

Review Article

Prevalence of work-related musculoskeletal disorders among IT professionals in India-a literature review

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ABSTRACT

Musculoskeletal disorders are typically characterised by discomfort (often persistent) and restrictions in mobility, dexterity and functional ability, reducing people's capability to work and participate in social roles with associated influences on psychological welfare, and at a wider level influence on the prosperity of communities Information technology- has played a vital role in transforming India from a slow administrative economy into a land of innovational entrepreneurs. The aim of this review is to, critically analyze the literature and report on the prevalence of work-related musculoskeletal disorders in information technology professionals. The review focused on computers users and software professionals. An extensive literature search was undertaken using google scholar and PubMed databases for last 10 years from 2011 to 2020. Further Following a thorough search of the databases, a total of 25 articles were evaluated. A number of articles reported a high prevalence of MSD, generally various studies have been done on information technology professionals and related to the work of IT professionals and studies on various risk factors also have been done in different states of India. 17 articles had selected for the study purpose in which prevalence study had selected for the review. The prevalence among the IT professionals is not uniform; however, Software engineers and computer operators appear to be more prone to neck, shoulder and back pain.

Keywords: Musculoskeletal Pain, Work related musculoskeletal disorder, Computer operator's health related problem

INTRODUCTION

Musculoskeletal disorders are characterized by persistent depression and restrictions in mobility, dexterity and functional ability which reduce people's capability to work and participate in social roles leading to associated influences on psychological welfare, and at a wider level influence on the prosperity of communities. The most common and restricting musculoskeletal conditions are osteoarthritis, back and neck pain, fractures associated with bone fragility, injuries and systemic inflammatory conditions such as Carpal Tunnel Syndrome, Tendonitis, Ligament Sprain Tension Neck Syndrome, Thoracic Outlet Compression Rotator Cuff Tendonitis,

Epicondylitis, Radial Tunnel Syndrome, Digital Neuritis, DeQuervain's Syndrome.¹

Work related musculoskeletal disorders is defined as widespread range of inflammatory and degenerative disease conditions which result in pain and functional loss disturbing the body part like especially upper extremity for example shoulder, neck and hands this are commonly affected. 93% of the participants had not less than one computer related complications. which is the commonest musculoskeletal symptoms reported are pain is (55%), and stiffness is (14.8%) and the common body sites which is affected are mentioned that neck is (44%), low back is (30.5%), wrist/hand are (19%) and shoulders reported as (12.5%).²

Work-related physical risk factors are poor posture, psycho-social factors and Occupational risk factors. The identification of applicable risk factors is vital importance in preventing the reappearance of the health issue in the numerous categories of workers for example industrial IT professional workers and their commonest risk factor is low back pain due to prolonged sitting this will be progress.⁴

Information technology- has played a vital role in transforming India from a slow administrative economy into a land of innovational entrepreneurs. The IT sector is generating about millions of employments in India. In the current modern world, India is one of the biggest IT capitals and almost all the major IT players in the world are present in the country. Many scientific researchers have acknowledged physical, psychosocial, organizational, occupational and individual causes as “risk factors” for the development of Musculo skeletal disorders.²

Carpel tunnel syndrome is the maximum common problem in work related musculoskeletal disorder in information technology professionals. carpal tunnel syndrome is impingement or irritation of the median nerve surrounded by the carpal tunnel at the base of your hand. When the median nerve develops irritation in this region due to pressure, swelling, and/or stretching, indications will occur.²

Computers had established an essential part of modern life, which is being used in every aspect of life and the technological development had convoyed in a different types of occupational health related problems and difficulties. The condition is characterized by discomfort and persistent pain, numbness, restricted movement and weakness in or around muscles and tendons of the back, neck, shoulders, elbows, wrists, hands, or fingers.⁹

METHODS

For this review, the term WRMSDS is used to refer to a host of work related musculoskeletal disorders (e.g., carpal tunnel syndrome, epicondylitis, tendonitis and other conditions related to overuse). The use of an aggregate term is based on the hypothesis that the individual conditions share several common etiologic factors.

