Original Research Article

Body Mechanics and Perceived Physical Health Problems among Computer Users

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ABSTRACT

Background: Computers are considered as an integral part of everyday life in the present era. Computers are widely used for music to photos and banking to communication.

Objectives: to determine the body mechanics of computer users during computer use, to identify the perceived physical health problems of the computer users and to find the relationship between body mechanics and perceived physical health problems of computer users.

Materials and methods: the study was conducted among 174 bank employees of Udupi and Manipal who use the computer for longer duration. The data were collected through demographic proforma, body mechanics checklist and perceived physical health problems.

Result: The majority (67.2%) of computer users was males with the most (54.6) of their BMI was within normal limit. Regarding body mechanics, 87.4% were reported have good position of hands, good back support (84.5%) and posture (82.2%), but, half of them sit in a same posture for more than one hour. They had the facility to adjust their table, computer, chair, keyboard and mouse as per their convenient. In perceiving physical health problems, tiredness of eye was the most common problem followed by eye strain, blurring and burning sensation, irritation and discomfort. Headache, shoulder pain and stiffness, neck pain and stiffness, backache, wrist pain was the frequent musculoskeletal problems. They also noticed that the grasping of the object is reduced because of lowered strength in their hand. Weak and negative correlation found was inferred as improvement in body mechanics results in decreased physical health problems.

Conclusion: the problems of eye and musculoskeletal system were the common health problems of the computer users. Regular exercise, health checks and good ergonomics may contribute to reduced problem and improved productivity of computer users.

Key words: bank employees, computer users, health problem, body mechanics, vision problem, musculoskeletal problem.

INTRODUCTION

The computer is considered as an integral part in everyday life. The computer is used in education, health and medicine, science, business, recreation and entertainment, governments, defense, sports, banking, recording etc.[1] Seventy five percent of the job is dependent on computer.[2] Computers are widely used in banks by many employees. However, the long period of working at a computer causes cumulative trauma disorders (carpal tunnel syndrome, tenosynovitis, epicondylitis, tendinitis, DeQuervain's disease and ganglionic cysts), vision problems and back, neck and shoulder problems.[3-6]

Prolonged use of computer may cause dynamic and sustained contraction of the small muscles of the forearms, hands, shoulder, neck and back muscles, leading to neck and shoulder problems.[6] Along with prolonged use of computers, improper uses of the computer monitor and mouse are some of the causes of different forms of musculoskeletal problems.[3, 5] Strenuous visual activity demand of the computer users can result in various visual problems.[3,5,7,8]

A study was conducted to assess the body mechanics and perceived physical health problems among computer users from the banks of Udupi District, Karnataka with the aim to understand the health burden related to computer use which may help the healthcare professionals and employer to take necessary action in order to correct or prevent such health related problems.

MATERIALS AND METHODS

The study adopted a cross sectional descriptive survey design with exploratory approach. A total of 174 computer users were employed by stratified random sampling from the nationalized banks of Manipal and Udupi. The objectives of the study were to determine the body mechanics of computer users during computer use, to identify the perceived physical health problems of the computer users and to find the relationship between body mechanics and perceived physical health problems of computer users. The data were collected through the demographic proforma, checklist on body mechanics and perceived physical health problems. The tools were developed by the investigators and validated by experts. The reliability was established for the checklist on perceived physical health problems (r=0.89) and body mechanics (r=0.86) and found to be reliable.

Ethical consideration:

The administrative permission for conducting the study was obtained from the Dean, Manipal College of Nursing Manipal, Manipal University, Institutional Research Committee and respective bank managers. The study subjects were explained the purpose of the study and written informed consent was taken on confidentiality of the information. The data were analyzed based on the objectives using SPSS (16.0) version.

RESULTS

The demographic data were obtained by administering demographic perform from 174 computer users. The data are presented in table 1.

