

Ergonomics Aspect of Occupational Hazard in the Data Processing in a Typical University Medical Centre

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Abstract The main objective of the study was to perform an ergonomic analysis of the work in the data processing sector of a medical centre. The administration has promoted quality of life for typists regarding the application of the discipline in particular in its physical domain. This category comprised of four groups of professionals and through the analysis, it was possible for the board to make recommendations for greater comfort and well-being for the employees. The research was characterized as descriptive and has an exploratory purpose by defining problems with a view to implementing corrective actions and it was possible through implementation of semi-structured interviews with the main focus of the study, typists and the administration of the institution, as well as direct observation in loco. The findings supported the proposed improvements, such as the replacement of some incompatible with their anthropometric measurements. Thus, the intention is for the organization to apply the knowledge generated, study carried out in promoting and preserving the psychological health of the staff and students of the institution.

Keywords - Ergonomics, Anthropometric, Comfort, Semi-Structured Interviews, Quality of Life.

I. INTRODUCTION

Every higher institutions, whether public or private, is interested in improving its competitiveness and this makes them to constantly seek strategies for improved well-being of their staff and students in an excellent way. What might not be sometimes realized is that the key to success is in the human capital well motivated, happy and satisfied with the values and school policy. According to Milkovich and Boudreau [5] “the gaining and sustaining competitive advantage lies in the people who make up the workforce.” The workers of any higher institution are the most important assets of the school set up, they must be treated in such a unique way, for that, there must be Quality of Life at Work - QVT. As cited from some authors; [3]; [7] “quality of life implies creating and improving the working environment, whether in their physical condition (hygiene and safety) or in their psychological and

social conditions”. The scientific discipline that studies the work environment and its relation with man is the Ergonomics. According to the Brazilian Association of Ergonomics - ABERGO [2] the word Ergonomics is derived from the Greek ergon (work) and nomos (norms, rules, laws) and it is about a discipline oriented towards a systemic approach to all aspects of human life, contributing to the planning, design and evaluation of tasks, jobs, products and systems to make them compatible with the needs and people's limitations [1]; [10].

1) Research objective

The main objective is to promote the well-being of the human being as that it interacts with the elements that are part of the system of work and life, developing, for this purpose, corrective and preventive measures. Ergonomic studies provide physical and mental well-being because they direct the eye of the investigator to problems with causes that are often unnoticed and which are related to the psychophysiological work environment [1];[9] A discomfort, a muscle injury, back pain, stress, and other problems, can affect the professionalism by generating discomfort and dissatisfaction. The work environment will become unproductive and will result into damage of the organization [4]. Persistent sickness and leave of absence from work often lead to need to hire new staff as well as the costly selection of qualified professionals, since the work of typing requires agility and technical training in the area. Institutions need to invest in human capital so that their competitive strategies will have the expected result. Not only the so-called "recycling" benefits, motivational incentives, but also, caring about the physical structure and work environment [6]; [8].

A case study of the administration of Afe Babalola University Medical Centre approach was perused to find out how the administration of the Afe Babalola University Medical Centre has dealt with the ergonomic situation, aiming at the well- being, in order to promote a healthy and safety environment.

I. Ergonomics: Concepts and Definitions

With the needs, abilities and limitations of people, the NR-17 establishes some norms that allow the adaptation of the conditions of work both the psychological and physiological characteristics of the workers, in order to provide a comfortable and safe working environment, determining performance of the institution Medical unit [7] defines Ergonomia (human factors) as a scientific discipline that aims at fundamental understanding of the interactions between humans and the other components of the systems and the profession that applies theoretical principles, data and methods with the aim of optimizing people's well-being and overall system performance. Ergonomics is the study of the adaptation of work to man, not only equipment used to transform materials, but all organizational aspects of how this work is programmed and controlled to produce the desired results [5].