Inclusion and exclusion criteria

This review includes cross-sectional surveys, analytical studies and cohort studies whose primary outcome was the prevalence of WRMSDS among information technology professionals in India. To minimize bias, I excluded case series, follow-up studies and interventional studies among information professionals. Case studies and literature reviews published in peer reviewed English journals were considered for inclusion, with letters to the Editor and conference proceedings excluded. Participants

in the studies had to have been listed as information technology professionals. No restrictions were placed on age, gender, race or socioeconomic status. Only articles that documented the prevalence of MSD and its risk factors were considered. Articles not written in English were excluded from the literature review.

Searching techniques

The following databases were searched for the period 2011 to 2020. Search engine google scholar and PubMed; all searches are restricted to English-language articles. The search terms include “work,” “information technology” “professionals,” “pain,” “health problems,” “discomfort,” “musculoskeletal diseases” and “musculoskeletal system.” The terms “pain,” “musculoskeletal diseases” and “musculoskeletal system” are exploded according to accepted search techniques. I searched the computer professionals Information, software engineer using the key words “performing” “survey” and “prevalence and incidence. Empirical research, case studies and literature reviews. An extensive literature search was undertaken in PubMed and google scholar databases during 2011. Keywords used for the search were; musculoskeletal disorders, musculoskeletal discomfort, back pain, information technology professionals and software professionals.

Study selection

For all research articles identified during the search, the titles, keywords and abstracts, where available, were considered for possible relevance to this literature review. Full text copies were obtained for analysis and data extraction for all articles that met the inclusion criteria.

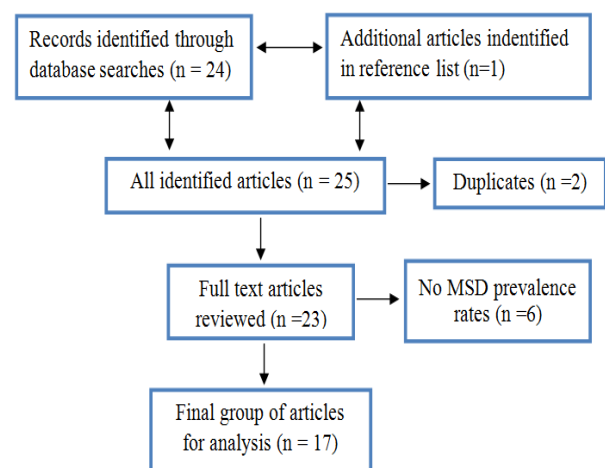


Figure 1: Flow chart of the literature search. The figure illustrates the details of the strategy.

Data extraction

Description of the 25 studies located during this review had either measured the prevalence of MSD or reported

on possible risk factors for MSD among information technology professionals. All studies had been published in English. Figure 1 provides a flowchart of the literature search methodology. Indian studies on MSD among information technology professionals have reported a high prevalence of MSD as indicated in (Table 1). A

number of articles reported a high prevalence of MSD, generally various studies have been done on information technology professionals and related to the work of IT professionals and studies on various risk factors also have been done in different states of India. 17 articles had been selected for the study purpose.

Table 1: Indian studies reporting the prevalence of MSD among information technology professionals.

Author	Year	State	Response rate (%)	Outcome measures	Sample Size	Prevalence Outcome, (%) of body site
Moom et al	2015; (1)	Punjab	71%	Self-designed questionnaire and ANOVA Scale.	(n=60)	Low back pain (40.4%, upper back (39.5), Neck (38.6%), hand/wrist (36.8%) and shoulder (15.2%)
Hameed	2013 Jul;2(7)	Tamilnadu	Male 40.5% & female 24.5%	Cornell musculoskeletal discomfort questionnaire	(n=400) and male is (162) and female (98)	More than 50% of them reported low back pain
Bansal et al	2013;2(2):	Gujarat, surat city	For female 52.5% & for male 47.5%	Interview questions were done.	(n=290)	Female shows higher prevalence of neck pain than boys (64 % Vs 53%). Pain over finger, shoulder, 58% and 56%
Srivastava et al	2012;1	Kaanchipuram TamilNadu	89%	Pre-tested semi-structured questionnaire.	(n=200)	The proportion of visual, musculoskeletal, and stress was found to be 67%, 63%, and 44%,
Govindarajan et al	16-Oct	Chennai, Tamilnadu	69%	Nordic questionnaire.	(n=500)	Body region - neck (29.56%), lower back (22.89%), shoulders (12.17%) and knees (9.56%)
Karmaka et al	2017	Kolkata, West Bengal	NR	Structured knowledge questionnaire	(n=100)	Mild problem, 28% had moderate problem and only 3% had severe problem.
Vijay	2013; 2(2):	Tamilnadu, India	59%	Nordic self-reported questionnaire	(n=300)	Neck pain problems reported where 30% of the IT professionals.
Sasidharan et al	2011	Different IT companies in India	95%	Short form workstyle questionnaire and pain questionnaire	(n=125)	22% high risk of an adverse workstyle. 63% of participants pain symptoms
Kumar et al	2018	Kolkata (west bengal)	44%	Questionnaie	(n=244)	(1.4-5.1) male having more symptoms OR=7.2 (3.6-14.4), job duration more than 2 years had more morbidity OR=2.2 (1.1-4.4),
Mohan et al	2019;81	Karnataka (Bangalore)	87%	Screening Questionnaire and MUEQ for CANS were used.	(n=206)	91 men (50.27%) and 90 women (49.72%) with mean ages of 30.12±5.23 years and 30.69±6.67 years.

