

To assess the ergonomic hazards and related musculoskeletal discomfort among bank employees

■ Neha Arya and Seema Kwatra

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■ **ABSTRACT :** Banking sector is the backbone of the nation and lifeline for its people. In banks, work load is very high, so new advancements in computers, made their work and life easier and faster, increased their work efficiency and saved time. Despite feeling relaxed with modern technology in the banking sector, employees feel overloaded with work and stressed out to cope with those changes resulting in increased health related hazards. The results revealed that computer workstation used by bank employees was not appropriate and employees had to adjust to fixed design features at work. Musculoskeletal pain /discomfort was emerged among bank employees due to long working hours, awkward body postures and repetitive work. Approximately thirty per cent of the employees had regular pain in lower back and neck. Almost half of the total bank employees suffered from symptoms like visual stress, headache, fatigue and burning sensations in eye due to prolonged work hours, and insufficient breaks.

■ **KEY WORDS:** Computer, Posture musculoskeletal discomfort, Visual stress, Workplace

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The advancement in the field of technology has incorporated a drastic change in the conventional pattern of work and revolutionized our way of working. In modern era banking sector is becoming a lifeline for its people. It is a financial institution that accepts deposits from the public and creates loans. In banks, work load is very high, so new advancements in computers, made their work and life easier and faster, increased their work efficiency and saved time. Despite feeling relaxed with modern technology in the banking sector, employees feel overloaded with work and stressed out to cope with those changes resulting in occupational health hazards. In banks employees are engaged in

repetitive tasks for long hours in static position in front of computers. That result is visual stress (headache, fatigue and burning sensation in eyes). Pain or discomfort in muscles and nerve of the hands, arms, wrists, elbows, shoulders, neck, back, knee and legs which are formed due to awkward static work posture and poorly designed workstation (Shabbir *et al.*, 2016). In any working organization ergonomics play a tremendous role for designing an appropriate work environment. OSHA (Occupational Safety and Health Administration) define ergonomics is the science of fitting the job to man, rather than fit the man to job, according to the capabilities and limitations of the worker. When there is a mismatch

between work, worker and their working environment, work related musculoskeletal discomforts (MSDs) result. Millions of employees are doing their jobs in banking sectors for fulfilling the needs and expectations of the peoples, so for their betterment we have to move one step agensised that problem. These musculoskeletal problems are considered to be the most prevalent of all work related injuries. Start as minor aches and pain, but when left unaddressed can result in serious injuries that can be permanent disabling. In addition, these painful injuries take long recovery periods and sometimes are hard to return to their job. The present study was planned with the following objectives :

- To assess the demographic profile of the bank employees.
- To assess the ergonomic hazards and related musculoskeletal discomfort among bank employees.
- To assess the visual stress among bank employees.

Following hypothesis were tested in the study:

- Ho: There is no significant relationship between occupational health hazards and posture
- Ho: There is no significant relationship between visual stress symptoms and work environment.

■ RESEARCH METHODS

The present study was carried out purposively in selected 13 public sector banks of Pantnagar and Rudrapur in Udham Singh Nagar district of Uttarakhand

state. The locale of Udham Singh Nagar district was purposively selected. Approximately 100 per cent of the sample was taken for the study to make a total of 90. The data was collected in the month of April and May of year, 2017. Assessment of demographic characteristics (age, marital status, education, income, family size, family type, working hours etc.) of the employees done by interview schedule. Ergonomics hazard identification checklist and Dutch Musculoskeletal Discomfort Questionnaire was adopted for assessing the computer workstation, equipments or tools and musculoskeletal discomfort among bank employees, respectively.

■ RESEARCH FINDINGS AND DISCUSSION

Table 1 depicts the personal profile of the bank employees, that out of total banks, majority of the employees were males (74.44 %) and 26 per cent were females. It was found that 45.5 per cent of total employees were under the age group of 24-37 years. In female category it was found that majority of employees 82.60 per cent were from the age group of 24-37 years of age. While in male category it was found that 38.80 per cent employees were under the age group of 37-47 years of age. Majority (72.22 %) of employees were married. 65.21 per cent females were married. Similar was the case among the male employees (74.62 %) were married. Approximately 66.66 per cent employees were from general category.