Table-1 Frequency and percentage distribution of demographic characteristics. n=174

Sl.no.	Sample characteristics	Frequency (f)	Percentage (%)
1	BMI		
	Below normal	5	2.9
	Normal	95	54.6
	Above normal	74	42.5
2	Age in years		
	25-36	7	4.0 %
	37-48	12	6.9%
	49-60	155	89.1%
3	Gender		
	Male	117	67.2%
	Female	57	32.8%
4	Educational qualification		
	Diploma in computer application	19	10.9%
	Bachelor's degree in computer application	9	5.2%
	Master degree in computer science	5	2.9%
	Any other qualification (B.com, BA, M.com, CAIIB)	141	81.0%
5	Working experience in years		
	2-13	115	66.1%
	14-25	58	33.3%
	26-37	1	.6%
6	Total working hours of computer per day		
	3 hours	11	6.3%
	4 hours	10	5.7%
	5 hours	15	8.6%
	6 hours	45	25.9%
	7 hours	38	21.8%
	8 hours	55	31.6%
7	Any eye problem		
	Yes	41	23.6%
	No	133	76.4%

The data presented in table 1 shows the majority (89.1%) of computer users belonged to the age between 49 to 60 years, 67.2% were males with the most (54.6) of their BMI was within normal limit. Eighty one percent of computer users have their educational qualification as B.com, BA, M.com and CAIIB and have 2-13 years of work experience as bank employees. Duration of work in the computer by the employees differs. However, nearly 79% of them use computers more than six hours in a day during their working hours.

Body mechanics of computer users

Data was collected by using a self reported checklist on body mechanics. The data is presented in table 2.

In the percentage distribution of body mechanics related to posture in table 2a, maximum (87.4%) number of subjects represent that their arms were hanging comfortably at their sides, half of the total sample sits in a same posture for more than one hour, 84.5% computer users use good back support (84.5%) and good posture (82.2%).

Table 2a. Body mechanics: posture of computer users . n=174

Sl.no	Item	Yes		No	
		f	%	f	%
1	Good back support	147	84.5	27	15.5
2	Good posture	144	82.2	30	17.2
3	Same posture more than one hour	87	50.0	87	50.0
4	Foot supported	129	74.1	45	25.9
5	Foot rest while working	92	52.9	82	47.1
6	Arm rest is below the elbow	139	79.9	35	20.1
7	Arms hang comfortably	152	87.4	22	12.6

Related to sitting arrangement, maximum number, 98.35% of subjects had a good viewing position, 91.4% had a good seat height facility, 96% computer workers arranging tables and screen properly (talbe2b). Maximum number (68.4%) of subjects was taking regular breaks, whereas 40.8% subjects performing exercise for neck and shoulder regularly (talbe2c).

Table 2b. Body mechanics: sitting arrangement of computer users. n=174

SL.no	Item	Yes		No	
		f	%	f	%
1	Good seat height	159	91.4	15	8.6
2	Arranging table and computer screen	167	96.0	7	4.0
3	Good viewing position	171	98.3	3	1.7
4	Hands perpendicular to keyboard	147	84.5	27	15.5
5	Wrist rest	88	50.6	86	49.4
6	Thighs are supported	143	82.2	31	17.8
7	Mouse tray next to the keyboard	137	78.7	37	21.3
8	Curve of the back	112	64.4	62	35.6
9	Chair tilts back	113	64.9	61	35.1
10	While keying and mousing	167	97.0	7	4.0
11	Organizing work place without overreaching	146	83.9	28	16.1
12	Chair adjustability facility	144	82.8	30	17.2

Table 2c. Body Mechanics: rest and exercise. n=174

Sl.no	Item	Yes		No	
		f	%	f	%
1	Regular break	119	68.4	55	31.6
2	Exercise for neck and shoulder	71	40.8	103	59.2
3	Eye exercises	49	28.2	125	71.8
4	Eyesight test	82	47.1	92	52.9

Perceived physical health problems

Perceived physical health problems of the computer users were collected through the checklist on perceived physical health problems.

