

To study the ergonomic deficiencies in computer workstation design of the Bank employees.

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Abstract:

Background: In today's competitive world especially in banking sector employees are working for longer duration and constant sitting work posture. Most of the office work includes working on computers for long duration of time in the same sitting posture that include table and chair as their work station. The effects of ergonomic factors have an influence on the productivity, health and wellbeing of office workers. Most of the office workers are working with computers. Hence, this present study focus on ergonomic deficiencies in computer workstation design of the bank employees.

Materials and Methods: The banking sector of Anand has been chosen as the population for the study. Out of 9 banks, 7 banks were taken as sample. A total of 180 bank employees from these 7 banks were taken as the sample size. The study was quantitatively conducted using standardized questionnaires that was participated by 180 respondents and to gauge the effects caused because of ergonomic deficiencies which leads to physical health of the bank employees. The study used descriptive analysis techniques to analyze the data.

Results: The finding of the present study shows that 88% the entire keyboard located in a neutral position and parallel with the floor, 93.3% of the monitor heights were normal, 80% used a chair with low back support and padded armrest. Moreover, the consequences in terms of user health problems reported that headaches (66%), neck pain (32%) and upper part of the back pain (16%). These results indicated serious ergonomic deficiencies in office computer workstation design, layout, and usage. Moreover, the bank employees were continuously on their work station which was adversely affect their health and leads to many musculoskeletal disorders. Strategies to reduce or eliminate ergonomic deficiencies in computer workstation design were suggested.

1. Introduction:

Nowadays, it is practically impossible to find an office or a shop floor without a computer workstation. The need to use computers increases as computer technology advances and software and computer packages are being developed. As a result, occupational health and safety problems are continuously increasing. This, obviously, can lead to reduced performance and dissatisfaction.

Ergonomics is the science and technology of fitting the activities and environment to the abilities, dimensions, and needs of people to improve performance while enhancing comfort and health and safety [1]. The efficiency of human-computer interaction, comfort, health, and the user's safety can be improved by applying ergonomic principles. Eason [2] developed a classical ergonomic framework and identified factors that affect human performance. These factors include task characteristics, user issues, environmental factors, and human-computer interaction.

The elements of a work system, such as the worker, equipment, environment, task, and organization interact when work is performed. A research model that incorporated these variables was developed. The study found that screen glare, fatigue, and awkward posture were the most important factors contributing to ocular, general musculoskeletal, upper body, and physical symptoms. Workstation designs significantly affect working posture, which in turn, contributes to physical symptoms [3]. Another model of a work system with components, technology, organization, person, task and environment shows that the objective of work system design is to optimize the whole system rather than maximize just one component [1]. People should be the central focus and the other factors should be designed to help the person work effectively and comfortably.

Research studies showed that many cases of shoulder and neck pain were caused by inappropriate design or use of furniture [4]. Users should position their heads so that minimum stress is put on the neck muscles. The recommended viewing angle is 15°–30° [5]. The position of a video display terminal (VDT) relative to eyes can influence visual strain. The two main parameters of VDT position are the viewing distance from the eyes to the screen, and the height of the visual target relative to the eyes [6].

Work practice is an important issue for computer workstation users. Regardless of how well a workstation is designed, if users have to work in a static posture for a long period, the workstation can contribute to performance, comfort, and health problems. Salvendy [1] recommended computer users to take a minimum 15-min break from working after 2 hrs of continuous computer work. Neuffer, Schulze, and Chen [9] found that at least some improvement in body part discomfort levels could be attributed to mandatory rest breaks.

Occupational illnesses such as back, neck, shoulder, arm, and hand and wrist pain were related to intensive keyboard work, chair and workstation characteristics, increased job demands, poor psychological work environment and being female [10, 11]. Matias, Salvendy, and Kuczek [12] reported that cumulative trauma disorder (CTD) of the hand and wrist was the most common disabling injury experienced by VDT operators.

A series of multinational ergonomic intervention studies were conducted to investigate the effects of VDT work on musculoskeletal, visual, ergonomic and psychosocial factors [10]. These studies laid out a basic methodological structure for various ergonomic interventions. The interventions included ergonomic information and training, workstation redesign, and providing new facilities and improved working conditions. A significant reduction in health symptoms, such as neck and shoulder pain, eye problems, and other ergonomic problems was observed in various groups after the interventions [12]. Thus, the main objectives of this research was to study the ergonomic deficiencies in computer work station design of the bank employees and suggest strategies to reduce or eliminate these deficiencies to improve occupational health and safety, and employee performance and satisfaction.