Table 2 states that majority (72.22 %) of total

Table 1 : Personal Profile of the bank employees			(n= 90)
Personal variables	Frequency		Total
	Male (n=67)	Female (n=23)	
Age			
24-37	22 (32.83)	19 (82.60)	41 (45.5)
37-47	26 (38.80)	3 (13.04)	29 (32.22)
>47	19 (28.35)	1 (4.34)	20 (22.22)
Marital status			
Unmarried	17 (25.37)	8 (34.78)	25(27.77)
Married	50 (74.62)	15 (65.21)	65(72.22)
Widow/divorced/separated	Nil	Nil	Nil
Caste			
SC	15 (22.38)	4 (17.39)	19 (21.11)
ST	2 (2.98)	Nil	2 (2.98)
OBC	59 (7.46)	4 (17.39)	9 (10)
General	45 (67.16)	15 (65.21)	60 (66.66)

Note : Values in parenthesis indicates percentage.

Table 2 : Personal profile of the bank employees			(n= 90)
	Male (n=67)	Female (n=23)	Total
Education qualification			
Upto metric	Nil	Nil	Nil
Graduation	46 (68.65)	17 (73.91)	63 (70)
Post-graduation	19 (28.35)	5 (21.73)	25 (24.44)
Diploma holders	Nil	Nil	Nil
Designation			
Top/higher level employees: Deputy Manager, Branch Manager	16 (23.88)	5 (21.73)	21 (23.33)
Middle level employees: accountant, Sr. Asst, Jr. Asst, Cashier	37 (55.22)	9 (39.13)	46 (51.11)
Lower level employees: Clerk	14 (20.89)	9 (39.13)	23 (25.55)
Family type			
Nuclear	35 (52.23)	15 (65.21)	50 (55.55)
Joint	32 (47.76)	8 (34.78)	40 (44.44)
Family size			
Upto three members	11 (16.41)	6 (26.08)	17 (18.88)
Four members	31 (46.26)	12 (52.17)	43 (47.77)
Above four members	25 (37.32)	5 (21.73)	30 (33.33)

Note : Values in parenthesis indicates percentage.

employees were graduates, while 24.44 per cent of the employees were post graduates. Approximately one fourth of the total male and female employees were having top level designation. Whereas, 55.22 per cent and 39.13 per cent employees were under middle level employees category. Around 20.89 per cent males and 39.13 per cent female employees come under lower level category. Overall it was found that 23.33 per cent, 51.11

per cent and 25.55 per cent employees falls under top, middle and lower level criteria.

Fig. 1 reveals that 30 per cent of the total employees had the monthly salary of Rs. 35,000-45,000 per month. Approximately forty per cent of the female employees had the monthly salary of Rs. 25,000-35,000 whereas 32 per cent of the male employees had salary of 35,000-45,000 Rs. per month.

