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STUDY ON OCCUPATIONAL HEALTH AND SAFETY FOR WORKER'S IN COMPUTER AIDED DESIGN

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ABSTRACT:

Professionals in computer aided design (CAD) are exposed to a number of occupational health and safety hazards since they work with computers for extended periods of time. Occupational health and safety (OHAS) is crucial in computer-aided design (CAD) environments to safeguard the health of employees who use digital design tools for extended periods of time. In addition to ergonomic dangers, extended screen time, repetitive strain injuries, and mental health risks such eye strain, musculoskeletal diseases, stress, and anxiety, this study examines the main OHAS issues related to CAD work. In order to reduce health hazards, it emphasizes best practices such ergonomic workstations, frequent breaks, sufficient lighting, and the use of ergonomic input devices. Also covered is how software features like automation tools and configurable interfaces can lessen stress. Organizations may improve productivity, lower work-related injuries, and give CAD professionals a safer, more comfortable workplace by putting in place efficient OHAS procedures.

INDEX TERMS: CAD, Health hazards, Mental health risks, Ergonomic Dangers

Introduction:

Occupational health is multidisciplinary activity aimed for promotion and maintenance of the highest degree of physical, mental and social well-being of computer users by preventing and eliminating occupational health hazards. Occupational health dealing with all aspects of health and safety in the workplace and has a strong focus on primary prevention of health hazards and enabling computer users to conduct socially and economically productive lives.(Bahgat, H. H., Mahmoud, A. A., & Abosree, T. H. (2024)).The presence of computer in the workplace leads to a set of peculiar characteristics of the workstation which require the workers to stay in a static posture for long periods . This has led to an increase in computer related injuries like back pain, neck pain, repeated strain injuries, computer vision syndrome. Occasional computer users may notice no ill effects; however those who spending several hours a day for many years especially computer professionals should pay careful attention to ergonomics. (Hiremath, P. K. S. & Dr Hedgewar College of Nursing, Aurangabad. (2020)).

Occupational health and safety definition:

Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the workers in an occupational environment
adapted to their physiological and psychological capabilities; and, to summarize : the adaptation of work to man and of each man to his job" (WHO, 1995)

Occupational health and safety in CAD works:

Occupational health and safety (OHS) is a multidisciplinary concept touching on issues relating to such disciplines as medicine, law, technology, economics and psychology (Leka, 2003). As a broad based concept, occupational health and safety encapsulates the mental, emotional and physical well-being of the worker in
relation to the conduct of his work. This therefore makes it an important discipline contributing to the success of any organisation. However, considering the multiplicity of disciplines subsumed in it, it has been treated as a ―throw-away‖ subject with all the other disciplines such as law, economics, medicine, technology, psychology among others feasting on it when ―hungry‖. Thus not only do the various disciplines focus on aspects of the concept but they also make reference to it only during critical situations. For instance, the law discipline makes reference to the concept only when employers are to pay compensations for health and safety failures

Data analysis and interpretation:

In this study the data was collected from 60 CAD workers . The detailed information was obtained by online interview. The exposure was assessed by a questionnaire regarding age, gender, mode of employment, experience in CAD, working hours, resting time, physical health issues, safety measures done and give suggestion for improvement. The main focus on this study is to identify work related health issues among home-based CAD workers.

Table 1: gender-wise distribution of respondents

Gender	Frequency	Percentage
Male	24	40
Female	36	60
Total	60	100

Source: online survey

The above table shows the gender-wise distribution of respondents.40%of respondents are male and 60%of respondents were female.

Table 2: age-wise distribution of respondent

Age group	Frequency	Percentage
Below 20 years	7	12
20-30 years	30	50
30-40 years	12	20
Above 40 years	11	18
Total	60	100

Source: online survey

The above table shows the age-wise distribution of respondents. 12% of respondents are below 20 years old, 50% of respondents are 20-30 years old, 20% of respondents are 30-40 years old and 18% of respondents are above 40 years old.

Table 3: education-wise distribution of respondent

Education	Frequency	Percentage
Ug	37	61.6
Pg	12	20
Others	11	19
Total	60	100

Source: online survey

The above table shows the education-wise distribution of respondents ug level of education,61.6% of respondents have pg level of education and 20% of respondents are other educational degrees or diplomas.

Table 4: marital status-wise distribution of respondents

Marital status	Frequency	Percentage
Married	12	20
Unmarried	48	80
Total	60	100

Source: online survey

The above table shows the marital status-wise distribution of respondents. 20% of the respondents are married and 80% of respondents are unmarried.

Table 5: type of software -wise distribution of respondent

Software	Frequency	Percentage
Adobe illustrator	32	53.3
Corel draw	12	20
Opti tech	6	10
Tuka tech	10	17
Total	60	100

Source: online survey

The above table shows the education-wise distribution of respondents ,53.3% has said to be adobe illustrator ,20% has said to be corel draw,10% has said to be opti tech,17% has said to be tuka tech

Table 6: mode of employment-wise distribution of respondents

Mode of employment	Frequency	percentage
Full time	28	47
Part time	32	53
total	60	100

Source: online survey

The above table shows the mode of employment-wise distribution of respondents. 47% of respondents are full time employee and 53% of respondents are part time employee.

