovels until the fastest shoveling rate was reached. Frank and Lillian Gilbreth expanded Taylor's methods in the early 1900s to develop Time and Motion Studies. They aimed to improve efficiency by eliminating unnecessary steps and actions. By applying this approach, the Gilbreth's reduced the number of motions in bricklaying from 18 to 4.5, allowing bricklayers to increase their productivity from 120 to 350 bricks per hour. The Second World War prompted greater interest in human-machine interaction as the efficiency of sophisticated military equipment like airplanes could be compromised by bad or confusing design. Design concepts of fitting the machine to the size of the soldier and logical/understandable control buttons evolved. After Second World War, the focus of concern expanded to include worker safety as well as productivity (Ismail&Samwel 2014)

Ergonomics is an exceptionally essential issue in organizations on account of different reasons, for example, the increasing expenses connected with business related wounds and disorder, lawful prerequisites, weight from worker's organizations and back up plans, and the proof that ergonomics projects can decidedly influence the nature of production (Rowan & Wright, 1994).

As indicated by Washington state bureau of work and industry report (2002), Ergonomics considers how key components of an office, for example, computers, seats, lighting, clamor level, room temperature, and so on could be customized to fit and improve representative wellbeing and execution. It is an instrument which managers and administrators can use to forestall wounds in the workplace; it helps in diminishing these wounds by adjusting the work to fit the individual as opposed to constraining the individual to adjust to the work. The accomplishment of ergonomic exertion is measured by enhanced profitability, effectiveness, cost reduction, a method of supporting and encouraging diversity, wellbeing and acknowledgment of the resultant framework plan and enhanced nature of human life (Services Division Washington State Department of Labor and Industries, 2002).

1.1.1 Employee productivity

Productivity has different meanings at various levels of analysis, in different jobs, different industries, and different contexts. The meaning also depends on the measures examined and the purpose of the assessment. The definitions of productivity are numerous and have evolved as the science of work, technologies, organizational practices, and fluctuations in the economic climate have changed (Smith & Bayeh, 2003).

According to Bernolak (1997) the basic meaning of productivity is how and what an individual can produce with his efforts from the resources he uses. It's the relationship between what is produced and the resources used in its production.

An employee's productivity may differ due to many factors such as his or her ability and effort, the tools available the organization of work and the environment (Bernolak, 1997).

Creating a work environment in which employees are productive is essential to increased profits for an organization, corporation or small business. Principles of management that dictate how, exactly, to maximize employee productivity center around two major areas of focus: personal motivation and the infrastructure of the work environment. Employee productivity can be improved through various means such as motivation, Praise, setting goals that correspond to the actual work being done, Creating disciplinary guidelines, creating a system of tangible rewards and healthy level of communication and by providing right tools and a healthy physical work environment (Linkages, Integration, Council, & Harris, 1994).

Al-Anzi (2009) as mentioned by Kingsley (2013) suggests that the key factors that affect employee productivity and performance fall into two categories namely management driven factors and factors that arise from premises, offices or factory design. Some of the management driven factors that tends to affect employee's productivity and performance include organization plans such as the allocation of responsibilities at all levels of the organization, definition of job descriptions and the degree of access to the management and administrative support needed to complete their tasks, working patterns, shift-

working, break times, absence or holiday cover and health and safety policies, including the provision of training, development of safe working practices and the adequate supply of protective clothing and equipment. Factors that arise from premises, offices or factory design include factors such as furniture, workspace availability, light intensity, weather/temperature, ventilation/humidity, noise/vibration, premises hygiene/welfare facilities (Kingsley 2013).

1.2 Statement of the Problem

In practice, office ergonomics aspects at the workplace have gained considerable attention and research has revealed that more than 50 % of workers' time is spent interacting with office equipment and office environment (Brown, Albert & Croll, 2007).

The Government of Kenya has provided a framework to guide employers on how to take care of their employees in matters of safety and health. In section VI, of the Kenya's Occupational Safety and Health Act of 2007, the legal provisions set out, seeks to promote health and safety of workers by stipulating the ergonomics standards to be adhered to at the work place. The fundamental objective of this Act is to enhance workers capabilities to improve productivity. The Act recognizes that workplace equipment, physical work settings, individual worker's unique characteristics, and the organizational elements as important aspects of the employee – work environment fitness. All these should be aligned with the prescribed safety and health standards in the Act.

However, some Kenyan Parastatals have paid little attention to the components of ergonomics, namely; workplace environment, equipment, unique characteristics of an individual worker and the organization as a whole. A research study conducted by Ronald (2012) on motivational strategies for parastatal workers in Nakuru and Koibatek counties indicated these organizations have poor working conditions, inadequate office facilities and equipment, high rate of employee complaint, high turnover rate and poor employee productivity. The study also indicated that the workplace environment was not conducive, appropriate working tools and protective equipment were inadequate, and that ergonomics in general was not being observed among other conditions.

The prevailing situation in the many Kenyan parastatals has compromised service delivery as reported by Ronald (2012), who claims that this situation in the parastatals has led to the decline in the growth of the economy from an average GDP growth rate of 2.3 % in the 1990s to 1.1% in 2000s as indicated by world bank report (World Bank Report 2003).

While these facts remain, researchers have not focused their efforts to find how these ergonomic aspects influence productivity hence the quest for the study. Therefore this study seeks to investigate the effects of office ergonomics on employee's productivity in selected parastatals in Nakuru County, Kenya.

1.3 Objectives of the study

The general objective of the study is to determine the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya.

1.3.1 Specific objectives

- i) To assess the effects of physical work environment on employee productivity among selected parastatals in Nakuru County in Kenya.
- ii) To analyze the effect of work station equipment on employee productivity among selected parastatals in Nakuru County in Kenya.
- iii) To analyze the effects of individual worker's unique characteristics on employee productivity among selected parastatals in Nakuru County in Kenya.
- iv) To assess the effects of organizational characteristics on employee productivity among selected parastatals in Nakuru County in Kenya.

1.4 Research Hypotheses

H₀₁: Physical work environment factors have no significant effect on employee productivity in selected parastatals in Kenya.

H₀₂: Work station equipment has no significant effect on employee productivity in selected parastatals in Kenya.

H₀₃: Individual worker's unique characteristics have no significant effect on employee productivity in selected parastatals in Kenya.

H₀₄: The organizational characteristics have no significant effect on employee productivity in selected parastatals in Kenya.

1.5 Significance of the study

By exploring the link between office ergonomics aspects and their effects on employee productivity, this study will contribute to the provision of information necessary for educating the management and workers. Specifically, the results of the study may benefit in the following areas; it will reveal areas that need to be addressed for effective design of office equipment to boost employee productivity. There's need for managers to understand the individual workers unique characteristics because this can enable them in acquiring appropriate office equipment which can make work easier and more comfortable for workers hence improved productivity and finally, the study will provide a framework for designing a conducive physical office environment for employees in order to improve their productivity.

1.6 Scope of the study

The study focused on office ergonomics aspects, such as Physical work settings, workstation equipment, organizations characteristics and individual workers unique characteristics and their effects on employee productivity in selected parastatals geographically limited to Nakuru County. The target population was ten parastatals and the data was collected from the entire employees in these parastatals. The study was undertaken in August and September 2016.

1.7 Justification of the study

A positive, collaborative and creative work environment is what attracts and retains the employees in the long run and motivates them to work harder. Office ergonomics is therefore an important issue to employees because great energy can be created by an attractive, comfortable, physical environment and work equipment. This energy

ultimately enhances productivity and success, Al-Anzi(2009) as mentioned by (Kingsley, 2013).

In developed countries, the research on office ergonomics and their effects on employee productivity has received substantial attention, However, in Kenya, research on office ergonomics as one of the means to enhance productivity has had very little attention, therefore the researches which have been conducted pertaining this area in Kenya is scanty and few data concerning the same are available.

1.8 Limitations and Delimitations of the Study

1.8.1 Limitations of the Study

The study on effects of office ergonomics on employee productivity was conducted in parastatals in Nakuru region only. This implies that a small sample size was used, which may be insufficient for the study, however, to deal with this anticipated limitation, the sample was randomly selected from all the identifiable organizations, units and groups at selected parastatals to ensure fair and adequate representation.

The time span within which the study was conducted to some extent put a limit to the depth to which the theme of the study could have been analyzed. However, time was prudently managed within the scope of the study to ensure that the objectives of the study are met.

The study and conclusions were based on primary data, which was basically the responses of the respondents; and thus had not represented the actual situation on the ground due to personal perspectives and beliefs. However, the questionnaire was tactfully structured to help identify inconsistencies, traces of bias and lack of objectivity in responses.

1.8.2 Delimitations of the Study

The researcher took the responsibility of informing respondents on relevance of the study and assuring them of confidentiality of their information.

1.9 Assumptions of the Study

The study was based on the assumption that the respondent understands the elements of office ergonomics and the questions they are being asked about their offices. It's also assumed that they were well conversant with the factors affecting their performances as individuals in the organization and the effectiveness of office ergonomics principles, and that effective office ergonomics is a reliable instrument in measuring productivity.

1.10 Operational Definitions of Terms

Ergonomics -ergonomics is the science of designing the job to fit the worker, rather than physically forcing the worker's body to fit the job (Roper and Yeh, 2007). In this study the same definition is retained.

Employee Productivity- Employee productivity is how and what an individual can produce with his efforts from the resources he uses. It's the relationship between what is produced and the resources used in its production (Bernolak, 2009). In this study the term means evaluating the productivity of employees in an office building through individual measures by checking on their health issues, absenteeism rate, safety rules violation, punctuality and job satisfaction.

Individual Employee's Unique Characteristics: this involves what each of the employees does on the job on a daily basis. It differs from a job description which usually contains generic job requirements, because it gathers information about how a specific worker does his or her job (Washington State department of labor and industries, 2002). In this study, individual employee's unique characteristic considers the employees age, gender, training and education.

Office Ergonomics: A branch of ergonomics which deals with office environment, which considers how key elements of an office such as computers, chairs, lighting, noise level, room temperature, etc. could be tailored to fit and enhance employee health and

performance (Washington state department of labour and industry 2002).The same definition of office ergonomics is retained for this study.

Office Ergonomics Aspects: A branch of ergonomics which deals with office environment, which considers how key elements of an office such as workstation equipment, physical work settings, individual worker's unique characteristics and the organizational characteristics could be tailored to fit and enhance employee health and performance (Washington state department of labour and industry 2002).The same definition of office ergonomics aspects is retained for this study.

Organizational Characteristics:Organizational characteristics deals with issues at the department or company-wide level, such as staffing levels,assignment of responsibilities, work schedules, overtime policies and other aspects of what are typicallyconsidered "working conditions." These issues are typically outside the control of individual employees, but theycan have the greatest impact on risk factors such as repetition and static loading, as well as the duration ofexposure to all risk factors (Mcfee, 2005). The same definition is retained for the study.

Physical Work Settings:Physical work settings includes components of the tangible workplace environment that comprise employee's working conditions such as clean indoor air, safe drinking water, ergonomic workstation designs, violence and aggression-free work environment and available technologies (Washington state department of labour and industry 2002).According to this study, the physical work settings includes factorssuchaslighting and glare, temperature, humidity and noise, office design, all of which affect employee comfort and performance.

Work Station Equipment: It includes tools and equipment a worker uses while performing his duties in an office.Workstation Analysis looks at the physical components of the workstation, such as monitor and keyboard, work surfaces, and chair adjustments. Each of these components is measured relative to the individual worker(Pheasant 1996).

According to this study, the workstation equipment includes furniture, computers and other accessories used in an office.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of ergonomics concept, insight to the importance of office ergonomics, elements of office ergonomics, the theories that have shaped the understanding of office ergonomics, the empirical framework of office ergonomics and the concepts of the effect office ergonomics on organization productivity.

2.2 Theoretical Review

2.2.1 The general system theory

The system theory was developed by biologist Ludwig von Bertalanffy in 1936. He felt the need for a theory to guide research in several disciplines because he saw striking parallels among them. His hunch was that if multiple disciplines focused their research and theory development efforts, they would be able to identify laws and principles which would apply to many systems. This would allow scholars & scientists to make sense of system characteristics such as wholeness, differentiation, order, equifinality and progression. With a common framework, scientists could better communicate their findings with each other and build upon each other's work (Begley, 1999).

General systems theory emphasizes the way in which organized systems (human and non-human) respond in an adaptive way to cope with significant changes in their external environments so as to maintain their basic structures intact. In predicting overall system performance, office ergonomics must not only provide design guidance to minimize or eliminate health and safety issues but should also deliver positive organizational outcomes such as enhancing recruitment, retention and productivity (Lahiri, Gold, & Levenstein, 2005).

Sociotechnical system approach represents a complete design process for the analysis, design and implementation of a system. The approach is based on open system theory and emphasizes the fit between social and technical systems and the environment. The approach includes methods for analyzing the environment, the social system and the

technical system. The overall design objective is the joint optimization of the social and technical system.

Participatory ergonomics system approach is the application of ergonomic principles and concepts to the design process by people who are part of the work group and users of the system. These people are typically assisted by ergonomic experts who serve as trainers and resource centers. The overall goal of participatory ergonomics is to capitalize on the knowledge of users and to incorporate their needs and concerns into the design process. Methods such as focus groups, quality circles and inventories have been developed to maximize the value of user participation. Participatory ergonomics has been applied to the design of the jobs and work places like quality circle approach which was adopted by the refrigerator manufacturing company that needed a system wide method for assessing the issues of aging workers (Salvendy, 2012).

User centered system approach represents an approach where human factors are of central concern within the design process. It is based on an open system model and considers the human and technical sub systems within the context of the broader environment. User centered approaches propose general specifications for systems design such as the system must maximize user involvement at the task level and the system should be designed to support cooperative work and allow user to maintain control over operations. Essentially, the design approach incorporates the user requirements, goals and tasks as clearly as possible into the design of a system.

Design of work environment is an important aspect of work system design. Systems exist within a context and the characteristics of this context affect the overall system performance. The primary concern of work system design is to ensure that the work environment supports the operator and the activity performance and allows the worker to perform task in an efficient, comfortable and safe manner. Important issues include workplace and equipment layout, furnishings, reach dimensions, visual dimensions and the design of the ambient environment (Salvendy, 2012).