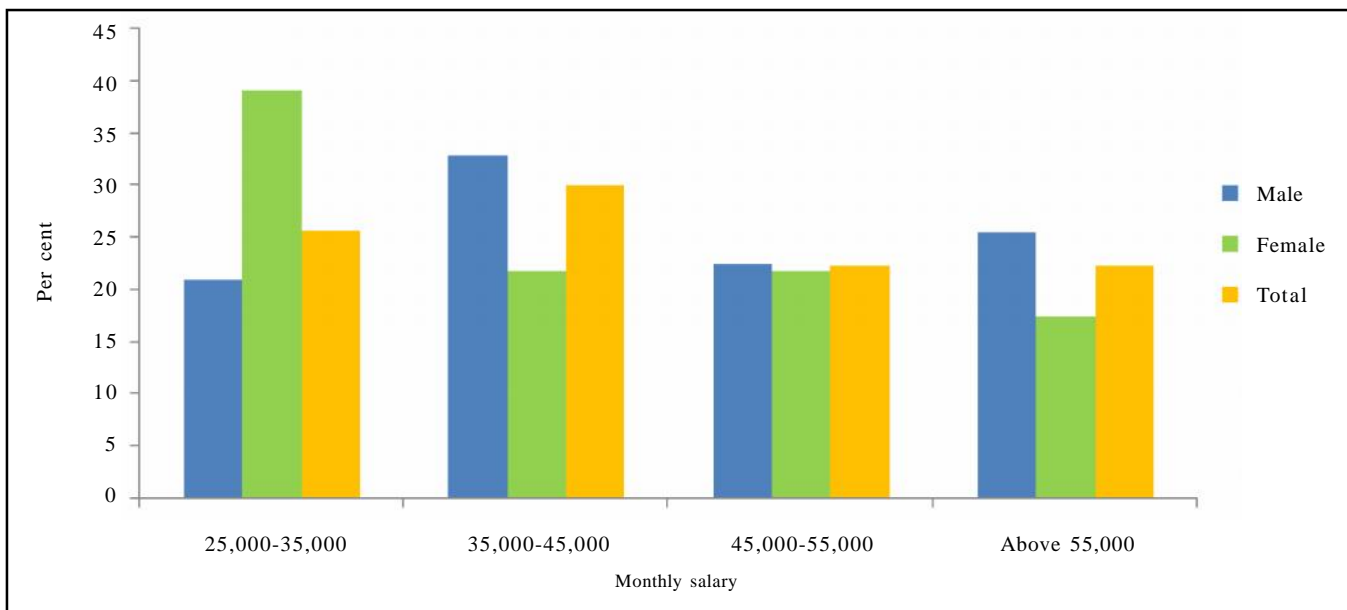


Fig. 1 : Percentage distribution of employees with respect to monthly salary

Fig. 2 denotes that 43.33 per cent of total employees had work experience of 1-10 years. Majority (78.34 %) of female employees had 1-10 years of work experience, followed by 34.3 per cent of male employees having work experience of 11-20 years.

Fig. 3 shows that more than half (56.66 %) of total employees reported that they work for more than 8 hours /day and 43.33 per cent employees work for 6-8 hours/day. It can be said that most of the employees devoting more 8 hours per day were top level employees.

Shrivastava and Bobhate (2012) observed that frequency of visual stress and musculoskeletal complaints increased simultaneously as the number of working hours or duration of work increased.

Table 3 revealed the pain and discomfort among employees in last 7 days and it was found that 20.80 per cent of males and 21.73 per cent of females were more susceptible for pain in lower back, followed by 10 per cent and 13 per cent male and females were having pain in neck in last 7 days, respectively. Continuous and

