

# Prevalence of Various Work Related Musculoskeletal Disorders in Software Professionals

Supriya Vinod\*, B. Arun\*\*

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## Abstract

20 million people are experiencing various work related musculoskeletal disorders (WRMSD) around the world. These are group of painful disorders of muscles, tendons, and nerves, which occurs as a result of frequent or repetitive activities with awkward postures. Software professionals who usually adopt an awkward posture are more prone to develop WRMSD. Evidence suggested that long and extended working hours and rate of disorders are significantly correlated. This study aims to identify the prevalence of various WRMSD in software professionals who works in an IT industry. 400 software professionals were selected through convenient sampling method with descriptive study design. Nordic musculoskeletal questionnaire was given to all the participants. Data was evaluated and analyzed using SPSS software. The result findings shows that low back pain ranks first among the overall WRMSD and spine related problems are most common than peripheral extremities.

**Key words:** Software professional, Work related musculoskeletal disorders, Low back pain, Nordic musculoskeletal questionnaire.

## Introduction

Work related musculoskeletal disorders (WRMSD) are very common in employees working on computers and peripheral devices are a major concern in the recent years [1]. Computers are embodiment of modern life which reaches every facet of the society. 25% of computer users suffer from computer related injuries and this is becoming epidemic [2]. Poor workstation design and Poor ergonomics have been associated with an increased risk of developing these disorders. In India, 76% of computer professionals reported various musculoskeletal disorders which were shown by various epidemiological studies[3, 4].

WRMSD are influenced by various factors which include, poor sitting posture, unsuitable seating (chair), and inappropriate use of keyboard or mouse, which was used for a long time can lead to chronic disabilities like muscle, tendon injuries or stiffness in the muscles [5,6,7]. WRMSD which result from either a single instantaneous exposure or multiple or prolonged exposure to the work environment leading to death, lost work time, medical treatments, work restriction, or transfer to another job[6,7]. Various nomenclature have been used for the WRMSD like Repetitive Stress Injury (RSI), Occupational Overuse Syndrome (OOS), Occupational Cervicobrachial Disorder (OCD), and Cumulative Trauma Disorder (CTD) [1].

Musculoskeletal complaints in neck and back are very common in computer professionals. [8, 9]. Prevalence of these musculoskeletal disorders during recent years leads to sickness absenteeism. Physical factors, psychological factors and organizational factors as well as individual factors are all thought to affect the workers musculoskeletal health. Human body was designed to adapt various physical

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**Author's Affiliation:** \*Professor, Mother Theresa Post Graduate and Research Institute of Health Sciences, Puducherry, India. \*\*Professor, K.G.College of Physiotherapy, K.G.Hospital, Coimbatore, India.

**Reprint request:** B. Arun, 14/72-D, Chinappa Street, Kaikolan thottam, Erode dt, Tamil Nadu- 638001

E-mail: [barunmpt@gmail.com](mailto:barunmpt@gmail.com)

stresses; repeated stress and sitting in awkward posture potentially end up with various musculoskeletal disorders [10, 11].

Tendons and muscles are inflamed and micro-tear occurs as a result of persisted activity during the work tasks, prolonged duration of sitting in front of computers. Adopting certain static postures with repeated movements, awkward postures and vibrations tend to cause various musculoskeletal injuries [12,13,14]. Fewer studies found on evaluation of prevalence of work related musculoskeletal disorders in software professionals and these studies are not extensively studied. The purpose of the study is to find out the prevalence of various musculoskeletal disorders in software professionals.

### Methodology

Descriptive study design with 400 software professionals was selected by convenient sampling method. The study was carried out from May 2008 to October 2008, for six months duration. Samples included in the study are software professionals with more than 2 years of work experience, age group 25–40 years, both genders were included, professionals using desktop computer for their work, persons who currently engage in projects and persons who work more than 40 hours in computer in a week. Radiating pain in the neck or back, Fibromyalgia, any recent fractures, congenital abnormalities, any recent trauma were excluded from the study. Once the subjects selected they all provided with Nordic musculoskeletal questionnaire and the questions were filled up by them. The demographic data was developed upon to identify the personal features about the professionals which were validated by 2 senior physiotherapists and senior ergonomist. The survey questionnaire was distributed to every individual subject. 5–10 subjects were selected and the questionnaire was given to them and advised to fill up. Before the session a brief introduction about the study was given to the participants. 30–45 minutes was given to fill up the questions and checked whether all the questions were filled up by the participants. Once the questionnaires were collected the employees were thanked for their active participation. Consent was obtained from the participants orally before recruiting the participants for the study as well as before filling up of the questionnaire. The study was approved by institutional ethical committee and no risk to the participants who involved.

### Result & Discussion

Descriptive statistics was used to analyse the data which was collected from the participants. The analysis was done using SPSS 19.1. Analysis of the demographic representations is mentioned in the table 1. Age group of the participants varies from 25 years to 40 years. 26% of participants with age group of 37–40 yrs, 21% of participants with age group of 31–33 yrs. 19% of participants with age group of 25–27 & 28–30 yrs and 15% participants with age group of 34–36 yrs. The mean age of participant is  $32.5 \pm 3.97$  with standard deviation of 4.584.