2.2.2 Interdependencies among Ergonomics Principles

Office ergonomics must not only provide design guidance to minimize or eliminate health and safety issues, increasingly, the discipline needs to deliver positive organizational outcomes such as enhancing employee recruitment, retention, and productivity. Even when implementing a health management system for documenting and treating health symptoms, a comprehensive, multi-component approach will likely be more effective than independent, one-time interventions Chapman and Pelletier, (2004) as mentioned by (Brand 2011). In order to meet such ambitious demands, a broader, systems view for office ergonomics must be adopted, such a framework fully acknowledges the influence of additional psychosocial, sociotechnical, and organizational layers beyond individual human-workstation interactions. It begins by embracing the interdependencies of the human body as a dynamic biomechanical system. For example, wrist postures cannot be evaluated independently of elbow position, and therefore the design of keyboards or mice cannot be optimized without also considering the design and placement of forearm or wrist support (Brand 2011).

Optimal desk surface or input device heights cannot be provided without knowledge of seat height and seat pan angle. Whether or not a foot rest should be recommended depends somewhat on seat height, seat back angle, and seat pan angle as well as on knee clearance considerations related to desk surface height, placement of input devices, and the relative position of these components to one another. Maintaining neutral postures and neutral loadings for users requires simultaneous design of the physical components of the environment, their spatial relationships to one another, the user's behavioral interaction with each component, and task requirements (Brand, 2011).

2.2.3 Theoretical Framework flowchart

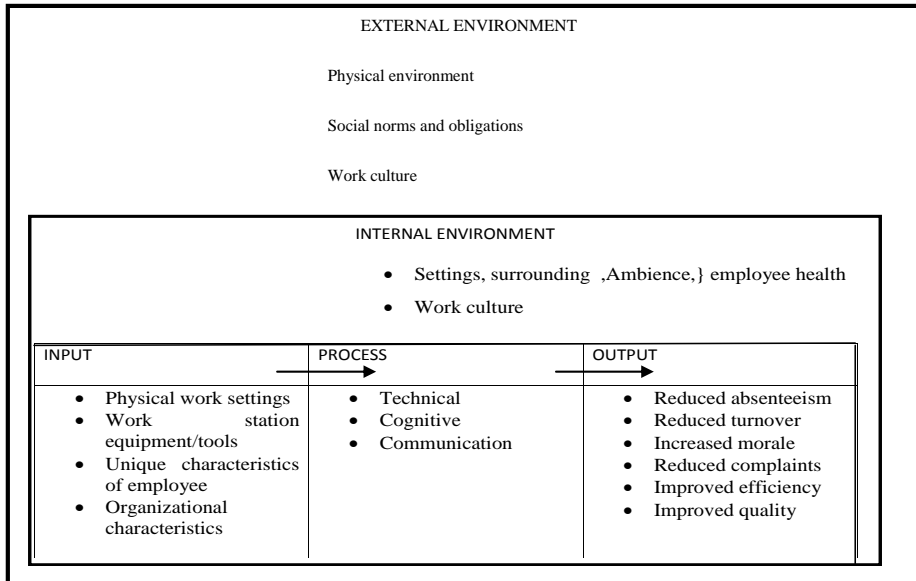


Figure 2.1: Theoretical framework flowchart.

Source: (Washington state department of labour and industries, 2002).

2.3 Overview of Ergonomics Concept

Ergonomics can be defined simply as the study of work. More specifically, it is the science of designing the job to fit the worker, rather than physically forcing the worker's body to fit the job. Adapting tasks, work stations, tools, and equipment to fit the worker can help reduce physical stress on a worker's body and eliminate many potentially serious, disabling work-related musculoskeletal disorders. Providing a workplace free of ergonomic hazards can be beneficial for an organization in the following ways: Lower injury rates and MSD incidences, Increase productivity because workers are more comfortable, Improve product quality because workers are more concentrating on what they are doing, Reduce absences because workers will be less likely to take time off to recover from muscle soreness, fatigue, and MSD-related problems; Reduce turnover as new hires are more likely to find an ergonomically designed job within their physical

capacity, Lower costs as workers' compensation and other payments for illness and replacement of workers go down; Improve worker safety, Increase worker comfort, Reduce worker fatigue and Improve worker morale (OSHA 2000).

2.3.1 Elements of office ergonomics

Ergonomics deals with many issues, starting with a single employee and their workstation, and expanding out to include an entire department or organization. The focus of ergonomics is always on designing for the individual employee, who brings unique characteristics with her or him to the job. Some of these characteristics, such as height and age, cannot be changed, while others, such as training and experience, can be changed (Washington state department of labour and industries, 2002).

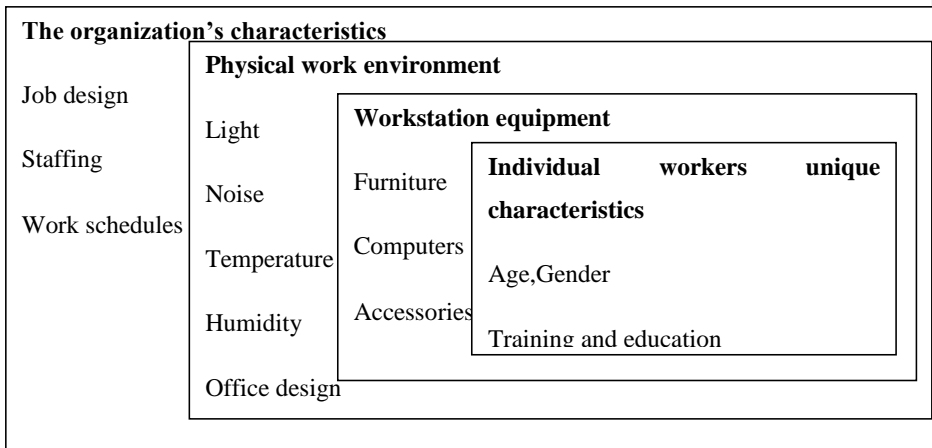


Figure 2.2 Elements of an office environment

Source: (Washington state department of labour and industries, 2002).

2.3.2 Physical work settings

According to office ergonomics practical solutions for a safer workplace (2002), the physical work environment components include office light, temperature, noise level and the office design. A well designed workplace are physical environments that allow individuals to perform distraction -free work, collaboration and impromptu interactions, accommodation of personal work styles and workstation personalization, individual control of thermal comfort, access to daylight, control of glare, and ergonomic accommodation among other factors.

Office noise and employee productivity

Office noise is defined as an unwanted sound, it's a phenomenon that confronts human factors and professionals in many settings and applications, it is a sound that is undesirable or offensive in some aspect, however, the distinction is largely situational and listener specific as perhaps best stated in the old adage that one person's music is noise to the other. Unlike some common ergonomic related stressors such as repetitive motion or awkward postures, noise is a physical stimulus that is readily measurable and quantifiable. The need for attention to office noise is indicated when noise creates sufficient intrusion and operator distraction such that job performance and job satisfaction are compromised and when noise creates interference with important communication and signals such as inter-operator communication (Salvendy, 2012).

Today, many companies use open plan office design intended to increase communication, interaction and productivity, however, studies indicate that these open interactive spaces augment noise in the work place. The American society of heating and air conditioning engineering recommend that open plan office have a noise range criterion between 49 and 58decibels so as not to interfere with verbal communication and complex mental work.

Several studies of noise in workplaces have documented noise levels from a low of 42 decibels to a high of 60 decibels. For ideal work settings, office workers themselves have chosen sound level of between 48 and 52 dB. Research indicates that prolonged exposure to noise reduces office workers motivation. These findings can have serious consequences in the workplace where employees and organizations are expected to compete in a rapidly changing economy (Salvendy, 2012).

Noise in the office almost never reaches a level where it is harmful to the employees hearing, but it can be a distraction that is detrimental to performance and productivity. The following conditions can act as a guide if people are unsure if noise levels are unacceptable. When noise levels are above 80 decibels (dB) people have to speak very loudly to be heard, between 85 and 90 decibels people have to shout to be heard, greater than 90 decibels people have to move very close together and shout to be heard. Apart from hearing loss and other direct health effects noise can be detrimental to communication and performance. In the early 1980s, in the United States, it was estimated that over 9 million workers were exposed to noise levels averaging over 85 dBA for an 8-hour workday. Today, this number is likely to be higher because the control of noise sources, in both type and number, has not kept pace with the proliferation of industrial and service sector development. Due in part to the fact that before the first OSHA noise exposure regulation of 1971 there were no U.S. federal regulations governing noise exposure in general industry, many workers over 50 years of age now exhibit hearing loss that results from the effects of occupational noise (Salvendy, 2012).

Office light and employee productivity

Natural light raises the neurotransmitter in the brain called serotonin, a chemical that has a large impact on mood, disposition and the ability to handle stress. The more serotonin released, the better an individual's mood, as well as their ability to deal with stress. The brightness of office light affects alertness, concentration, and task performance. Adjusting the type and quality of light can significantly improve working experience and productivity. Benefits of improved lighting include, reduced glare, increased productivity, improved work quality and energy savings (Boubekri 1995).

Office lighting can have a considerable effect on both comfort and performance. Harsh, excessively bright fluorescent lighting can cause eye strain, especially when it creates glare on computer monitors. Too little lighting can also result in eye strain when working with paper documents, as well as a "gloomy" atmosphere in which to work. Windows can cause lighting and glare problems as well, although most employees prefer to have natural light and a view, given the choice. Direct sunlight can create light levels many times brighter than what is needed for office work (Washington State Department of Labor and Industries, 2002).

Light is not only an essential prerequisite and the medium by which workers in an organization are able to see but good lighting design aims to create perceptual conditions and orient employee's safety while promoting a feeling of well-being in a particular environment. There are four different types of lighting in an office environment which can be adopted, ambient lighting which is the general room lighting and is usually in the form of direct recessed or ceiling mounted fluorescent tube, too low ambient lighting can be gloomy. Task lighting is used to individually light the workers specific task area. A good task light is the best combination of bright, flexible and directional. Accent lighting is used to light specific objects such as works of art or to help balance room brightness level. Natural light can come from windows, glass doors or skylights. The general considerations to be addressed in the workplace which can help maximize a workers' productivity include brightness and contrast of light, glare, and the color of light (Anshel, 2002).

Office temperature, humidity and employee productivity

Indoor temperature is one of the vital elements in an office building. It has various effects on the building's inhabitants, which include employees' thermal comfort and work performance; it can also be an indicator of sick building syndrome, Seppanen et al. as mentioned by Ali, Chua, and Lim (2015). According to guidelines on Occupational Safety and Health in the office, it must be possible to customize the temperature in office buildings. For instance, employees who are sitting nearer to direct sunlight will feel warmer compared to those who are sitting under the air-conditioning vent. However,

advice from the Department of Occupational Safety and Health in the Ministry of Human Resources, Malaysia states that the temperature should be kept between 23 and 26°C. Humidity on the other hand means the amount of water vapor content in air. If the amount of water vapor in the air is low, it will cause extreme dryness in the throat, nose and especially the eyes. Referring to the Industry Code of Practice on Indoor Air Quality, for office buildings, it can be seen that the optimum comfort range for relative humidity is approximately from 40 to 70 per cent (Ali et al, 2015).

Other research has shown an optimal office temperature to be between 70 and 73 degrees Fahrenheit. This degree provides the best temperatures for maximum worker productivity. The research also found that a few difference in degrees in case of using a median may cause a dramatic difference across the entire organization. Sometimes as temperatures increase, productivity may decrease and as temperatures decrease, productivity increases. Therefore the employer should consider a number of factors to determine the optimal temperature in an office; these factors may include season, clothing, weight, age, and climate/altitude (Ali et al, 2015).

According to the international labor office, the office premises should neither be too hot nor too cold. Excessive heat can strongly influence working capacity by decreasing productivity and increasing errors and accidents. Heat stress may increase fatigue and lead to heat induced illness. On the other hand, excessive cold temperatures can increase the risk of cumulative musculoskeletal disorders especially if the work is done by exerting forces when the body is cold. Excessive long exposure to cold may result in permanently damage to the tissue and may even lead to hypothermia, an abnormal low body temperature (Gross, 1997).

Air quality and employee productivity

Air quality has a significant effect on employee performance and productivity because in offices with adequate ventilations and windows which can open and close effectively to allow adequate air circulation, fewer symptoms of sick building syndrome can be displayed. Ventilations and exhaust pipes should be located properly for sufficient emission of polluted air from office toilets (Roelofsen 2002).

A number of credible studies have shown that indoor air quality can have a significant effect on employee productivity, for example, a series of laboratory studies at Lawrence Berkeley Laboratory (LBL) examined typing speed and accuracy, as well as addition and proofreading error rate, with and without a section of 20-year-old carpet present in the room. The carpet, which was known to emit volatile organic compounds which were used and produced in the manufacture of paints and adhesives was hidden from the subjects. Results found a 4 percent improvement in speed and accuracy when the carpet was absent (Siegel 2014).

A similar study found a 10 percent improvement in call center talk times when additional fresh air ventilation was provided, In many of these studies, the inhabitants made no complaints and were unaware of any issue with respect to the air quality (Health & Breuer, 1999).

Office design

Office design centers on open plan versus closed offices. Haynes (2008) states that office design should match the work that is being carried out in such offices. He includes that poorly designed offices can hinder productivity of up to 35 billion pounds every year. The research carried out by Gensler (2005) and cited~~stated~~ by Haynes (2008) identifies the impacts of office working environment has on improving productivity by, that is, 19% increase in case of appropriate office layout.

