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Original Research Article

Creating Office Ergonomic Awareness among the Staff of Katsina State Local Government Offices in Nigeria: A Viable Strategy for Reducing the Prevalence of Work Related Musculo-Skeletal Disorders

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ABSTRACT

Complaints of arms neck and shoulders (CANS) pains are common issues among the typists, secretaries, personal assistants, computer users and other related clerical activities in the governmental offices in Nigeria. This issue of work related musculo-skeletal complaints or disorders has a devastating, negative impacts on the overall workers' output and the economy in general as a result of incessant absenteeism and loss of workers' productivity. Previous reports have shown that, providing office ergonomic facilities which gives comfort and ease the task for the workers is not enough to tackle the epidemic of work related musculo-skeletal disorders among the workers. However, workers need to be trained and educated on the use of these ergonomic facilities, correct work postures and other issues of work place safety and health on a sustained basis. The main objective of this study is to investigate the level of office ergonomic awareness among the secretaries, typists, personal assistants, computer users and other related office activities in Katsina State Local Government offices in Nigeria, so as to make a case for effective intervention through creating ergonomic awareness as a sustainable measure towards reducing musculo-skeletal complaints among the workers. The methodology used in this study is questionnaire approach as a self-report instrument, using certain aspects of "Cornel Musculo-Skeletal Disorder Survey Questionnaire" (CMDQ), based on 5-Likert Scales opinion rating. This was followed by unobtrusive observation of the working postures of the questionnaire respondents in order to support and validate the findings of the questionnaire method. Descriptive statistics of mean and standard deviation was used in analysing the questionnaire responses, using SPSS version 22. Interpretive analysis was used to interpret the observational data. The result of this study from both the questionnaire and the observation shows that, office workers in the above mentioned categories in Katsina Local Government offices in Nigeria have a poor habit of work posture as result of low level of office ergonomic awareness. It is therefore concluded that in order to tackle the problem of work related musculo-skeletal disorders among the staff of Katsina State Local Government offices, there is a strong need to create office ergonomic awareness among them for a sustainable and safe office work environment.

Keywords: Office Ergonomics, Musculo-skeletal Disorders, Ergonomic Awareness

INTRODUCTION

A sustainable office work environment is the one which is free from all sorts of occupational/ergonomic hazards capable of threatening the health of workers. [1] A work environment must be well taken

care of like any other human environment as substantial numbers of adult hours are spent in the work environment, especially the office environment. [2] An office work environment comprises a place designed for performing all productive office tasks and as such it is a combination or integration of physical location of an office, the interior and exterior surroundings, office layouts, work organisation, office temperature and humidity, light intensity, work facilities, as well as the right training and awareness of how to make effective use of these work facilities so that that they do not inflict harm on the user and general awareness of other aspects of office safety and health. [3] In order to ensure the wellness of a work environment, healthy organisational culture tries to create healthy outcome for its workers through well-designed safety and health measures, which must include training the workers on the use of work facilities and other aspect of work place safety measures.

This involves ensuring that workers are physically and mentally safe by promoting occupational safety and health guidelines, entrenching organisational wellness and creating safe and healthy work place culture and make them part of daily organisational practice. [4] Inentrenching a healthy work place culture especially as it applies to office work environment, the principles of ergonomic design has become a factor worthy of consideration. Principles of office ergonomics emphasizes that, in designing work places, furniture, office layout and equipment, it is important that such designs take human factor into considerations so as to make work easier and safer for the workers. [5] In this case, in order to have ergonomic designs of work place facilities, it is also necessary to consider the features, sizes, biological make up and the capability of workers who will use them. This is exactly where the question of office ergonomics comes about. Ergonomics as a part of organisational practice of safety and health and as a field of study, has drawn a lot of elements and contributions from other areas of human factor studies such as psychology, engineering, biomechanics, Industrial design, Human Resource Management, Anatomy and Physiology, and Anthropometry. [6]

The main concern of ergonomics is the study of designing equipment, products and devices that fit the human body and its cognitive abilities. Based on this, the two terms "human factor" and "ergonomics" are essentially synonymous and are used interchangeably. [7] In this case, there is the need to have accurate measurement of human elements such as height, weight, widths and other aspects of biological tolerance in designing work place and work facilities for the workers. This is because, human beings, are not like machines or equipment, and should therefore not be assumed to have standard form in terms of their sizes and dimensions and that their sizes, strengths and biological tolerances are important to consider when designing work places and work facilities. [8] Therefore, ergonomics is all about designing for the humans in order to optimize their productivity, safety and health.

Complaints of bad back or stiff – nakedness, shoulder pains as well as eye syndromes from workers (which are attributable to the poorly designed tables, desks, chairs or work stations) could have been prevented if there is a proper application of Ergonomic and Anthropometric principles as well as the proper training and awareness of workers of how to use these ergonomic facilities. [9] However, despite what has been said about the importance of having ergonomic designs of work place facilities, it is still not enough to prevent the prevalence and complaints of work related musculo-skeletal disorders. Thus, providing workers with ergonomic facilities as a classical approach to ergonomic intervention is not an end itself. It is also important to discuss the level of ergonomic awareness of the workers which is also a risk factor associated with the cases of musculo-skeletal disorders. [10,11]

Therefore, the provision and installation of various models of office ergonomic facilities in form of ergonomic computer, adjustable chair, ergonomic work stations etc., must be followed by effective ergonomic awareness campaign as previous experiments have shown a significant reduction in the cases of musculo-skeletal pains as a result of effective office ergonomic education and awareness campaigns through trainings, education and guidelines. [12,13]

Therefore, the focus of this study is the issue of low level of ergonomic awareness among the workers in the public sector in Nigeria which is a risk factor contributing to the prevalence of office work-related musculo-skeletal disorders. Due to the wideness of scope of public sector offices, the area of the study is Local Government offices of Katsina State. This is because, Local Governments in Nigeria are the most neglected tier of government and are suffering from gross underfunding which makes them difficult to provide right ergonomic facilities as well as required safety and health measures including staff training on ergonomics. [14] Hence, workers in the Nigerian Local Governments offices are more exposed to the cases of work-related musculo-skeletal disorders in Nigeria.

Office Ergonomics

Ergonomics as a concept being used in so many disciplines emerged with the emergence of human civilization. Its concern is the consideration of human factor in the work environment with a view to making labour or work easier and comfortable for human beings. It is the practice of designing products, systems or processes to take proper care of the interaction between them and the people that use them in such a way that the products provide comfort of use, without inflicting pains to the workers and at the same time optimize their use without losing productivity. [15,16] This is another way of saying that ergonomics take account of human factor in terms of human capability and limitations when designing or assigning a work.

