

Factors affecting musculoskeletal low back pain due to computer usage

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Objective: To find the factors affecting low back pain among office workers due to computer usage.

Methodology: This observational cross sectional study included 197 patients with low back pain recruited from Descon power solution and finance department of sapphire as well as Outfitters Company using purposive sampling technique. Both gender patients were included in the study with age range from 25 – 60 years. Data were collected through a self-administered questionnaire.

Results: The association of low back pain with various ergonomical factors was calculated through

chi-square test which was found to be statistically significant (< 0.05). These factors included working posture (0.031), distance between table and chair (0.014), height of computer (0.03), distance of screen (0.053) and key board (0.002). These factors were found to be significantly associated with working hours, type of chair used and gender.

Conclusion: There was significant association of low back pain with working posture, distance between table and chair, height of computer and distance of screen and key board among office workers.

Keywords: Low back pain, ergonomics, posture.

INTRODUCTION

Another pandemic that was out broken before COVID-19 is still not getting attention by the world overall, which is technological pandemic. Technology has tremendous affects in our lives but due to excessive use of technology people of almost every age are facing musculoskeletal issues, in which low back pain (LBP) is the most common.¹ LBP is a challenge in office workers who most often use computers which causes an increase in sick leaves and early retirement with productivity loss.²⁻⁴ Computer usage is the most commonly used technology after mobile phones.⁵ The nature of their job is sitting and using computers for hours resulting in LBP.⁶ The cost of this digital handy metamorphosis is health and adoption of sedentary life style, which is one of the reason of top four causes of death.⁷

Sitting for hours without break is not equal to smoking, it is also a global pandemic which is silently killing the population.⁸⁻¹⁰ Sitting was found significantly associated with LBP.¹¹ The Ideal distance between a chair and the monitor screen, verified by WHO, is 20 inches. Extending arm as much as possible should be the distance between a chair and computer.^{12,13} Weak ergonomics which also includes the distance between the front of knees and the table should be 2-3 inches apart as in to relax the body and allow the body to function properly.¹³ Maximum stress over synovial area or cartilage of the joint can lead to pain which can be neurological or from muscles.¹⁴

Many studies have concluded that the mechanical LBP is usually work related including ‘bending or

twisting,^{13,15} squatting or kneeling,⁶ prolonged sitting,¹⁶ uninterrupted standing ‘heavy physical work,¹⁷ nursing activities such as manually handling the patients.¹⁸ Posture during work, work ergonomics, manual carrying and handling are the risk factors for LBP.¹⁹ Health is being compromised in the office workers due to prolonged sitting and thus affecting the productivity.²⁰ There can be biomechanical, ergonomical trainings in developing countries,²¹ and developing proper risk free preventive strategies in order to boost the productivity.²² The aim of this study was to find the factors affecting LBP among office workers due to computer usage.

METHODOLOGY

This cross sectional study used purposive sampling technique in which data were collected from administrative branches of different setups where sitting time was up to 6 – 8 hrs. The data were collected after the approval from ethical committee of the institution from Descon power solutions, financial and administrative departments of sapphire and outfitters companies. Inclusion criteria were that the age should be above or equal to 25 and officials should be working as setting for at least past one year. There should be work related LBP. They should be spending 50% of their working hours on the computer desk. The exclusion criteria were that there should be no systematic LBP or suffering from any connective tissue disorder and degenerative changes, history of past surgery or accident affecting low back or LBP related to pregnancy or post-partum.

A semi-structured, self-administered questionnaire was used. 300 questionnaires were distributed in which only 210 were returned with proper response. Further, only 197 were included in the study and others were discarded due to not related with low back. The questionnaire included demographic details such as age, gender and working details. They were informed about the study being done and no personal information has been violated at any point of study.

Statistical Analysis: SPSS 21 was used for analysis of data. The association of LBP with various ergonomical factors was calculated through chi-square test. $P < 0.05$ was considered significant.

RESULTS

The responses were graded as good or poor (24) as shown in Table 1. These responses were recorded as per the ergonomical demands by ISO standard in which good means the very positive movement while the working hours such as back fully supported, appropriate distance between table and chair, worthy distance between key board or a mouse, availability of full elbow support, feet touching the ground with or without the support. Gender wise working condition is shown in Table 2.

Table 1: Response Grading.

Parameters	Good	Poor
Working hours	< 6 hrs	> 6hrs
Distance of screen	50 – 70 cm	< 50 – > 70 cm
Height of computer from table	< 10 cm	> 10 cm
Distance between keyboard/mouse	< 15 cm	> 15 cm
Distance between table and chair (Normal = 23 inches (59 cm) (25)	More: > 23 in.	Less: < 23 in.

Table 3 shows all ergonomical factors in association with working hours that is < 6 hours or > 6 hours that also shows p value less than 0.05 in all the variables. Table 4 shows all the ergonomical factors with the type of chair used by the participant such as normal chair, adjustable having supported back or with no back support in which result were found significant except the distance between table and chair as shown.

Table 2: Gender.

Determinates		Male	Female	p-vale
Working posture	G	90	76	0.031
	P	32	49	
Distance between table and chair	N	17	73	0.014
	L	20	68	
	M	4	65	
Height of computer	G	80	86	0.03
	P	32	49	
Distance of screen	G	52	37	0.053
	P	54	104	
Distance of key board	G	47	36	0.002
	P	57	107	

G = Good, P = Poor, N = Normal, L = Less, M = More

Table 3: Working Hours.

Determinates		< 6 hrs	> 6 hrs	p-vale
Working posture	G	65	48	0.022
	P	57	77	
Distance between table and chair	N	54	36	0.002
	L	31	57	
	M	40	29	
Height of computer	G	45	68	0.002
	P	80	54	
Distance of screen	G	52	37	0.05
	P	52	106	
Distance of key board	G	23	18	0.051
	P	81	125	

G = Good, P = Poor, N = Normal, L= Less, M = More

DISCUSSION

We found out that both the genders were equally affected by LBP, although the study has more male ratio. In another study, females were more affected with ergonomical LBP and the reason was more female ratio in the study.¹⁹ Various ergonomical factors were found statistically significant such as working posture, distance between table and chair; height of computer, distance of screen and key board was found positively associated with working hours, type of chair used and gender. On the other hand, a study from India concluded that

Table 4: Type of Chair.

Determinates		Normal	Adjustable Back Support	No Back Support	p-vale
Working posture	G	17	20	4	0.022
	P	73	68	65	
Distance between table and chair	N	48	44	25	0.002
	L	35	38	33	
	M	7	6	8	
Height of computer	G	39	49	43	0.002
	P	51	39	26	
Distance of screen	G	54	35	40	0.05
	P	36	53	29	
Distance of key board	G	21	20	4	0.051
	P	69	68	65	

G = Good, P = Poor, N = Normal, L = Less, M = More

only bending or twisting while standing or sitting is significant with ergonomic factors.⁶ As LBP is found highly prevalent, not only in Pakistan but all around the globe thus leading to mismanaged ergonomivcs.²⁴

Normally, the study can be generalized because it can be implied on anyone who works in sitting posture from 6-8 hrs. Now a day, due to different technologies sitting is very common. The sample was taken from one region of the country; it could vary in other regions. A possibility of recall bias among subjects while answering.

CONCLUSION

There was significant association of low back pain with working posture, distance between table and chair, height of computer and distance of screen and key board among office workers. Musculoskeletal problems are the widely known issues and emerging in the world as the pre-existing and unattended pandemic which needs quite attention by medical staff as well as the administration of major companies in order to increase the production and lessen the absenteeism of their employees.

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