

# A Study of Related Characteristics and Association of Some Factors Causing Neck Pain in the Constant Computer Users

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## Abstract

**Background:** Use of computer has been an integral part of every setting, offices and daily life. Over use of computer has led to a number of morbidities and physical illness in recent years. In our settings there is no proper awareness and training sessions to avoid the illness due to prolonged sitting and poor posture. This study is an attempt to find the neck pain in heavy computer users and related factors. This study will help us to design a proper awareness program and an agenda

Student, MCPH from Public Health School, Erasmus Campus University of Libre De Bruxells, Belgium to reduce the neck pain after knowing the basic awareness, needs and factors affecting human health.

**Objectives:** The objective of this was to find out the related characteristics and association of some selected factors causing neck pain in the constant computer users.

**Methodology:** This cross sectional study was conducted in Lahore, Rawalpindi and Karachi from July 2009 to December 2009. Sample size of 122 subjects from banks, call centers, Information Technology, Telecom Industry and ISPs was taken to meet our objectives. Data was collected through an e-questionnaire (close ended) using non-probability sampling. The subjects using computer for 8 or more hours in office settings with either gender between the ages of 20 to 50 years were taken.

**Results:** The mean age of the patients was  $29.74 \pm 6.30$  years. In this study there were 99 (81.8%) males and 23 (18.9%) females. Among all subjects, 102 (83.6%) subjects had neck pain. The pain was due to constant computer usage in 85 (69.7%) subjects. The neck pain was statistically same in both males and females, i.e.  $p\text{-value} > 0.05$ . The average experience of the subjects was  $3.18 \pm 1.02$  years. Association between the concepts possible cause of neck pain versus working hours showed  $p = 0.014$ . Association between idea about appropriate posture versus neck pain has  $p = 0.001$ . In association, awareness of proper workstation setting versus neck pain found  $p\text{-value} = 0.014$ . Moreover, statistically speaking, physical activities

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had no influence on neck pain in this study, i.e.  $p$ -value  $> 0.05$ .

**Conclusion:** Neck pain in computer users is due to overwhelming of work load, lack of proper training, less awareness about the work setting and posture. Physical activities have no influence on neck pain in prolonged computer users.

**Keywords:** Occupational physical disorders, postural disorders, Physical Therapy.

## Introduction

Neck pain is one of the most prevalent Musculoskeletal disorders (MSDs) in all working age and a leading source of disability and health care utilization among adults.<sup>1,2</sup> The prevalence of neck pain in the general population is significant. The United States National Center for Health Statistics reported that in 2004, 14.8% of surveyed adults aged 18 and older experienced neck pain within the past 3 months.<sup>3</sup> Previous studies have reported that 54% of the population has experienced neck pain within the last 6 months, causing disability in 5%.<sup>4</sup> Each year between 14.6% and 18.0% of adults develop a new episode of neck pain, which causes a new episode of disability in 600 / 100,000 adults annually.<sup>5-7</sup>

The main two factors for neck pain are:

**Age:** Neck pain is often affected by the wear-and-tear variety of arthritis (osteoarthritis), which becomes more common with age.<sup>8</sup>

**Occupation:** Risk of neck pain may be higher if job requires neck to be held in one position for prolonged periods of time. Examples include driving and over computer work.<sup>8</sup> A total of 56.2% even mentioned that their complaints started during the excessive computer usage. A total of 10.2% reported sick leave due to neck complaints. The work place and equipment were adapted in 24% of the patients due to neck pain. Work time was changed due to the same reason.<sup>9</sup>

In another study analyses of the association between neck pain and computer related physical factors, revealed that neck pain was significantly associated with often holding the neck in a forward bent posture for a prolonged time, various short periods of movements with the neck, often working in the same position for a prolonged time, often making the same movements per minute, often sitting for a prolonged time, dry air and temperature fluctuation, and computer working time.<sup>9</sup>

In Pakistan not a single study has been found on this topic. This study would be of great importance and informative for the people and to the health care system of the country. It will certainly help them to work in an appropriate posture and minimize their neck pain. The neck problems can be minimized, which will increase the daily attendance of the workers, so this study will contribute in growing economy of the country. With the study people will understand the importance of good posture. For proper guidance they will consult their physical therapist. By this mean general public health will be improved.