Thus, ergonomics (human factor) is the scientific discipline concerned with the practice of understanding the nature of interactions among humans and other elements of a system, and the profession that applies theory, concepts, principles, data and methods to work place designs in order to optimize human well-being and overall system performance. [17-19] Based on this, ergonomics is called with various names and applications which in some countries or contexts, are being used interchangeably. For example, ergonomics is called human factor engineering, human capable designs, worker-friendly design, and functional design. [20] Ergonomic helps to harmonize things that interact with people in terms of recognizing people's needs, capabilities and limitations.

Human Factor Engineering and Ergonomics are terms that are being used interchangeably especially in the countries such as United States, [21] and are employed to fulfill the ultimate goals of occupational safety and health to achieve optimum productivity. They are most relevant in the design of such things as safe furniture and easy-to-use interfaces to machines and equipment. Proper ergonomic design is necessary to prevent repetitive strain injuries and other musculoskeletal disorders which can develop over time and can lead to long-term disability.

Office ergonomics, as a branch of human factor in the office environment, is a paradigm of workplace ergonomics and occupational safety and health concerned with making office work easier and free from repetitive movement injuries. Most of the office activities are physical in nature involving body movement such as carrying out typing jobs, arranging and preparing records, making calls, writing reports, minuting files, attending meetings (involving sitting for a very long time), preparing accounts and ledger and general clerical work. In the process of conducting

such physical office activities, it is expected that a worker is prevented from sustaining injury or pains in the wrists, shoulders, neck, back, eye injury or even loss of sight as a result of unprotected glare of the computer screen and general body pains accompanied by headache. [22]

Office work, as a system, is entirely carried out by human beings. Hence the *comfort and happiness of the people who carry out office work must be the central concern of office ergonomics.* [23] Providing comfort to the office worker encompasses total organization of the work space and its components such as computers, desk, chairs, floor measurement (work space) and other adjustable working tools designed to suit individual worker's need. An office ergonomist is therefore a professional who uses his knowledge and expertise to ensure such comfort to the workers so as to enhance their healthy well-being and to achieve maximum productivity. Poor office ergonomics *leads to the cases of musculo-skeletal injuries and health related* problems. [24] In this case, it is correct to say that the role of office ergonomist is ever changing as changes in technology continue to introduce new challenges and work demand capable of affecting workers' health and comfort. [25]

Designs and specifications of work components (facilities) such as chair, desk and work station must consider the nature, capabilities and limitations of the person who uses them through the proper application of principles of "Anthropometrics". In other words, well-designed office workspaces require good anthropometric data in order to accommodate differences in the workers' population. This exercise is not a static affair which could be dispensed with once and for all as recent obesity epidemic brings about a number of anthropometric changes that have significant impact on the designs of office facilities. [26]

However, getting the required anthropometric data necessary for designing work place facilities such as desks and chairs might not work well in the third world as it is very difficult to keep measuring every worker, every now and then as a result of changes in body mass caused by obesity. Based on this, the main target and concern of office ergonomics is to set up office work space and the work facilities so that it fits workers and their jobs in order to fulfill the basic ethics of "fitting the job to the person and not fitting the person to the job". In the study of office ergonomics, the focus is on the study and analysis of the kind of work you do in the office, the office work environment itself, the task to be carried out and the tools with which you use to carry your job all within the context of office designs and specifications. [27] When the office work environment is equipped with the right ergonomic facilities and the ergonomic principles in mind the result will be:

a) Reduction or avoidance of body pains and weakness as well as the cases of headaches or eyestrain.
b) Reduce the neck and back pains.
c) Prevent bursitis or tendon problems as a result of carrying out repetitive tasks.

When all the above health issues are resolved through effective office organization, with all the ergonomic facilities put in place, workers' productivity will be enhanced.

Office Work Related Musculo-skeletal Disorders

Work related musculo-skeletal disorders/injuries in the context of office safety and health are the injuries and pains which occur to the workers when exposed to various ergonomic risk factors in the office environment. These injuries develop over time as a result of awkward or un-neutral posture, forceful exertion or strain contact pressure, exposure to vibration, exposure to intense heat or cold. [28]

Work related musculo-skeletal injuries are being called by various names such as Musculoskeletal Disorders, Repetitive Stress Injuries (RSIs), Repetitive Motion Injuries (RMIs), (MSDs), Exertion

Injuries, Cumulative Trauma Disorders (CTDs), or Cumulative Trauma Injuries (CTIs), Occupational overuse injuries. Work-related musculoskeletal injuries and pains are not fatal in nature but cause serious worker discomfort, disability and loss of productivity. As a result of difficulties associated with analyzing the process of damages to the tissues of patients in the early stages of the development of work-related MSD, there are a lot of controversies in explaining the pathological and systematic development of these disorders. [29] Therefore, as a result of this, there are a lot of speculations concerning the prime causative agents of work related musculo-skeletal disorders, so much so that various theories try to offer explanation to the factors leading to the etiology of the development of work related musculo-skeletal injuries. This is to say that, due to the difficulties in diagnosing the etiology of these injuries, it is often very hard to pinpoint single or exact cause of such of injuries within the work environment. [30]

Work related musculo-skeletal disorders are injuries and pains as a result of damage to soft tissues such as tendinitis or tenosynovitis or a situation of nerve compression leading to the development of Carpal Tunnel or Cubital Tunnel injuries. [31] However, in most of the occupational safety and health terminology, the name given to these injuries is "Work Related Musculo-Skeletal Disorders". In the theory of work related musculo-skeletal disorder causation, Kumar (2001) posited that these injuries are better differentiated from disorder. He argues that, injury can cause disorder or malfunctioning of a body system which can disappear with the healing process of the injury. So going by this scholastic approach, injury and disorder are two independent variables of analysis.