Health problems related to eye and vision

In perceiving physical health problems related to eye/vision, 85.6% subjects had no problem such as redness of the eyes, 64.9% had no blurred vision (figure 1). Eye tiredness (72%) and strain (48%) are the most common presented problems.
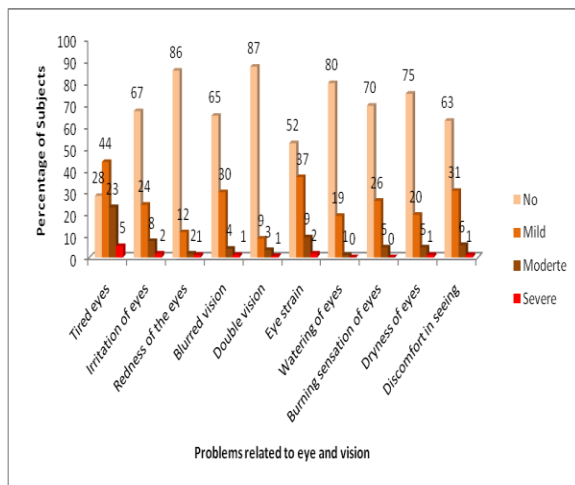

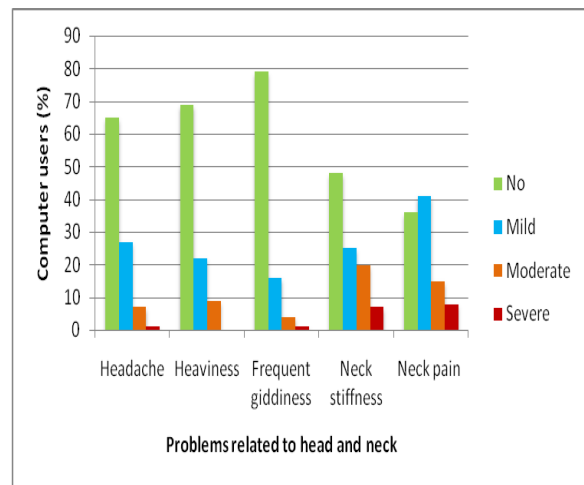**Figure 1. Problem related to eye and vision.   n=174**

Figure 2. Problem related to head and neck.

Health problems related to head and neck

Figure 2 shows, maximum number of subjects (79.3%) had no frequent giddiness. Neck pain varied from mild to moderate to severe accounting for 64%. Nearly half the total (52%) of the sample suffered from neck stiffness.

Health problems related to back and shoulder

Subjects reported to have mild to moderate shoulder stiffness and pain. 44% of them have back ache of varying degree.
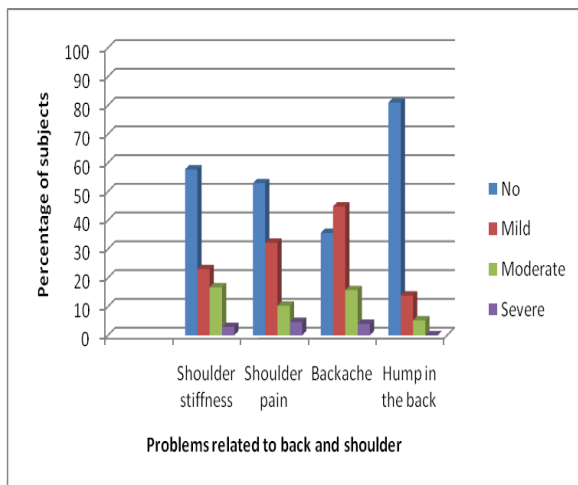

Figure 3. Problems related to shoulder and back.   n=174

The correlation between body mechanics and physical health problems

Person's correlation coefficient is calculated to find the correlation between body mechanics and perceived physical health problems. Table 3 shows that there is a weak and negative correlation (p<0.001) between body mechanics and perceived physical health problems. So, it can be inferred that perceived physical health problems can be reduced by having good body mechanics while working in computers.

Table 3: Correlation between body mechanics and perceived physical health problems. n=174

Variables	r	p
Body mechanics Perceived physical health problems	-.215	0.001*

* Correlation is significant at the 0.001 level

DISCUSSION

The results of the present study reported that the majority (89.1%) of computer users were in the age between 49 to 60 years, while other studies shows that age is comparatively less; 28.23 ($\pm$4.3)years,[6] 31.5 ($\pm$7.3)[8] and 64.2% are more than 30 years.[9] Gender-wise, males were the majority, 67.2 % of the computer users in the present study. A comparable gender proportion is noticed by other researchers; 62%[6], 59.2%.[9] A different ratio (61.5 % female) is stated in a study.[8]

We found that the majority (54.6%) of the computer users have the normal BMI. Similar result is observed in the past; 22.42$\pm$0.39[7]. Duration of work in the computer by the employees differs. However, nearly 79% of them use computer more than six hours in a day during their working hours. Likewise, the available published data shows the duration was 5.9($\pm$1.82) hours[8] and 72.5% [9] of computer users make use of computer for more than four hours. In contrast, a study noted only 12.5% computer users to work for longer duration.[9] On the other hand, 68.4% of the study subject found the computer users to take regular break during their working hours in computers which support findings; 61.9%,[8] and 47.3% [10] of the earlier researches.

