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# Epidemiology of Low Back Pain among Information Technology Professionals Across India - A Systematic Review

**Vaibhavi Rajesh Kulkarni[1], Dr. Pradeep Borkar[2]**

[1,2] Department of Orthopaedic Physiotherapy,
Dr. APJ Abdul Kalam College of Physiotherapy, Pravara Institute of Medical Sciences,
Loni, Maharashtra, India.

Correspondent Author: Vaibhavi R. Kulkarni

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## ABSTRACT

**Purpose of study:** LBP has profound effects on well-being and is often cause of significant physical and psychological health impairments. It affects work performance, social responsibilities and is one of major cause of absenteeism at workplace. Use of computer substantially increased in working populations throughout the world. Studies have reported significant increase in prevalence of low back pain among IT professionals and its co-relation with faulty postures. Identifying epidemiology of low back pain will help therapist to plan prevention strategies for low back pain in IT professionals, hence study was aimed to study "Epidemiology of low back pain among IT professionals across India.'

**Methodology:** Systematic review was conducted from scientific electronic databases; PubMed, Embase, Medline, Google Scholar, Google Advance Search, Cochrane, Web of Science and critically analyzed entire relevant articles from February 2012 to February 2022 according to the nature of this study. Total articles search was 84, from which 9 were excluded on basis of duplicates. 38 were excluded as they were not meeting with inclusion criteria. 17 articles were selected for further methodological quality assessment on strobe scale. 10 out of 17 were included in qualitative synthesis.

**Results & Conclusion:** We found that in India near about 8% people lived with disability due to low back pain. Based on our analysis, most of the study stated high prevalence of low back pain among IT professionals. Prevalence was high in female and with increase in age. Low socioeconomic status, repetitive job, prolonged static posture, awkward posture, lack of job control, mental stress, working hours are some of the major risk factors found to be associated with LBP in IT professionals.

***Keywords:*** low back pain, IT professionals, Epidemiology, India.

## INTRODUCTION

LBP represents a major social and economic problem. The prevalence of acute and CLBP in adults doubled in the last decade and continues to increase dramatically in the aging population, affecting both men and women in all ethnic groups. LBP has a significant impact on functional capacity, as pain restricts occupational activities and is a major cause of absenteeism. Its economic burden is represented directly by the high costs of health care spending and indirectly by decreased productivity. These costs are expected to rise even more in the next few years. These costs are expected to rise even more in the next few years. The prevalence of back pain was, respectively, 64.8%, 19.8%, 69.5%, 40.6% and 36.2% in Bangladesh, India, Nepal, Pakistan and Sri Lanka. Lack of physical activity is cause to

high percentage lower back pain in all the above countries[1]. Globally, lower back pain affects more than 540 million people and the condition has doubled in the last 25 years. The prevalence of the condition is expected to continue to increase with an ageing and increasingly obese population[2].

LBP prevalence has been found to range from 6.2% to 92% with increase of prevalence with age and female preponderance. Low socioeconomic status, poor education, previous history of LBP, physical factors such as lifting heavy loads, repetitive job, prolonged static posture and awkward posture, psychosocial factors such as anxiety, depression, job dissatisfaction, lack of job control and mental stress, working hours and obesity have been found to be associated with LBP[2].

'Workstyle' is proposed as a mechanism by which ergonomic and psychosocial risk factors interact to affect the development, exacerbation and/or maintenance of upper limb pain and functional limitations. Use of computer substantially increased in working populations throughout the world as well as in India. 64% of Indian IT professionals reported symptoms of pain and discomfort in a recent study.

Globally, lower back pain affects more than 540 million people. It has profound effects on well-being and is often the cause of significant physical and psychological health impairments. It also affects work performance and social responsibilities, such as family life, and is increasingly a major factor in escalating health-care costs. It has a significant impact on functional capacity, as pain restricts occupational activities and is a major cause of absenteeism. Its economic burden is represented directly by the high costs of health care spending and indirectly by decreased productivity[5].

Previous research has shown that, The prevalence of Work-related Musculoskeletal Disorders (WMSD's) is increasing among Computer users throughout the world. A number of studies have suggested that prolonged sitting could be one of the major risk factor for the development of Low-Back Pain along with other risk factors like Low socioeconomic status, poor education, previous history of LBP, physical factors such as lifting heavy loads, repetitive job, prolonged static posture and awkward posture, psychosocial factors such as anxiety, depression, job dissatisfaction, lack of job control and mental stress, working hours and obesity have been found to be associated with LBP. Use of computer substantially increased in working populations throughout the world as well as in India.