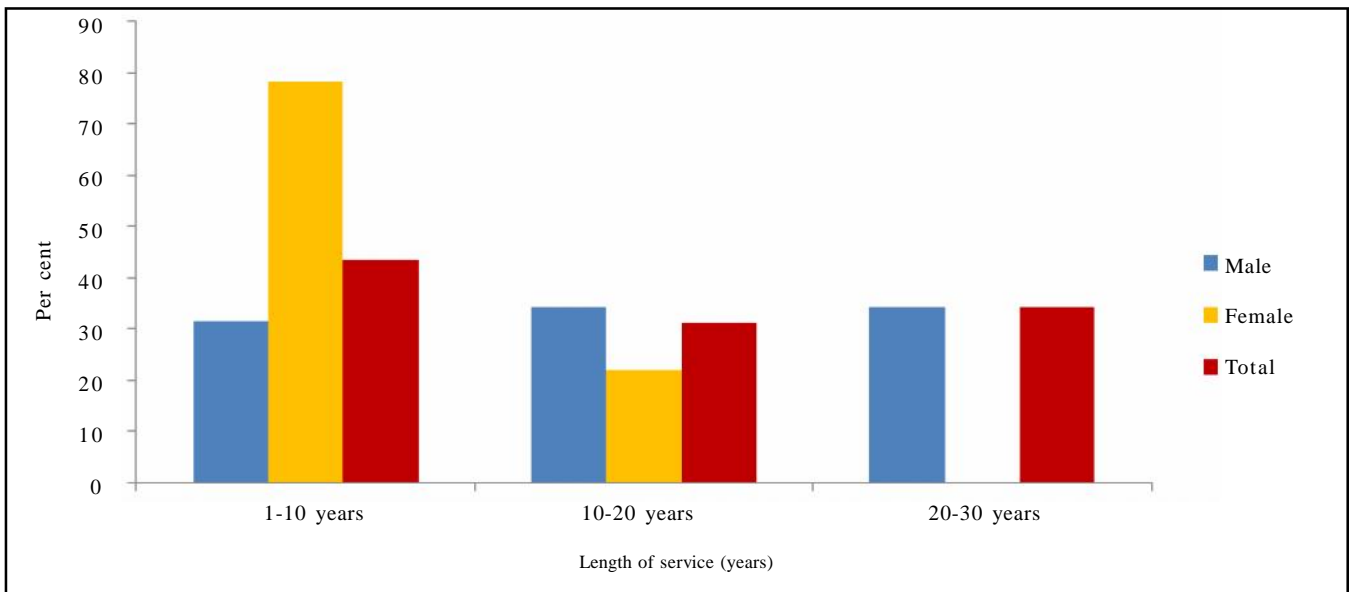


Fig. 2 : Percentage distribution of employees with respect to length of service (years)

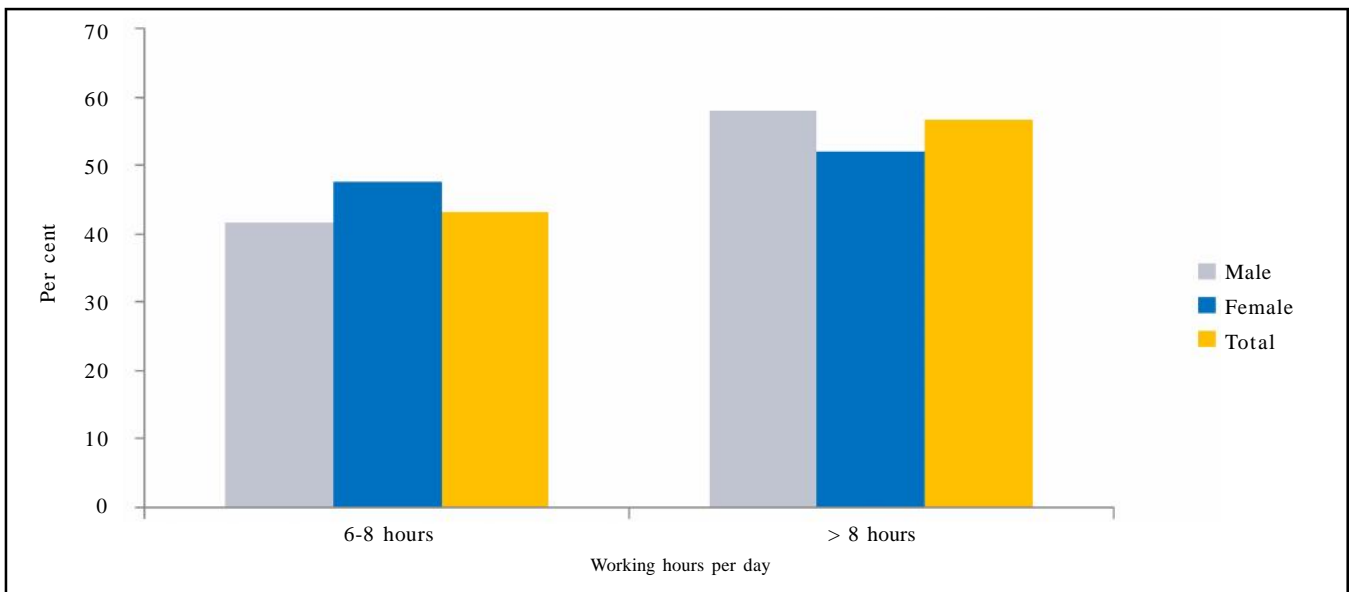


Fig. 3 : Percentage distribution of employees with respect to and work in terms of hours per day

Table 3 : Distribution of employees on the basis of pain/discomfort during past 7 days (n= 90)

