

PREVALENCE OF LOW BACK PAIN IN COMPUTER USERS

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ABSTRACT:

Objective: To study the prevalence of low back pain in computer users and how different age groups behave under prolong sitting posture on axial loading against time.

Design: A multicenter cross sectional study by initial screening questionnaire followed by further clinical examination and evaluation.

Setting: Survey among students of computer institutes and the data from hospital base practice in the city of Karachi.

Main outcome measures: Variation in the pattern of low back pain in response to duration of work, age and gender against time was noted.

Results: Low back pain in computer users is more common in the younger age group (16-18 yrs) with a second surge (23-30 yrs) specially at the beginning of their carrier with a prevalence rate of 6.7%, mean age 30.29, std. deviation 12.744 and a frequency of male to female 223:95, novice to professional 182:136, single to married 192:127, about 44% of VDU users developed LBP in 4 hours and 35% in 3 hours about 50% of them found to have lax back muscles.

Conclusion & Clinical Relevance: Low back pain is a common condition in computer users in all age groups. Working for long in faulty position; inappropriate ergonomics, old age and lack of physical exercises result in laxity of ligaments which are the main causes of back pain. Symptomatic conservative treatment with NSAIDS, muscle relaxant and regular back muscle exercises are extremely helpful.

KEYWORDS: VDU (Visual display unit) / VDT (Visual display terminal), Postural low back pain, MSD (Musculo-skeletal disorder), Ergonomic, PID (prolapsed intervertebral disc)

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INTRODUCTION

Low back pain (LBP) a complex symptom is a very common condition. From time immemorial, the human race is paying a price for

attaining the upright posture. From adolescence to adulthood 80 to 85% of people suffer from this ailment in the modern world. Studies in USA have reported an annual incidence of 15 to 20% with 1:1 male to female ratio and a 50% recovery by two weeks and 90% recovery within 6 weeks after appropriate treatment. However, it results in tremendous loss of time and work productivity costing billions of dollars.

(Acute low back pain (LBP) lasts less than 6 weeks, whereas chronic low back pain (LBP) lasts for more than 12 weeks).¹

Background:

During the past few years, it has been observed that a new class of young sedentary back pain sufferers is emerging who are becoming more frequent visitors of orthopedic

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clinics. They usually are in a profession where prolonged sitting on chairs is essential like computer / visual display unit (VDU) users, bank clerks, accountants, stock exchange workers, tillers, industrial workers, architects etc. Prolonged, continuous sitting, in an inactive posture is a common feature among the computer /VDU users as the technology and its use is becoming more and more common.² This calls for a comprehensive approach for the proper use of the ergonomics and maintenance of posture to address the mechanism leading to musculo-skeletal disorder in VDU users. It is important to have a proper seat angle while at work as the changes in the intradiscal pressure during various sitting position has its deleterious effects on the structures of the spine and around. This could be minimized with proper posture. It is also important to have regular exercises for the lumbar spine and a change of posture while at work to keep fit and prevent the increasing incidence of LBP among such patients.

The commonest site of pain felt by most of these white collar workers after a working spell of 3 to 4 hours was the lower cervical, suprascapular, upper dorsal and at the inter scapular region, which usually abated after taking rest.^{2,3,4} The second most common, but persistent site of low back pain⁵ was the involvement of lumbo-sacral region and the sacro-iliac joints. These were the cases that usually recovered well on analgesics and symptomatic management within few days.

PATIENTS AND METHODS

During the study period from 1996 till 2003, a survey questionnaire was developed which was distributed among students of randomly selected computer institutes / schools, situated in different parts of Karachi, with a request to record general information such as name, age, sex, class, novice or professional, duration of computer use and appearance of symptom, involvement in sports / physical exercises, any disease past or present (physical or mental). Those computer users having back pain or an

episode within the previous one-year duration were selected and encouraged to visit the authors for further free clinical consultation and evaluation. The response rate to questions was 92% while 67% came for free consultation. Total number of LBP cases from computer institutes were 509. This included 181 cases of low back pain due to the use of computers.

Exclusion criteria

Those suffering from back pain due to any pathological condition (e.g. congenital, traumatic, infective, metabolic, malignant, or psychological reasons) kyphosis, scoliosis, scheuermanns disease, spondylosis, spondylolisthesis spina bifida, T.B spine, and osteoporosis were excluded. Similarly those with back pain episode lasting more than one year were also excluded from this study.

Another group of 138 patients was of computer professionals or VDU users who were the employees of Banks, OGDC, Pak Steel, Port Qasim, KESC, PTCL, Stock Exchange, Pharmaceutical companies or other multinational / national organizations who come for consultation in our OPD. They were all examined, investigated and treated as a normal influx of university hospital based/private practice. Final collection and assimilation of data were mainly at our teaching university hospital in Karachi. The exclusion criteria were similar to both the groups. Special consideration was paid for the ergonomic as well as the appearance of back pain in relation to duration of continuous computer use.