Allen et al as mentioned by Hynes (2008) evaluated a number of offices in United Kingdom and proposed that workplace layout can be used to increase collaboration and openness thereby improving employee performance, he proposed that an office layout should be matched with the kind of involvement of individuals required to perform a given task in order to support the work process. He claimed that productivity losses could be attributed to the mismatch of the office environment and the work that is being carried out. He also identified four metaphors to help understand various work patterns which can be attributed to different office layouts and designs such as a hive, which is an office characterized by individual routine process work with low level of interactions and individual autonomy cell, which is individual concentrated work with little interaction

and high level of autonomy, a den, which is an office associated with group process work, interactive and not highly autonomous, typically arranged in the open plan or a group room and a club which is an office associated with knowledge work, both highly autonomous and highly interactive, and a variety of shared task setting (Hynes 2008).

2.3.3 Workstation equipment

The workstation equipment includes the office chair, desk, computer, and other accessories that the office worker uses while performing daily office duties (Pheasant 1996).

Office desk

Nowadays, virtually all office chairs are adjustable for height. In the UK, however, adjustable office desks remain something of a rarity, elsewhere in the world adjustable desks are more common, for example in Australia, the repetitive strain injury epidemic of the 1980s acted as a major stimulus to the improvement of working conditions in offices. Economically, adjustable height desks are the preferred solution for office work, particularly if this is intensively screen-based. A fixed height desk may be regarded as an acceptable second best, provided that the floor level is adjustable, which in practice may be achieved in part by the provision of footrests where required. The British Standard for Office Furniture specifies a height of 720 ± 10 mm for a 'general purpose office desk; this figure is given for the recommended height for the surface on which the keyboard is placed. Office desks are made to a standard height; office workers are no (Pheasant 1996).

The standard desk is satisfactory for the average person, but for people who are markedly shorter or taller than average it can cause serious problems particularly for intensive screen-based keyboard work, where the potential long-term consequences of a mismatch are likely to be greater. To reach an appropriate working height in relation to the keyboard, an office worker with short legs working at a standard height desk will have to adjust her chair to a level that is too high for comfort; as a consequence she will tend to perch on the front edge of the seat, thus losing the support of the backrest. This may lead to back problems and worse, if she lowers the seat, however, she will commonly end up

working with her shoulders hunched and her elbows raised out sideways. This becomes uncomfortable to the worker and may lower her productivity. On the other hand, the desk top must be large to allow the screen to be placed at a suitable viewing distance and permit the user some degree of flexibility in where she places the keyboard. The recommended office desk should have an ample space for both writing and accommodating other equipment such as telephone and computers. The desk should have drawers for storage and adjustable keyboard holders. These help preventing the impingement of desk space and reduce clutter. It also provides convenience for workflow and adjustability. The overall space that is needed will of course depend also on what other items live on the desk (Pheasant, 1996).

Office chair

The look and feel of an office plays a role in employee productivity. Sitting all day long in uncomfortable chairs is bound to disrupt workers' concentration as they shift in their seats throughout the day. An office space that feels disjointed and bland tends to produce less innovation than an office space that inspires. To meet the requirements of a range of users the height of the seat should be easily adjustable from the sitting position. The height range that is required will in principle depend upon whether the seat is to be used with an adjustable desk or a fixed height desk. A height range of 380– 535 mm should thus in principle meet all eventualities, concerning the seat tilt, some modern office chairs incorporate a rocking mechanism in the seat such that it may be tilted forwards and backwards. Bendix and Biering (1983), as mentioned by Pheasant (1996) report a trial in which it was found that subjects preferred a seat that was free to tilt between an angle of 5° forwards and 5° backwards compared with seats fixed in either position. Experience indicates, however, that many users actively dislike tilting seats; so again it is important that the user should be able to lock the tilt mechanism in place if he or she wishes. Some keyboard users like to support their elbows on the arms of a chair as they work and inasmuch as it reduces the static loading on the muscles of the neck and shoulder girdle,

this can help reduce fatigue. An alternative which achieves the same end is to support the wrists (Pheasant, 1996).

Adjustable task chairs are recommended for workers who spend a considerable amount of time seated, especially if they work at a computer or other job which does not allow for a lot of movement. The adjustments and features on a task chair are intended to provide support and allow workers to vary their posture throughout the day. These features also make the chairs to provide to workers who have an injury or who do not fit well into standard chairs.

Standard office chairs typically lack many of the adjustment features of a task chair, although they should have the following: an adjustment for seat height, good lumbar support, a waterfall front edge, a five star pedestal, casters and a swivel base. A standard chair is acceptable for office jobs that have a variety of tasks and frequent opportunities to stand and move around. However, care should be taken to ensure that a standard chair fits the worker well and is comfortable (Washington State Department of Labor and Industries 2002).

The national institute for occupational safety and health dictates that office chairs should be at least vertically adjustable, should have back raised or lowered, back should be reclined or locked and should have the seat pan tilt or remain flat depending on the job function, Chairs and desks should accommodate the range of height and sizes of users. Most importantly, users should be given instruction on how to adjust the workstation for themselves and why it is important (Attaran&Wargo, 1999).

Accessories

Other tools such as telephone headsets, electric staplers, keyboard wrist pads, and ergonomic pens, letter openers and staple removers make the job easier. Especially in repetitive functions, the more stresses eliminated through the use of ergonomic tools, the more productive employees will be. With the reduction of stresses on the body, repetitive motion injuries are also reduced (Mohsen 1999).

Computers

Video display terminals have become a part of daily work for millions of workers in offices, commerce and industry and the main health related issues brought about by VDT are visual harm, musculoskeletal disorder, and psychological stress which may affect an individual's productivity. The international business machines (IBM) states that the above arise from poor workstation design and organization. At traditional office workplaces the risk of constrained postures is low, since workers perform a variety of activities. Given such working conditions no employee will mind or complain if the design of the workplace is not optimal. However, unsuitable settings will be of crucial importance for people who adopt a constrained posture when working with VDTs or other office machines. Every inadequacy of design or dimension will, in the long run, generate static efforts associated with muscle fatigue, stiffness and pains in the neck, shoulders, arm and hand region. This is the reason why adjustable VDT workstations have appeared on the market in the last few years, mainly with the argument that a workstation should be adaptable to the different anthropometric features of employees (Grandjean & Gr, 2002).

Grandjean and Gr , (2002) tested 30 trained female typists. The group had a normal distribution of body statures, 166 cm, thirteen subjects wore glasses. Only two subjects reported pains in neck and shoulders during the last few weeks. The keyboard was 8 cm above the desk level. A support for forearms and wrists was provided, the chair had a high backrest and an adjustable inclination was also provided. The subjects typed a text of five lines on the screen and afterwards copied the same text again and again for 10 minutes. The preferred dimensions were assessed before, during and after the 10 minute typing test. After that the subjects had to repeat the typing tasks with imposed settings. The experiments with preferred and imposed settings revealed an increase in physical discomfort in the neck— shoulder— arm region under the conditions of imposed keyboard height and screen distance.

Musculoskeletal problems, stress and fatigue are associated with task performed by the VDT operator and other intrinsic and extrinsic factors such as complexity, monotony,

over or under qualifications of the worker, interpersonal relations, therefore opportunities should be provided for VDT operators to have some human interactions during the day and also periodic rests for postures and eyes should also be provided. Tasks should also be varied to overcome stress and jobs should be designed to incorporate change in patterns of activity. Employers should provide congenial rest areas convenient to the operators but separate from the work station. These helps break fatigue cycle and allow quicker recovery from the stressful effects of the VDT work. Computer aided work places should be checked periodically in order to ensure no emission of radiation and the employer should also provide radiation shielding on VDU's (Satish, Kalla, & Ravishankar, 2014).

2.3.4 Individual workers unique characteristics

They include factors, such as height, gender and age, which cannot be changed, while others, such as training and experience, can be changed.

Age

Research in social psychology supports the idea that younger and older workers differ in their orientation towards self, others and work. These differences may lead to different motives for job performance for example older employees are more inclined to focus on feelings of personal importance and interpersonal values. Wagner and Rush (2000) as mentioned by Nasurdin and Khuan, (2011), older workers tend to view their organization as a source of social satisfaction whereas younger workers are more likely to be consumed by the need for economic security and success (NasurdinandKhuan 2011).Wagner and Rush (2000) hypothesized that attitudes such as job satisfaction, pay satisfaction, organization commitment and trust are more related to ultraistic behavior among younger employees whereas self-monitoring and moral judgment are more pronounced for older employees. This is because as people grow older, they are more inclined to place emphasis on socially responsible norm of benevolence (Nasurdin&Khuanl 2011).

In order to provide effective solution for older workers, the facility managers must take into account that physical capabilities decline with age and physical decliners related to age include speed movement, fatigue and motor skills. People lose 5 % of the strength at the age of 20 and by the age of 55, the loss grows to 20%, also as people grow, muscle tissues injured by overexertion generates more slowly. Bones of older people are prone to fracture more frequently because these bones become more porous with age. The common musculoskeletal disorder among the aging employees includes back pain, hand pain, and shoulder/arm pain. Sixty two percent of men and women between 51- 61 years report one or more MSD and these are the common cause of disability among aging worker (Roper &Yeh, 2007).

Since ageing workforce is one of the factors contributing to cumulative trauma disorders, workplace managers must take CTD into account when creating and updating office environments. They should come up with ways to combat CTDS and MSDS such as coming up with ways in reducing extreme joint movement since it's one of the causes of CTD'S. They should also minimize work conditions that require extreme and unusual postures such as twisting the spine such as mounting shelving at an appropriate height, they should also have proper workplace design setup such as ergonomically designed seating and providing workers with large and varied number of tasks to perform and provide rest periods for workers by giving breaks in work routine and promoting exercise (Roper &Yeh, 2007).

In the workplace, older workers tend to have more valuable experience that contributes to organizations productivity than younger ones hence they tend to achieve satisfactory performance. They are also subject to natural age-related conditions that compromise peak performance. Attention to ergonomic and human factors principles in office furniture and work practices can help offset aging's negative effects and enhance older workers' ability to effectively contribute to organizations objectives. Other studies based on supervisors' ratings typically did not find any clear systematic relationship between the employee's age and his/her productivity. A meta-analysis by Waldman and Avolio (1986) as mentioned by Skirbekk (2004) based on 18 supervisor assessment samples,

found a slight negative impact of age on job performance and argue that only a small part of the productivity variation could be attributed to age (Skirbekk, 2004).

Gender

Men and women are different with regard to physical capacity and muscular strengths. In some scholarly writing, and in some popular opinion, women are generally held to be less productive than men. If not always entirely explicit, the contention is there, at least as an important undercurrent. Historically, however women were plainly viewed to be less productive than men in most situations. This might have been due to lack of physical strength, lack of initiative, family responsibilities, more sick days, and jobs were correspondingly divided into those suitable for each sex, such as light work for women and heavy for men. In periods where women had extensive family obligations, such as caring for small children, they may on average be less productive than men in the same age groups (Habib and Messing 2012). Gender and sex cannot be altered like a poor work schedule or a wrong table height. Yet an understanding of gender, sex and other sources of diversity can lead to innovative and successful interventions that ensure better health and productivity for all workers. One example concerns what lawyers call systemic discrimination, the kind of subtle discrimination whereby treating different populations equally creates inequality. A simplified example of systemic discrimination well known to ergonomists would be a workplace requiring both men and women to wear the same work boots, despite considerable differences in hip, knee and foot angles and dimensions Krauss (2008), as mentioned by Habib and Messing (2012). Both men and women tend to act differently to work schedules in that women with families may tend to work for shorter periods in order to find time to attend to their families, whereas men with families may want to work for longer hours in order to get extra money which can enable them support and meet their family needs (Habib & Messing 2012).

In a research conducted by Chung and Wang (2011), as mentioned by Pheasant (1996) which focused on the different anatomical structures of men and women that affect walking speeds and peak pressure. He found that each group has a different pressure distribution at different walking speeds, suggesting footwear should be designed

specifically for each gender. In another study on workspace design for weavers, [if](#) was found that anthropometric dimensions/description of body size and shape, to be important risk factor for musculoskeletal symptoms and explored guidelines for workstation design, suggesting interventions that better adapt equipment to women's size and shape (Pheasant, 1996).

Education and training

Experience has shown that buying new furniture alone does not reduce discomfort or risk of injury. Very often, employees will not adjust [to the](#) new furniture properly, partly because they have not been taught proper posture, and partly because they may not know how the adjustment mechanisms operate. They may not even know that their furniture is adjustable, and they'll leave it in the same position in which it was given to them. Employees may also feel that good posture, rest breaks, and good work habits are not that important, so they need to be educated on the possible consequences of not changing their workstations or their work methods (Washington State Department of Labor and Industries 2002).

Several research studies have shown that the application of ergonomic principles and programs in almost all workplaces results in an increase in productivity and, in fact, decreases WMSDs. Prior investigations conducted on the effectiveness of office ergonomic training reported improvements in knowledge and workstation habits reduced the incidence of MSDs. One particular study used various educational interventions that included posters, emails, stretching diagrams, information on stress relief activities, workshops and informational booklets. The provided material was shown to increase the overall understanding of the workers regarding the issue of cumulative trauma disorders. The support enabled the workers to make substantial changes to their hand/wrist and neck/shoulder posture when using computers. Robertson, Amick, and DeRango as mentioned by (Abareshi, Yarahmadi, Solhi&Farshad, 2015).

In another study, intervention consisted of a physician contacting the workers' supervisor and an occupational physiotherapist conducting an ergonomic assessment at the worksite.

The results demonstrated that, after eight weeks, both the proportion and magnitude of productivity loss was lower in the intervention group in comparison to the control set. Recent research by Heuvel et al. as explained by Abareshi et al (2015) examined the effect of two modifications, namely taking extra breaks and performing exercises during these breaks and their influence on sick leave and productivity. The findings from the study demonstrated positive and encouraging results. There was an increase in terms of productivity upon utilizing both amendments. No effects on sick leave were conformed.