Pain in the body parts	Male (n=67)		Female (n=23)		Total
	Frequency (%)				
Neck	9 (10.44)		3 (13)		10 (11.11)
Upper back	6 (8.95)		3 (13)		9 (10)
Lower back	14 (20.80)		5 (21.73)		19 (21.11)
Shoulders	5 (7.46)		2 (8.69)		7 (7.77)
Elbows	Nil		Nil		Nil
Wrists/hands	5 (7.46)		3 (13)		7 (7.77)
Hips/ thighs	Nil		Nil		Nil
Knees	2 (2.98)		1 (4.34)		3 (3.33)
Ankles/feet	3 (4.44)		1 (4.34)		4 (4.44)

Note: Values in parenthesis indicates percentage.

repetitive work in upward and awkward position and uncomfortable back rest while working on computer were the real cause for pain and discomfort in lower back and neck among employees.

Table 4 revealed that in last 12 months out of total bank employees, 47.76 per cent of male employees and 39.13 per cent of female employees sometimes experienced pain in neck. While 26.86 per cent males, 13 per cent females and nearly 23.33 per cent of the total employees were suffering from regular pain in neck. It also revealed that around 28.35 per cent males and

21.73 per cent females were regularly experiencing pain in lower back. Furthermore it was noticed that 26.66 per cent of total employees regularly felt pain in lower back region. Whereas 11.94 per cent and 13 per cent of male and female employees complained about continuous pain in upper back while working, respectively. Approximately 12.22 per cent of total employees suffered from regular upper back pain. Whereas 17.91 per cent and 11.94 per cent of male employees suffered from regular pain in right and left shoulders, respectively. While 21.73 per cent and 13 per cent of female employees had regular

Table 4 : Distribution of employees on the basis of feeling pain /discomfort in last 12 months (n= 90)

Sr. No.	Body parts	Frequency of discomfort	Yes Sometimes		Yes Regularly		Yes Chronically		No Never	
			Male	Female	Male	Female	Male	Female	Male	Female
			Total		41(45.55)		21(23.33)		6(6.66)	
1.	Neck	32 (47.76)	9 (39.13)	18 (26.86)	3 (13)	4 (5.97)	2 (8.69)	13 (19.40)	9 (39.13)	
2.	Upper back	24 (35.82)	5 (21.73)	8 (11.94)	3 (13)	Nil	Nil	35 (52.23)	8 (34.78)	
3.	Lower back	23 (34.32)	11 (47.82)	19 (28.35)	5 (21.73)	Nil	Nil	24 (35.82)	7 (30.43)	
4.	Shoulder	R	32 (47.76)	9 (39.13)	12 (17.91)	5 (21.73)	3 (4.47)	1 (4.34)	41 (61.19)	12 (52.17)
		L	24 (35.82)	6 (26)	8 (11.94)	3 (13)	Nil	Nil	35 (52.23)	14 (60.86)
		Total	41 (45.55)		17 (18.88)		4 (4.44)		53 (58.88)	
5.	Elbow	R	16 (23.88)	5 (21.73)	8 (11.94)	3 (13)	2 (2.98)	1 (4.34)	41 (61.19)	14 (60.86)
		L	8 (11.94)	3 (13)	4 (5.97)	3 (13)	Nil	Nil	55 (82)	17 (73.91)
		Total	21 (31.34)		11 (12.22)		3 (3.33)		55 (61.11)	
6.	Wrist	R	24 (35.82)	6 (26)	9 (39.13)	5 (21.73)	Nil	Nil	34 (50.74)	12 (52.17)
		L	8 (11.94)	5 (21.73)	4 (5.97)	3 (13)	Nil	Nil	55 (82)	8 (34.78)
		Total	30 (33.33)		14 (15.55)		Nil		46 (51.11)	
		Total	13 (14.44)		7 (7.77)		Nil		63 (70)	

Note: Values in parenthesis indicates percentage

pain in right and left shoulders during the past twelve months, respectively. Approximately 18.88 per cent and 12.22 per cent of total male and female employees were suffering from regular pain in right and left shoulders, respectively.

Table 5 revealed that majority of the employees had never complained pain in lower extremities.