Studies have reported significant increase in prevalence of low back pain among IT professionals and its co-relation with awkward postures and prolonged sitting. Hence it is imperative to study about the 'Epidemiology of low back pain among IT professionals across India.'

This study aims To Review epidemiology of low back pain among Information Technology professionals across India.

## MATERIALS & METHODS

Literature Search is gathered from the sources of information like

PubMed, Medline, Google Scholar, Cochrane, Web of Science. Studies which were addressing the epidemiology of low back pain among IT professionals across India were included in the study.

**Inclusion Criteria and Exclusion Criteria:** This review includes cross sectional surveys, analytical studies, cohort studies whose outcome was showing the prevalence of Low back pain among Information Technology professionals across India. Articles which have score greater than 15 on strobe scale were included. To minimize the bias I excluded case series, follow- up studies and interventional studies among Information technology professionals. Duplicate articles were also excluded.

**Searching Technique**: An extensive literature search was undertaken following databases for the period 2012 to 2022. Search engine google scholar and PubMed,

Embase, Medline,; all searches are restricted to English-language articles. The search terms include" work," "information technology" "professionals," "Low back pain," "health problems," discomfort," "musculoskeletal diseases" and "Musculo-skeletal system." "survey" and "prevalence and incidence. Empirical research, case studies and literature reviews. 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 were included.