The health and wellness aspects of the work designed must be adequate to the physiological characteristics of the workers. Always thinking about their well-being and their physical and mental health, Ergonomics as a profession seeks to put into practice all the principles of the ergonomics so that you can evaluate a work environment, collect data, apply methods and use common sense, developing solutions and intervening in situations, in order to promote, mainly, the quality of life for the employee, and, consequently, the institution success [6]. Based on these approaches, Ergonomics is understood as the whole set of studies and actions which deal with the mutual influences that exist between man and his work, seeking always, firstly, the preservation of their health and their satisfaction.

II. Methodology

The method is related to how the data will be collected and analysed in order to understand and / or solve a problem. "Method is a path, a form, logic of thinking"[10]. Appropriate methods for an ergonomic investigation are the phenomenological and since, in studies of this kind, it is necessary to investigate, among other aspects, the human satisfaction at work. Therefore, in addition to raising quantifiable facts, it is crucial to a survey of human actions and their influence on the determination of the environment psychology.

The first type of method, according to etymology, seeks to understand and interpret phenomena, that is, studies the phenomena using qualitative data. This is important to human action; how people behave and how they attribute significance to the phenomena which defines the phenomenological method from the perspective that "the world and reality are not objective and external to man, but socially constructed and receive meaning from man" [8]. The dialectical method sees things in constant flux and transformation, studies the phenomena within a

context, where exactly all the forces interact and determine the changes [10]. According to Vergara [10] both in the phenomenological and in the dialectical method, the researcher obtains the data he needs in observation, interviews and questionnaires. Unstructured, in the histories of life, in contents of texts, in the histories of countries, companies, organizations in general; finally, in everything that allows you to reflect on processes and interactions. The method refers to the way in which the elements necessary for the resolution of a problem. The phenomenological and dialectical methods are closely related to the means of research used at work.

III. Research Methodology

An exploratory research was carried out to evaluate how the work environment in the ABUAD Medical Centre chosen as the object of study to examine ergonomically how the satisfaction of workers has been affected in proportion of comfort and well-being. Exploratory research seeks to better understand problem that already exists, as well as its cause and work on alternative courses of action. Descriptive research was used to gather some information about the population. Respondents' attitudes were used as a basis for analyzing their satisfaction with work, being, therefore, necessary to investigate the population as a whole.

For the case study, both bibliographical and documentary researches were carried out. The search includes the study of books, magazines, newspapers, and electronic media, that is, everything that accessible to the general public [10]. The unfolding of any academic work requires thorough and systematic research. This necessitates the reading and study of scientific works already outlined to validate the credibility of research. There are a multitude of authors who deal with the subject Ergonomics, as well as their application in the field of administration. Agents with authority and texts of aiming at the enrichment of work, Web searches were fundamental importance because of the myriad of information it offers to the users, which otherwise might not be able to access. Such information was filtered, analysed, selected and used to facilitate greater understanding of the subject. It is up to the researcher to be able to select and judge what may be more useful for the study. In addition to the Ergonomics theme, other subjects addressed in this study were: quality of life and work safety, motivation, organizational climate, the organization's physical environment, historical evolution of the administration, among others. Documentary research refers to the search for information, through documents, which can be, or not, in the power of the institution studied. Mattar [8] calls these data and highlights its importance, in addition to other things, cost to have access. A case

study was carried out, which according to Vergara [10] is the circumscribed to a few units, understood as person, family, product, company, public agency, community or even country. It has depth and detail character. It may or may not be carried out in the field. For [6] case studies make it possible to examine the phenomenon within their context, and are based on the present. The case studied was the organization of ABUAD Medical Centre, specifically in the area of production such as typing of reports and observing the development of the work when it was executed.

IV. COLLECTION OF DATA

To collect important data for ergonomic research at ABUAD Medical Centre, interviews were carried out with the typing professionals and the administration of the Centre. The interviews were recorded with MP4 player on questions related to the aspects related to the work on daily bases, description of activities, health problems, environmental and psychological discomfort and suggestions to improve the work environment. Heights (sitting and standing) were measured, height of the eye (sitting), height of the centre of the computer screen, table height, among others.