RESULTS

From 1996 till 2003, we have seen 4741 patients of LBP. It included 3256(70%), male 1485(30%) females. Those who met the inclusion criteria were 319 patients male 223(69.9%), female 95(29.8%) who had LBP due to computer use. The overall prevalence rate was 6.5% and their age was between 12-65 years. SPSS 11.0 version was used for data analysis.

The clinical features manifested by most of them, was the pain in the lumbo-sacral region

Table-I: Variables

		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>
Gender				
Valid		1	0.3	0.3
	Female	95	29.8	29.8
	Male	223	69.9	69.9
	Total	319	100.0	100.0
Development of back pain after continuous use of VDU				
Valid		3	1.0	1.0
	Pain after 1 hour	1	0.3	0.3
	Pain after 2 hours	10	3.1	3.1
	Pain after 3 hours	113	35.4	35.4
	Pain after 4 hours	140	43.9	43.9
	Pain after 5 hours	48	15.0	15.0
	Pain after 6 hours	4	1.3	1.3
	Total	319	100.0	100.0
Novice or professional				
Valid	Novice	136	42.6	42.8
	Professional	182	57.1	57.2
	Total	318	99.7	100.0
Missing	No response	1	0.3	
Total		319	100.0	
Marital status				
Valid	Single	192	60.2	60.2
	Married	127	39.8	39.8

with spasm of the para-spinal muscles with limitation of flexion and tenderness around L4-L5-S1 area with occasional involvement of sacro-iliac joint/ radiation to the buttocks or back of the thigh. SLR (straight leg raising test) less than 90 degrees were found in 14% of cases. There was only one case that showed some neurological deficit. Common findings among these patients were spasm of the back muscles with loss of the lordotic curve. All these patients were managed symptomatically and conservatively on NSAID / Muscle relaxants, rest (for few days) and physiotherapy followed by back muscles exercises. All of them responded well.

In VDU users 3 to 4 hours of continuous use was the most common duration in which pain occurred in 79% (253) of cases while 15% (48) developed pain after 5 hours of VDU use.

DISCUSSION

Biomechanical Considerations:

The spinal column has protective, supportive and locomotor functions. The vertebrae articulate with each other anteriorly via the intervertebral discs and posteriorly via the facets joints and are made exceptionally strong to withstand the compression forces during axial loading⁶. The mobile segment of the spine i.e.

cervical and lumbar region, usually suffer the most loading stresses. A rapid stretch to spinal ligaments is less likely to cause the failure than slow repetitive stretch due to the viscoelastic properties of the osseoligamentous structure that deforms on slow loading. The anterior 2/3 structures of the spine provide support to the trunk and helps in 80% of weight transmission of vertebral loading and keeps us mobile, while the posterior 1/3 structures bears about 20% of weight bearing along with the posterior spinal complex and provide protection to the neural structure. It also determines the direction of movements. It has been observed that if the synovial facet joints were static the inter vertebral discs would wear out rapidly as a result of rotational and torsional stress leading to changes, like O.A, spondylolisthesis and spinal stenosis.⁷ The structure of the intervertebral disc comprises of the tough fibrocartilagenous ring called annulus fibrosis while the central gelatinous nucleus pulposus consist of a matrix of special protein, glycosaminoglycan and water. The nucleus pulposus in young person evenly transmit the load towards the adjacent structures The shock absorbing, compression resisting, force decimating properties are reduced as age advances and this predisposes the lumbar disc to prolapse, particularly at L4-L5, L5-S1, which are the common sites of excessive strain and back pain.

Under normal loading conditions, fluid seeps out and deformation of N. pulposis occurs, about six hours of standing can result in 16% - 20% loss in the vertical height of the disc. It has been observed that the intra discal pressure is higher in sitting than in standing position. The pattern of weight transmission changes during the inactive, slumpy posture of the computer users causing an excessive abnormal loading of the spine which is also a contributory factor for the development of low back pain.

During the loading of the spine the effect of the seating angle is a very important factor in the genesis of low back pain in people who sit for long hours at work. Lumbar disc pressure

and electrical activity in the spinal muscles reduces as the seat angle increases from 90° to 130°. A 110° tilt angle is considered as an ideal one for working purposes. Mechanically this ensures a degree of forward rotation of the pelvis while maintaining the lumbar lordosis hence reduction in the loading of the spine and intra discal pressure.