Whatever argument or proposition is taken, the focal point here is the physical injury leading to deterioration of workers' health as a result of their contact with a work environment and the concern of this work is that workers must be protected from becoming the victims of such injuries. According to Niu (2010), major office ergonomic injuries can be in any of this form:

(1) Carpal Tunnel Syndrome: This is a work related disorder caused by extended periods of repetitive work activities such as the process of keyboarding, and making the same movements of hand, often with pronated and bent down wrists (hands going down lower than the wrists), It can also occur where a worker is making the same wrist movements over and over again involving vibration, and extreme postures of the wrist. This situation is commonly associated with typing repetitive activates and use of mouse due to the pressure on the median nerve which controls movement and feeling. The nerve coordinates the movement between the thumb and the first three fingers. This kind of injury is characterized by acute pain in the hand and fingers as a result of compression of a major nerve where it passes over the carpal bones through a tunnel or passage at the front region of the wrist, alongside the flexor tendons of the hand. [32]

(2) Acute Tenosynovitis: This is an injury to the hand and the wrist due the damage or inflammation of the fluid-filled sheath (called the synovium). This fluid sheathe acts as a lubricant to the tendon and the symptoms of tenosynovitis include pains, swelling and difficulty in moving the particular joint where the inflammation occurs due to lack of lubrication. Sometimes, the condition can worsen and causes the finger to "stick" in a flexed position, this is called "stenosing" tenosynovitis which is popularly known as "trigger finger. [33] This condition is often present with comorbid tendinitis due to repetitive movements, forceful exertion and extreme postures of the wrist. Therefore, the main cause of this type of disorder is overuse of fingers in a repetitive work

activities and the epidemic is prevalent among office workers, dentists, musicians and carpenters.

(3) Cubital and Radial Tunnel Syndrome: This injury is also known as ulna neuropathy and it is caused by increased pressure on the ulnar nerve, which passes close to the skin's surface in the area of the elbow commonly known as "funny bone". This syndrome is also likely to develop due to the workers habit of resting the mass of the body on the elbow. [34] The most common symptom of cubital tunnel syndrome is the pain and numbness in the elbow, tingling in the ring and little finger. In acute cases, there is the weakness affecting the ring and little finger, and the general disability in overall hand grip.

(4) Lower Back Pains/Disorder: Lower back region comprises the lumber region of the body between the hips and the loins. Variety of factors or work related activities combine to cause lower back pains such as longer sitting hours in an office without break and working with an office chair without full lumbar and back support. [35] The direct cause of the lower back pain is when there is a weakening of any parts of the complex, integrated network of spinal muscles, nerves, bones, discs or tendons in the lumbar spine. [36] Based on this, the main sources of lower back disorder are:

- Irritation of large nerve roots in the low back that go to the legs.
- Irritation of smaller nerves that supply the low back.
- Strain and stress of large paired lower back muscles (erector spinae).
- Damage to the bones, ligaments or joints.
- Impairment of intervertebral disc.

(5) Upper Back Pains: The upper back region is also known as the thoracic region and spasm from the neck to the lower back. The verterbraterial canal that constitutes the upper back is attached the ribs and to the muscles of the back. [37] Despite the fact that upper back pain is not as common as neck and lower back, it has also become a source of worries to many individual adults, as it can still result in severe pains and with negative impact and discomfort on an individual's life. Upper back pain can be classified as either acute or chronic in nature, based on the length of time it has persisted in individuals. [38]

Acute upper back pain may be a direct result of inflammation of the thoracic spine and the symptoms of such inflammation includes sharp pains which in normal cases can persist for less than three months and are usually associated with short-term injuries. Cases of chronic upper back pain are expected to persist for more than three months and when this situation occurs, it is indicative of nerve damage or structural damage to the spinal bones. [39]

(6) Neck Injury (Disorder): Neck disorder includes such things as pains in the neck leading to stiff nakedness. This is could be as a result of strains and sprains which can develop over time, or as a result of poor posture that can cause the curvature of spine, neck bones, and muscles. It can also occur due to accidental or sudden injury. The most common condition that contributes to the development of neck pains and disorder is forward head leaning and shoulder posture. This is the situation when the neck slouch forward placing the head in front of the shoulders and this position of head leads to several ergonomic problems. [40] The pushing or pulling forward of the weight of the head tends to put un- natural stress on the vertebrae of the lower neck, contributing to serious verterbraterial disc disease and other degenerative neck injuries and disorders. In another observation, this un-neutral posture of head causes the muscles of the upper back to become over stressed in an effort to neutralise the pull of gravity on the forward pushing of the head.

Office Ergonomic Awareness

Creating ergonomic awareness is a programme of action aimed at equipping the workers with skills, knowledge, techniques and the right training in identifying the risk factors capable of causing work related musculo-skeletal disorders. [41] It forms part of the work place safety and health awareness campaign in order to change the work behaviour of the workers for the improvement of their general work condition. In creating ergonomic awareness among the workers, through training, workshops, symposium, video shows, lectures, issuing ergonomic booklets (Ergo-Manuals) etc., workers learn the basic skills of risk factor identification, work place risk reduction managing injuries and the work environment sustainability. [42-44]

Therefore, increasing office ergonomic awareness, the office workers are exposed or introduced to basic ergonomic tips in relation to sitting posture, office safety and health programmes, simple anatomy and biomechanics of the human body, identifying and controlling ergonomic-related risk factors in the office environment recognizing contributing factors from the home environment, setting up and making adjustment to an ergonomically correct workstation and examining workplace examples. Therefore, as a sustainable strategy for reducing the prevalence of office work-related musculo-skeletal disorders, creating ergonomic awareness will help workers in:

- Minimizing ergonomic-related risk factors through proper work techniques and behaviour
- Reducing the incidences of work-related risks through workplace adjustments or changes.
- Learning the basic precautionary measures aimed at accident prevention
- Recognize ergonomics opportunities within their office environment.

From the above highlights, it could be seen that, the central idea in creating office ergonomic awareness is to bring about a change in the work behaviour of the office workers through the massive awareness campaigns and programmes of action. Learning the correct sitting posture based on ergonomic tips,, adjustment to work station, and training on proper use of office ergonomic facilities can have a significant role in reducing the complaints of work related musculo-skeletal disorders among the workers.

Level of Ergonomic Awareness in Nigeria

According to previous studies, there is a poor level of ergonomic awareness in Nigeria especially in the government sector (Local Governments inclusive), which accounts for 80% of the workers lacking in ergonomic awareness. [45] This could be as a result of the fact that Nigeria is not conversant with the benefits of ergonomics or due to the scarcity of literature which makes the government not take the issues of ergonomics seriously in its Occupational Safety and Health Policies (OSHA). [46,47]

The poor funding of local Governments in Nigeria which explains its poor level of staff development and awareness on issues of safety and health at work is another big challenge which creates limited awareness of issues of work place ergonomics. [48] Thus, there is a great need for creating ergonomic awareness among the workers in public sector in Nigeria so as to have a more viable strategy for reducing musculo-skeletal complaints. This entails devising a training programme on the correct sitting posture in office, the training on the use of highly adjustable chair if provided, provision of guidelines on the ergonomic tips in form of ready printed manuals, and where possible constituting ergonomic committees and officials to educate workers on the health and economic benefits of office ergonomics.