A study by DeRango (2003) who specifically designed a study to assess the productivity effects of interventions in an organization. The interventions were delivered to two groups and one group was a control. One intervention group received a highly adjustable chair and training in office ergonomics whilst the other group received only the training and was taught to adjust their existing chair. Reports of pain were collected repeatedly. Productivity measures were provided from data collected by the organization and was sales tax collections per effective workday. Sick leave data as hours per month was also collected. The researchers examined the effect of the interventions on total productivity and on a health mediated model whereby the effect of pain on productivity was estimated. This allowed investigations of the improvements in productivity which was associated with improvements in pain scores which are less likely to be affected by the Hawthorne effect. Whilst they found that there was no significant effect of the interventions on sick leave hours they found that the 'chair with training' intervention improved overall productivity and that this improvement was sustained during the 15-month study period. The chair-with-training intervention also significantly reduced pain reports at a magnitude of approximately 9 to 10 %. When these improvements in pain scores were considered alongside productivity data it was found that a one-point improvement in pain was associated with an improvement of productivity of between \$13 and \$19 (Taylor & Green, 2008).

Lewis et al (2001) as mentioned by Taylor and Green (2008) firstly implemented an ergonomics training program for computer users and then assessed its effectiveness in terms of workers compensation costs and injury rates for musculoskeletal disorders associated with computer use before and after the training program. They found that

whilst the number of claims was higher following training the costs of the claims were much less than in the pre-training period and the average injury rate per 1000 employees was less. Lewis et al concluded that programs that provide employees with the necessary ergonomics knowledge and skills regarding proper workstation setup may be effective in reducing the injury rates and costs associated with those injuries. In summary, training, particularly in combination with other interventions, has a positive effect on productivity and is likely to have financial benefits for an organization (Taylor & Green 2008).

2.3.5 The organization's characteristics

Organizational analysis includes both business-wide and department-wide issues that are beyond the control of a single employee, the organizational analysis includes factors such as job design, staffing and work schedule (OSHA 2002).

Job design

Job design is defined as the process of deciding on the content of a job in terms of duties and responsibilities of the jobholders, on the methods to be used in carrying out the job, in terms of techniques, systems and procedures and on the relationships that should exist between the job holder and his superiors, subordinates and colleagues. Factors affecting job design include organizational factors, environmental factors and behavioral factors. Two important goals of job design are to meet the organizational requirements such as higher productivity, operational efficiency and quality of product/service, to satisfy the needs of the individual employees like interests, challenges, achievement or accomplishment and to integrate the needs of the individual with the organizational requirements (Rao, 2010).

According to OSHA (2000), job design is the process of putting together various elements to form a job, bearing in mind organizational and individual worker requirements, as well as considerations of health, safety, and ergonomics. In a good job design, employees should have the option to vary activities according to personal needs, work habits, and the circumstances in the workplace. It should also give employees a sense of accomplishment, Include training requirements so employees know what tasks to

do and how to do the tasks properly, provide good work/rest schedules and provide feedback to the employees about their expected performance (OSHA 2000). Scientifically structured job design motivates the employees for higher efficiency, productivity and generates job satisfaction than the one designed on the traditional basis. Job enrichment loads the job vertically. It means adding duties and responsibilities that will provide for skill variety, task identity; task significance, autonomy and feedback on job performance. It tries to deal with dissatisfaction by increasing job depth as work activities from a vertical slice of the organizational unit are combined in one job.

According to the literature, organizations can enhance their productivity through reorganizing tasks and jobs. For example, an organization can allow workers to perform narrowly defined jobs specialization. Under specialized task assignment, workers can invest in and perfect their specialties. Thus, specialization can result in a productivity increase. However, assigning workers to broadly defined jobs multitasking can also enhance productivity by facilitating the flexible use of labor and encouraging inter-task learning of workers (Rao, 2010).

Staffing

Staffing is concerned with the recruitment, selection, placement, evaluation and promotion of individuals in an organization. It focuses on matching the capabilities and inclinations of prospective candidates against the demands and rewards inherent in a given job. After identifying the sources of human resources, searching for prospective employees and stimulating them to apply for jobs in an organization, the management has to perform the function of selecting the right employees at the right time. The obvious guiding policy in selection is the intention to choose the best qualified and suitable job candidate for each unfilled job. The objective of the selection decision is to choose the individual who can most successfully perform the job from the pool of qualified candidates. The selection procedure is the system of functions and devices adopted in a given company to ascertain whether the candidates' specifications are matched with the job specifications and requirements or not. Selection of personnel to man the organization is a crucial, complex and continuing function. The ability of an organization to attain its

goals effectively and to develop in a dynamic environment largely depends upon the effectiveness of its selection program. If right personnel are selected, the remaining functions of personnel management become easier, the employee contribution and commitment will be at optimum level and employee-employer relations will be congenial. In an opposite situation, where the right person is not selected, the remaining functions of personnel management, employee-employer relations will not be effective (Rao, 2010).

Work schedules

A work schedule includes the days of the week and times of the day a particular employee is scheduled to work at a job. In some cases adding temporary staff rather than requiring employees to work overtime at a repetitive task may have long-term financial advantages due to reduced injury costs. Likewise, if the employee adjusts the scheduling to spread out highly repetitive tasks over a longer time, rather than letting a job wait until it requires lengthy repetitive work; the employee may lessen the risk of WMSD's (OSHA 2000).

Flexi time - requires that employees must complete an agreed number of hours within a set time frame, but allows them a certain amount of discretion in terms of when those hours are worked. For example, some employees prefer to start and leave work one hour early, to avoid busy commuting times. Usually flexi time arrangements stipulate that workers must be present at certain peak hours of the day to maintain the efficiency of the organization. Flexi time may have the effect of creating irregular working hours although these are often under the control of the employee. The major application of flexi time is in office environments such as public administration and financial services where they provide organizational benefits to the employees with no loss to the employer. Part-time work may be irregular in its timing and its duration. Generally, legal and collectively agreed overtime regulations apply to full-time employment relationships. One result of this is that overtime bonuses for part-time staff are only required to be paid beyond the same absolute number of hours as is applicable for full-time workers, Thus part-time

contracts offer companies considerably greater bonus-free room for flexibility than do full-time contracts. They also seem to result in a high degree of turnover (Spurgeon, 2003).

2.3.6 Employee health

Health and safety programs are concerned with protecting employees and other people affected by what the organization produces and does against the hazards arising from their employment. Occupational health programs deal with prevention of ill-health arising from working conditions.

Occupational hygiene is the province of chemist and engineer or ergonomist engaged in the measurement and control of environmental hazards. Research by health and safety executive (2004a) established that the tangible benefits from better health and safety management include higher productivity, lower absence rate, avoiding the cost of accidents and litigations, improved staff morale and good employee relations (Armstrong 2006).

Recent reviews indicate that workplace health promotions interventions can make important contributions to employee health. Dugdill et al (2008), as mentioned by Ljungblad, Granström, Dellve, & Åkerlind, (2014), found that there is a positive effect of workplace physical activity interventions on physical activity behavior. The vast majority of workplace health promotion studies in the literature is based on data analyses at individual level and consists of evaluations of specific intervention programs. According to Ljungblad et al (2014), there is moderate evidence that workplace health promotion interventions involving exercise, lifestyle, and ergonomics decrease sickness absence and productivity while educational and psychological means applied alone appear to be less effective.

2.4 Empirical literature

In a study conducted by Smith and Bayeh (2003), the research examined whether ergonomics workstation improvements led to increases in worker productivity in computerized call center jobs. The general belief was that ergonomics improvements in workstation design, layout and postural support would result in productivity improvements. The participants were assigned to Group A, B, and C. Within an ergonomics improvement condition and the ergonomics corrections were consistent. The ergonomics improvements were incremental in nature starting with training for all participants about ergonomics principles, musculoskeletal injuries and good working habits. Workers in Group C had corrections made using simple adjustments and repositioning of technology and materials, but no new components or equipment. In Group B worker workstations received new accessories like keyboard tray, foot rest, document holder, and/or wrist rest to provide the improvements in layout, and postural support of the arms and the legs. The Group A workers received the new accessories and also a new chair that provided better back support, and easier seat pan height adjustment. The changes observed showed small overall improvements in the mean output values for each ergonomics improvement group, and a small mean decrease for the control subjects. The findings indicated that there was an average improvement in total units processed correctly per hour for the combined ergonomics improvement group of about 5% compared to an average decreased productivity of about 3% for the control group post-intervention (Smith & Bayeh 2003).

Numerous studies have also shown that indoor climate impacts both health and performance, which in turn affect productivity. Discomfort factors can decrease employees focus on their works. However, employees can focus more when high temperature is reduced by the use of air conditioning equipment. Several studies conducted by Lorsch and Abdou (1994), as mentioned by Kamarulzaman, Saleh, Hashim, Hashim, and Abdul-Ghani(2011), shows that when the air-conditioning system was introduced, employees feel that their work space becomes more comfortable and the productivity tends to increase by 5-15 percent because they can concentrate on their work. This statement explains that when an employee feels comfortable with the

workplace environment, things that can distract their work can be reduced and they can perform better. Hence, from the literature review by other researchers indicate that productivity decreases by 2% per each degree over 25 degree C and presented the link between a decrement in productivity and high indoor temperature. Heat can cause insufficient energy which not only increases the rate of accidents but can also seriously affect productivity. Therefore as a conclusion it is indirectly explained that the office environment would influence the actions of an employee. Cramped, disorganized, dirty and dusty work space could also give pressure to employees and this could affect their work (Kamarulzaman et al., 2011).

Sound or noise problem in an office is something that could not be avoided. Studies have shown that when sound is turned off, errors in work are reduced and productivity increases. Sundstrom, Town, Rice, Osborn, and Brill (1994) as mentioned by Kamarulzaman et al (2011) identified noise as an ambient stressor relating to job satisfaction in the work environment. These researchers mentioned that noise not only containing speech, but sound produced by phone, copier, and keyboard causes disruption. The disruption in performance cannot be attributed to the presence of speech alone. The conclusion of the study was that researchers need to analyze the questions of what type of noise at what intensity affects which type of task performance. Other studies have found that open office noise can be stressful and demotivating. As jobs become more technologically complex, the frequency of stress-related disorders in work environments increases. Office workers, in particular, consistently report the ability to concentrate without noise and other distractions to be one of the most important aspects of the work environment (Kamarulzaman et al., 2011).

According to the research conducted by Kingsley (2013) on the impact of office ergonomics on employee productivity, the finding from the study to a considerable extent validates and brings to reality the widely accepted assumption that a better workplace environment motivates employees and produces better results. The study demonstrated that office ergonomics deficiencies at the Petroleum House which includes outdated office design and décor, inadequate office illumination, un-ergonomic office furniture,

unsuitable office design and décor have variedly impaired the performance of an average Ghanaian National Petroleum Corporation employee by between 20 to 80 percent. The findings from the study show that the current office layout at the Petroleum House typifies outdated and inefficient cellular office design prior to its modernization. The experience underscores the need to design office ergonomically to ensure that the workplace environment suits employee needs, functions and enhances performance.

According to the Health and Safety Executive (2007), as mentioned by Kingsley (2013), failure to observe ergonomic principles may have serious repercussions, not only for individuals, but the whole organization. Much well-known work related accidents might have been prevented if ergonomics had been considered in designing the jobs people did and the systems within which they worked. It emerged from the study however, that 33.0 percent of the respondents felt that their office environment had impacted negatively on their health, while 15.0 percent actually confirmed having suffered an injury or illness due to the nature of their office environments. These results uphold the assertion made by the HSE that some of these injuries that reduces employee performance may have been prevented if adequate ergonomic interventions were in existence at the Petroleum House (Kingsley 2013).

Another research conducted by Shikdar and Al-Kindi (2007) on office ergonomics, deficiencies in computer workstation design, Physical layout and the dimensions of the workstations indicated a significant deviation from the recommended designs and parameters. It was found that the components of computer workstations did not conform to recommendations. Usual office tables to put computers on, semi adjustable chairs and office chairs, lack of wrist rests, locating computers facing windows, and poorly laid out offices contributed significantly to ergonomic problems. Reported health symptoms were caused by ergonomic deficiencies in the computer workstation systems. It was evident from the results that some employees were using office tables for their computers, office chairs, and semi adjustable chairs. Most employees did not have document holders that are important for minimizing back and neck bending, especially for those who spend a lot of time on data entry. There were no wrist rests, either. These conditions, coupled with

long hours of computer usage, could cause body discomfort and musculoskeletal problems (Shikdarand Al-kind 2007).

2.5 Research gap

According to the literature above, most researchers did not consider all the aspects of office ergonomics and how these aspects influenced employee productivity. Most of the previous researchers in their studies were more focused on a single factor that could give an effect on employee's performance at work. However, no study was done to examine the relationships between the whole factors of office ergonomics and how they influence employee's productivity. Therefore this paper presents a literature review of several office ergonomics factors which directly or indirectly affect employees work productivity. Several factors of office ergonomics such as the effects of physical work settings, workstation equipment, individual worker unique characteristics and the organizational characteristics and how they affect employee's productivity are discussed.