**PRISMA 2020 FLOW CHART FOR SYSTEMATIC REVIEW:**

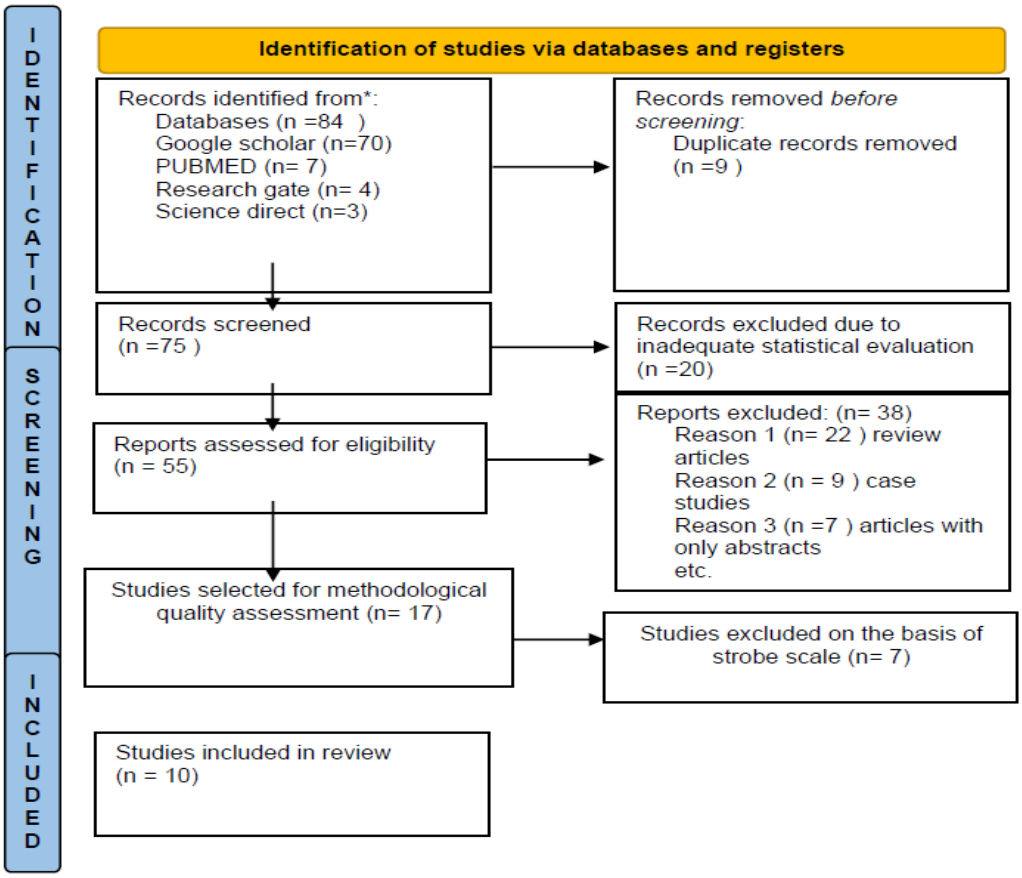



**Table 1: Quality assessment of articles on STROBE checklist**

| Sr no. | Study Title | Location | Study Design | STROBE Score |
|---|---|---|---|---|
| 1 | Work-related musculoskeletal health disorders among the information technology professionals in India: a prevalence study | Metropolitan cities, India | Cross-sectional study | 16 |
| 2 | A Co-relational study to identify prevalence of computer related health hazards and its relationship with selected factors among computer professionals of selected IT firms of Kolkata, West Bengal | West Bengal, India | Correlational-study | 17 |
| 3 | Computer related health problems among software professionals in Mumbai: A cross-sectional study | Mumbai, India | Cross- sectional study | 16 |
| 4 | A cross sectional study on work related musculoskeletal disorders among software professionals | Chennai, India | Cross- sectional | 17 |
| 5 | Duration of use of computer as risk factor for developing back pain among Indian office going women. | Delhi, India | Cross- sectional study | 18 |
| 6 | Do "Myths" of low back pain exist among young Indian college-going adults with a history of low back pain? A cross-sectional study | Punjab, India | Cross- sectional study | 19 |
| 7 | Prevalence and Impact of Low Back Pain in a Community- Based Population in Northern India. | North states, India | Cross- sectional study | 16 |

| ***Table no 1: continued…..*** | | | | |
|---|---|---|---|---|
| 8 | Work Related Low Back Pain Among The Information Technology Professionals In India – A Cross Sectional Study | Tamil Nadu, India | Cross-sectional study | 20 |
| 9 | Prevalence of Musculoskeletal Disorder among Computer Bank Office Employees in Punjab (India) | Punjab, India | Observational study | 21 |
| 10 | Risk Factors Responsible for Musculoskeletal Pain among Computer Operators | Odisha, India | Cross- sectional study | 19 |
| 11 | Associations between psychosocial risk factors and musculoskeletal disorders: application to the IT profession in India | Bangalore, India | Web -based survey | 20 |
| 12 | Prevalence of Neck Pain and Back Pain in Computer Users Working from Home during COVID-19 Pandemic: A Web-Based Survey | Ahmedabad, India | Observational study | 21 |
| 13 | Prevalence of low back pain among work from home its professionals during covid-19 pandemic in Anand city- a cross-sectional study | Punjab, India | Cross-sectional study | 18 |

## CHARACTERISTICS OF INDIAN STUDIES INCLUDED IN REVIEW:

| Sr.no | Author name and Study tittle | Name of journal and publication year | Sample size Gender and age group | Outcome Measure | Result/ Conclusion |
|---|---|---|---|---|---|
| 1. | Prevalence of Neck Pain and Back Pain in Computer Users Working from Home during COVID-19 Pandemic: A Web-Based Survey | International Journal of Health Sciences and Research Vol.11; Issue: 2; February 2021 | 129/ Both male and female: 18-65 | Pain- NDI questionnaire Disability- Oswestry pain and disability Questionnaire | 70.5% participants had pain or discomfort in body out of which 42.9% neck, upper back Pain, 36.3%- lower back and legs pain 16.5% -both regions. **Conclusion:** neck , upper and lower back pain is common MSD's in computer users during Pandemic. |
| 2. | Effect of Ergonomic and Workstyle Risk Factors on Work Related Musculoskeletal Disorders among IT Professionals in India | Work41: 2872-2875 DOI: 10.3233/WOR-2012-0536-2872 IOS Press:2012 | 200 | Self-reported questionnaire Workstyle assessment- Workstyle questionnaire | Most prevalent is lower back (20%), Upper back (16%) and shoulder (14%). they found positive association between workstyle score with musculoskeletal pain (r=0.85). **Conclusion:** both ergonomics and job stress management are effective. |
| 3. | Duration of use of computer as risk factor for developing back pain among Indian office going women. | Asian Journal of Medical Science, Volume-3: 2012 | 1066 Females: Age 20-60 yrs. | Low back pain – self reported questionnaire adopted from Nordic musculoskeletal questionnaire | Study indicated that back pain is present in as much as about 25.3% of the study population. For those who use the computer >6 hours daily, there was a statistically significant chance of developing back pain. |
| 4. | Do "Myths" of low back pain exist among young Indian college-going adults with a history of low back pain? A cross-sectional study | Bulletin of Faculty of Physical Therapy: 2021 | 516 245- males and 271- females | Back pain belief – back pain belief statements by O'Sullivan and colleagues | The findings suggest that community education programs must be developed to address these myths, hence reducing the disease burden associated with back pain. |
| 5. | Prevalence and Impact of Low Back Pain in a Community-Based Population in Northern India. | Pain Physician: July/August 2020 | 1,513 Both males and females: 18-65 years | Pain - NPRS | Significant impact of LBP on sleep (24%), depression/psychological problems (24%). Study concluded LBP is highly prevalent in India, adversely affecting QOL in respondents. |
| 6. | Risk Factors Responsible for Musculoskeletal Pain among Computer Operators | Scholars Journal of Applied Medical Sciences: 2017 | **715** | Work station, work time, pain in body area- self reported questionnaire | Prevalence of musculoskeletal pain among computer operators was (76%). The body region most affected was the lower back pain which was highest (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%). Conclusion: significant proportion of computer operators were found to have musculoskeletal pain |
| 7. | Prevalence Of Work-Related Low Back Pain Among The Information Technology Professionals in India – A Cross Sectional Study | INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 2, ISSUE 7, JULY 2013 | 400 Both males, female 25-45 years | Low back pain- Cornell Musculoskeletal Discomfort Questionnaire | It was inferred that 54% (N=162) male employees and 42% (N=98) female employees have reported LBP. Total participants with LBP-51%. The study concludes that the Low Back Pain is the major Work-Related Musculoskeletal Disorder among the IT Professionals. |