2. Methodology:

In the following Research quantitative approach is adopted where the data was collected through personal visits. The first part of the questionnaire comprised demographic data of the respondents such as Name, Experience, and Designation Status. The second part was related to working pattern, health problems and working posture. Body posture was assessed through visual inspection. Participants' individual perception on these attributes was assessed through the questionnaire. The third phase was i.e. ergonomic work station evaluation checklist of a computer workstation comprised of basic parts of computer, Work Space, Lifting and carrying, Environmental analysis. In all information sections employees were asked to tick Yes or No for each item. The last phase include the guide lines while working with computer through intervention which helps to reduce the stress, fatigue and health problems. The banking sector of Anand has been chosen as the population for the study. Out of 9 banks, 7 banks were taken as sample. A total of 180 bank employees from these 7 banks were taken as the sample size. The study was quantitatively conducted using standardized questionnaires that was participated by 180 respondents and to gauge the effects caused because of ergonomic deficiencies which leads to physical health of the bank employees. The study used descriptive analysis techniques to analyze the data.

3. Results and Discussions:

3.1. Participation Information: Information on the participants is represented in Table.1

Table.1. Demographic characteristics of the respondents

Descriptive	Criteria	Frequency	Percentage
Experience	<5 yrs	60	33.3
	5-10 yrs	30	17
	10-15 yrs	20	11.1
	>15 yrs	70	38.8
Designation	Manager	30	16.6
	Assi. Manager	40	22.2
	Supervisor	30	16.6
	Assi. Supervisor	30	16.6
	Accountant	20	11.1
	Cashier	10	06
	Special assistant	10	06
	Chief manager	10	06

From the above table it is inferred that Out of 180 beneficiaries, more than one-third of the respondents were having more than 15 yrs work experience in banking sector while one-fifth responders were Assistant manager in the present study.

3.2. Work Posture and Working Pattern: The work schedules of the job of the beneficiaries started from 10.00 am to 5 p.m.

3.2.1. Hours spent in work per day at the computer:

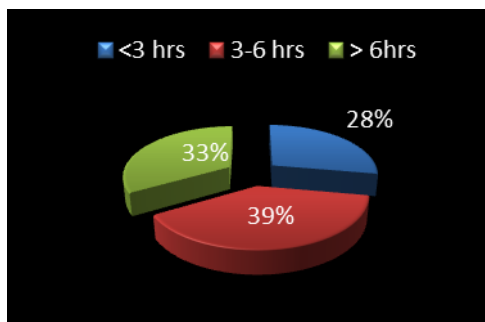


Fig.1. Hours spent in work per day at the computer

It can be seen from the above figure that when the respondents were asked about how many hours have you spent at the computer per day, the results indicated that two-fifth (39%) of the respondents spent 4 to 6 hours daily working with the computer while more than one-fourth (28%) spent less than 3 hours at daily working on computer.

3.2.2. Continually spent in working on table and chair:

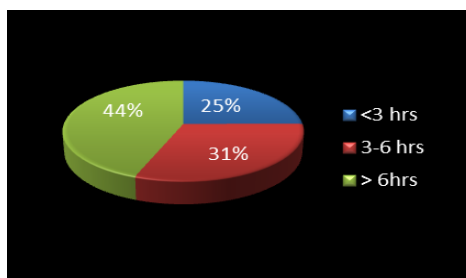


Fig.2 Continually spent in working on table and chair

It was found from the above figure that 44 percent of the employees spent more than 3 hours continually on table and chair whereas 25 percent spent less than 2 hours working on table and chair.