Improper posture may cause variety of musculoskeletal problems among computer users. The present study identified that the computer users had good back support (84.5%) and good posture (82.2%) while keying and mousing. But, half of them sit in the same position for longer duration. Studies have warned that same posture can end up in many health problems.[11] Upper limbs are exercised more than any other body part while on computers. Eighty percent of them reported that their arm rest was below the elbow level and could hang

their arms (87.4%) comfortably. Likewise, good foot support (74.1%) was also noticed.

The computer users were provided with good working environment with regard to seating arrangements, computer tables, anti glare glass for computer screen, adjustable chairs and support for wrist and foot. But, they do not exercise their neck and eyes regularly. Periodic eye sight assessment was also lacking.

In spite of having good facilities and body mechanics, varied physical health problems were recorded. We have observed that 72% of computer users had varying degrees of eye tiredness. Irritation of the eye was one of the common problems (33%). Significant eye irritation, 11.9%,[6] 18.6%,[12] was recorded in the past. Another complaint to eye was redness (14%). But, higher proportion of redness, 40.7% [12] and 54% [6] is evident from the previous studies. Additionally, blurring of the vision (35%) and burning (31%) was more common compared to redness of eye in the present study. Similarly, blurring, 12%,[6] 13.2% [12] and burning, 39%[6], 29.8% [12] were the complaint of the computer users in other researches too. Watering of the eye is noticed in 20% of the sample, which in accordance with other study; 23.2%.[12] Though computer vision syndrome was accounted, but it is not uniform, ranging from 25%,[9] 40 %,[7] to 68.1%,[8] among computer users

Few of the computer users (35%) reported to have headache because of computer use. A slightly lesser percentage, 29.2% [12] is noted by other computer users in the earlier period.
Neck pain (64%) and stiffness (52%) were the frequent physical health problems in the current survey which is comparable with the other researchers, 48.6%,[12] 57% [6]

Forty sever percent (47%) of the computer users complained about shoulder pain and slightly lesser (42.4%) percent of them had shoulder stiffness. However, shoulder pain/stiffness is varied from as low as 15%,[6] 15.7% [12] to as high as 63%.[13] Lower back pain was noticed among 35.6%,[12] 39% [6] computer users in the past, whereas we have noticed higher (64.4%) rate of mild to severe back pain. The muscles of hand, wrist and fingers are continuously exploited during keying and mousing while on computers.[6] Certainly physical problems are expected more in hand and arms. Pain in the wrist (30%) and finger joints (26%) are the common reported problems by the computer users. Further, the study subjects have also informed that they experienced tingling/numbness of the fingers (30%), reduced strength (27%) in their hands and difficulty to grasp objects (22%) at times. Similarly, pain/stiffness (20.6%)[5] (23.1%)[12] and burning (44.4%)[13] in the hand, wrist and fingers was detected in the previous studies.

Further the study noticed to have a negative correlation between body mechanics and perceived physical health problems. Therefore, improvement in the good body mechanics reduces the physical health problems of the computer users. But, the weak correlation is not strong enough to prove the evidence, giving a good scope for future research in this area.

CONCLUSION

In conclusion, majority of computer users have some computer related health problems. But, body mechanics such as sitting position, computer and table settings, and comfortable chairs were found to be better. Therefore, this shows that along with good ergonomic system employees should be motivated to use the facilities provided in the working place. However, weak and negative co-relation between computer related health problems and body mechanics represents that better the body mechanics, lesser the health problems. Their perceived

health problems can be subjected to diagnose medically by investigations, so as to initiate treatment. The employer should host regular health check camps, exercise sessions and awareness about occupational related problems.

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