## Subjects and Methods

**Study Design:** The cross sectional survey was conducted.

**Setting and duration:** This study was conducted at Lahore Rawalpindi and Karachi. The institutions targeted were banks, call centers, Information Technology, Telecom Industry and ISPs during July 2009 to December 2009.

**Sample size:** A sample of 122 was analyzed.

**Sampling Technique:** It was a purposive sampling.

**Sample Selection Criteria:** Inclusion and exclusion criteria were used to include only those participants who were using computer for 8 or more hours in office settings. Both genders between the ages of 20 to 50 years were taken.

**Data Collection Methods:** The subjects responded to an e-questionnaire (close ended), a written consent was also obtained.

**Statistical Analysis:** Statistical analysis was carried out using SPSS version 15. The qualitative data is given in form of frequency and percentages. Mean  $\pm$  S.D was used for quantitative data. Chi-square test was used to see any significance association in neck pain and possible related factors. P-value less than or equal to 0.05 was taken as significant.

## Results

The mean age of the patients was  $29.74 \pm 6.30$  years. In this study there were 99 (81.8%) males and 23

(18.9%) females. Among all subjects, 102 (83.6%) subjects had neck pain. Pain was mild in 62 (50.8%), was moderate in 35 (28.7%) and was severe in 5 (4.1%) of the subjects. The pain was due to constant computer usage in 85 (69.7%) subjects. The neck pain was statistically same in both males and females, i.e.  $p$ -value  $> 0.05$ . The average experience of the subjects was  $3.18 \pm 1.02$  years. The mean working hours of the computer was  $9.42 \pm 1.45$  hours. Different age groups, job experience and working hours did not have any influence on neck pain, i.e.  $p$ -value  $> 0.05$ . Awareness of proper working station was told by only 55 (45.1%) subjects. Neck pain was statistically significant in those who had lack of awareness of proper working station, i.e.  $p$ -value  $< 0.05$ . Fourteen (11.5%) subjects having neck pain needed medical assistance and 12 (9.8%) had very few times the medical assistance. There were 73 (79.9%) people who got off due to neck pain possibly 1 – 4 days. There were cumulatively 33 (27%) subjects who thought to quit computer work, and it was statistically significant in subjects having neck pain. Physical activity were also noted and 58

**Table 1:** Descriptive statistics of age, experience and duration of working hours.

		Frequency	Percent
Age (years)	20 – 29	67	54.9
	30 – 39	46	37.7
	40 – 49	9	7.4
	Mean $\pm$ S.D	$29.74 \pm 6.30$ years	
Job Experience (years)	1 – 2	32	26.2
	3 – 4	38	31.1
	More than 5 years	52	42.6
	Mean $\pm$ S.D	$3.18 \pm 1.02$ years	
Working Hours (hours)	8	55	45.1
	10	47	38.5
	12	20	16.4
	Mean $\pm$ S.D	$9.42 \pm 1.45$	

**Table 2:** Profile of Study variables.

		Frequency	Percent
Gender	Male	99	81.1
	Female	23	18.9
Neck pain	Yes	102	83.6
Pain Intensity	Mild	62	50.8
	Moderate	35	28.7
	Severe	5	4.1
Possible Cause of Pain	Constant computer use in bad posture	85	69.7
	Work load	37	30.3
Idea of Appropriate Posture	Yes	40	32.8
Awareness of Proper WorkStation Settings	Yes	55	45.1
Medical assistance need	Yes	14	11.5
	Very few times	12	9.8
Days get off due to neck pain	1 – 2 days	70	57.4
	3 – 4 days	3	2.5
	5 or more days	5	4.1
Ever think to quit computer work	Yes	11	9.0
	Very few times	22	18.0
Physical Activity	1 – 2 hours	58	47.5

	3 – 5 hours	37	30.3
	More than 5 hours	19	15.6

(47.5%) people had 1 – 2 hours, 37 (30.3%) had 3 – 5 hours and 19 (15.6%) people had more than 5 hours of physical activity. Statistically physical activities had no influence on neck pain in this study, i.e.  $p$ -value  $> 0.05$ .