Table 7: monthly income-wise distribution of respondents

Monthly income	Frequency	Percentage
Below 5000	28	47
5000-15000	30	50
Above 15000	2	3
Total	60	100

Source: online survey

The above table shows the monthly income-wise distribution of respondents. 47% of respondents has below 5000 as monthly income, 50% of respondents has income between 5001-15000and 3%of respondents has monthly income above 15000.

Table 8: experience-wise distribution of respondents

Experience	Frequency	Percentage
Below 5 years	30	50
5-10 years	13	22
10-15 years	10	16
More than 15 years	7	12
Total	60	100

Source: online survey

The above table shows the experience-wise distribution of respondents. 50% of respondents has below 5 years of experience in CAD, 22% of respondents has 5-10 years of experience in CAD,16%of respondents has10-15 years of experience in CAD and 12% of respondents has more than 15 years of experience in CAD.

Table 9: working hours-wise distribution of respondents

Working hours	Frequency	Percentage
Below 5 hours	27	45
5-10 hours	20	33
10-15 hours	11	19
More than 15 hours	2	3
Total	60	100

Source: online survey

The above table shows the working hour-wise distribution of respondents. 45% of respondents has said to be working below 5 hours per day, 33% of respondents has said to be working about 5-10 hours per day, 19% of respondents has said to be working 10-15 hours per day,3% of respondents has said to be working more than 15 hours per day.

Table 10: resting time-wise distribution of respondents

Resting time	Frequency	Percentage
Below 5 hours	31	52
5-10 hours	19	31
More than 10 hours	10	17
Total	60	100

Source: online survey

The above table shows the working hour-wise distribution of respondents. 52% of respondents has said to be resting below 5 hours per day, 31% of respondents has said to be resting about 5-10 hours per day, 17% of respondents has said to be resting more than 10 hours per day.

Table 11: physical health issues-wise distribution of respondents

Physical health issues	Frequency		Percentage	
	YES	NO	YES	NO
Insomnia	17	43	28	71
Neck pain	36	24	60	40
Shoulder pain	33	27	55	45
Eye problem	38	22	63	36
ENT	27	33	45	55

The above table shows the physical health issues-wise distribution of respondent. The physical health issues complaint such as Insomnia , Neck pain , shoulder pain , Eye problem , ENT was significantly seen among CAD workers.

FINDINGS

PERSONAL INFORMATION:

- 60% of the respondent were female workers.
- 20% of the respondents were around 30-40 years old.
- 81.1% of the respondents had Under graduate degree.
- 80% of the respondents were unmarried.
- 50% of the respondents are earning 5000-15000 rupees per month.
- 22% of the respondents has 5-10 years of experience in tailoring.
- 33% of the respondents work around 5-10 hours per day.
- 17% of the respondents rest more than 10 hours per day.

PHYSICAL HEALTH ISSUES:

a) **Eye Strain:** Prolonged screen time, poor lighting, and incorrect display settings.
b) **Musculoskeletal Disorders:** Repetitive strain injuries, carpal tunnel syndrome, and back pain from poor posture or inadequate ergonomic setup.
c) **Hearing Loss:** Prolonged exposure to loud noises or poor audio settings.

MUSCULOSKELETAL STRAINS:

a) **Repetitive Tasks:** Performing repetitive tasks, such as typing, mouse clicking, and scrolling, can lead to strain on the hands, wrists, and arms.
b) **Poor Posture:** Sitting for long periods with poor posture can lead to strain on the back, neck, and shoulders.
c) **Inadequate Ergonomic Setup:** Using a workstation that is not ergonomically designed can lead to strain on the muscles and joints.

d) **Prolonged Sitting:** Sitting for long periods without taking regular breaks can lead to muscle fatigue and strain.

SOLUTION AND RECOMMENDATIONS:

a) **Take Regular Breaks:** Take regular breaks (every 30-60 minutes) to stretch, move around, and rest eyes.
b) **Stretching Exercises:** Perform stretching exercises to loosen muscles and improve flexibility.
c) **Task Rotation:** Rotate tasks to avoid repetitive strain on specific muscles and joints.
d) **Prioritize Self-Care:** Prioritize self-care activities, such as exercise, meditation, and relaxation.

CONCLUSION:

This study shows the physical health issues that are faced by CAD workers and solutions and recommendations to resolve the occupational hazards faced by them. Regardless of age, gender, income and experience most of the CAD workers have been facing physical health issues due to their posture and exposure to screen radiation for a prolonged time. The recommendations might not be the permanent solution yet makes visible changes in the physical health of the CAD workers

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