2.6 Conceptual Framework

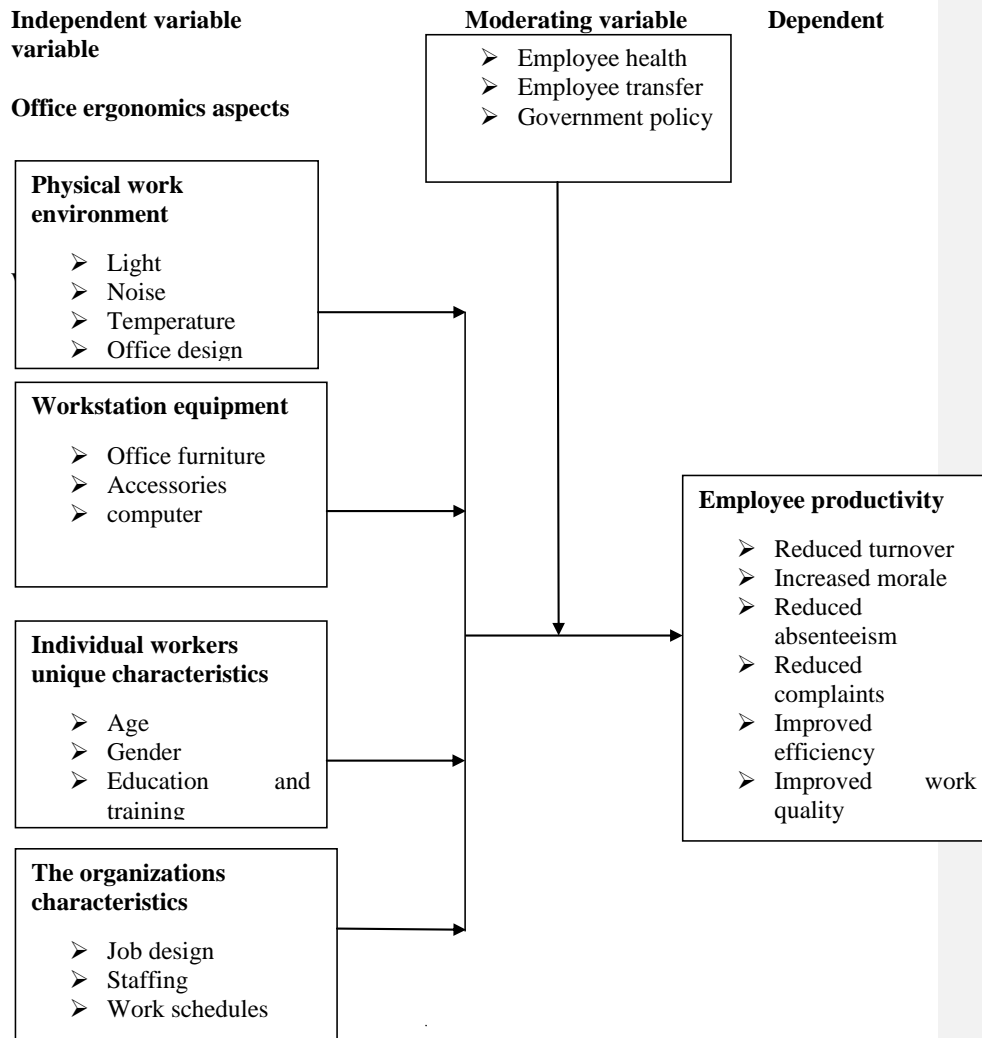


Figure 2.3:Conceptual framework

Source: Researcher 2016

The conceptual framework highlights the relationship between dependent, independent and the intervening variables in the evaluation of office ergonomics aspect and employee productivity. The researcher sought to investigate whether physical work environment affects employee productivity. This helped in identifying the effects of physical work environment factors such as light, temperature, humidity, noise and office design on employee productivity. The study also investigated the work station equipment, individual workers unique characteristics and the organizations characteristics by testing how these factors affected employee's productivity by reducing absenteeism,turnover, complaints and by improving efficiency in the selected parastatals. The intervening variable was established to determine whether independent variables were favorable or unfavorable to the employees.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was used to carry out this study. It includes the research design, target population that was studied, sampling design procedures and sample size, the data collection procedures, the instrument that was used in data collection and how data was analyzed and presented.

3.2 Research Design

According to Mugenda and Mugenda (2003), research design is the basic plan that indicates an overview of the activities that are necessary to execute the research project which consists of procedures used to test the predictable relationships and natural phenomena thus providing answers on how the variables under study should be defined, measured and related to each other.

The study adopted a descriptive survey design approach. This is whereby information is collected by interviewing a sample of individuals to determine their opinion, attitude and habits concerning an idea (Orodho and Kombo 2002). The data was collected in an attempt to describe accurately as possible the current situations of office ergonomics affecting employee productivity of parastatals in Nakuru County.

3.3 Target Population

According to Ngechu (2004), a population is a well-defined set of people, elements, group of things or households that are being investigated. The target population of this study was 385 employees from ten parastatals in Nakuru County. The main respondents were the top middle and low level carders of these organizations.

Table 3.1: Target population

Population	Employees
1. Kenya Revenue Authority	56
2. Kenya Power	66
3. Geothermal Development Company	58
4. Telecom Kenya	18
5. Post Bank	15
6. Kenya Post and Telecommunication	24
7. National Housing Corporation	40
8. Cereal Board of Kenya	36
9. Kenya Pipeline Company	44
10. Kenya Farmers Association	28
Total	385

Source: County Government of Nakuru, 2016

3.4 Sampling Procedure and sample size

According to Mugenda and Mugenda (2003), the purpose of sampling is to secure a representative group which enabled the researcher to gain information about an entire population when faced with limitations of time and funds. Stratified random sampling is one in which the population is divided into subgroups or strata, and a random sample is then selected from each subgroup. When a few characteristics are known about a population, stratified random sampling is preferable because the population may be arranged in subgroups and then a random sample may be selected from each of these subgroups (Latham, 2007). Stratified sampling method was used to select the parastatals in Nakuru County targeting the top, middle and lower level employees of each parastatal. This decision was informed by the fact that employees at all levels of organizations need ergonomics standards in order to be productive.

Tenstratas was formed and a sample was drawn from each strata using simple random sampling with proportional to the size.

The sample size was computed using Nassiuma (2000) formulae as illustrated below:

$$n = \frac{N * C^2}{C^2 + (N - 1)e^2}$$

Where

n = sample size

N = target population size

C = coefficient of variation (0.21)

e = error term (0.025)

Calculation of sample size

$$n = \frac{385 * [0.21]^2}{[0.21]^2 + [385 - 1][0.025]^2}$$

$$= 112.3489 \approx 113$$

A sample size of 113 respondents results from the above formula.

Stratified proportional allocation is used to allocate sample sizes in various strata. The following formula is used.

$$n_h = \left(\frac{n}{N}\right) N_h$$

Where n = sample size; n_h = sample size for strata

N = total number of respondents in all parastatals

N_h = total number of employees in a parastatal

Table 3.2: Stratified Proportional Sample Size

Name of Parastatal	Respondent Employees	Employee size	Sample size
			$n_h = \left(\frac{n}{N}\right) N_h$
1. Kenya Revenue Authority	56		16
2. Geothermal Development Company	58		17
3. Kenya Power	66		19
4. Telecom Kenya	18		5
5. Post Bank	15		5
6. Kenya Post Corporation	24		7
7. National Housing Corporation	40		12
8. Cereal Board of Kenya	36		10
9. Kenya Pipeline Company	24		14
10. Kenya Farmers Association	28		8
TOTAL	385		113

[Source: research data 2016](#)

3.5 Data Collection Procedures and Instrument

Data was collected using primary source method since primary data is the first hand information obtained from respondents through use of questionnaires and interviews.

The researcher conducted a pilot test after which the necessary amendments were made and finally the questionnaire was administered to the respondents.

The questionnaires contained structured questions to capture the ratings of the effects of office ergonomics on employee productivity.

3.6 Validity and Reliability of the Instrument

Validity is the accuracy of the research instrument to measure what is intended to be measured. To establish validity, the instrument was discussed among the Kenya revenue authority employees and colleagues. The questions and response options was checked for vocabulary, language appropriateness and consistency with the contrasts of the theoretical framework and also checked whether the items reflects the specific objectives.

~~Reliability is a measure of the degree to which a research instrument yields consistent results after repeated trials (Kothari, 2004).~~The questionnaires were pre-tested in Kenya revenue authority in Kisumu county in order to check for possible response errors that could rise from unclear instructions.

~~Reliability is the extent to which obtained scores may be generalized to different measuring occasions, measurement forms. Kothari and Garg (2014) explain that a measuring instrument is reliable if it provides consistent results. Sekaran and Bougie (2013) states that the reliability of a measure indicates the extent to which it is without bias (error free) and ensures consistent measurement across time and across the various items in the instrument. Reliability coefficient values were computed using Cronbach's alpha coefficient method that ranges between 0 and 1. The Cronbach's alpha of 0.70 is accepted as consistency reliability.~~The instruments gave a Cronbach's Coefficient Alpha value of 0.802, implying that it was above the recommended value and therefore suitable for administration.

3.7 Data Analysis Methods

Data analysis is the process of bringing order, structure and meaning to the mass of information collected (Mugenda and Mugenda, 2003). The analysis of qualitative data resulting from the questionnaires involves coding, data entry and processing. The relationship between office ergonomics and employees productivity was tested using Pearson Correlation. Since the relationship involves more than two variables, multiple regressions was applied in the analysis of the data to determine the relationship between the variables.

The equation was of the form: $EP = \alpha + \beta_1 PWS + \beta_2 WSE + \beta_3 IWC + \beta_4 TO + \varepsilon$

Where EP = weighted employee productivity, PWS, WSE, IWC and TO represent physical work settings, workstation equipment, individual worker characteristics and the organization characteristics.

The parameters $\beta=1, 2, 3, 4$. represents weighted coefficients to be estimated while the intercept is represented by α .

Multiple regression therefore was used in testing the association of variables. All data was keyed and analyzed using Statistical Package for Social Science SPSS.

3.8 Ethical measures

An authorization from Kabarak University to carry out research and an introductory letter from the researcher was given to all the selected organization branch manager who then gave consent to their respective employees to fill the questionnaires. Anonymity of the research respondents was maintained with all data being reported as group response and used for academic purposes only.

CHAPTER FOUR

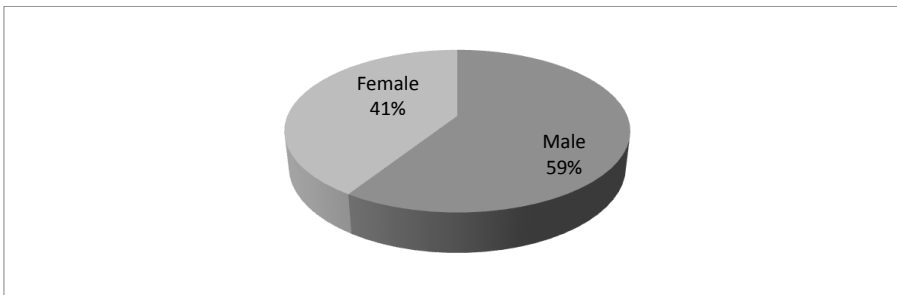
DATA ANALYSIS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

The purpose of this chapter is to analyze the data collected in relation to the set objectives and hypotheses, interpret and discuss the findings of the study reflecting on what other scholars have documented on the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya. A total of 113 questionnaires were distributed to respondents out of which 110 questionnaires were collected back representing 97.3% return rate which was significant to answer the objectives of the study.

4.2 Demographic Analysis of Respondents

The demographic data about respondents that were analyzed included; Gender parity, age variance, respondents' designation, level of work coverage and length of service.

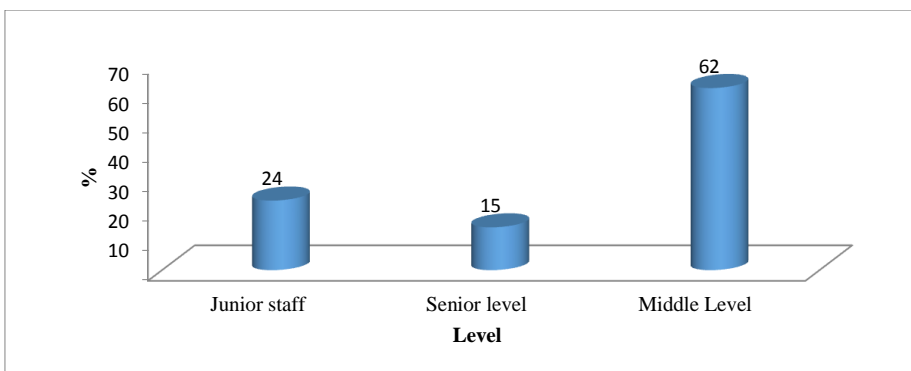


[Source:](#) Field data 2016

Figure 4.4: Respondents Gender parity

The study established that 45 females and 65 males responded to the questionnaires. About 59% of respondents were men compared to 41% who were women. This finding indicated that parastatals in Nakuru County employed the two genders within the confine

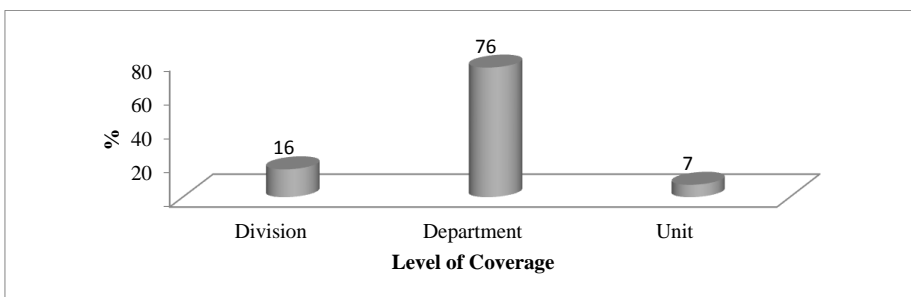
of the Kenya Constitution 2010 which asserts that at least 30% of either gender should be represented in Public Service. The mean age of employees was 40 years indicating that the Parastatals had middle age work force with experience to understand the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya



[Source:](#) Research Data 2016

Figure 1.5: Respondents Designation

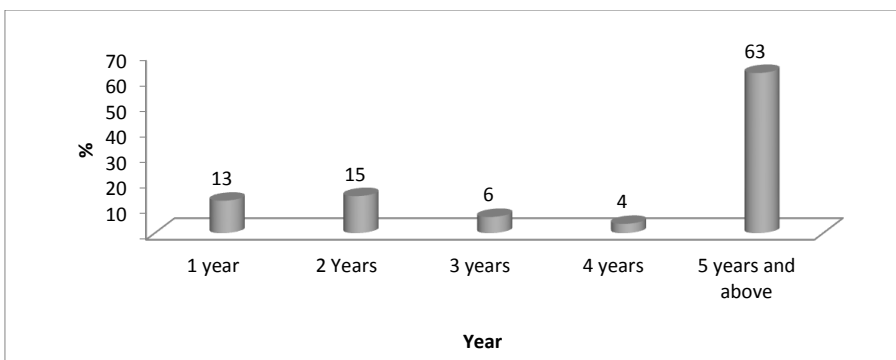
The study established that majority of the respondents 62% were middle level managers, 24% were junior staff and 15% senior managers. These findings indicate that all the management levels were having adequate employees who could give reports on office ergonomics aspects and how these factors influenced their productivity.