## Discussion

It has been found that prolonged static posture is a major risk factor in computer users.<sup>10</sup> Most of literature identified public health aspects of neck pain as associated with computer use. There are many retrospective types of research that support that frequent computer using is associated with neck pain.<sup>11</sup> In the current study of 122 subjects with mean age  $29.74 \pm 6.30$  years. There were 99 (81.8%) males and 23 (18.9%) females. The provenance of neck pain in heavy computer users was 83.6%. The identified pain was due to constant computer usage in 85 (69.7%) subjects.

Poor positioning can also cause neck pain.<sup>12</sup> A study conducted in Hong Kong determined the relationship between individual factors; job nature, psychosocial factors, and neck pain were also analyzed. There was a significant association between head posture during computer processing and neck pain ( $p = 0.02$ ). Among those with neck pain during computer processing, 60.5% had a forward head posture.<sup>13</sup> One study determined differences between computer workers with varying levels of neck pain in terms of work stressors.<sup>14</sup> Workstation setup and worker postures contribute to upper – extremity and neck symptoms among computer users.<sup>15</sup> One study was carried out on 103 subjects found working posture was risk factors for neck pain ( $p < 0.05$ ).<sup>16</sup> According to another study common causes of pain and disability in the neck and shoulder region include poor postural habits at work.<sup>17</sup>

In the present study lack of awareness of proper working station and poor posture was also a significant contribution in neck pain i.e.  $p$ -value  $< 0.05$ , which is similar findings to the above cited literature. Another study demonstrates that prolonged sitting is also associated with a high prevalence of neck and shoulder pain in girls, and neck or occipital pain in boys. Neck or occipital pain and shoulder pain are very common symptoms among adolescents, and both prolonged sitting and a high level of physical activity seem to be related to them.<sup>18</sup> We also found similar findings that the mean working hours of the computer was  $9.42 \pm 1.45$  hours.

Previous studies also found that workers who sat for more than 95% of the working time the risk of neck pain was twice as high as for worker who hardly ever worked in a sitting position. The risk for neck pain increases with the time spent working in a sitting position, suggesting a clear relation between sitting posture and neck pain. Previous studies reported a relation between sitting for more than 5 hours a day and self reported neck pain. Remaining seated for long periods, usually accompanied by curvature of the spine, increases pressure on vertebral discs, ligaments, and muscles. In our study the working hours are comparable to these findings.<sup>8,9</sup>

The combination of high job strain and high perceived muscular tension is another associated factor of developing neck pain than the combination of high physical exposure and high perceived muscular tension. There was an indication of an excess risk due to interaction between high physical exposure and high job strain.<sup>19</sup> Risk factors associated with neck pain in workers also includes age, previous musculoskeletal pain, high quantitative job demands, low social support at work, job insecurity, low physical capacity, poor computer workstation design and work posture, sedentary work position, repetitive work and precision work.<sup>20</sup> But in this study age, gender, working experience and physical activities have no influence on neck pain. This is may be due to the restricted sample size, heavy gender variation, constant working experience and poor response of the subjects regarding their physical activities.<sup>20</sup>

Hence it is suggested that the workplace should be planned for typing from known facts related to anthropometric dimension of the users and use of proper furniture in order to obtain a concordant set among furniture and user providing comfort and avoiding health problems.<sup>35</sup>

## Conclusion

Neck pain in computer users is due to devastating work load, lack of proper trainings, less awareness about the work setting and posture. Physical activities have no influence on neck pain in prolonged computer users. So, keeping in mind the proper guidelines of proper posture neck pain can be minimized by the people who work on the computers for longer period of time.