Another workable strategy for creating ergonomic awareness especially at the Local Government office, is by way of organizing seminars, conferences and workshops in order to teach the staff the topic of ergonomics and the general issues which border on work place safety and

health. Creating awareness should not only be limited to the training and lectures on ergonomic tips, rather, serious effort should be made towards changing the work habit and attitudes of the workers as some workers will find it difficult to adjust to the new training and workshop needs. This will involve the use of other methods such as moral suasions as a method of ergonomic intervention. [49] Moral suasions are a way of appealing to the morality of the workers in order to accept the required changes in their work attitudes. Therefore, poor ergonomic awareness in Nigeria due to the low level of commitment of the government towards ergonomics and other OSHA issues as well as the poor funding of local governments is another risk factor towards the prevalence of work related musculoskeletal disorders. [50]

The Research Methodology

This shows the details of the logical and systematic steps followed to arrive at the findings and the conclusion in this study. It is the master blue print which informs the methods of data collection and data analysis.

The Research Frame Work

The approach to this research is essentially a quantitative approach. It is thus a research approach within the positivist paradigm. It involves a quantitative opinion survey of the Local Government workers of Katsina State of Nigeria concerning their level of ergonomic awareness. Thus, ergonomic awareness survey questionnaire was used to study the prevailing opinion of workers concerning their awareness of the issue of office ergonomics as a branch of work place safety and health. However, in order to corroborate the findings of the questionnaire, an unobtrusive observation was conducted which observed the sitting posture of the workers, which informs their level of ergonomic awareness. Thus, in this research approach, there is a triangulation of methods.

Area of the Study

The area of this study is Katsina State of Nigeria. According to Katsina Wikipedia (2015), Katsina State was among the North Central States of Nigeria, which was later curved out of Kaduna State in 1987. Now it is lying in the North-Western Geo-Political Zone. It is bounded in the North by Niger Republic, in the East by Kano State, in the South by Kaduna State and by Sokoto State in the West. The State covers an area of 26,785 Square Kilometers and has 34 Local Government Areas. Each Local Government Administrative complex is called "Secretariat". The Secretariats and their office workers is an area of the research interest. 10 Local Governments were selected for the survey using randomized cluster sampling. The Research was conducted from the period of January, 2015 to September 2016.

Population of the Study

Population of the study is the subjects of the research interest. In other words, they are the respondents of the survey questionnaire and subjects of the observation. The populations of the study in this research are secretaries, typist, personal assistants, computer users and other workers in related clerical fields. This is because; this is the category of workers identified with work related musculo-skeletal complaints from the literature.

Sample of the Population

To determine the sample of the population, Krejcieamd Morgan formula was applied. Using Morgan Table for sample determination, 205 was suggested for the research respondents which are 428 in number in the 10 Local Governments. Therefore, from the group of 428 people, 205 is an adequate sample for the survey based on Morgan table.

Methods of Data Collection

Two principal methods were applied in data collection in this research. Ergonomic Awareness Questionnaire was designed based on 5 likert scales with opinion rating ranging from Strongly

Disagree to Strongly Agree. The questionnaire was validated and was confirmed to have both content and construct validity by the experts in the field. 250 questionnaires were distributed to take care of the unreturned ones and the ones with the missing values. 210 questionnaires became ready for the analysis. There are 8 items on this section of the construct for the survey of ergonomic awareness.

Structured, unobtrusive observation was also conducted after the questionnaires were collected. The observation aimed at studying the work postures of the respondents from each of the Local Governments visited. Office ergonomic observational checklist was used to record important events and activities in relation to the work postures of the respondents. Field notes were developed, giving the detailed account of what has been observed and recorded in the checklist. In some instances, photographs were captured.

Method of Data Analysis

In analysing the opinion data from the questionnaire, descriptive statistics of mean and standard deviation was applied, using SPSS version 22. This is the method of determining the central tendency of the response. In interpreting the result of the responses, the mean calibration of Hassanain 2008 was adopted as follows;

Table 1: Mean Calibration of the Questionnaire

Mean	Response
0 - 1.49	Strongly Disagree
1.50 - 2.49	Disagree
2.50 - 299	Moderately Agree or Undecided
3.00 - 3.50	Agree
Above 3.50	Strongly Agree

Adapted from Hassanain (2008)

In analysing the data from the observation, interpretive/reflective analysis was used to describe the events and activities observed as recorded in the observational checklist as well as the interpretation of the photographs (Image Data).

Ethical Consideration of the Methodology

Due process was followed in conducting this study. Formal permission was sought before administering the questionnaire and conducting the observation on the respondents from the Heads of Local Government Administration of each of the Local Governments visited for the purpose of conducting the research. Introduction letter seeking permission to conduct the research was tendered to each Local Government for record purpose. The letter was issued by the Faculty of Technology Management, University Tunn Hussein on Malaysia dated 27th, August, 2015

RESULT AND DISCUSSION

The presentation and discussion of the result is based on the data extracted from the questionnaire and the observational data extracted from the field trips to the 10 Local Governments sampled out for the study.

1. **Data From the Questionnaire:** As earlier stated, 250 questionnaires were distributed to the group of typist, secretaries, personal assistants and other related clerical assistants in the 10 Local Government Secretariats of Katsina State of Nigeria. However, 218 were retrieved and 210 questionnaires were ready for the analysis after rejecting the missing values and treating the outliers. In the questionnaire, 8 items were asked which form the construct or variable which measures the level of ergonomic awareness of the respondents. The questionnaire has a good response rate as shown in table 2 below

Table 2. Questionnaire Response Rate

No.	Respondents Categories	No. Received	Percentage	No. Returned	Response rate
1.	Secretaries	75	30%	67	89.3%
2.	Typists	96	38.4%	84	87.5%
3.	Personal Assistants	42	16.8%	36	85.7%
4	Related Clerical Jobs	37	14.8%	31	83.7%
	TOTAL	250	100%	218	86.55% (Mean Rate)

From the above table, it could be seen that there is 89.3% response from the Secretaries, 87.5% from typists, 85.7% from personal assistants, 83.7% response rate from other clerical office staff. The overall mean response is rate 86.55%.