Table 6 revealed that maximum (88.06 % and 86.96 %) of male and female employees were having slightly bent trunk while computing. Out of total it was found that majority (87.77 %) of employees carried out the work in bending posture while performing the task.

Around 52.23 per cent males, 34.78 per cent females and 47.77 per cent of total employees had slightly twisted posture while at work. This may be due to side positioning of the computers. It was found that maximum 87.77 per

cent of total employees were having bent posture of back for long hours. Around 48.88 per cent of total employees were working in twisted posture. Placement of computers on the side of the desk was the main reason for employees to work in twisted posture. Out of total employees 70 per cent of employees had forwarded neck posture. Gangwar and Kwatra (2017) did a study on sugarcane workers and found that workers work in awkward bending posture throughout their work day with complaints related to pain in neck, upper arm and lower back.

Table 7 depicts the visual stress symptoms among employees and it was reported that sixty one per cent employees reported to have headache very often while working on computer. Almost fifty per cent employee reported to have body fatigue and tiredness very often

Table 5 : Distribution of employees on the basis of feeling pain/ discomfort in last 12 months (n=90)

Sr. No.	Frequency of discomfort	(n=90)							
		Yes Sometimes		Yes Regularly		Yes Chronically		No Never	
		Male	Female	Male	Female	Male	Female	Male	Female
Body parts									
1.	Hip	17 (25.37)	10 (43.47)	4 (5.97)	3 (13)	Nil	Nil	46 (68.65)	13 (56.52)
	Total	27 (30)		7 (7.77)		Nil		59 (65.55)	
2.	Knee R	14 (20.89)	5 (21.73)	8 (11.94)	2 (8.69)	2 (2.98)	Nil	45 (67.16)	16 (69.56)
	Total	19 (21.11)		10 (11.11)		2 (2.22)		61 (67.77)	
	L	11 (16.41)	5 (21.73)	5 (7.46)	1 (4.34)	Nil	Nil	51 (76.11)	17 (73.91)
	Total	16 (17.77)		6 (6.66)		Nil		68 (75.55)	
3.	Ankle R	14 (20.89)	5 (21.73)	8 (11.94)	2 (8.69)	Nil	Nil	45 (67.16)	16 (69.56)
	Total	19 (21.11)		10 (11.11)		Nil		61 (67.77)	
	L	11 (16.88)	4 (17.39)	5 (7.46)	2 (8.69)	Nil	Nil	51 (76.11)	17 (73.91)
	Total	15 (16.66)		7 (7.77)		Nil		68 (75.55)	

Note: Values in parenthesis indicates percentage.

Table 6 : Working posture of bank employees while performing task on computer (n = 90)

Sr. No.	Working posture	Male (n=67)		Female (n=23)		Total	
		Yes	No	Yes	No	Yes	No
1.	Slightly bent with your trunk	59 (88.06)	8 (11.94)	20 (86.96)	3 (13.04)	79 (87.77)	11 (12.22)
2.	Slightly twist with your trunk	35 (52.23)	32 (47.76)	8 (34.78)	15 (65.21)	43 (47.77)	47 (52.22)
3.	Heavily twist with your trunk	Nil	67 (100)	Nil	23 (100)	Nil	90 (100)
4.	Slightly bent posture for long period	59 (88.06)	8 (11.94)	20 (86.96)	3 (13.04)	79 (87.77)	11 (12.22)
5.	Heavy bent posture for long posture	Nil	67 (100)	Nil	23 (100)	Nil	90 (100)
6.	Slightly twisted posture for long period	32 (47.76)	35 (52.24)	12 (52.17)	11 (47.83)	44 (48.88)	46 (51.11)
7.	Neck in a forward posture for long period	43 (64.18)	24 (35.82)	20 (86.96)	3 (13.04)	63 (70)	27 (30)
8.	Neck in a twisted posture for long period	32 (47.76)	35 (52.24)	12 (52.17)	11 (47.83)	44 (48.88)	46 (51.11)
9.	The same movements with arms, hands and fingers many times per minute	60 (89.55)	7 (10.45)	23 (100)	Nil	83 (92.22)	7 (7.77)
10.	The same movement of head many times per day	32 (47.76)	35 (52.24)	12 (52.17)	11 (47.83)	44 (48.88)	46 (51.11)

Note: Values in parenthesis indicates percentage.

