Reducing Ergonomic Hazards and Challenges in Clothing Laboratories in Tertiary Institutions in Anambra State.

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Abstract

This study focused on reducing ergonomic hazards and challenges in clothing laboratories in tertiary institution in Anambra State. The population for the study comprised of 1,752 students and laboratory assistants in tertiary institutions in Anambra State. Simple random sampling technique was used to select 140 students and laboratory assistants. Questionnaire was used for data collection. Data was analyzed using mean to answer research questions. The findings indicated that, repetitive movement, forceful movement, awkward postures, carrying heavy loads, and improper lifting methods were major ergonomic hazards in clothing laboratories, while, use of proper tools, avoidance of awkward postures, use of safe lifting procedures, and reduction of excessive force were strategies to minimize ergonomic hazards. Recommendations were made which include proper training of workers, providing safe work station, involvement of workers in decision making, provision of safety standards for workers among others.

Key words: Ergonomics, hazard, challenges, clothing laboratories, tertiary institutions.

Introduction

Working safely in clothing laboratories require proper use of laboratory equipment. Work related injuries can be highly reduced if work environment and equipment are planned in such a way that they are of the best benefit to the worker. In the last decade, almost every branch in the production and service industry has expended great effort in improving productivity and quality through restructuring of work environment (Middleworth, 2013). This restructuring process has yielded practical experience which clearly shows that productivity and quality are directly related to the design of working environment.

Ergonomics has been widely studied for nearly 70 years. The term ergonomics came into use about 1950 when the priorities of developing industry were taking over from priorities of military. The United Nations agencies particularly International Labour Organization (ILO) and the World Health Organization (WHO) became active in this field in the 1960s. Ergonomics has been defined as the scientific study of the relationship between man and his working environment. In this sense, the term environment is taken to cover not only the ambient environment in which he may work, but also his tools and materials, his methods of work and the organization of his work

either as an individual or within a working group. It is the process of designing products and work plan to accommodate the people who use them. From its beginning, ergonomics was focused on reducing discomfort and fatigue while improving productivity. The National Institute for Occupational Safety and Health (2002) defined ergonomics as the study of work activities that cause musculosketal disorders which is the fastest-growing category of work-related illnesses. Ergonomics is the study of the interaction between humans and their work. According to Lowe (2022) ergonomics can be a powerful tool for designing enabling and ennobling work. It's foundation were a noble drive to increase a worker comfort and productivity. Ogbonnaya and Ugwuoke (2019) observed that ergonomics refer to human posture by which people interact with equipment, tools and machines in work place for effective performance and productivity. It encompasses the human practice of designing equipment and work task to conform to the capability of the worker. Furthermore, Kogi (2000) asserted that ergonomics is the study of people in relation to their working conditions especially in the design of tools, equipment and furniture to help an individual work efficiently to protect live, property and improve productivity in work places. Dohrmann (2016) maintained that ergonomics is the process of designing or arranging workplaces, products and system so that they fit the people who use them.it applies to anything that involves people – workplace, sports, and leisure, health and safety.

The application of ergonomics principles are essential to good occupational health and safety practices for all work activities. Common ergonomics principles as stated by Sheprack (2021) are the basic principles of ergonomics which can help you evaluate the task you do every day and make simple changes that make a big impact; they include working in a neutral position, decrease the need for excessive force, keep materials within easy reach, work at proper height, reduce unnecessary motion, maximize fatigue among others.

Hazard is a potential source of harm or adverse health effect on a person or persons (Health and Safety Authority, 2020). It is a source or situation with the potential for harm, in terms of human injury or ill health, damage to property, damage to the environment or combination of these. Milan (2013) observed that most hazards are dormant or potential with only a theoretical risk of harm. According to him, once a hazard becomes active, it can create an emergency situation. In the opinion of Jennifer C (2020) hazards are grouped into six categories: biological, chemical, physical, safety, ergonomics and psychological hazards.