The eating pattern of the participants was analyzed, 41% are vegetarians and 59% are non vegetarians. Timing for the food showed that 45% consume food on time (e.g. lunch at 1.30–2.30 pm), they consume within this one hour of time, whereas 55% consume food on irregular timings (e.g. lunch was between 1.30–5.30) there is no proper timing for the lunch.

Ergonomic knowledge was questioned and 45% has knew about the computer ergonomics, where as 55% doesn't know about the ergonomics for computer users. Those who have knowledge were not practicing the ergonomics, some of the participants gained knowledge from their physician or physiotherapist.

**Table 1:** Basic information about the study participants

S.N	Characteristics	Percentage (%)
1	Age	
	25–27	28
	34–37	29
	38–41	21
2	42–45	22
	Food habit	
3	Vegetarian	41
	Non Vegetarian	59
4	Previous knowledge on ergonomics	
	Yes	45
5	No	55
	Management	
	Medical	35
	Physiotherapy	20
	Massage	12
	Ayurveda	12
	Others	12
No treatment	9	

This study also describes the management strategies adopted by the participants with various musculoskeletal problems, 35% of participants take medications prescribed by the local physician or from the pharmacy (over the counter), 20% take treatment from physiotherapist, 12% underwent ayurveda and Massage (Traditional massage) or other treatment which includes siddha, unani and pain patches from pharmacy and 9% did not take any treatment.

Table 2 shows the ratio of male / female subjects who participated in the study, there are more number of male participants when compared to the females in this study which help us to conclude that the pain is not following menstrual complaints or menstrual related problems.

**Table 2:** Sex differences of the participants

Age group (years)	25-27	28-30	31-33	34-36	37-40	Total
Male	43	50	53	37	66	249
Female	33	28	29	24	37	151
Total	76	78	82	61	103	400

Table 3 shows the analyses of the work related musculoskeletal disorders based on the Nordic questionnaire and result shows spinal pain ranks first in all the musculoskeletal disorders. 31 % of participants complained of low back pain around (123 participants), 18% of participants complained of neck pain, 13% complained of shoulder pain, 11% on upper back pain, 9% on wrist pain, 5% on elbow, 4% on knee and Hip, and 5% on other areas like Leg pain, calf pain etc.

Mismatch between the requirements of the job and individual capacity which leads to WRMSD. The mismatch is due to inappropriate work set up which

**Table 3:** Musculoskeletal disorders in software professionals

Musculoskeletal problems	No participants with injury	Percentage of injury
Low back pain	123	31
Neck pain	71	18
Shoulder pain	52	13
Upper thoracic pain	46	11
Wrist pain	38	9
Elbow pain	19	5
Hip	18	4
Knee	14	4
Others	19	5
Total	400	100

includes the tool, design, working platform and poor work station [15]. Working in computer stations leads to a set of peculiar characteristics like the workers to stay in a static posture for extended period, repetitive activity, poor posture, inappropriate seat and sedentary. Workers often complain of various musculoskeletal injuries and these injuries are owing to inactivity and static postures [16]. Back pain is the most common complaint which occurs due to sprains and strains at the back as consequence of static or an awkward posture.

Various studies have been done on computer professionals which show that nearly 2/3rd of the employees suffering with various computer related health problems [17]. Some studies showed that the prevalence of pain as complained by workers includes back pain as 57% and neck as 43% which is similar to this study, that spinal pain was more prevalent than the peripheral regions [18]. Studies have also shown that the IT professionals were exposed to such different risk factors and therefore, it is expected that they are prone to develop work related musculoskeletal discomfort [19].

Musculoskeletal pain is one of the most common problems in IT workers. Studies done by Shikdar and Alkindi found that the major WRMSD in computer users includes back pain as 43% and neck pain as

30% [20]. Studies done in Nigeria has shown that low back pain is highly prevalent in computer users, about 74% suffer with low back pain, similar study in Netherlands shows 44% suffer with low back pain. The back pain also ranks first in other occupations like child care workers, manual labors etc[21]. Study done with the IT professionals also showed a high prevalence of musculoskeletal co-morbidities [22, 23].

There are few hypotheses for the occurrence of low back pain in the software professionals which includes: (a) Sitting for longer duration especially in awkward postures, (b) use of wrong body mechanics during the working hours, (c) poor knowledge on work station arrangements, (d) poor knowledge on working atmosphere (Unaware about the seating, chair design, chair height, monitor positioning etc.), (e) poor dietary habits, (f) life style modification, (g) stress at work, and (h) shift work (affects sleep style, & sleep cycle).

Limitations in the study are convenient selection of samples which may pretend the individuals focus on their injury. Study does not focus on any treatment to the participants. The study was done within limited geographical location thereby decreasing generalizability, large scale study is needed to make generalizability of the findings. Large group and variety of working populations should be involved to get more confident results.

## Conclusion

The findings show that low back pain is the common work related musculoskeletal disorder in software professionals. Ergonomic consultation or work station examination is recommended to all software companies to prevent various computer related injuries and thereby make the employer work efficiently and reduce absenteeism in the work place. This study provides knowledge to the fellow healthcare team that treatment in the clinic may not be sufficient enough to reduce the pain or disorders in addition modification of work station should be considered to prevent recurrence of injury.

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