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Original Research Article

An epidemiological study of computer related health problems and stress among bank employees in the vicinity of a tertiary care hospital

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ABSTRACT

Background: Due to the upsurge in information technology and daily increase in the number of computer usage in banking sector and increasing use of online banking services in India, there is need for research into computer related health problems. The objectives of the study were to estimate prevalence of computer related health problems and stress among Bank employees and to study its association with their working environmental conditions.
Methods: A cross sectional study was conducted, with a pre-tested, pre-designed questionnaire in 19 banks among 255 bank employees aged 25 to 50 years by census enumeration method in urban field practice area for 18 months. Inclusion criteria included employees working in current job since the past 2 years and on computer for at least 5 days/week and minimum 4 hours/day. The questionnaire included socio-demographic details, working environment and problems experienced while working on computers. Modified standardized Nordic questionnaire (musculoskeletal), depression anxiety stress scales (DASS) (stress), Snellen`s-Jaeger's chart (visual acuity) and digital lux meter (illumination) was used. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) version 25.0.
Results: The proportion of musculoskeletal, symptoms of Carpal tunnel syndrome due to keyboard use, visual problems and stress was found to be 69%, 60%, 58% and 38% respectively. Statistically significant association was found between visual, musculoskeletal complaints and duration of service, time spent on computers, level of computer desktop and ergonomic design of sitting chair. Stress had significant co-relation with age, duration of service, duration of using computers and addictions.
Conclusions: Banks should adopt ergonomic workplace design for better health, well-being and productivity of bank employees.

Keywords: Musculoskeletal disorders, Carpal tunnel syndrome, Ergonomics

INTRODUCTION

The proliferation of video display terminals (VDT) in the modern office setting of banks has generated concern related to potential health hazards associated with their use.[1] Musculoskeletal pain and visual discomfort are the main health problems reported by computers and the major contributors to workdays lost.[2-4] Prevalence of musculoskeletal disorders among keyboard users has been reported to be as high as 81%. In the computing environment, incorrect computer workstation set up, prolonged work in fixed or awkward positions, seated and static work, and overuse have been identified as MSD risk factors.[6-10]

Psychosocial and organizational factors were related to the experiences of psychological stress, musculoskeletal disorders and problems with vision among computer users.[11] A large percentage of data processing workers reported chronic physical complaints (i.e. eyestrain,

musculoskeletal pains, and headaches) and emotional stress that they believed were work related.[12]

Surveys of computer workers reveal that vision related problems are the most frequently reported health problems, occurring in over 70% of computer workers.[13] "Computer vision syndrome" is related to the unique aspects of tasks. Aspects of the design of the computer video display terminal such as screen resolution and contrast, image refresh rates and flickers and screen glare as well as working distances and angles all may contribute to worker symptoms.[14,15]

Thus, this study is being carried out with the following objectives: to study the socio-economic and demographic profile of the bank employees, to identify the ergonomic factors related to the working conditions of the employees and to determine their quality at workplace, to estimate the prevalence rate of computer related health problems and stress among bank employees and to study their association with the working environmental conditions, and to assess the stress levels associated with computer use among bank employees.

METHODS

A cross sectional study was conducted in 19 banks among 255 bank employees aged 25 to 50 years in the vicinity of a tertiary care hospital of Mumbai, Maharashtra in India for 18 months from April 2017 to November 2018.

It included males and females who are mainly desk job workers, subject working in the current job since past 2 years, subject working on computers for at least 5 days/week and minimum 4 hours/day and excluded any type of postural deformities, any history of recent injury/trauma or accident, spinal surgery or any other surgery, any neurological disorders, pregnant and severely fallen ill recently, and any eye injury.

After obtaining permission from the institutional ethical committee, 38 banks were identified in the field practice area of teaching medical institution. The identified banks were divided into 21 government, 8 private and 9 co-operative banks. Each of these banks were approached and permission was acquired from the respective bank managers to conduct the study on their bank employees. Out of 38 banks, 19 granted permission and therefore, based on census enumeration method, all the bank employees from these 19 banks were included i.e. 255 bank employees (Table 1).