[Source:](#) Research Data, 2016

Figure 4.6: Level of Work Coverage by Employees

The study established that majority of respondents,76% were within the scope of departments, 16% were covering division and 7% were working in units. These findings showed that majority of respondents were working in the departments with the least employees working in units. The findings could also help identify which department, unit or division had much ergonomics effects on its employees.



Source: Research Data 2016

Figure 4.7: Employees Length of Service

The study established that majority of respondents 63% had worked for their respective organizations for 5 years and more, 15% had worked for 2 years, 13% had worked for 1 year, 6% had worked for 3 years and 4% had worked for 4 years. This finding indicated that employees working for different parastatals in Nakuru County had enough work experience to understand issues to do with ergonomics and productivity which is the main objective of the study.

4.3 Descriptive Statistics of Firms' Physical Work Environment

The first objective of the study was to assess the effects of physical work environment on employee productivity among selected parastatals in Nakuru County in Kenya. This section uses descriptive statistics to analyze data related to the firms' physical environment. The key variables analyzed in this section include; general office design, office décor, office space and size, suitability of office furniture, conditions of office furniture, low noise level, comfort of office room temperature, Illumination of offices, No straining working in the offices, Fresh humidity and air quality in the office, Office

environment well air conditioned, office being too dark and crowded, document well arranged in the office, office is in clean and comfortable environment, significant ventilation in the office, office lighting are controllable and that office sometimes becomes too cold.

Table 4.3: Descriptive Statistics of Physical Work Environment

Physical Description	SA (%)	A (%)	N (%)	D (%)	SD (%)	χ^2	P-Value
Well lit	37.3	22.7	18.2	11.8	10.0	26.2	<.001
Ventilation sufficient	41.8	22.7	20.9	11.8	2.7	46.7	<.001
air condition conducive	44.5	21.8	13.6	7.3	12.7	47.4	<.001
Sufficient size and space	29.1	17.3	26.4	29.1	14.5	11.7	0.019
well ventilated	36.4	25.5	17.3	15.5	5.5	8.4	0.079
Decor satisfactory	31.8	35.5	13.6	10.0	9.1	30.1	<.001
No strains while working	54.5	18.2	5.5	16.4	5.5	14.1	0.007
Office design appropriate	40.0	16.4	3.6	16.4	23.6	80.6	<.001
Low noise level	35.5	17.3	21.8	21.8	3.6	159.8	<.001
Office always clean	33.6	22.7	18.2	19.1	6.4	49.7	<.001
Documents well arranged	30.9	25.5	20.0	19.1	4.5	29.5	<.001
Temperature comfortable	24.5	27.3	23.6	17.3	7.3	94.5	<.001
Lighted well controlled	52.7	19.1	5.5	15.5	7.3	92.6	<.001
Suitable office furniture	26.4	32.7	13.6	13.6	13.6	91.9	<.001
Office too cold	44.5	19.1	18.2	14.5	3.6	44	<.001
Furniture in good condition	26.4	24.5	15.5	21.8	11.8	21.1	<.001
Crowded	11.8	10.0	16.4	12.7	49.1	46.7	<.001
Office dark and not lively	9.1	16.4	5.5	12.7	56.4	17.8	0.001
Office too small	7.3	13.6	9.1	13.6	56.4	38.9	<.001

Source: Field Data (2016)

Table 4.3: captures the findings regarding employees' perception on the physical work environment as a component of office ergonomics. The study established that majority of respondents 60% (strongly agreed and agreed) significantly ($\chi^2 = 26, P \leq 0.001$) that the rooms are well lighted. Majority of respondents, 65% (strongly agreed and agreed) significantly ($\chi^2 = 46.7, P \leq 0.001$) that their offices had sufficient ventilation. Concerning conducive air condition, 66.3% of respondents (strongly agreed

and agreed) significantly ($\chi^2 = 47.4, P \leq 0.001$) that their offices were well air conditioned. About 46% of respondents (strongly agreed and agreed) significantly ($\chi^2 = 11.7, P \leq 0.02$) that their offices had sufficient space, 43.65% disagreed about the issue whereas 29.4% were not sure. Respondents were not significantly clear on the question of office being well ventilated ($\chi^2 = 8.4, P > 0.05$).

Majority of respondents 67.3% (strongly agreed and agreed) significantly ($\chi^2 = 30.1, P \leq 0.001$) that internal decor was satisfactory. Majority of respondents 73% (strongly agreed and agreed) significantly ($\chi^2 = 14, P \leq 0.005$) that they did not experience strains while working. About 56% (strongly agreed and agreed) significantly ($\chi^2 = 80.6, P \leq 0.001$) that that office design was appropriate, clean and documents were well arranged. About 52% (strongly agreed and agreed) significantly ($\chi^2 = 159, P \leq 0.001$) that that there was low noise in the offices, furniture was in good condition and temperature were comfortable. Majority of respondents 71.8% (strongly agreed and agreed) significantly ($\chi^2 = 92.6, P \leq 0.001$) that lighting in the room was well controlled. Majority of respondents 63.3% (strongly agreed and agreed) significantly ($\chi^2 = 44, P \leq 0.001$) that office was too cold. Majority of respondents 61.9% (strongly disagreed and disagreed) significantly ($\chi^2 = 46.7, P \leq 0.001$) that the rooms were overcrowded. Majority of respondents 69.4% (strongly disagreed and disagreed) significantly ($\chi^2 = 17.8, P \leq 0.001$) that the offices were dark and not lively. Majority of respondents 70% (strongly disagreed and disagreed) significantly ($\chi^2 = 38.9, P \leq 0.001$) that the offices were too small.

Respondents were not sure on the following aspects of office ergonomics; comfortable temperature, controllable lights, suitability of furniture in form and condition to enable them work without strains. They were not sure whether offices sometimes were too cold for them to work for long times. They disagreed that the offices were too crowded and too dark leading to uncomfortable work environment. They also disagreed that the offices were too small to accommodate the required number of employees.

The finding is supported by Salvendy(2012) who observes that prolonged exposure to noise reduces office workers motivation. These findings can have serious consequences in the workplace where employees and organizations are expected to compete in a rapidly changing economy.

This finding showed that, as far as physical work environment was concerned, the ergonomics of the offices belonging to the Parastatals in Nakuru County were; the offices were well lit to enable them work without straining their eyes. The offices were well ventilated for sufficient circulated air. The humidity and air conditioning in the offices were always fresh. There was adequate size and spaces in the office to allow employees easy movement during working hours. The office interior décor was satisfactory and accommodative allowing the employees to work without any distraction making them not to strain during working times. Office design was also appropriate for the different types of work the employees performed. Noise level in the offices were low suitable for working conditions. The offices were always clean and all documents well arranged providing suitable working ergonomics, which can be supported by the findings of Gross (1997) which explains how unfavorable working conditions can influence the working capacity and decrease productivity of the occupants.

4.4 Descriptive Statistics of Firms' Workstation Equipment

The second objective of the study was to analyze the effect of work station equipment on employee productivity among selected parastatals in Nakuru County in Kenya. The key variables included; flexibility of office chairs, telephone and other accessories being within reach, availability of enough working space, adjustable lighting, large table for work and computer fitted with light rays anti-glare.

Table 4.4: Descriptive Statistics of Workstation Equipment

Workstation	SA	A	N	D	SD	χ^2	P-Value
Foot touches the floor	71.8	10.9	4.5	8.2	4.5	186.2	<.001
Office table big	46.4	21.8	11.8	10.9	9.1	53.2	<.001
Lights adjustable	44.5	18.2	20.0	9.1	8.2	47.5	.001
Comfortable seat	35.5	31.8	14.5	10.0	8.2	18.5	<.001
Computers state is good	38.2	30.9	8.2	11.8	10.9	39.2	<.001
Chair backrest comfortable	29.1	30.9	9.1	14.5	16.4	20	<.001
Chairs flexible	28.2	27.3	12.7	14.5	17.3	11.5	0.021
Accessories within reach	30.0	17.3	20.9	17.3	14.5	8	<.001
modern Furniture	20.9	25.5	12.7	14.5	26.4	8.5	0.092
Armrest well padded	22.7	20.0	10.0	13.6	33.6	18.5	<.001
anti-glare fitted	26.4	12.7	8.2	15.5	37.3	30.4	<.001
Telephone comfortable	19.1	12.7	12.7	14.5	40.9	31.5	<.001
Radiation free	14.5	12.7	20.9	15.5	36.4	20.5	<.001

Source: Field Data (2016)

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Table 4.4 was used to capture the findings regarding the state of workstation equipment of the parastatals in Nakuru that can affect productivity. Majority of respondents 82.7% (strongly agreed and agreed) significantly ($\chi^2 = 186.2, P \leq 0.001$) that their feet touched floor while working. Concerning office table, majority of respondents 68.2% (strongly agreed and agreed) significantly ($\chi^2 = 53.2, P \leq 0.001$) that office tables were big enough. Majority of respondents 72.7% (strongly agreed and agreed) significantly ($\chi^2 = 47.5, P \leq 0.001$) that office lights were adjustable. Majority of respondents 67.2% (strongly agreed and agreed) significantly ($\chi^2 = 18.5, P \leq 0.001$) that office seats were comfortable. Majority of respondents 69.1% (strongly agreed and agreed) significantly ($\chi^2 = 39.2, P \leq 0.001$) that office computers were in good working conditions. Majority of respondents 60% (strongly agreed and agreed) significantly ($\chi^2 = 20, P \leq 0.001$) that office chairs backrest were comfortable. About 50% (strongly agreed and agreed) significantly ($\chi^2 = 11.5, P \leq 0.001$) that chairs were flexible and accessories were within reach. About 40% (strongly agreed and agreed) significantly ($\chi^2 = 18.5, P \leq 0.001$) that office chairs were modern and armrest were well padded. About 50% (strongly disagreed and disagreed)

significantly ($\chi^2 = 31.5, P \leq 0.001$) that there were antiglare fitted on computer screens with low radiation and comfortable telephones in the office.

This finding is supported by Smith and Bayeh (2003) who found out that there was an average improvement in total units processed correctly per hour for the combined ergonomics improvement group of about 5% compared to an average decreased productivity of about 3% for the control group post-intervention.

This finding is also supported by Shikdar and Al-Kindi (2007) who found that the components of computer workstations did not conform to recommendations. Usual office tables to put computers on, semi adjustable chairs and office chairs, lack of wrist rests, locating computers facing windows, and poorly laid out offices contributed significantly to ergonomic problems. Reported health symptoms were caused by ergonomic deficiencies in the computer workstation systems. It was evident from the results that some employees were using office tables for their computers, office chairs, and semi adjustable chairs. Most employees did not have document holders that are important for minimizing back and neck bending, especially for those who spend a lot of time on data entry. There were no wrist rests, either. These conditions, coupled with long hours of computer usage, could cause body discomfort and musculoskeletal problems

This finding indicated that the workstation ergonomics was well configured to support employees work environment in such areas as; giving employees free stretch of their feet to touch the floor. The office table was also big enough to accommodate accessories that they required during work. The lights in the computers were adjustable to suit users' eye sight. Office chairs were flexible and adjustable to give employees functionality support. The seats were also comfortable with possibility of adjustment to fit the users' needs.

4.5 Descriptive Statistics of Farms' Individual unique Characteristics

The third objective of the study was to analyze the effects of individual worker's unique characteristics on employee productivity among selected parastatals in Nakuru County

inKenya. The key variables analyzed under individual characteristics included; age, gender, training of supervisors, time management, level of responsibilities given to employees, individual ability to like their jobs and qualification required by the job.

Table 4.5: Individual unique Characteristics

Characteristics	SA	A	N	D	SD	χ^2	p-value
Age	33.6	16.4	25.5	12.7	11.8	19.2	0.001
Gender	33.6	33.6	12.7	10	10	34	<.001
Training	28.2	14.5	21.5	20.9	14.9	7.4	0.127
Time management	33.5	44.5	5.5	11.8	4.7	78	<.000
Too much responsibility	4.5	22.7	18.2	19.1	35.5	26.1	<.000
Overtime	40.9	23.6	8.2	20	7.3	41.4	<.000
Qualification	54.5	25.5	4.5	12.7	2.8	99.7	<.000

Source: Field Data (2016)

Table 4.5 was used to capture the findings regarding individual unique characteristics that can affect their productivity. About 50% (strongly agreed and agreed) significantly ($\chi^2 = 19.2, P \leq 0.001$) that their ages as individual characteristics affected their productivity. Majority 67.2% (strongly agreed and agreed) significantly ($\chi^2 = 34, P \leq 0.001$) that their gender parity as individual characteristics affected their productivity. About 42.7% (strongly agreed and agreed) significantly ($\chi^2 = 7.4, P \leq 0.001$) that their training orientation as individual characteristics affected their productivity. Majority 78% (strongly agreed and agreed) significantly ($\chi^2 = 78, P \leq 0.001$) that their time management orientation as individual characteristics affected their productivity. About 54% (strongly disagreed and disagreed) significantly ($\chi^2 = 26.1, P \leq 0.001$) that too much responsibility affected their productivity. Majority 64.5% (strongly agreed and agreed) significantly ($\chi^2 = 41.4, P \leq 0.001$) that overtime affected their productivity. Majority 80% (strongly agreed and agreed) significantly ($\chi^2 = 99.7, P \leq 0.001$) that overtime affected their productivity.

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This finding indicated that as far as individual unique characteristics were concern, employees agreed that individual workers ages can affect their productivity. Employees reacted differently on job requirement based on their gender. Supervisors trained them on how to adjust to different job situations. Employees could accomplish their jobs within the required time. Employees liked their work and were willing to work overtime. Employees were qualified for their jobs.

The finding is supported by Nasurdin and Khuan, (2011) who observes that older workers tend to view their organization as a source of social satisfaction whereas younger workers are more likely to be consumed by the need for economic security and success (Nasurdinand Khuan 2011).Wagner and Rush (2000), as mentioned by Nasurdin and Khunan (2011) hypothesized that attitudes such as job satisfaction, pay satisfaction, organization commitment and trust are more related to ultraistic behavior among younger employees whereas self-monitoring and moral judgment are more pronounced for older employees. This is because as people grow older, they are more inclined to place emphasis on socially responsible norm of benevolence.The finding is further supported by Habib and Messing(2012) who observes that both men and women tend to act differently to work schedules in that women with families may tend to work for shorter periods in order to find time to attend to their families, whereas men with families may want to work for longer hours in order to get extra money which can enable them support and meet their family needs.