Biological hazards include viruses, bacterial, insects, animals among others that can cause adverse health impact. Chemical hazards are hazardous substances that can cause harm (The National Institute for Occupational Safety and Health, 2020) (NIOSH) these hazards can result in both health and physical impacts, such as skin irritation, respiratory system, irritation, corrosion and explosions. Physical hazards are environmental factors that can harm an employee without necessarily touching them, including heights, noise, radiation, pressure. Safety hazards are hazards that create unsafe working conditions (Indeed Editorial Team, 2022). Ergonomic

hazards are as a result of physical factor that can result in muscular skeletal injuries. Psychological hazards include those that can have adverse effect on employee's mental health or wellbeing (Jennifer, 2020).

Ergonomic hazards according to Ogbonnaya and Ugwuoke (2019) refer to workplace conditions that pose the risk of injury to the musculoskeletal system of the worker which include repetitive and forceful movements, awkward postures or positions that arise form improper work methods and improperly designed workstations, tools and equipment. Clothing construction laboratory is a place where equipment for sewing are kept, where drafting of patterns, clothing construction, mixing of chemicals for tie and dye production take place (Emeka-Okafor, 2014). The major health hazard in the clothing laboratory do not arise from immediate potentially fatal hazards instead the risk that clothing workers are exposed to come from subtle hazards whose effect accumulates over time. Studies show that the frequency of persistent neck and shoulder injuries increases with years of repetitive strain injuries and these lead to long term health effect. The risks for sewing machine operators have been linked to conditions such as poor workstation design. Factors such as repetition, force, bad posture and vibration are associated with higher rates of injury in clothing laboratory. Injuries and muscle pains affecting wrist, shoulders, neck and back are common problems for workers in the clothing industry (Okareh and Olawoyin, 2021). According to Lakhal et al. (2017) common ergonomics problems were encountered during cutting of fabrics, stacking cut pieces, stitching, bad posture, repetitive work, sewing with poor light, mixing of chemicals, lack of job rotation among others.

Ergonomics is very important to every worker especially those working in clothing laboratories as workers prioritize physical comfort when working. The benefits of ergonomics cannot be overemphasized as it improves productivity and removes much stress from the worker. According to Gunning et al. (2010), the benefits of ergonomics include improvement of quality, reduce cost, improves employee engagement, creates a better safety culture, reduce unwanted tension, help to reduce absenteeism due to more comfort, safety and healthy working environment.

This study focused on reducing ergonomics hazards and challenges in clothing laboratories in tertiary institutions in Anambra State. Workers in clothing laboratories are exposed to ergonomic hazards and challenges. Poor workstation design can lead to fatigue, frustration and hurting to workers, poor worksite rarely leads to the most productive worker, most likely, it leads to a painful and costly injury, lower productivity and poor product quality. Musculoskeletal disorders are common illness among garment workers who worked in poor working conditions and poor ergonomic factors. Most often, workers in clothing laboratories are forced to work within the confine of the job or work station that is already in place. This may require employees to work in awkward postures, perform the same motion over and over again or lift heavy loads all of which could cause work related musculoskeletal disorders (Gunning et al., 2010).

These situations according to Ogbonnaya and Ugwuoke (2019) have caused human tragedies, de-motivated workers, disrupted workshop activities, delayed progress which has caused the reputation of clothing industries. Some machine operators in clothing laboratories work in awkward posture for so long which can result in pains and injuries in various part of the body. Hence it is necessary to reduce ergonomic hazard and challenges in clothing laboratories in tertiary institutions in Anambra State in order to enable the workers work in an environment that cannot cause them harm.

Purpose of the Study

The major purpose of the study was to investigate ergonomic hazards and challenges in clothing laboratories in tertiary institutions in Anambra State.

Specifically, the study:

1. Identified causes of ergonomics hazards in clothing laboratories in tertiary institutions in Anambra State.
2. Identified various ways of reducing ergonomics hazards or challenges–in clothing laboratories in tertiary institutions in Anambra State.

Research Questions

1. What are the causes of ergonomics hazards in clothing laboratories in tertiary institutions in Anambra state.
2. What are various ways of reducing ergonomics hazards or challenges in clothing laboratories in Anambra state.

Methodology

Research Design: A survey design was employed to seek the opinion of the respondents on reducing ergonomic hazards and challenges in clothing laboratories in tertiary institutions in Anambra state.