Descriptive Statistics of the Responses:

The descriptive statistics to be used in analysing research data is dependent on the nature of the variable. For different variables, different statistical tool is employed. For example, where there are categorical variables mostly the ones found in characteristic sample of the population, it is more apt to use percentage and frequencies. However, in the case of continuous variables, descriptive statistics of mean and standard deviation is more appropriate. [51,52]

Therefore, in this section of the research report, descriptive statistics of mean and standard deviation is used. Table 3 below shows the descriptive analysis of the respondent's opinion concerning their level of office ergonomic awareness. The table shows the mean and standard deviation of the responses.

Table 3: Descriptive Statistics for Ergonomic Awareness Construct

No.	Items of the Construct	Mean	Standard Deviation	Response
1.	"I am always aware of the term "Office Ergonomics" as a branch of office safety and health before receiving this questionnaire".	2.48	1.06	Disagree
2	"My organisation gives training to office workers concerning sitting and work posture in the office".	2.29	1.01	Disagree
3.	"I am quite aware that incorrect sitting posture while carrying out work causes body pains and work related problems".	3.04	1.20	Agree
4.	"My organisation gives out periodicals, manuals or handbooks with guidelines on proper sitting/correct work posture.	2.12	0.91	Disagree
5.	"My organisation engages the services of office/medical experts to educate workers on the health implication of incorrect posture of work".	2.17	0.92	Disagree
6.	"My organisation has committee or any unit charged with the responsibility of educating workers concerning proper sitting posture during work".	2.04	0.89	Disagree
7	"I have been attending seminars and conferences on office ergonomics to learn about work posture and sitting position from time to time."	2.22	0.94	Disagree
8.	"I am aware that working for too long without break causes serious body pains and health related problems	3.45	1.16	Agree
TOTAL		2.48	0.67	Disagree

N=210

From table 3 above, the mean and standard deviation for the 8 items of the construct for the survey of the level of ergonomic awareness of the Local Government office staff in Katsina State of Nigeria is interpreted as follows:

The first item has the statement "I am always aware of the term "Office Ergonomics" as a branch of office safety and health before receiving this questionnaire. The mean is 2.48 and the standard deviation is 1.06. The response is a "Disagree Response"

The second item is "My organisation gives training to office workers concerning sitting and work posture in the office". The mean is 2.29 and the standard deviation is 1.01. This statement also has a "Disagree" response.

Under the third item the statement is "I am quite aware that incorrect sitting posture while carrying out work cause body pains and work related problems". The mean is 3.04 and the standard deviation of 1.20. This mean response indicates "Agree" opinion.

The fourth item is "My organisation gives out periodicals, manuals or handbooks with guidelines on proper sitting/correct work posture. The mean response is 2.12 and the standard deviation 0.91. Therefore the response is "Disagree".

From the fifth item the statement is "My organisation engages the services of office/medical experts to educate workers on the health implication of incorrect posture of work". The mean is 2.17 and the

standard deviation of 0.92. The response is showing "Disagreement".

In the sixth item, the statement is "My organisation has committee or any unit charged with the responsibility of education workers concerning proper sitting posture during work". The mean is 2.04 with a standard deviation 0.89. The mean response also indicates "Disagree."

The seventh Item has this statement "I have been attending seminars and conferences on office ergonomics to learn about work posture and sitting position from time to time." The mean is 2.22 and the standard deviation is 0.94. This also shows "Disagreement" with the statement.

In the eighth item, the statement is "I am aware that working for too long without break causes serious body pains and health related problems. The mean response is 3.45 and the standard deviation is 1.16. This statement shows "Agreement".

The total mean for the whole construct is 2.48 and the standard deviation is 0.67. Therefore, the overall response for this variable shows "Disagreement", and that the level of ergonomic awareness among the workers in Local Government offices of Katsina State of Nigeria is poor.

The finding of this survey has therefore confirmed the findings of Ismaila *et al.* (2010), which concluded that the level of ergonomic awareness in Nigeria is very low especially among the staff of governmental office.

2. Data from the Observation

The observation was conducted in order to confirm the data generated by the questionnaire. The focus of the observation is on the sitting posture of the respondents. This is because the sitting posture of the respondents will say a lot about their level of ergonomic awareness and training for their own general safety and protection from continuous musculo-skeletal complaints.

Observation as a technique of qualitative data generation is concerned with watching, or at a more technical level, systematically investigating and making judgment about what is seen or perceived by the sense organs within the study environment. [53] In another dimension, scientific observation involves careful and attentive watching, measuring, recording and accurate reporting of what has been discovered in the field or experiment. [54] Therefore, observation in research is different from mere seeing. The major essence and advantages of supporting quantitative data or other methods with observation is its directness and naturalism. That is the events; objects and behaviour are being watched, captured and or recorded in their natural and un-adulterated setting (in-situ). [55]

Observational method of data collection has many forms and styles. In this study it is a non-participant observation because the researcher does not participate in the activities being observed. In this sense, the researcher assumes the role of a neutral person from what is observed and the activities taking place.

The observation is an un-obtrusive one because the subjects were not made to detect that their actions were being observed and examined. For example, the subjects of the study were not made to detect that their work behaviour and sitting posture were part of what this study is interested in recording. This is important in order avoid a situation of "reactive measurement effect". That is a situation where the subjects under study will change their natural behaviour and disposition which will distort the validity of the study findings. [56]

Still, the observation is a structured one in the sense that only the phenomena of interest as outlined in the observation checklist/schedule is observed. In order to outline the focus of the observation, an office ergonomic checklist based on Rapid Office Strain Assessment (ROSA) was adapted from Christ Brunt Office Ergonomic Checklist as used in previous studies by Michelle *et al.*, 2012 cited above. This type of checklist is designed to quickly assess and identify ergonomic risk factors capable of causing the development of work related musculo-skeletal disorders in the office work environment with specific

emphasis on the work posture. That is to study the risk factors associated with the nature of computer/typing job, clerical and general office work environment in order to establish an action level for change and improvement.