| *Table continued…..* | | | | | |
|---|---|---|---|---|---|
| 8. | **A cross sectional study on work related musculoskeletal disorders among software professionals** | International journal of community health and medicine | **500** | Low back pain-Nordic musculoskeletal questionnaire | The common prevalence of work-related MSD reported during last 12 months based on their body region were neck (29.56%), lower back (22.89%), shoulders (12.17%), knees (9.56%). **Conclusion-** due to high prevalence of MSDs among IT professionals' appropriate prevention strategies need to be carried out to enable them work comfortably. |
| 9. | Prevalence of Musculoskeletal Disorder among Computer Bank Office Employees in Punjab (India) | | **60** Both males and females | Low back pain-Nordic musculoskeletal questionnaire | Low back pain (40.4%, upper back (39.5), Neck (38.6%), hand/wrist (36.8%) and shoulder (15.2%). |
| 10. | Computer related health problems among software professionals in Mumbai: A cross-sectional study | International journal of allied health and sciences | **200** Both males and females | Low back pain-self reported semi- structured questionnaire | The prevalence computer-related morbidity in software professionals was (89%). The proportion of visual, musculoskeletal, and stress was found to be 67%, 63%, and 44%. Study concluded that Ocular discomfort, Musculo-skeletal disorders and psycho-social problems form key category of health problems found among computer users |

## RESULTS

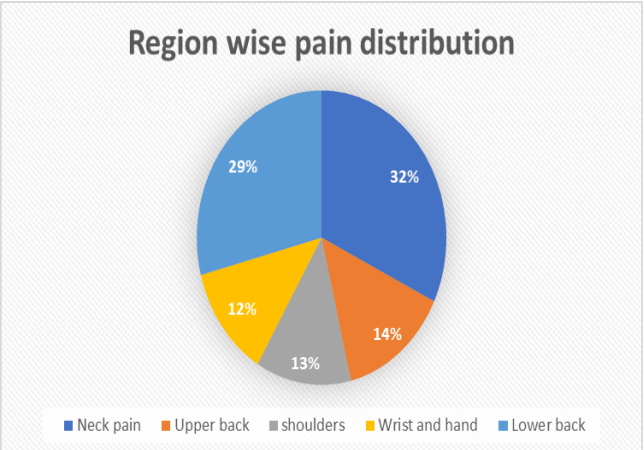
We identified 84 full text articles, Articles of observational, Cross- sectional studies were chosen for this analysis, sources including PubMed (n=7), Google Scholar (n=70), ResearchGate(n=4), Sci-Direct(n=3). The studies included Information technology professionals across India. After removing duplicates and based on inclusion criteria 17 articles were selected. The methodological quality of 17 articles was assessed using the STROBE checklist, out of which 7 studies had shown low evidential value, 3 studies have shown moderate evidential value, 7 have shown high evidential value.