Area of the Study: The study was carried out in tertiary institutions in Anambra State. The study covered three tertiary institutions in the state that offer Home Economics.

Population for the Study: The population for the study consisted of 1,752 students and laboratory assistants who make use of clothing laboratory equipment. This number was retrieved from school record for 2018/19 academic session. Federal polytechnic Oko 866 students and 4 laboratory assistants, Federal College of Education (Technical) Umunze 507 students and 3 laboratory assistants while Nwafor Orizu College of Education 368 students and 2 **laboratory** assistants.

Sampling for the Study: A simple random sampling technique was used to select 140 students and 9 laboratory assistants. This was made up of 70 students and 4 laboratory assistants from Federal Polytechnic Oko, 40 students and 3 laboratory assistants from Federal College of Education Tchenical, Umunze, and 30 students and 2 laboratory assistants from Nwafor Oriuzu College of Education, Nsugbe.

Instrument for Data Collection: Data were collected using structured questionnaire. The questionnaire was divided into two parts. Part one contained three items designed to seek background information about the respondents. The second part was divided into two sections. This section consisted of

47 items based on literature review and specific purposes of the study. The questions sought information on reducing ergonomic hazards and challenges in clothing laboratories in tertiary institutions in Anambra State. The response options were based on a 4-point rating scale. It was validated by two experts from the department of Home and Rural Economics, Federal Polytechnic, Oko. The reliability index of 0.83 was obtained and adjudged reliable for embarking on the study.

Method of Data Collection: A total of 150 copies of questionnaires were administered to the respondents by hand. One hundred and forty six copies of questionnaire were retrieved back after three days showing 97% return rate.

Method of Data Analysis: The data were analyzed using mean to answer research questions and information retrieved through focus group discussion was summarized. The mean scores were used to determine the perceived importance level expressed on a 4-point scale for each of the item. A mean rating of 2.50 was used for decision making.

Findings for the Study: Findings are summarized in table 1 – 2

Table 1: Mean responses on the causes of ergonomic hazards in clothing laboratories in tertiary institutions in Anambra state.

S/N	Ergonomic Hazards in clothing Lab.	Mean	Remark
1.	Repetitive movement	2.81	Hazard
2.	Forceful Movement	2.62	Hazard
3.	Awkward postures	2.73	Hazard
4.	Carrying heavy loads	2.73	Hazard
5.	Use of Improper tools	2.57	Hazard
6.	Improper method of lifting goods	2.85	Hazard
7.	Lack of rest	2.60	Hazard
8.	Standing or sitting for too long	2.61	Hazard
9.	Lack of job rotation	2.58	Hazard
10.	Lack of training	2.57	Hazard
11.	Head height too short for tall person	2.52	Hazard
12.	Carrying heavy loads without support	2.72	Hazard
13.	Improperly designed work station	2.62	Hazard
14.	Vibration from machines	2.51	Hazard
15.	Poor lighting	2.64	Hazard
16.	Un-adjustable sewing chairs	2.55	Hazard
17.	Un-adjustable sewing tables	2.50	Hazard
18.	Use of unsafe work practice	2.63	Hazard
19.	Use of unsafe work environment	2.77	Hazard
20.	Lack of ventilation	2.56	Hazard
21.	Excessive noise which can result to loss of hearing	2.74	Hazard

The data presented in table 1 above show that the respondents have agreed that all items are ergonomic challenges in clothing laboratory.

Table 2: Mean responses on the way of reducing ergonomic hazards in clothing laboratories in tertiary institutions in Anambra state.