A predesigned, pretested semi structured questionnaire was used encompassing socio-demographic data along with their occupational and professional history, working and environmental history related to the ergonomic conditions prevalent in the banks; questions related to visual status of the bank employees working on computers; and questions related to mental ill-health of the bank employees. DASS 21 (Depression Anxiety Stress Scale) was used to assess the mental health status.[16] General and systemic examination of the study subjects along with visual acuity examination done with the help of Snellen' vision charts. Environmental history of the banks i.e. illumination, temperature, humidity, ventilation and working area of the banks.

Table 1: Details of banks and their bank employees included in the study.

Banks	Total no. of banks in the field practice area	No. of banks that granted permission	No. of bank employees using computers
Government banks	21	12	144
Co-operative banks	9	5	77
Private banks	8	2	34
Total	38	19	255

RESULTS

The mean age of study subjects was 38.20±8 years and the male to female ratio being 1.3:1. Table 2 shows the association of age with various health problems related to computer use in bank employees. It was found that musculoskeletal symptoms, visual symptoms, stress and keyboard related symptoms due to computer use had a significant association ($p<0.05$) with age. Most of the bank employees i.e. 156 (61.17%) had completed their post-graduation and majority of them i.e. 223 (87.45%) belonged to upper class according to modified Kuppuswamy socio-economic classification.[17] The mean duration of service in banking sector was 14.71±8.60 years while the mean duration of using computers in the job was 11.50±5.69 years. Working hours per day (including overtime) of majority 151 (59.21%) bank employees was 5-7 hours out of which time spent on computers (hours per day) by most of them i.e. 105 (41.17%) was 4-5 hours/day. Table 3 shows that 176 (69.01%) bank employees experienced musculoskeletal symptoms due to computer use with the most common site of pain in majority bank employees being upper back (36.93%) and lower back (26.70%) followed by neck (18.18%). It showed a significant association with factors like duration of service in banking sector, level of desktop at workplace and ergonomic design of sitting chair (p value <0.05). Among those who experienced musculoskeletal discomfort, 77 (43.75%) bank employees reported the level of their computer desk being below eye level and 39 (22.15%) reported it to be above eye level. 91 (35.68%) found the arrangement of their sitting chair and computer desk as uncomfortable and 109 (61.93%) were using sitting chairs

which were not ergonomically designed. Table 4 shows the various morbidities in the study subjects some of which are related to use of computers at workplace. The most common morbidities were musculoskeletal discomfort (69.01%) followed by keyboard related symptoms (60.39%) and visual symptoms (58.43%).

Out of 149 (58.43%) who experienced visual symptoms, most common symptoms were irritation of eyes 49 (32.88%), watering of eyes 39 (26.17%) and burning of eyes 34 (22.81%). 90 (35.29%) employees used visual aids as a protective measure, most commonly used aid being eye drops followed by computer glasses and screen guards. 93 (36.47%) employees showed low vision (visual acuity >6/18) as measured by Snellen's vision chart.

Out of 154 (60.39%) bank employees who experienced symptoms due to keyboard use, the most common symptoms were stiffness in hands and fingers 78 (50.64%), pain 69 (44.80%) followed by tingling sensations 24 (15.58%). Significant association of symptoms related to keyboard use with age and duration of service (p value <0.05) was found.

Out of 255 bank employees, it was found that 98 (38.03%) study subjects experienced stress at workplace (According to DASS scale) which was more in the government bank employees followed by co-operative banks and private bank employees. Table 5 shows significant association of stress with age, duration of service, duration of using computers, addictions and exercise (p value <0.05).