## References

1. Côté P, Cassidy JD, Carroll L. The Saskatchewan Health and Back Pain Survey. The prevalence of neck pain and related disability in Saskatchewan adults. *Spine* 1988; 23 (15): 1689-98.
2. Cassidy JD, Carroll L. The treatment of neck and low back pain: who seeks care? Who goes where? *Med Care* 2001; 39 (9): 956-67.
3. Borghouts JA, Koes BW, Vondeling H. Cost-of-illness of neck pain in the Netherlands in 1996. *Pain* 1999; 80: 629-36.
4. Cote P, Cassidy J, Carroll L. The factors associated with neck pain and its related disability in the Saskatchewan population. *Spine* 2000; 25: 1109-17.
5. Kristman V, Côté P, Cassidy JD, Carroll LJ. The annual incidence and course of neck pain in the general population: a population – based cohort study. *Pain* 2004; 112 (3): 267-73.
6. Croft PR, Lewis M, Papageorgiou AC, et al. Risk factors for neck pain: A longitudinal study in the general population. *Pain* 2001; 93 (3): 317-25.
7. Picavet HS, Schouten JS. Musculoskeletal pain in the Netherlands: prevalence's, consequences and risk groups, the DMC (3) – study. *Pain* 2003; 102 (1-2): 167-78.
8. Barnsley L, Lord SM, Wallis BJ, Bogduk N. Lack of effect of intra-articular corticosteroids for chronic pain in the cervical zygapophyseal Joints. *New Eng J Med* 1994; 330: 10447-50.
9. Donelson R, Silva G, Murphy K. Centralization phenomenon. Its usefulness in evaluating and treating referred pain. *Spine* 1990; 15: 211-3.
10. Szeto GP, Straker LM, O'Sullivan PB. A comparison of symptomatic and asymptomatic office workers performing monotonous keyboard work – 2: neck and shoulder kinematics. *Man Ther*. Nov 2005; 10 (4): 281-91.
11. Green, Bart N. A literature review of neck pain associated with computer use: public health implications. *Journal of the Canadian Chiropractic Association* 2008; 52 (3): 161-7.
12. Ian W, Wilson I. A pain in the neck. *Australian Cyclist* 2008; 33 (2): 58-62.
13. Chiu TT, Ku W, Lee WY, Sum MH, Wan WK, Wong MP, et al. Study on the Prevalence of and Risk Factors for Neck Pain Among University Academic Staff in Hong Kong. *Journal of Occupational Rehabilitation* 2002; 12 (2): 77-91.
14. Swan PD, Spitler DL, Todd MK, Maupin JL, Lewis CL, Darragh PM. Effects of posture on upper and lower limb peripheral resistance following submaximal cycling. *Arch Phys Med Rehabil* 1989; 70 (9): 678-80.
15. Andersen JH, Harhoff M, Grimstrup S, Vilstrup I, Lassen CF, Brandt LP, et al. Computer mouse use predicts acute pain but not prolonged or chronic pain in the neck and shoulder. *BMJ* 2007; 1-22. Online available from; <http://oem.bmj.com/content/early/2007/08/06/oem.2007.033506.full.pdf>
16. Fabrizio P. Ergonomic intervention in the treatment of a patient with upper extremity and neck pain. *Phys Ther*. 2009 Apr; 89 (4): 351-60.
17. Hill J, Lewis M, Mills P, Kielty C. Pulsed short-wave diathermy effects on human fibroblast proliferation. *Arch Phys Med Rehabil* 2002; 83: 832-6.
18. Hoving JL, Koes BW, de Vet HC. Manual therapy, physical therapy, or continued care by a general practitioner for patients with neck pain: A randomized controlled trial. *Ann Intern Med* 2002; 136: 713-22.
19. Bronfort G, Evans R, Nelson B, Aker PD, Goldsmith CH, Vernon H. A randomized controlled trial of exercise and spinal manipulation for patients with chronic neck pain. *Spine* 2001; 26: 788-97.
20. Cote P, vander VG, Cassidy JD, Carroll LJ, Hogg-Johnson S, Holm LW, et al. The burden and determinants of neck pain in workers: results of the Bone and Joint Decade 2000 – 2010 Task Force on Neck Pain and Its Associated Disorders. *Spine* 2008; 33 (4 Suppl): S60-74.
21. Maciel MH, Marziale MH. Postural problems and problems of equipment: an ergonomic study of users of microcomputers in a nursing school. *Rev Esc Enferm USP* 1997; 31 (3): 368-86.