Continued.

Author	Year	State	Response rate (%)	Outcome measures	Sample Size	Prevalence Outcome, (%) of body site
Murthy	2019; 10(8)	Banglore city	Nr	Standardized Nordic Questionnaire	6 months of work experience 6 & 4 hours of using computer experience	89% musculo-skeletal disorders, computer vision syndrome 86.5%
Mohanty	2017; 15(6)	Bhubaneswar Delhi, Mumbai, Varanasi, Lucknow	71.50%	Self-administered Questionnaire	(n=715)	The body region most affected was the lower back pain (59.86 %) d by neck pain (47.13%) upper back (46.43%) shoulder (46.43%), wrist (38.04) % hip/ buttock (37.90%), knee(37.62%) and lower leg (34.82%).
Mehta et al	-	Banglore India	-	Jcq, the swat questionnaire pain/discomfort scales.	(n=77)	Back pain (n=14) and shoulder/neck pain (n=5).
Ajeesh et al	2011	Bangalore, India	68%	Self-reported checklists.	(n=200)	136 of participants reported pain and discomfort lower back and neck pain was more followed by wrist, upper back and shoulder pain.
Sasikumar et al	2018	Trivandrum, India	81.25%	Nordic musculo-skeletal questionnaire RU LA scale MSD SCORE	(n=66)	Risk of musculo-skeletal Disorders -(81.25%)
Prasad et al	2014	Nagpur district central of India	71.90%	Nordic questionnaire	(n=719)	Body ache (59%) and Visual symptoms (52%) Backache (34%) and Headache 16%) were very common.
Srilatha et al	2011	Karnataka, India	53.60%	Self-reported Questionnaire	(n=783)	Wrist and hand are prevalence rate women vs men (69% vs 53%).

PREVALENCE OF MSD

Upper extremity and back pain problems

Four similar study were done on upper extremity, low back and upper back problems. Neck (38.6%), hand/wrist (36.8%) and shoulder (15.2%), (40.4%) is of lower back pain and upper back pain is reported (39.5), Neck pain is (38.6%) while hand and wrist are reported (36.8%) and also shoulder reported (15.2%).¹⁰ (76%) in computer operators. lower back pain which is highest prevalence rate with (59.86 %) and followed by Neck pain is (47.13%), Upper back and shoulder is reported as same prevalence rate with (46.6%), (38.04 in wrist hip and buttock prevalence rate is mentioned (37.90%), Knee are

slightly reported higher than both lower leg (37.62%) lower leg had been reported (34.82%) as prevalence rate. The lower back pain (59.86%) followed by Neck pain (47.13%), Upper back (46.43%) Shoulder (46.43%), Wrist (38.04%) Hip/Buttock (37.90%), Knee (37.62%) and lower leg (34.82%).¹⁸

Physiological and psycho-social problems

Three similar study were done on psycho-social and physiological problems: 89% of computer professionals are having computer-related visual problems is 67%, musculoskeletal problems is 63%, stress 44% and other problems which is suffered while using computers are