3.2.3. Sitting posture on the chair:

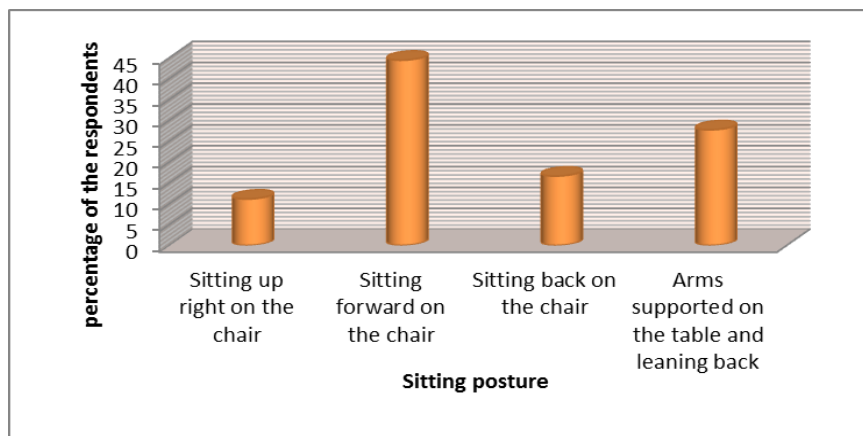


Fig.3 Sitting posture on the chair

When the sitting posture of the bank employees was assessed while working, the results revealed that less than half (44.4%) of the respondents sit forward on the chair, the reason could be that most of the respondents were used table and chair for only writing purpose while very few (11.1%) respondents sit upright on the chair.

3.2.4. Leg position while sitting on the chair:



Fig.4 Leg position while sitting on the chair

From the above results, it may be seen that 33 percent of the employees stretched their legs while working while only 11 percent of the respondents preferred to sit crossed feet on the chair.

3.2.5. Health Problem:

Health effects or work-related health symptoms were found highly significant. A wide variety of health problems were reported in Figure 5: 66% of the respondents reported headache, 32% reported pain in nape of the neck and Upper limbs, 38% Wrists and 25% shoulders pain while working on their work station. (Fig.5)

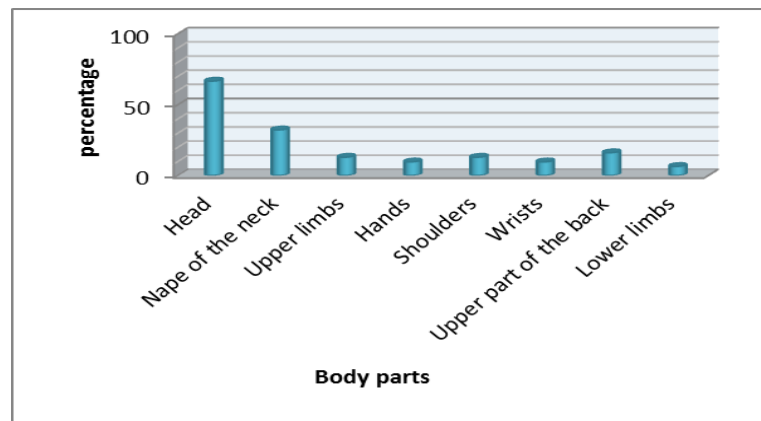


Fig.5 Health Problem:

4. Workstation Components:

Majority of the employees used a wood table and chair, while others used an iron table or chair for the computer. While 80% used a chair with padded armrests and provide support in the low back. Most employees (98%) had window blinds in their offices. Majority of the respondents' keyboard was located in a neutral position and parallel with the floor. Two-third of the employees used a keyboard wrist rest pad and 59% used a mouse wrist pad. This indicated that about half of the employees neither used a keyboard nor a mouse wrist pad. The position of the employee with respect to the monitor and the keyboard was aligned in 83% of cases while in others either the keyboard was in front and the monitor on the side or vice versa. This nonalignment indicated repeated turning of head and hence deviation in the neck's natural posture. More than one-third of the bank employees reported that their hand or wrists were free from contact with the desktop edge, easy to reach desktop accessories i.e. telephone, stapler, manuals, proper placement of monitor, keyboard and input device.

5. Conclusion:

Office ergonomics is a widely acceptable means of providing an enabling environment that best facilitates employees' performance and general productivity. The need for high office ergonomic standards is vital considering the fact that the type of employee work place environment impacts a great deal on employee collaboration, health and safety, morale, motivation and overall performance

This study very well revealed that the body pain in the bank employees will be minimized due to implementation of ergonomically work station design. This leads to increase in productivity and efficiency of the worker. Rest pauses minimizes due to which lead time decreases. Capability and concentration of workers increases due to less fatigue and stress observed.

It is concluded that ergonomics deficiencies had significant influence on health problem and it is suggested that regular breaks are taken if working on a computer, leaving the workstation for a few minutes every hour to engage briefly in some other work-related activity, stretching exercises, foot and body exercises, to refresh all of the body's muscles, promoting personal health and a safe learning environment and thereby leads to reinforce the importance of human-workplace interaction.

6. References:

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