Illumination was measured using digital lux meter. According to the calibration and operation manual provided with the instrument, the recommended levels of illumination for office work (i.e. typing and drafting) is 1,000 to 2,000 lux. Out of 19 banks, 12 (63.15%) banks had low levels of illumination i.e. less than 1000 lux and 2 (10.52%) banks had high levels of illumination i.e. more than 2000 lux.

Table 2: Age-wise distribution of study subjects showing various symptoms due to computer use.

Age (in years)	Musculoskeletal symptoms (176/255)	Visual symptoms (149/255)	Symptoms related to keyboard use (154/255)	Stress (98/255)
25-29	25 (14.20%)	23 (15.43%)	18 (11.68%)	10 (10.20%)
30-34	30 (17.04%)	35 (23.48%)	30 (19.48%)	20 (20.40%)
25-39	33 (18.75%)	31 (20.80%)	33 (21.42%)	22 (22.44%)
40-44	19 (10.79%)	20 (13.42%)	17 (11.03%)	15 (15.30%)
45-49	41 (23.29%)	25 (16.75%)	32 (20.77%)	21 (21.42%)
50	28 (15.90%)	15 (10.06%)	24 (15.58%)	10 (20.20%)
Total	176 (100%)	149 (100%)	154 (100%)	98 (100%)
P value	P=0.0009	P=0.0133	P=0.0023	P=0.018
	X^2=20.73	X^2=14.39	X^2=18.57	X^2=13.36
	(df=5)	(df=5)	(df=5)	(df=5)

Table 3: Association of musculoskeletal discomfort with various factors.

Factors	Musculoskeletal discomfort		Total	P value
	Present (%)	Absent (%)		
Duration of service (in years)				
<5	17 (9.65)	21 (26.58)	38	X^2=20.88, (df=3) p value=0.0001 (significant)
6-15	84 (47.72)	42 (53.16)	126	
16-25	32 (18.18)	11 (13.92)	43	
>26	43 (24.43)	5 (6.32)	48	
Total	176 (100.00)	79 (100.00)	255	
Level of desktop at workplace				
Above eye level	39 (22.15)	7 (8.86)	46	X^2=6.98, (df=2) p value=0.0303 (significant)
At eye level	60 (34.09)	35 (44.30)	95	
Below eye level	77 (43.75)	37 (46.83)	114	
Total	176 (100.00)	79 (100.00)	255	
Sitting chair whether ergonomically designed				
Yes	67 (38.06)	67 (84.81)	134	X^2=47.78, (df=1) P value=0.0000001 (significant)
No	109 (61.93)	12 (15.18)	121	
Total	176 (100.00)	79 (100.00)	255	

Table 4: Distribution of study subjects according to various morbidities in study subjects due to computer use.

Morbidities in study subjects	Number (%)			
	Government banks	Co-operative banks	Private banks	Total
	n=144	n=77	n=34	n=255
Musculoskeletal disorders	106 (73.61)	46 (59.74)	24 (70.58)	176 (69.01)
Visual symptoms	89 (61.80)	34 (44.15)	26 (76.47)	149 (58.43)
Keyboard related symptoms	85 (59.02)	47 (61.03)	22 (64.70)	154 (60.39)
Stress	60 (41.66)	22 (28.57)	15 (44.11)	98 (38.03)
Anxiety	34 (23.61)	9 (11.68)	12 (35.29)	55 (21.56)
Depression	58 (40.27)	24 (31.16)	11 (32.35)	93 (36.47)
Obesity	60 (41.66)	28 (36.36)	9 (26.47)	97 (38.03)
Addictions	90 (62.50)	42 (54.54)	27 (79.41)	159 (62.35)
Low vision	53 (36.80)	28 (36.36)	12 (35.29)	93 (36.47)

Table 5: Association of stress with various factors.