4.6 Descriptive Statistics of Firms' Organizational Characteristics

The fourth objective of the study was to assess the effects of organizational characteristics on employee productivity among selected parastatals in Nakuru County in Kenya. The analyzed variables under this study include; job variety, feedback, satisfaction, inflexibility, Skillfulness, breaks, Job demands and flexi time.

Table4.6: Organizational Characteristics

Characteristics	SA	A	N	D	SD	χ^2	p-value
Job variety	39.1	24.5	15.5	16.4	4.5	36.2	<.0001
Feedback	30.0	26.4	9.1	20	14.5	15.9	0.03
Satisfaction	41.8	26.4	5.2	20	6.6	52.97	<.0001
Inflexibility	17.3	19.1	12.7	19.1	31.8	11.09	0.03
Skillful	43.6	29.1	6.4	15.5	5.4	58.3	<.0001
Rest	36.6	30	16.5	12.7	4.2	35.9	<.0001
High demands	13.6	23.6	10	19.1	33.7	18.7	0.001
No freetime	18.2	14.5	10.9	16.4	40	29.09	<.0001

Source: Field Data (2016)

Key: SA=Strongly Agree, A= Agree, N= Neutral, D= Disagree and SD= Strongly Disagree.

The study established that majority 63.6% (strongly agreed and agreed) significantly ($\chi^2 = 36.2, P \leq 0.001$) that job variety as organizational characteristics affected their productivity. About 56.4% (strongly agreed and agreed) significantly ($\chi^2 = 41.4, P \leq 0.001$) that job feedback as organizational characteristics affected their productivity. majority 68.2% (strongly agreed and agreed) significantly ($\chi^2 = 52.97, P \leq 0.001$) that job work satisfaction affected their productivity. About 50% (strongly disagreed and disagreed) significantly ($\chi^2 = 31.8, P \leq 0.001$) that inflexibility, no free time and high demands affected their productivity. Majority 72.7% (strongly agreed and agreed) significantly ($\chi^2 = 58.3, P \leq 0.001$) that their skillfulness affected their productivity. majority 66.6% (strongly agreed and agreed) significantly ($\chi^2 = 35.9, P \leq 0.001$) that rest affected their productivity.

This finding showed that as far as organizational characteristics were concerned, employees had job responsibility; employers provide them with the variety they need with feedback continuously communicated to them about their performance leading to

their satisfaction. They were also skillful and the job environment provided breaks to attend personal issues.

This finding is supported by Rao (2010) who observes that specialization can result in a productivity increase. However, assigning workers to broadly defined jobs multitasking can also enhance productivity by facilitating the flexible use of labor and encouraging inter-task learning of workers. Finding on staffing is supported by Rao (2010) who observes that if right personnel are selected, the remaining functions of personnel management become easier, the employee contribution and commitment will be at optimum level and employee-employer relations will be congenial. In an opposite situation, where the right person is not selected, the remaining functions of personnel management, employee-employer relations will not be effective.

4.7 Effect of Office Ergonomics on Employees Health

This section analyzes the effect of office ergonomics on employees' health. The analyzed variables under this section included; safety of offices, enough space for easy movements, stressed caused by office ergonomics, office environment conditions affecting employee's health, injuries suffered and effect of disorders on employee's job performance.

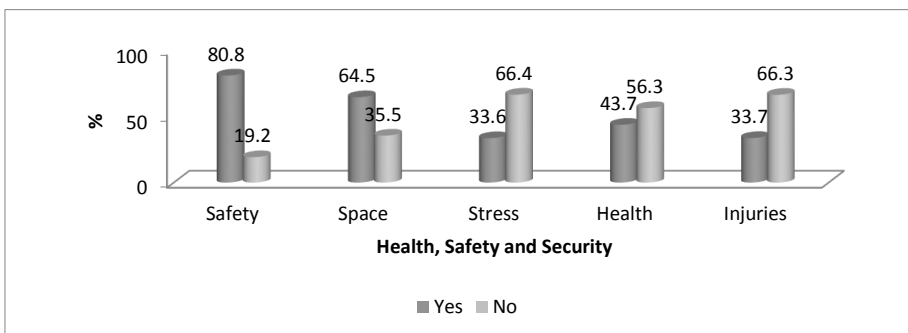
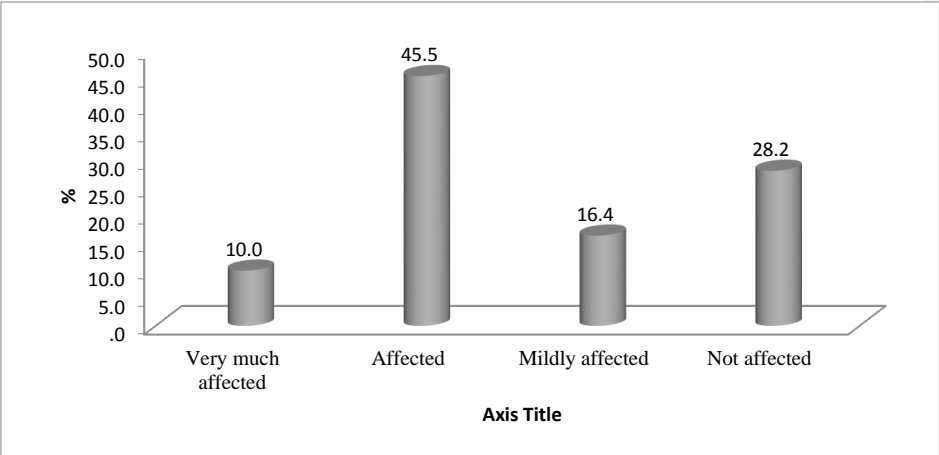


Figure 4.8: Effect of Ergonomics on Health, Safety and Security

The study established that majority of respondents 80.8% agreed that they found their current office safe and secured compared to 19.2% who did not. Majority 64.5% had enough office space for easy movement emergency exits compared to 35.5% who did not. Majority 66.4% had never felt stressed due to office environment and by extension did not fall sick compared to 33.6% who did. Majority 56.3% had not been affected by bad health due to office environment compared to 43.7% who experienced injuries. Majority 66.3% had not experienced any injuries due to office environment compared to 33.7% who experienced such injuries.



Source: field data 2016

Figure 4.9: Effect of Illness on Job Performance

Majority of respondents 55.5% agreed that Illness affected their job performance compared to 45.5% whose performances were not affected.

The finding is supported by health and safety executive (2004a) established that the tangible benefits from better health and safety management include higher productivity, lower absence rate, avoiding the cost of accidents and litigations, improved staff morale and good employee relations. Ljungblad et al (2014) further observes that there is

moderate evidence that workplace health promotion interventions involving exercise, lifestyle, and ergonomics decrease sickness absence and productivity while educational and psychological means applied alone appear to be less effective

4.8 Ergonomics and Employees Productivity

This section analyses elements of employees' productivity. Key elements analyzed included; standards of job performance, working without wasting resources, interesting work environment, work enjoyment, continuous attendance of work, no intention to leave current job and high quality product.

Table4.7: Employees Productivity

Productivity	SA	A	N	D	SD	χ^2	p-values
Standards	59.1	19.1	6.4	9.1	6.3	111.1	<.0001
No wastage of resources	53.6	25.5	8.2	8.2	4.5	92.4	<.0001
Interesting job	54.5	17.3	13.6	9.1	5.5	86.5	<.0001
Enjoy working	52.7	23.6	7.3	10	6.4	84.3	<.0001
Don't miss work	62.7	9.1	4.5	10	13.7	127.5	<.0001
Don't like organization	19.1	8.2	4.5	15.5	52.7	80.9	<.0001
High quality product	58.2	19.1	4.5	14.5	3.7	109.7	<.0001

Source: Field Data (2016)

The study established that majority 78.2% (strongly agreed and agreed) significantly ($\chi^2 = 111.1, P \leq 0.001$) that organization standards improved their productivity. Majority 79.1% (strongly agreed and agreed) significantly ($\chi^2 = 92.4, P \leq 0.001$) that no wastage of resources improved their productivity. Majority 72.81% (strongly agreed and agreed) significantly ($\chi^2 = 86.5, P \leq 0.001$) that interesting work environment improved their productivity. Majority 76.3% (strongly agreed and agreed) significantly (

$\chi^2 = 84.3, P \leq 0.001$) that enjoyment of their work improved their productivity. Majority 71.8% (strongly agreed and agreed) significantly ($\chi^2 = 127.3, P \leq 0.001$) that the fact that they do not miss work improved their productivity. Majority 68.2% (strongly disagreed and disagreed) significantly ($\chi^2 = 80.9, P \leq 0.001$) that the fact that they do not like the organization improved their productivity. Majority 77.3% (strongly agreed and agreed) significantly ($\chi^2 = 92.4, P \leq 0.001$) that they produce high quality products improved their productivity.

This finding indicated that productivity in the Parastatals in Nakuru County was high evident by standards of work, resource economics during work, interesting and likeable jobs, employees enjoying their work, reporting to work without missing based on unfounded excuses, employees liking their organization and were not planning to leave and also providing high quality products and services, which is also supported by Armstrong (2006) findings that better health and safety management improve morale, improve employee relations and reduce turnover.

4.9 Effects of Office Ergonomics on Employees Productivity

The purpose of this study was to determine the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya. In order to establish the relationship, Pearson correlation was used.

Table 4.8: Correlation between Office Ergonomics and Employees Productivity

Variables		Physical	Workstation	Unique	Organizational	Productivity
Physical	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	110				
Workstation	Pearson Correlation	.6933**	1			
	Sig. (2-tailed)	.000				
	N	109	109			
Unique	Pearson Correlation	.693**	.379**	1		
	Sig. (2-tailed)	.000	.000			
	N	110	109	110		
Organizational	Pearson Correlation	.310**	.344**	.232**	1	
	Sig. (2-tailed)	.001	.000	.051		
	N	110	109	110	110	
Productivity	Pearson Correlation	.651**	.456**	.612**	.256**	1
	Sig. (2-tailed)	.000	.000	.000	.007	
	N	110	109	110	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

This section presents the correlation analysis between office ergonomics aspects and employee productivity. The intention is to establish which of the aspects are significantly correlated with employee productivity.

The study established a strong positive correlation 0.651 with significance of $p=0.000 < 0.05$ between physical work environment and employees productivity indicating that physical work environment as an aspect of office ergonomics positively influenced the employees productivity in the selected Parastatals in Nakuru County.

Further finding indicated established a strong positive correlation 0.456 with significance of $p=0.000<0.05$ between workstation equipment and employees productivity indicating that workstation equipment as an aspect of ergonomics positively influenced the employees productivity in the selected Parastatals in Nakuru County.

In terms of individual unique characteristics, the study established strong positive significant correlation 0.612 with significance of $p=0.00<0.05$ indicating that individual unique characteristics as an aspect of ergonomics positively influenced the employees productivity in the selected Parastatals in Nakuru County. Further analysis indicated strong positive significant correlation 0.256 with significance of $p=0.007<0.05$ between organizational characteristics and employees productivity indicating that organizational characteristics as an aspect of ergonomics positively influenced the employees productivity in the selected Parastatals in Nakuru County.

The finding is supported by Smith and Bayeh(2003) in their study which established that there was an average improvement in total units processed correctly per hour for the combined ergonomics improvement group of about 5% compared to an average decreased productivity of about 3% for the control group post-intervention. Kingsley (2013) further observes a considerable extent validates and brings to reality the widely accepted assumption that a better workplace environment motivates employees and produces better results. The study demonstrated that office ergonomics deficiencies at the Petroleum House which includes outdated office design and décor, inadequate office illumination, un-ergonomic office furniture, unsuitable office design and décor have variedly impaired the performance of an average Ghanaian National Petroleum Corporation employee by between 20 to 80 percent. The findings from the study show that the current office layout at the Petroleum House typifies outdated and inefficient cellular office design prior to its modernization. The experience underscores the need to design office ergonomically to ensure that the workplace environment suits employee needs, functions and enhances performance.

Table 4.9: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.706	0.500	0.479	0.736

The R value was 0.706 and R² of 0.500, which indicated a high degree of correlation. The Adjusted R² value indicates how much of change in the dependent variable, "employees productivity", can be explained by the independent variables, "physical work environment, workstation equipment, individual unique characteristics and organizational characteristics". In this case, 47% was the R Square adjusted, which was fairly large indicating that the data collected was closely fitted to the regression line, and 53% was explained by other variables not discussed.

Table 4.10: ANOVA of the Predictors and the Dependent variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	56.035	4	14.009	25.832	.000 ^a
Residual	56.400	104	.542		
Total	112.435	108			

Predictors: physical work environment, workstation equipment, individual unique characteristics and organizational characteristics. The dependable variable: firms' profitability. Table 9 indicated that the regression model predicted the outcome variable significantly with $p = 0.00$, which was less than 0.05, and indicated that; overall, the model statistically and significantly predicted the outcome variable.

Table 4.11: Multiple Linear Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients Beta	T	Sig.	VIF
	B	Std. Error				
(Constant)	-1.171	.367		-3.192	.002	
Physical	.592	.174	.396	3.408	.001	2.8
Work station	.029	.102	.028	.290	.772	2.0
Individual	.553	.154	.326	3.595	.000	1.7
Organizational	.126	.109	.087	1.151	.252	1.1

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The regression equation was of the

$$\text{form: } EP = -1.17\alpha + 0.59\beta_1PWS + 0.03\beta_2WSE + 0.55\beta_3IWC + 0.13\beta_4TO + \varepsilon$$

Where EP = Employee productivity, PWS, WSE, IWC and TO represent physical work settings, workstation equipment, individual worker characteristics and the organization characteristics.