Ocular discomfort, musculoskeletal disorders and psycho-social problems.^{9,11}

Body ache (59%) were very commonly seen and 83% health related problems for example visual symptoms (52%) are very commonly seen. backache had the prevalence rate of 34% in software professionals.¹²

Comparison study of MSD among female and male information technology professionals:

Two similar studies were done on female and male Information technology professionals. The MSD prevalence is high among female subjects, subjects working on computers for more hours per day and more number of days per week.¹³ Man is having lesser musculoskeletal symptoms as compared to women. (53% vs. 69%) Computer users between 21 to 30 years of age were more to report symptoms than those between 40 to 55 years (76% vs. 9%).²⁴

Psychological health problems/risk factors

Mild problem is having 49%. 28% had moderate problem and only 3% had severe problem Findings related to computer related psychological health hazards. Majority of the respondents (81%) had no anxiety, 7% had mild anxiety, 7% had moderate anxiety, 4% had severe anxiety and 1% had extremely severe anxiety. Majority of the respondents (82%) had no depression, 8% had mild depression, 8% had moderate depression and none had severe or extremely severe depression. Ninety percent had no stress, 5% had mild stress, 4% had moderate stress, 1% had severe stress and none had extremely stress.¹⁴

Outcome measures questionnaire

Four similar studies were reported using questionnaire to identify prevalence of MSD in body parts. In metropolitan cities of India, the selected IT Industries to capture the prevalence of self-reported musculoskeletal complaints they used Nordic musculoskeletal questionnaire to find out the musculoskeletal complaints the 59% of them had experienced some form of musculoskeletal health symptoms. In which Neck pain problems where 30% in the IT professionals.³

22% of participants have a high risk of an MSD among its participants with 89% have work related musculoskeletal disorders and this is found by using Standardized Nordic questionnaire. Work related problems had majority trouble in lower-back followed by neck, wrist and shoulder.¹⁵ and in Bangalore 58.6%. Neck complaints are in topped the list followed by shoulder, wrist, hand, elbow, upper arm, and lower arm complaints in the descending order man are having less prevalence rate of upper limb pain as compare to women.¹⁶

DISCUSSION

Overall, this review suggests that while MSD is most likely an under researched topic an under researched topic among Information technology professionals, software engineers and computer professionals represents a high risk occupation for MSD. The findings of this literature review have been drawn from 17 articles each of which had measured different musculoskeletal regions using different methods. As most studies had used self-developed questionnaires,^{2,3,18} or the Standardized Nordic Questionnaire.^{12,17,19} Other methods used included questionnaires such as the MUEQ and CANS.¹⁶ JCQ and SWAT questionnaire.⁷ Semi structured questionnaire demographic and workstyle questionnaire.^{3,11,17} Personal data questions was also interviewed for the selected participants in that age, gender, socioeconomic status and how much time they spend on computer and health related problems experienced while using computer.^{6,9,13} Cornell MSD discomfort.⁴ Structured knowledge questionnaire.¹⁴ ANNOVA scale used for work related MSD questionnaire 10 While questionnaires are an inexpensive and convenient mode of data collection, these can introduce to make up follow up difficult and to recall bias. The most prevalent body regions on which IT professionals reported MSD have been the back pain, neck pain, upper extremity pain and shoulder pain.^{2-4,6,7,9-11,13,18} Inbaraj et al had done study on 8 January 2019 on the commonest part of the body site CANS (complaint of arm, neck and shoulder) which get affected in IT professionals mostly this are the commonest complain which is reported by IT professionals. Number of studies has been carried out to specifically investigate back and neck pain.¹⁸

Physical factors

Three similar studies had been reported on physical factors: Prasad et.al reported The use of a computer had been significantly associated with neck pain and this may impact on IT professionals who spend considerable time on laptop and computers and on typing keyboard work.¹² Vijay A et al mentioned that Neck pain (30%) among IT professionals has been positively correlated with computer processing posture.² Parijat P et al that 34% experienced numbness/tingling sensation in their fingers loss of strength in hands.³

Psychosocial factors

Karmakar et al suggests that psychosocial factors have not perceived moderate stress level, anxiety level and depression. This study reported on psychosocial factors affecting on computer related health problems among computer professionals.¹⁴

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