V. Observation

The information collected from the questionnaires and interviews were compared with reality, that is, with the development of the work in the organization. Theoretical knowledge acquired in the field of administration and Ergonomics, together with what was seen in the practice gave background to the formulation of proposals and valuation of the study. Observing a work environment requires establishing a method. According to Mattar (1999) there are two types of methods of observation: structured and unstructured. It is necessary to have the flexibility to analyze behaviors and situations. Therefore, the method of observation used in the study was the unstructured, since the type of study in question was exploratory.

VI. Data Processing

The answers collected in the interviews were arranged in tables, through the

Interview	Answers:
Digitizer 1	"Something related to space? Do not

software Microsoft Word 2007 and in this way, it was possible to perform a content analysis. Bardin (1977), content analysis is a set of techniques for analysing the content of information enabling an understanding of the conditions under which they were produced. In many cases, the simple survey of the topics covered in the interviews is the objective of the research. The analysis of content allowed in evaluating the information in a more profound way, the answers were taken and the information of greater relevance to the research was collected. Through the results of this study were designed to improve the organization, with a view to satisfaction with work.

VII. Results and Discussion

Interviews with the four typists working at centre were carried out with questions related to their work day, activities performed, comfort sense in relation to equipment and working environment, body care (posture), frequency of discomforts, among others. The responses collected could be compared with the personal observation and with the result of the interview conducted with the clinic administration.

The questions addressed to the organization's four typists, their respective answers, and the observations made by the researcher through the analysis of the answers, are related as follows:

A. *Table 1: What do you mean by Ergonomics*

Table 3 - Describe the activities you perform at ABUAD Medical Centre

	know"
Digitizer 2	"I do not know what it means"
Digitizer 3	"Little thing. It is related to the posture of how you should work, the chair that is sitting, how you are going to type, whether it is the correct form and whether the equipment"
Digitizer 4	"Physical and mental protection"

Source: Field survey conducted on 15.01.2017

Typists, for the most part, do not know how to define the term Ergonomics, or relate it to the protection at work, posture or correct use of instruments. Only the Digitizer 4 made mention of the mental protection afforded by an ergonomic approach to work. Although the study intends to evaluate the work in the physical domain of Ergonomics, psychosocial aspects were investigated in order to evaluate the level of satisfaction with the overall work environment, including in this survey.

Interview	Answers:
Digitizer 1:	"Do not stay straight, always take a break. For example, I give a break of ten, fifteen minutes. I do not keep typing, I always stop to rest, I do other things "
Digitizer 2:	"Straight, I've spent four hours. But, it is not every day. The most hours I've spent without stopping it was four hours "
Digitizer 3:	"The whole file, but, always stops to answer the phone, prepare some examination, prepare patient, etc. "
Digitizer 4:	Three to four hours

Table 2 - How long have you worked at ABUAD Medical Centre?

Source: Field survey conducted on 17.02.2017

	Answers:
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Digitizer 1:	"Seven years ago"
Digitizer 2:	"I worked six years, I stopped for a while and I came back eight months ago, in the same role"
Digitizer 3:	"Four years ago"
Digitizer 4:	"Nine months ago"

Source: Field survey conducted on 12.02.2017

Regarding the time the interviewees work in the institution, it varies between seven months and seven years. The Clinic initially offered one-third of the current services. This indicates that in the course of its existence, the institution had to hire professionals according to the increment of staff and students demand, thus justifying the variation in the time of operation of the typist.

Table 4 - How long, uninterrupted, do you work typing?

Interview	Answers:
Digitizer 1:	"Enter report, assist doctors"
Digitizer 2:	"I help with the ultrasound (I prepare the patient, I put the data in the device), Typing reports and closing exams "
Digitizer 3:	"I started on ultrasound as an aid, and also on biopsies (storage of the material, etc.), punctures, procedures, and also typing".
Digitizer 4:	Ultrasound and Typing Assistant

Source: Field survey conducted on 25.02.2017

It may be noted that there is no uninterrupted time because of the other activities performed. Digger 2 mentioned that he spent up to four hours typing, but it was an isolated fact, therefore, there are always breaks for rest or other activities. The Digger 3 reported that the entire expedient has passed, but not in an uninterrupted manner due to the other activities that

are performed in the sector. The other activities that are performed during the day allow the body movement, which can help to avoid some common health problems.