Apart from using the checklist to record the data and develop the field notes, photograph method of work posture was also adopted in the observation. This because, all the reported measures of sitting posture, as well as photographs, have the same flaw, as these measures are only good in examining the external structures of the body. These measures use calculations from external bony landmarks to estimate spinal posture on the basic assumption that what is being measured externally is the true and accurate reflection of the shape, health and performance of structures of the underlying spine. [57]

However, despite this flaw, photographic posture analysis method (PPAM) is the commonest method used in estimating the sitting postures of the adolescents. Based on this, photographs were taken using the Photographic Posture Analysis Method (PPAM) and the report of the work postures is based on the analysis and interpretation of the photographs to estimate the work postures as suggested by Van (2008) cited above. This is because the findings of their work have established that photograph method is still a valid method of estimating the work posture. Therefore the work postures observed in the 10 Local Governments in Katsina State of Nigeria presented in a summarised form as follows;

(a) Sitting Postures: As already mentioned, in observing the sitting and work posture of the workers in the sampled Local Governments, systematic, unobtrusive, observation was carried out. However, such phenomenon of interest is difficult to observe in all the Local Governments. This because it requires skills and artistry of the highest order. Therefore, in this section of observational data capturing, the sitting postures where captured at a time when workers' attention is so much taken by their job, especially in the registry units where many workers became so much engrossed in their work. Based on this, therefore, the instances where such opportunities became available to allow the capturing of images were very limited. Period of 3 hours were spent in each Local Government where the observation was carried out covering the period from 9 a.m. to 12.pm. 10 weeks were spent doing the observation, each week for 1 Local Government. The observation was conducted in the following departments/offices:

(1) Office of the Chairman
(2) Office of the Director Administration and Finance
(3) Central Registry
(4) Primary Health Care Department
(5) Agriculture and Natural Resources Department
(6) Works Department
(7) Education and Social Services Department
(8) Water Sanitation Department

A pretense of taking photographs of the office furniture was used to hide the real intention of capturing the sitting behaviour of the workers. Therefore, the workers were not aware that they were being photographed. This presented the data of natural behaviour of the workers (Naturalistic Inquiry).

From such few instances where the images of sitting posture of the Local Government workers were captured, the pictures show the sitting posture which is unnatural, unsymmetrical and unbalanced. This type of awkward sitting posture is a typical case of violation of natural and biomechanical properties of human body which are good predictors of musculo-skeletal pains of upper extremities (upper back, arms, shoulders and neck). [57] The sitting postures were always very awkward and work is continuous without break under such posture. The head is tilted downward

during the work, with the body trunk (thoracic posture) inclined to form C shape rather than upright neutral shape at approximately 60^0(acute angle). This will continue to violate the body mechanical properties leading to neck and back disorder.

Similarly, the typing habit is not a soft touch typing. Most of the machines used for typing job are heavy mechanical machines. Where such heavy mechanical typewriters have to used, heavy stroke is needed and the wrist are pronated downward below the fingers, while the fingers bend too vertically to above 15 degrees of curvature which all these are factors for wrist carpal tunnel injury and the damage to the ligaments as highlighted by Chaparro *et al.(*2000)*,, cited above.*

The figures below are example of the general nature of work postures of the workers in all the Local Governments where the opportunity to observe and take photographs was available

Figure 1 Example of Work Posture in Kafur Local Govt.
Source: Kafur Local Government on 8th February, 2016

From the above posture in figure 1, it could be seen that the back and the spine assume a forward leaning posture and the mass of the head slouched forward instead of upright. This is a good scenario for the development of both lower and upper back region pains because none of them is fully supported. Sustained and poor sitting postures have been identified as important risk factors for back pain in adults. [58]

Figure 2: Working Posture with Forward Head Leaning
Source: Daura Local Government Secretariat on 25th January, 2016

Figure 2 above, shows a scenario where the sitting posture is un-neutural with head leaning forward position. The head is slouched forward and the mass of the head is posing pressure on the neck bones, ligament and spinal disc. This is another good predictor for neck disorder when sustained for a very long time. [59]

Figure 3: Poor Work Posture, Legs Not Firmly Place on the Floor
Source: Malumfashi Local Government

Figure 3 above is another example of poor work posture where the legs are stretched and not firmly placed on the floor or foot rest, to give support to the entire mass of the body.

(b) The Typing Posture: In observing the activities taking place during the typing process, the focus of the attention is on the nature of the keyboards, the curvature of the fingers and the wrists, the nature of the mouse being used as well as the position of the typing or reference materials to be typed. From the observation of these variables, the position of the typing reference materials and the mouse during the typing are placed to the other side, left or right which forces workers to be turning the neck to the other direction of the typing material or mouse and this is a very good factor for the neck disorder

In some instances, the typing behaviour involves stretching the fingers too horizontal which is a good predictor for trigger finger or tenosynovitis and numbness of the fingers as highlighted by (Chaparro 2000) above. Similarly, the feet are not firmly resting flat on the floor while performing any of such operations so as to add more support to the hips and lumbar region while seated. The figures below are example of poor typing posture of the Local Government Staff.

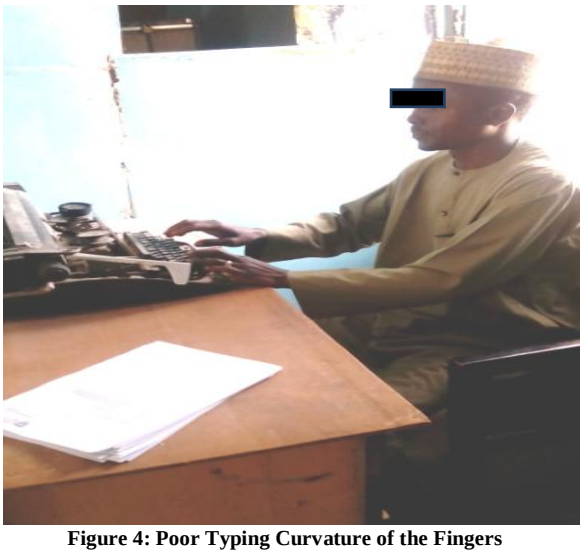

Figure 4: Poor Typing Curvature of the Fingers
Source: Kafur Local Government

Figure 4 above, shows that when typing, the fingers are too horizontal to the extent that the left hand is touching the surface of the table. Similarly, the reference material is place to the other side and when reference is to be made, the neck must be turned to that direction. The curvature above is a good predictor for tynosynovitis as highlighted by Kumar, 2001 cited above.

Figure 5: Typing with Excessive Curvature of the Wrist
Source: Katsina Local Govt. On 4th January, 2016

Figure 6: Neck Turning Posture at Batagarawa Local Govt.

Figure 5 above, is an example of typing with pronated wrist. The focus is on

the hands here not the entire body so as to observe the trends capable of causing carpal tunnel injury. The right hand side of the staff is so much pronated and when typing process continues on a sustained basis, the result will be a case of severe carpal tunnel syndrome as highlighted by Karsh (2005) above.

Figure 6 above, shows a typing posture were the staff has to turn the neck to the other side in order to make reference to the typing materials. This is a good predictor for neck disorder if such position is sustained for a very long time.