Table 7 : Visual stress symptoms while working on computer (n= 90)									
Sr. No.		Very often 4		Often 3		Some times 2		Never 1	
		Male	Female	Male	Female	Male	Female	Male	Female
1.	Headaches during or after working on computer	41 (61.19)	14 (60.86)	11 (16.41)	4 (17.39)	15 (22.38)	5 (21.73)	Nil	Nil
	Total	55 (61.11)		15 (16.66)		20 (22.22)		Nil	
2.	Overall bodily fatigue or tiredness	34 (50.74)	11 (47.82)	29 (43.28)	9 (56.52)	4 (5.97)	3 (13.04)	Nil	Nil
	Total	45 (50)		38 (42.22)		7 (7.77)		Nil	
3.	Burning eyes	Nil	Nil	8 (11.94)	2 (8.69)	39 (58.20)	9 (39.13)	20 (29.85)	12 (52.17)
	Total	Nil		10 (11.11)		48 (53.33)		32 (35.55)	
4.	Distance vision is blurred when looking up from the computer	Nil	Nil	8 (11.94)	3 (13.04)	10 (14.92)	6 (23.08)	49 (73.13)	14 (60.86)
	Total	Nil		11 (12.22)		16 (17.77)		63 (70)	
5.	Dry, tired or sore eyes	Nil	Nil	15 (22.38)	5 (21.73)	33 (49.25)	10 (43.47)	19 (28.35)	8 (34.78)
	Total	Nil		20 (22.22)		43 (47.77)		27 (30)	
6.	Double vision	Nil	Nil	Nil	Nil	Nil	Nil	67 (100)	23 (100)
	Total	Nil		Nil		Nil		90 (100)	
7.	Letters on the screen run together	Nil	Nil	Nil	Nil	Nil	Nil	67 (100)	23 (100)
	Total	Nil		Nil		Nil		90 (100)	

Note : Values in parenthesis indicates percentage.

Table 8 : Relationship between parameters			
Sr. No.	Parameters	Correlation co-efficient	Remark
1.	Occupational health hazards and posture	-.423**	Significant
2.	Visual stress symptoms and work environment	.064**	Significant

** indicates significance of value at P=0.05

while working. Approximately 53.33 per cent of the total employees sometimes experienced burning sensation in eyes. Continuous and repetitive work on computers and inappropriate lighting and glare affects their work and cause stress on their eyes leading to headache, dry eye while working. It would be the major reason for visual stress among employees. Arya and Kwatra (2014) did a study on Mithila art workers. It was found that workers complained about eyes strain/eye fatigue and irritation in eyes (56.66 %) burning sensations in eyes.

For testing of hypothesis, the correlation co-efficient values were studied among different parameters.

Table shows the correlation co-efficient values identifying that occupational health hazards are dependent on posture adopted and had a significant relationship with posture of the employee hence null hypothesis is rejected and alternate hypothesis is accepted. Similarly it is found that visual stress symptoms, working environment also had a significant relationship.

Conclusion:

On the basis of the research findings it was found that due to poor workplace and lack of knowledge of

ergonomics and its use in workplace, employees faced musculoskeletal problems. Employees were unaware or having less knowledge about the proper working posture while working on computer which cause pain in neck, back and shoulders. On the basis of results considerations regarding ergonomically designed workplace should be used. Chairs should be equipped with adjustable features having adequate lumbar support, seat pan with cushion support, depth, height should be adjustable. Arm rest well designed, monitors with height adjustable feature, antiglare screen, keyboard should be restructured for comfortable and congenial use. Padded palm rest should be designed for reducing the pressure on palm while computing. Soundproofed curtains should be used to minimize the noise level as well as glare from window. Energy saving LED bulbs should be used. Working posture should be appropriate for minimizing the negative impacts on health. To generate awareness regarding ergonomics, work related musculoskeletal discomfort, postural discomfort campaigns were organized. It will enhance the efficiency and performance of the worker and will increase the productivity of organization and reduce the health hazards and minimize absenteeism.

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