S/N	Ways of reducing ergonomic hazards in clothing Lab.	Mean	Remark
1.	Use of proper tools	2.70	Principle
2.	Keep repetitive motion to a minimum	2.57	Principle
3.	Avoid Awkward postures	2.63	Principle
4.	Use safe lifting procedures	2.81	Principle
5.	Get proper rest	2.52	Principle
6.	Maintain neutral posture while sitting or standing	2.60	Principle
7.	Make out time for movement and stretching of legs	2.51	Principle
8.	Reduce excessive force	2.65	Principle
9.	Use job rotation	2.71	Principle
10.	Share heavy loads by two persons	2.80	Principle
11.	Train workers on ergonomics principles	2.67	Principle
12.	Head height should be sufficient in all areas	2.51	Principle
13.	Care should be taken when lifting heavy object	2.74	Principle
14.	Wheeled trolleys should be used to carry Heavy loads	2.65	Principle
15.	Identify tasks that will cause serious risk of acute injury	2.59	Principle
16.	Keep weight of boxes or sacks to25kg or below	2.61	Principle
17.	Employee should be involved in decision making	2.52	Principle
18.	Reduce excessive motion	2.53	Principle
19.	Minimize contact stress	2.56	Principle
20.	Reduce excessive vibration in work place	2.60	Principle
21.	Work within comfort zones	2.81	Principle
22.	Use safe work practices	2.76	Principle
23.	Stay in safe environment while working	2.84	Principle
24.	Take regular break	2.61	Principle
25.	Maintain proper ventilation	2.58	Principle
26.	Re-design work spaces to accommodate individuals to reduce risk	2.71	Principle

Table 2 shows that all the items have their mean ranged from 2.51 to 2.84. This showed that the mean value of each item was above the cut off of 2.50 indicating that they are all ways of reducing ergonomics hazards in clothing laboratories.

Discussion of Findings

Responses to research question 1 revealed that the respondents accepted that all 21 items are causes of ergonomic hazards in clothing laboratories in tertiary institution in Anambra State. This shows that forceful movement, repetitive loads, use of improper tools, improper method of lifting goods, lack of rest, standing or sitting for too long, lack of job rotation, lack of training, carrying heavy loads without support, among others are the ergonomic hazards in clothing laboratories. The findings is in agreement with Amadi (2012) who noted that ergonomics hazards are as a result of poor work place design, awkward body posture, repetitive movement among others and can contribute to a staggering number of cumulative trauma Disorders (TI). Ozle (2015) further asserts that ergonomics hazards occur in the process of work types, body position and working conditions in carrying out operations and this put strain on one's body. According to him these hazards threatens an individual's physical safety, leads to death or ill-health. The result also agree with the findings of Gislason, (2018) which states that ergonomic hazards include posture, workstation design, poor equipment, improper workstation setup, heavy or awkward lifting, repetitive movements, among others. Most of the clothing laboratory floors do not have ergonomically designed working conditions which cause the workers suffer from back pain, loose their eyesight and face numerous other challenges (Shah et al., 2016) Heavy workloads and ergonomically inadequate working condition can negatively influence health of the workers since the tasks in apparel industry include repetitive motions.

In table two, the result of the findings indicated that use of proper tools, keep repetitive motion to a minimum, avoid awkward posture, use safe lifting procedures, get proper rest, maintain neutral posture while sitting or standing, reduce excessive force, use job rotation, share heavy loads, identify tasks that cause serious risk of acute injury among others as ways of reducing ergonomic hazards in clothing laboratories. In support of this Muhundhan (2013) stated that garment industry should focus and develop good working conditions to reduce the injuries created to their workers since there is ample room for ergonomic improvements in the clothing industry. Also Kadiri (2008) affirmed that once hazards have been identified and the risks assesse, appropriate control measures must be put in place. The goal of ergonomics is to reduce workshop stress and eliminate injuries and disorders associated with the overuse of muscles, bad posture and repeated task (Rudakwe and Valent, 2001). The goal of ergonomics according to them is accomplished by designing tasks, work spaces control, displays tools, lighting and equipment to fit the workers physical capabilities and limitations.

Conclusion

The study established that common causes of ergonomics hazards in the clothing laboratories can be encountered during the cutting of fabric, stacking cut pieces, sewing, poor lighting, sewing tables and chairs not easily adjustable, standing or sitting for a long time, mixing of chemicals, lack of job rotation among others. This paper has reviewed various ways of reducing ergonomics hazards in clothing laboratories in tertiary institutions in Anambra stste to the minimum.

Recommendations

The following recommendations are made based on the findings of the study.

1. Training and workshops should be provided for students, laboratory assistants and even lecturer on ergonomic principles. This will help to reduce the hazards to the minimum.
2. The school authority should provide suitable equipment for workers in clothing laboratories. Those equipment provided should be ergonomically suitable to work with.

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