Factors	Stress		Total	P value
	Present (%)	Absent (%)		
Duration of service (in years)				
<5	10 (10.20)	38 (24.20)	48	X^2=15.92, (df=3) p value=0.001 (significant)
6-15	46 (46.93)	52 (33.12)	98	
16-25	30 (30.61)	31 (19.74)	61	
>26	12 (12.24)	36 (22.92)	48	
Total	98 (100.00)	157 (100.00)	255	
Duration of using computers (in years)				
<5	8 (8.16)	28 (17.83)	36	X^2=10.81, (df=3) p value=0.012 (significant)
6-15	75 (76.53)	96 (61.14)	171	
16-25	11 (11.22)	31 (19.74)	42	
>26	4 (4.08)	2 (1.27)	6	
Total	98 (100.00)	157 (100.00)	255	
6-7	43 (43.87)	68 (43.31)	111	
8-9	11 (11.22)	23 (14.64)	34	
Total	98 (100.00)	157 (100.00)	255	

DISCUSSION

In the present study, among the interviewed bank employees, 144 (56.47%) were males and 111 (43.52%) were females. The mean age of bank employees in the study was 38.20±8.00 years. Moom et al in their study found that 60% were males and 40% were females and mean age of bank employees to be 30.20±8.1 years which is similar to present study.[19] It was found that 176 (69.00%) employees experienced musculoskeletal pain or discomfort, site of pain were noted as 65 (36.93%) had pain/discomfort in upper back, 47 (26.70%) in lower back, 32 (18.18%) in neck, 30 (17.04%) in shoulders, 23 (13.06%) in hips, 19 (10.79%) in wrists, 9.09% in knees, 15 (8.52%) in fingers and 9 (5.11%) in hands. Similarly, Mohammadi observed in their study the highest prevalence of symptoms was found in the body part upper back (56%) followed by (49.76%) lower back, forearm (40.84%), neck (40.37%), hips (35.21%), knees (30.98%), upper arm (30.04%), shoulders (24.88%), wrist (23.94%).[20] Shrivastava et al found that 88 (44%) subjects experienced stress related to work. In the present study, out of 255 bank employees, 97 (38.03%) experienced stress in their job.[21] Musculoskeletal symptoms were significantly co-related with age and duration of service (in years). Sulaiman et al in their study also found that there was a significant correlation between MSD and job tenure.[22]

CONCLUSION

42.35% of study subjects spent 6-7 hours working on computers and laptops per day while 41.17% spent 4-5 hours per day. Majority of government (24.70%) and private bank (7.45%) employees worked for 4-5 hours on computers per day while majority of co-operative bank (13.72%) employees spent 6-7 hours working on computers per day. Maximum 45.88% of all study subjects reported the level of computer desktop 'below eye level'. Prevalence of symptoms of Carpal tunnel syndrome due to keyboard use and musculoskeletal discomfort was 60.39% and 69% respectively. According to DASS 21 scale of mental health status assessment, 38.03% were found to have stress. Employees of the banks should be made relieved from fear of quality of performance and from

other types of fear in their minds. Guidance and counselling, quality consciousness awareness programs, psychological support may be provided to employees through yoga camps, meditation camps, entertaining programs, sports and other recreational activities.

Limitations

The present study does not include all the government, co-operative and private banks which lie in the vicinity of the tertiary care hospital as only a few of these banks granted permission to conduct the study. The study includes bank employees of age group 25-50 years. Though the age of retirement according to government of India is 58 years, the age related changes and associated deformities cannot be over-ruled. Therefore, the study does not include bank employees above 50 years.

Recommendations

All the banks should adopt ergonomic workplace design for better health, well-being and productivity of bank employees which includes ergonomically designed cushioned chairs with arm rest, adjustable/movable monitor which can provide flexibility to the user, a well-designed and appropriately-adjusted desk with adequate space for clearance for legs which allows proper placement of computer components and accessories, and wrist/palm rests for operating mouse. Banks should conduct pre-employment tests and visual examination for all the selected bank employees in order to rule out any pre-existing health condition in the employee.

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