In all these postures observed, these sitting positions are not changed for over 30 minutes and no adjustments were made to the sitting arrangements. Therefore, from the analysis and of both the quantitative data and the observational data, it could be seen that there is a relationship between the data generated from the questionnaire concerning poor level of ergonomic awareness among the secretaries, typist and other related clerical workers in the offices of 10 Local Government Secretariats were the observation was carried out.

CONCLUSION

From the above analysis of both quantitative and qualitative data which reveals the work postures of the research subjects, it could be concluded that the secretaries, typists, personal assistants and other related clerical officers are lacking in ergonomic awareness. Lack of ergonomic awareness is a good risk factor for the prevalence of work related musculo-skeletal disorders among the office workers. Therefore in order to resolve the problem of work-related musculo-skeletal disorders among the staff and to achieve a sustainable work environment it is necessary to launch a robust ergonomic awareness campaign as a sustainable strategy. [60] This lack of ergonomic awareness could be attributed to the neglect of staff welfare and training which is a common feature of Local Governments in Nigeria (Katsina State inclusive), as reported by the State Ministry of Finance and Economic Planning. [61] Thus, providing ergonomic facilities in form of highly adjustable chair, ergonomic computers, work stations etc., are not enough. The staff must be trained on how to use these ergonomic facilities as well as training and awareness in ergonomic work and typing postures.

REFERENCES

1. Ennals, R. (2001). Work Environment. In *Work Life 2000 Yearbook 3* (pp. 45-118). Springer London.
2. Saurin, T. A., & Ferreira, C. F. (2009). The impacts of lean production on working conditions: A case study of a harvester assembly line in Brazil. *International Journal of Industrial Ergonomics*, *39*(2), 403-412.
3. Ekstrand, Mari, and Sigrid Damman. (2016) "Front and backstage in the workplace: an explorative case study on activity based working and employee perceptions of control over work-related demands." *Journal of Facilities Management* 14.2.
4. Epstein, M. J., &Buhovac, A. R. (2014). *Making sustainability work: Best practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts*. Berrett-Koehler Publishers.
5. Crowl, D. A. (Ed.). (2007). *Human factors methods for improving performance in the process industries*. John Wiley & Sons.
6. Bentley, T., & Tappin, D. (2010). Incorporating organisational safety culture within ergonomics practice. *Ergonomics*, *53*(10), 1167-1174.
7. Michelle, M. (2008). Flexible workspace Design and Ergonomic Training: Impacts on the Psycho-social Work Environment, Musculo-skeletal Health and Work Effectiveness among Knowledge Workers: *Journal of Applied Ergonomics* Vol. 39 pp 482 – 494.
8. McGlothin, D.J., (2012). *Occupational Ergonomics: Theory and Practice*, Second Edition.CRC Press, Taylor & Francis Group U.S.A.
9. Cavalho, M.A., et al., (2014) *Occupational Safety and Hygiene Journal*, Vol. II Taylor and Francis Group, London. Anthropometric Data Collection for Occupational Ergonomics

10. Kalla, A. A. (2010). *The Bone and Joint decade* l 2000-2010-For Prevention and Treatment of Musculo-Skeletal Disorders Press Release-October 11, 2000.
11. Niemi, E., &Zarabadi, P. Development of an ergonomic couch with a Cradle to Cradle approach (for an activity based office environment).
12. Menendez, C.C., et al., (2012). A Replicated Field Intervention Study Evaluating the Impact of a Highly Adjustable Chair and Office Ergonomic Training on Visual Symptoms: *Journal of Applied Ergonomics* Vol. 43 pp. 639 -644
13. Straker, L., Abbott, R. A., Heiden, M., Mathiassen, S. E., &Toomingas, A. (2013). Sit–stand desks in call centres: Associations of use and ergonomics awareness with sedentary behavior. *Applied ergonomics*, *44*(4), 517-522.
14. Kyenge, J., (2013). *The Challenges of Local Government Administration in Nigeria*: Journal of Management and Corporate Governance in Nigeria. Vol. 5 Issue 1.
15. Alan, H. (2013) *Ergonomics and U.S. Foreign Public Policy*: Forum for Interacting with Public Policy
16. Kroemer, A. D., &Kroemer, K. H. (2016). *Office Ergonomics: Ease and Efficiency at Work*. CRC Press.
17. Karwowski, W. (2006). The discipline of ergonomics and human factors. *Handbook of human factors and ergonomics*, *3*.
18. Dul, J., Bruder, R., Buckle, P., Carayon, P., Falzon, P., Marras, W. S., ... & van der Doelen, B. (2012). A strategy for human factors/ergonomics: developing the discipline and profession. *Ergonomics*, *55*(4), 377-395.
19. Hollnagel, E. (2014). Human factors/ergonomics as a systems discipline? "The human use of human beings" revisited. *Applied ergonomics*, *45*(1), 40-44.
20. Lehto, M. R., & Landry, S. J. (2012). *Introduction to human factors and ergonomics for engineers*. Crc Press.
21. Brand, J. L. (2008). Office ergonomics: A review of pertinent research and recent developments. *Reviews of human factors and ergonomics*, *4*(1), 245-282.
22. Smith, L., &Deivanayagam, S. (2014). Workspace, Equipment and Tool Design. *Work Space, Equipment and Tool Design*, *15*, 113.
23. Karl, H.E., Kroemer& Anne D (2001) *Office Ergonomics*. Published by Taylor and Francis Ltd. 11 New Fetter Lane, London.
24. Niu, S. (2010), Ergonomics and Occupational Safety and Health: An ILO, Perspective. Programmes on Safety and Health at Work and the Environment, International Labour Organization. *Journal of Applied Ergonomics*, Vol. 41 2010. Pp. 744-753
25. Dimberg, L., Laestadius, J. G., Ross, S., &Dimberg, I. (2013). *Office Ergonomics and its impact on health and productivity with focus on musculoskeletal symptoms*. The World Bank Bulletin of Safety and Health.
26. Vischer, J. C. (2012). *Workspace strategies: Environment as a tool for work*. Springer Science & Business Media.
27. Vischer, J. C. (2008). Towards an environmental psychology of workspace: How people are affected by environments for work. *Architectural science review*, *51*(2), 97-108.
28. Kumar S. (2001) *Theories of Musculo-skeletal Injuries causation.* National Centre for Bio-Technology Information, US Library of Medicine
29. Barr, A. E., &Barbe, M. F. (2004). Inflammation reduces physiological tissue tolerance in the development of work-related musculoskeletal disorders. *Journal of Electromyography and Kinesiology*, *14*(1), 77-85.
30. Karsh, B. (2005). Theories of work-related musculoskeletal disorders—implications for ergonomic interventions. *Theoretical Issues in Ergonomic Science*, 7: 71–91
31. Mircea, F. and Kumar S. (2003) *Carpal Tunnel Syndrome Due to Keyboarding and Mouse Tasks*: A Review. International Journal of Industrial Ergonomics vol.31 2003s
32. Chaparro, A., Rogers, M., Fernandez, J., Bohan, M., Sang Dae, C., &Stumpfhauser, L. (2000). Range of motion of the wrist: implications for designing computer input devices for the elderly. *Disability and rehabilitation*, *22*(13-14), 633-637.
33. Pille, V., Tuulik, V. R., Saarik, S., Tint, P., Vare, T., &Sepper, R. (2009). Work-related musculoskeletal symptoms in industrial workers and the effect of balneotherapy. *ISSN 1406-894X*, *13*(3), 820-828.