Table 5- Do you feel any physical discomfort when typing? Describe if so, with what frequency?

Interview	Answers:
Digitizer 1:	"Headache, only when I stay too long"
Digitizer 2:	"No"
Digitizer 3:	"When I spend all day yes, sometimes the arm, shoulder, but, it is from time to time, it is not ever"
Digitizer 4:	"The discomfort I feel in the typing is sometimes pain in the spine"

Source: Field survey conducted on 15.03.2017

The physical discomforts cited by three of the typists were headaches, on the arms, shoulders and spine. Only Digger 2 did not mention any discomfort. Note that physical discomforts are not frequent, perhaps because spend their entire journey carrying out a single activity, as already presented. However, since typing requires fixed positions of some parts of the body and repetition of some movements, the types of complaints mentioned are common, which can be resolved, in most cases, taking better care of the posture, positioning themselves or organizing the instruments of work better. When asked if they have already been affected by any health problem related to what they complained about and if they have already had to be removed from work because of any related illness, the tasks they performed, all responses were "No". It is found that, in this category of professionals, the occupational disease leave rate is zero, which means that can be considered positive for the centre since the employees, being in an environment, will work more satisfied and will not affect centre.

VIII. CONCLUSIONS

Typing function is highly repetitive, which can lead to the development of problems health commonly known as RSI or RSI, which was not observed in the survey. This is justified by the fact that the professionals studied perform various activities during the day, do not exceed the time of four hours doing typing and pausing daily for thirty minutes to rest. Also, there was no mention of withdrawal because of occupational diseases, which already is a positive aspect for Centre. The mentioned discomforts are mainly due to the bad postures, as evidenced by staff and by observing what was collected through interviews. In general, it was found that the evaluated professionals perceive the concern of Centre with its ergonomic situation and see positively the changes so far implemented. However, a relative stress with respect to the atmosphere mentioned psychological company. Therefore, some aspects were checked beyond the actual physical issue. The reasons that lead to cooperation and job satisfaction are private; however, organizational climate is established through the emotional state of the group, with these two closely associated aspects. It is attributed to organizational motivation, not the individual, the type of existing organizational atmosphere in a work environment positive mood is beneficial for the team in general, and as noted, the environment psychological can influence directly the motivation and health of people in Centre. Thus, we saw the need to ascertain the general state of satisfaction with the work by all the staff of the studied company. The research conducted with the digitadoras, as regards the problem of chairs mentioned, the resolution can occur simply. It will be necessary for this, replace the models currently used by chairs with arm and with the possibility of height adjustment, so that meets the various physical types of digitadoras. This attitude will prevent appearance in long-term problems related to injuries in the shoulders, neck, spine and bloodstream. There is also need to change or replace the system current lighting in order to leave in the properly lit environment. As interview with management, the company has projects for solution some problems encountered by internal changes, to provide a better use of space, and installation of diagnostic services and typing reports in separate rooms. Thus, considering that the centre will comply with the predetermined goal to renovate and expand the typing room, ergonomic survey can help that this change has as main objective to adapt the environment and tools psychophysiological characteristics of the work data entry professional, since the current

room does not allow a reorganization of the layout that allows solve all difficulties found. Therefore, when designing a new physical working environment for digitadoras and medical, must be careful to arrange the data acquisition terminals so that the light from the negatoscopes do not cause glare on the monitor screen and the lighting must meet the standards established by the Ministry of Labor. It was found that the centre has sought to promote the digitadoras welfare, implementing some safety measures and comforts are good views. This study will give the administration a better assessment of the sector, pointing to some ignored problems. The centre is undergoing restructuring, and research could contribute to the design of new data acquisition terminals and the industry itself, are better suited to psychophysiological characteristics of people.

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