In this study we have not investigated the work related environmental / ergonomic design and other individual factors as predictors for low back pain. Mental stress and cases having job dissatisfaction or any psychosomatic illness were not included in most of the studies.⁸ The prevalence rate of low back pain is higher in those studies as compared to our study. It is rather interesting to note that most of the studies, world over, pertain to the visual/upper extremity musculo-skeletal discomfort having a prevalence rate of 40-66% (including the psychosocial, physical/ergonomic factors) but their subjective discomforts are short lived. A similar prevalence range is noted in LBP sufferers in VDT users having pronounced symptomology and dominant psychosocial and ergonomic variables with a prolong periods of discomfort.⁹

The prevalence for LBP among typists is reported to be 53% and neck pain among 50%. Clinical Dentist is also prone to develop LBP due to their seated working posture and repeated unidirectional twisting of the trunk while working in one position for prolonged periods.¹⁰

Women are more likely than men to have upper extremity musculoskeletal disorders (MSD)¹¹. As the subject of our study is specifically related to LBP therefore we have not gone into the details of subjective pain in neck, shoulders, upper back; weakness and motion restriction; tingling or numbness in the upper extremities. However, we have not encountered a single case of carpal tunnel syndrome in ultra-sonographers, though the reported prevalence among them is 4-5%.¹²

Bivariate analyses found significant associations between VDU use, static postures, faulty ergonomics and laxity of back muscles, as the

main reasons for the musculoskeletal symptoms. Symptoms appeared to increase as duration of VDU exposure increased. The incidence/prevalence of LBP and other subjective discomforts could be decreased if all the contributory factors are addressed properly on the continuous use of VDU at a stretch is discouraged and about five minutes of rest every half an hour is practiced.¹³

CONCLUSIONS

Musculoskeletal disorder (MSD) is a common condition among workers. However little data regarding prevalence in the general working population is available except for LBP. Even the data for LBP among computer users is very scanty. After literature search we could not find any study regarding prevalence of low back pain among computer users in Pakistan. Computer users and all other professionals who have to work for long hours in a particular posture should be advised to take couple of minutes rest after working for sometime to reduce pressure on the spinal column Symptomatic conservative treatment with NSAIDS, muscle relaxants, rest and regular back muscle exercises are extremely helpful.

REFERENCES

1. Harry B. Skinner. Diseases and disorders of the lumbar spine. Current Diagnosis and treatment in Orthopedics. Second Edition. McGraw Hill, Singapore 2003;195-201.
2. Koh D, Ong CN, Jeyaratnam J. The safe use of visual display units. Singapore Med J 1994; 35(4): 381-5.
3. Nachemson A, Morris JM. In vivo measurement of intradiscal pressure. J Bone Joint Surg 1964;46A: 1077.
4. Palmer KT, Cooper C, Walker Bone K, Syddall H, Coggon D. Use of keyboards and symptoms in the neck and arm: evidence from a national survey. Occup Med (Lond), 2001 Sep; 51(6): 392-5 Comment in: Sep 51 (6):365-6.
5. Ijadunola KT, Ijadunola MY, Onayade AA, Abiona TC. Perceptions of occupational hazards amongst office workers at the Obafemi Awolowo University, Ile-Ife. Niger J Med 2003; 12(3): 134-9.
6. Stanley V Paris. Anatomy as related to function and pain. Symposium on Evaluation and Care of Lumbar Spine Problems: Orthopedic Clinics of North America 1983; 14(3): 475-89.
7. Ken Yong-Hing. The pathophysiology of degenerative disease of the lumbar spine. Orthopedic Clinics of North America. 1983; 14(3): 491-504.
8. Hsu WH, Wang MJ. Physical discomfort among visual display terminal users in a semiconductor manufacturing company: a study of prevalence and relation to psychosocial and physical/ergonomic factors. Am Indust Hyg Assoc J (Fairfax) 2003; 64(2): 276-82.
9. Bergqvist U, Wolgast E, Nilsson B, Voss M. The influence of VDT work on musculoskeletal disorders. Ergonomics 1995; 38(4): 754-62.
10. Ignatius YT, Yee TY, Yan LT. Self reported musculoskeletal problems amongst typist and possible risk factors. Singapore Med J 1998; 39(8): 363-7.
11. Tamez Gonzalez S, et al. Risks and health problems caused by the use of video terminals, Salud Publica de Mexico 2003; 45(3):171-80.
12. Schoenfeld A, Goverman J, Weiss DM, Meizner I. Transducer user syndrome: an occupational hazard of the ultrasonographer. Eur J Ultrasound 1999; 10(1): 41-5.
13. Demure B, Mundt KA, Bigelow C, Luippold RS, Ali D, Liese B. VDT work station improvement program: 11. Ergonomic intervention and reduction of musculoskeletal discomfort. J Occup Environ Med 2000; 48(8): 792-7.