34. Palmer, B. A., & Hughes, T. B. (2010). Cubital tunnel syndrome. *The Journal of hand surgery*, *35*(1), 153-163
35. Cho, C. Y., Hwang, Y. S., &Cherng, R. J. (2012). Musculoskeletal Symptoms and Associated risk Factors among Office Workers with High Workload Computer Use. *Journal of Manipulative and Physiological therapeutics*, *35*(7), 534-540.
36. Eatough, E. M., Way, J. D., & Chang, C. H. (2012). Understanding the link between psychosocial work stressors and work-related musculoskeletal complaints. *Applied ergonomics*, *43*(3), 554-563.
37. Jaraczewska, E., & Long, C. (2015). Kinesio® taping in stroke: improving functional use of the upper extremity in hemiplegia. *Topics in Stroke rehabilitation.*
38. Azevedo, D. C., Van Dillen, L. R., de Oliveira Santos, H., Oliveira, D. R., Ferreira, P. H., & Costa, L. O. P. (2015). Movement System Impairment–Based Classification VS General Exercise for Chronic Low Back Pain: Protocol of a Randomized Controlled Trial. *Physical therapy*, *95*(9), 1287-1294.
39. Vardeh, Daniel, Richard J. Mannion, and Clifford J. Woolf. (2016). "Toward a Mechanism-Based Approach to Pain Diagnosis." *The Journal of Pain* 17.9 T50-T69.
40. Kang, J. H., Park, R. Y., Lee, S. J., Kim, J. Y., Yoon, S. R., & Jung, K. I. (2012). The Effect of the Forward Head Posture on Postural Balance in Long Time Computer Based Worker. *Annals of rehabilitation medicine*, *36*(1), 98-104
41. Martimo, K. P. (2010). *Musculoskeletal Disorders, Disability, and Work*. Finnish Institute of Occupational Health.
42. Van Eerd, D., Cole, D., Irvin, E., Mahood, Q., Keown, K., Theberge, N.,& Cullen, K. (2010). Process and implementation of participatory ergonomic interventions: a systematic review. *Ergonomics*, *53*(10), 1153-1166.
43. Wirth, O., & Sigurdsson, S. O. (2008). When workplace safety depends on behavior change: Topics for behavioral safety research. *Journal of Safety Research*, *39*(6), 589-598.
44. Hymel, P. A., Loeppke, R. R., Baase, C. M., Burton, W. N., Hartenbaum, N. P., Hudson, T. W., ... &Konicki, D. L. (2011). Workplace health protection and promotion: a new pathway for a healthier—and safer—workforce. *Journal of occupational and environmental medicine*, *53*(6), 695-702.
45. Ismaila, S.O (2010). A Study on Ergonomic Awareness in Nigeria. *Australian Journal of Applied Sciences* Vol. 4 Issue 5 731-734
46. Idowu, P. A., Adedoyin, R. A., &Adagunodo, R. E. (2005). Computer Related Repetitive Strain Injuries. *Journal of Nigeria Society of Physiotherapy*, *15*(1), 1318.
47. Menéndez, C. C., Amick, B. C., Robertson, M., Bazzani, L., DeRango, K., Rooney, T., & Moore, A. (2012). A replicated field intervention study evaluating the impact of a highly adjustable chair and office ergonomics training on visual symptoms. *Applied ergonomics*, *43*(4), 639-644.
48. Kyenge, J., (2013). The Challenges of Local Government Administration in Nigeria: *Journal of Management and Corporate Governance in Nigeria*. Vol. 5 Issue 1.
49. Okolie, K. C., and Okoye, P.U. Assessment of National Cultural Dimensions and Construction Health and safety climate in Nigeria. *Science Journal of Environmental Engineering Research*, 2012. Vol. 2012, 6 pgs.
50. Pires, R. (2008). Promoting sustainable compliance: Styles of labour inspection and compliance outcomes in Brazil. *International Labour Review*, *147*(2-3), 199-229.
51. Pallant, J. (2011). *SPSS survival manual: A Step by Step Guide to Data Analysis Using SPSS*. Open University Press.
52. Hair, F.J. (2010). *Multivariate Data Analysis* Seventh Edition. Peason Prentince Hall: London
53. Tilstone, C., (Ed.) (2002). The Technique of Observation, in Observing Teaching and Learning: Principles and Practice: London David Fulton Publishers.
54. Godwin, S. L., & Chambers IV, E. (2009). Observational research: A tool for collecting behavioral data and validating surveys. *Proceedings of Summer Programme in Sensory Evaluation (SPISE) 2009*, 29-36.
55. Puvenesvary, M., Rahim, R. A., Naidu, R. S., Badzis, M., Nayan, N. F. M., & Aziz, N. H. A. (2008). *Qualitative Research: Data Collection & Data Analysis*. UUM press
56. Robson, C. (2000). *Real World Research*. Oxford: Blackwell

57. Van Niekerk, S. M., Louw, Q., Vaughan, C., Grimmer-Somers, K., &Schreve, K. (2008). Photographic measurement of upper-body sitting posture of high school students: a reliability and validity study. *BMC musculoskeletal disorders*, *9*(1), 1.
58. Anderson, J. (2007) *Health and Safety - Matching Legislation and Enforcement*. Proceedings of the Institute Of Civil Engineers Management, Procurement and Law Pp. 11-15.
59. Vieira, E. R., & Kumar, S. (2004). Working postures: a literature review. *Journal of Occupational Rehabilitation*, *14*(2), 143-159.
60. Hassanain, M. A. (2008). On the Performance Evaluation of Sustainable Student Housing Facilities. *Journal of Facilities Management*, *6*(3), 212-225.
61. Katsina State Wikipedia (2015). Retrieved on 2oth February, 2016

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