The parameters $\beta=1, 2, 3, 4$ represents coefficients to be estimated while the intercept is represented by α . Multiple regressions therefore was used in testing the association of variables. Before the estimation of regression analysis, the assumption of multi-collinearity was checked in order to ensure that it is absent among independent variables. Mohammed and Mohammed (2012) refer to multicollinearity problem as actual disparity percentage among variables. Multicollinearity can be controlled by two ways: tolerance values and values of Variance Inflation Factor (VIF). In this study, VIF was used. According to Besley 1980 as sighted in (jingyu li, 2003) researchers have used VIF of 10.0 as critical value rule of thumb to determine whether too much correlation existed. The VIF values in the table 4.11 above were less than 10.0 so there was no multicollinearity problem.

The first null hypothesis that Physical work environment factors have ~~no~~ significant effect on employee productivity in selected parastatals in Kenya was rejected. Physical work environment contributed significantly to employee productivity this was because Physical work environment had (0.59, $P \leq 0.001 < 0.05$) indicating that Physical work environment influenced the employee productivity significantly. The second null hypothesis that Work station equipment has no significant effect (0.03, $p > 0.05$) on employee productivity in selected parastatals in Kenya was accepted. ~~Work station equipment did not contributed significantly to employee productivity, this was because work station equipment had $P = 0.772 > 0.05$ indicating that Work station equipment did not influence the employee productivity.~~

The third null hypothesis that individual worker's unique characteristics factors have no significant effect on employee productivity in selected parastatals in Kenya was rejected. Individual worker's unique characteristics contributed significantly to employee productivity this was because individual worker's unique characteristics had (0.612, $P \leq 0.000 < 0.05$) indicating that individual worker's unique characteristics influenced the employee productivity. The fourth null hypothesis that organizational characteristics have no significant effect on employee productivity in selected parastatals in Kenya was accepted. Organizational characteristics did not contributed significantly to employee productivity this was because organizational characteristics had $P = 0.252 > 0.05$ indicating that organizational characteristics did not influenced the employee productivity.

From the unstandardized coefficients, the following equation was developed:

$$EP = -1.171 + 0.592PWS + 0.029WSE + 0.553IWC + 0.126TO + \varepsilon$$

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of findings; conclusions and recommendations based on the findings on the office ergonomics aspects and their effects on employee productivity in selected parastatals in Nakuru county in Kenya.

5.2. Summary of Findings

The aim of this study was to determine the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya. The summary of the findings is as follows;

On demographic characteristics, the mean age of employees was 40 years indicating that the Parastatals had middle age work force at the middle level management with experience to understand the effects of office ergonomics aspects on employee productivity in selected

parastatals in Nakuru County in Kenya. Majority of respondents was working in the departments with the least employees working in units. Employees working for different parastatals in Nakuru County had enough work experience to understand issues to do with ergonomics and productivity which is the main objective of the study.

The first objective of the study was to assess the effects of physical work environment on employee productivity among selected parastatals in Nakuru County in Kenya. The study established that as far as physical work environment was concerned, the ergonomics of the offices belonging to the Parastatals in Nakuru County were; the offices were well lit to enable them work without straining their eyes. The offices were well ventilated for sufficient circulated air. The humidity and air conditioning in the offices were always

fresh. There was adequate size and spaces in the office to allow employees easy movement during working hours. The office interior décor was satisfactory and accommodative allowing the employees to work without any distraction making them not to strain during working times. Office design was also appropriate for the different types of work the employees performed. Noise level in the offices were low suitable for working conditions. The offices were always clean and all documents well-arranged providing suitable working ergonomics. The study also established positive significant correlation between physical work environment factor and employees productivity among selected parastatals in Nakuru County in Kenya

The second objective of the study was to analyze the effect of work station equipment on employee productivity among selected parastatals in Nakuru County in Kenya. The study found out that the workstation ergonomics was well configured to support employees work environment in such areas as; giving employees free stretch of their feet to touch the floor. The office table was also big enough to accommodate accessories that they required during work. The lights in the computers were adjustable to suit users' eye sight. Office chairs were flexible and adjustable to give employees functionality support. The seats were also comfortable with possibility of adjustment to fit the users' needs. The study further established positive significant correlation between workstation equipment factor and employees productivity among selected parastatals in Nakuru County in Kenya

The third objective of the study was to analyze the effects of individual worker's unique characteristics on employee productivity among selected parastatals in Nakuru County in Kenya. The study established that as far as individual unique characteristics were concerned, employees agreed that individual workers ages can affect their productivity. Employees reacted differently on job requirement based on their gender. Supervisors trained them on how to adjust to different job situations. Employees could accomplish their jobs within the required time. Employees liked their work and were willing to work overtime. Employees were qualified for their jobs. The study found positive significant

correlation between individual worker's unique characteristics and employee's productivity among selected parastatals in Nakuru County in Kenya

The fourth objective of the study was to assess the effects of organizational characteristics on employee productivity among selected parastatals in Nakuru County in Kenya. The study established that as far as organizational characteristics were concerned, employees had job responsibility provide them with the variety they need with feedback continuously communicated to them about their performance leading to their satisfaction. They were also skillful and the job environment provided breaks to attend personal issues. The study further found positive significant correlation between organizational characteristics and employees productivity among selected parastatals in Nakuru County in Kenya.

5.3 Conclusions

The study aimed at determining the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya. The first hypothesis was stated as Physical work environment factors have no significant effect on employee productivity in selected parastatals in Kenya. The null hypothesis that Physical work environment factors have no significant effect on employee productivity in selected parastatals in Kenya was rejected. Physical work environment contributed significantly to employee productivity this was because Physical work environment had $P=0.001 < 0.05$ indicating that Physical work environment influenced the employee productivity.

Further, the second hypothesis was stated as Work station equipment has no significant effect on employee productivity in selected parastatals in Kenya. The null hypothesis that Work station equipment has no significant effect on employee productivity in selected parastatals in Kenya was accepted. Work station equipment did not contributed significantly to employee productivity this was because Work station environment had

$P=0.772>0.05$ indicating that work station equipment did not influence the employee productivity.

The third hypothesis was stated as individual worker's unique characteristics have no significant effect on employee productivity in selected parastatals in Kenya. The null hypothesis that individual worker's unique characteristics factors have no significant effect on employee productivity in selected parastatals in Kenya was rejected. Individual worker's unique characteristics contributed significantly to employee productivity this was because individual worker's unique characteristics had $P=0.000<0.05$ indicating that individual worker's unique characteristics influenced the employee productivity.

The fourth hypothesis was stated as the organizational characteristics have no significant effect on employee productivity in selected parastatals in Kenya. The null hypothesis that organizational characteristics have no significant effect on employee productivity in selected parastatals in Kenya was accepted. Organizational characteristics did not contribute significantly to employee productivity this was because organizational characteristics had $P=0.252>0.05$ indicating that organizational characteristics did not influence the employee productivity.

5.4 Recommendations

5.4.1 Recommendation for Practice and Policy

According to the findings of this study, the following recommendations are important as far as determination of the effects of office ergonomics aspects on employee productivity in selected parastatals in Nakuru County in Kenya is concerned. First, the study recommends that the physical work environment should be improved further by installing temperature regulators and window paints that absorb excess light. The furniture should be designed based on acceptable ergonomics standard to protect employees from getting unnecessary strains and eventually falling sick which may lower their

productivity. Second, the study recommends that the parastatals should carry out workstation ergonomics evaluation to establish the items in the workstations that need adjustment and those which need replacement so that they can fit the ergonomics standards. Third, the study recommends that the Parastatals should re-design the jobs further with flexible time for personal and family activities. More reward systems should be re-designed to increase the level of satisfaction which in turn will lead to employees' productivity. The finding showed that illness affected employees' job performance particularly, although they had safe offices, with enough space for easy movements, with less stress caused by office ergonomics, leading to less health and injuries related issues.

5.4.2 Recommendation for Further Studies

A study on the effects of office ergonomics aspects on employee turnover should be carried out. This is because the study did not concentrate on employees' turnover which may also affect the Parastatals productivity. The findings from this study will shed more light on which aspects of office ergonomics most mostly influence' the turnover.

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APPENDICES

Appendix 1:List of the selected parastatals in Nakuru County

1. Kenya revenue authority
2. Kenya power and lighting company
3. Geothermal Development Company
4. Telecom Kenya
5. Kenya post and telecommunications ltd
6. Kenya Post bank
7. National housing corporations
8. Cereal board of Kenya.
9. Kenya Pipeline Company limited
10. Kenya farmers association

Source: County Government of Nakuru, 2016

APPENDIX 2: QUESTIONNAIRE

SECTION A: SOCIO-DEMOGRAPHIC DATA OF RESPONDENT

1. Gender 1. Male [] 2. Female []
2. Age actual years []
3. Level of work 1. Junior Staff [] 2. Middle level staff [] 3. Senior management []
4. Division/Department/Unit
5. Length of service
 - 1 year []
 - 2 years []
 - 3 years []
 - 4 years []
 - 5 years and above []

SECTION B. PHYSICAL WORK ENVIRONMENT AND EMPLOYEE PRODUCTIVITY.

In the questionnaire value scales below, some statements are positive while others are negative, for each statement, you are asked to indicate your level of agreement.(1) representing total agreement while(5)representing total disagreement. Please respond to the items by marking what you consider to be the most appropriate answer. Choose only one answer to each question.

Indicate the level of agreement with the following statements about the physical work environment from 1= total agreement to 5 = total disagreement.

	Item	1	2	3	4	5
1	The general office design is appropriate for my work needs and requirements					
2	The office décor is satisfactory for my work needs					
3	The size and space allocated for my work is sufficient					
4	The office furniture is suitable for my work.					
5	My office furniture are in good condition					
6	Noise levels are low enough that I can work undisturbed					
7	Office room temperature is comfortable enough for productive work.					
8	Illumination in my office is well /my office is well lit to enable me work without straining my eyes.					
9	I don't strain my eyes while working in the office					
10	The humidity/air quality in my office environment is always fresh					
11	My office environment is well air conditioned and comfortable					

12	Office is dark and not lively						
13	Office is too small						
14	Office is crowded						
15	The arrangements of documents and other office equipment in my office encourages comfort as I do my work						
16	The office is always in a clean and comfortable condition						
17	Ventilations in my office are sufficient for air circulation						
18	I can control the light requirements in my work space						
19	The office sometimes becomes too cold						

SECTION C, WORKSTATION EQUIPMENT AND PRODUCTIVITY

Indicate your level of agreement with the following sentences about the work station equipment of your office from (1) total agreement to (5) total disagreement.

	Item	1	2	3	4	5
1	My office chair is flexible to adjust, rearrange or reorganize to offer me support and functionality					
2	The backrest of the chair provides support in the lower back					
3	The armrests of my chair are padded to avoid hard edges.					
4	The telephones can be used without having to hold it between the ear and the shoulder					
5	Other accessories like telephone, staplers and other manuals are within easy reach and are arranged according to frequency of use.					
6	There's a comfortable amount of space between the edge of the seat and the back of the knees					
7	My foot touches the floor when I am seated on the chair					
8	The state of my office equipment e.g. computers and other accessories are good					
9	I can easily adjust the light in my computer so that it fits my visual needs					
10	My computer is fitted with anti-glare filters so my eyes are					

	not affected by the excessive lights from the computer.					
11	My computer is always monitored for any radiation emission					
12	Office furniture and equipment is modern and functional					
13	My office table is big enough to accommodate accessories that I use on a daily basis.					

SECTION D: INDIVIDUALS UNIQUE CHARACTERISTICS AND PRODUCTIVITY

Rank your views on the individual unique characteristics and productivity in an organization by putting a tick in the corresponding box. Indicate from 1= strongly agree to 5= strongly disagree

	Item	1	2	3	4	5
1	Individual workers age can affect his productivity					
2	Different genders react differently on job requirements					
3	My supervisor trains me on how to adjust my work area					
4	I always accomplish my work assignment in time					
5	I have a lot of responsibilities such that I cannot finish my office work					
6	I like my work and I can always work overtime without being asked to do so					
7	am qualified to do the work am employed to do					

SECTION E: THE ORGANIZATIONS CHARACTERISTICS AND EMPLOYEE PRODUCTIVITY

Rank your views on the organizations characteristics by putting a tick in the corresponding box. Indicate from 1= strongly agree to 5= strongly disagree.

	Item	1	2	3	4	5
1	My job responsibilities provide task varieties					
2	I always get feedback on my job performance					
3	I am always satisfied with my work					
4	My job schedule is not flexible enough					
5	My skills match the requirements of my job					
6	I always get short breaks to rest after a given time					
7	My job demands are too many					
8	I do not get free time for myself when I am in the office					

SECTION F: EFFECTS OF OFFICE ERGONOMICS ON EMPLOYEE HEALTH, SAFETY AND SECURITY

7. Do you find your current office safe and secured?

Yes () No ()

8. Does your office have enough space for easy movement and emergency exit?

Yes () No ()

9. Have you ever felt stressed by your office environment (furniture, decor, air conditioner?)

Yes() No ()

10. Do you feel that your office environment (including your chair, desk and computer) has affected your health in anyway?

Yes () No ()

11. Have you suffered any injury/disorders/illnesses due to your current workplace environment?

Yes() No ()

If you have answered “Yes”, please state the nature of illness and the attributed course.---

12. To what extent did the disorder/illness affect your job performance?

- Very much affected ()
- Affected ()
- Mildly affected ()
- Not affected at all ()

Please explain how your job performance was affected as indicated in the Question above.

SECTION F: ERGONOMICS AND EMPLOYEE PRODUCTIVITY

Rank your views on employee productivity by putting a tick in the corresponding box, 1 representing strongly agree while 5 representing strongly disagree.

	Item	1	2	3	4	5
1	The standards of my job performance is the required					
2	I work without wasting resources					
3	My job is interesting and I like it					
4	I enjoy my work and I don't need to be supervised					
5	I don't miss work due to unnecessary reasons					
6	I don't like my organization and I do intend to leave it anytime soon.					
7	We provide high quality products/services					

APPENDIX 3: AUTHORIZATION LETTER.