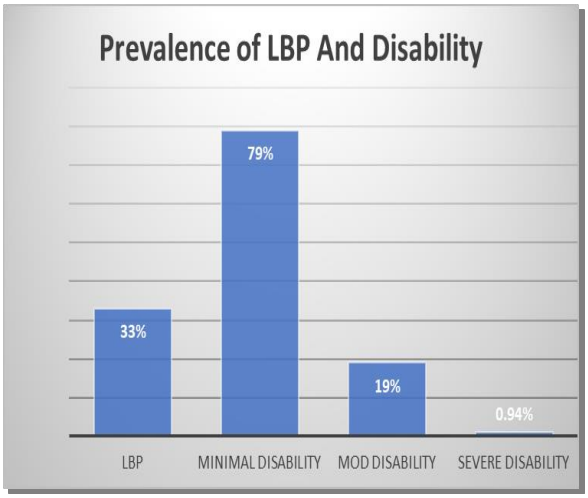
So, a total of 10 studies was included in qualitative synthesis. The sample size included in the study ranged from 40-1550. The subjects reported with age ranging from 18-65.

The major Pain caused in IT professionals is in low back pain area, and due to this, Disability is seen among the employees. The mean percentage were: 33% employees suffered from Low back pain. The disability percentage seen are employees suffering from minimal disability are 79%, 19% with moderate disability, 0.94% were with severe disability.

We found that in India near about 8% people lived with disability due to low back pain**.** Based on our analysis, most of the study stated high prevalence of low back pain among IT professionals. Prevalence was high in female and with increase in age.

| Region Wise Pain Distribution | Percentage |
|---|---|
| Neck pain | 36.45% |
| Upper back | 16% |
| shoulders | 14% |
| Wrist and hand | 14% |
| Lower back | 33% |






## DISCUSSION

This systematic review focused on the Prevalence of Low back pain among Information technology professionals across India. The review revealed a wide range of prevalence of Low back pain among IT professionals across India. Other musculoskeletal disorders like neck pain, upper back, shoulder pain is some of the common disorders seen among the IT professionals Across India.

**LOW BACK PAIN:** Low back pain is a major problem throughout the world and it is getting worse-largely in IT population. It affects all age groups and is mainly associated with sedentary occupations which demands long hours of static posture, and the occupations which demands repeated trunk bending movements. It has also shown association with low socioeconomic status, obesity and smoking.[8]Together with cervical pain, lumbar pain is considered the main cause of disability in most countries. Low back pain not only impacts the affected individual and his/her environment, but also results in a huge socio-economic impact in terms of medical care, absenteeism, and sick leaves.[16] There are several risk factors associated with the development of work-related musculoskeletal disorders among the workers who use computer extensively at their workplace. All the risk factors can be divided into two major categories. occupational and non–occupational/personal. Among the occupational repetition, force, awkward/ static postures, duration of exposure and vibration are major risk factors. Workstyle is characterized as an individual's response to increased work demands. In a cross-sectional study, work style was identified as a possible risk factor for neck and upper extremity symptoms related to office and computer work.[2] A number of studies have suggested that prolonged sitting could be a risk factor for the development of Low-Back Pain. Thus the study of discomfort in relation to prolonged sitting may reveal important aspects of the transition between discomfort and pain. Discomfort is considered to be related with sitting postural changes and it had been reported a positive relationship between discomfort and the frequency of postural changes during computer work. The presence and severity of Low Back Pain is associated with several socio-demographic factors and also in relation with gender, age, education level, smoking. Obesity has also been found to be a cause of back pain. Physical Inactivity, Inferior fitness and nutrition levels are common characteristics of smokers and obese individuals. Stress, Pain behavior, Depressive mood, cognitive functioning are the Psychosocial risk factors at work. The two major occupational risk factors for Low Back pain symptoms are static muscle load and flexed curvature of the lumbar spine, both of which are involved in seated work tasks.[17]

**PREVENTION STRATIEGIES:** As part of an MSD prevention strategy, workers should be provided with ergonomic support, involving the possibility of an individual conversation with an expert about any irregularities related to the workstation ergonomics, familiarizing them with work techniques and the active use of breaks at work (especially micro breaks). Parallel to this type of intervention, spin-up educational activities such as workshops, training sessions, meetings, etc. should be held to promote knowledge of ergonomics,

raise awareness of health consequences resulting from non-compliance with ergonomic principles at work-stations and also to show ways of preventing MSD-related health issues, both in the workplace and during free time. Equally important is the ability to relieve stress at work.

## CONCLUSION

The study revealed that there is a high prevalence of low back pain among IT professionals across India. Our findings revealed that focus on musculoskeletal rehabilitation of IT professionals with LBP is essential along with Ergonomic workstyle modifications and promoting the importance of regular physical mobility exercises to maintain physical fitness which will further be effective in reducing work absenteeism at workplace.

**Clinical Implication:** Early identification of risk factors will help the health workers to plan the effective preventive strategies for preventing low back pain.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Source of Funding:** None

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