

“A Systemic Analysis on Increasing Prevalence of Work-Related Musculoskeletal Disorder And Low Back Pain In Teaching Profession”

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KEYWORDS

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ABSTRACT

Introduction- Nowadays, the most prevalent and serious occupational safety affecting the health issues of the working populations are musculoskeletal disorders (MSDs) and low back pain that tend to have a substantial negative influence affecting the quality of life. The present study focuses on the increase in physical health issues of the teaching group related to work-related musculoskeletal disorders and low back pain affecting the quality of life. The study emphasises on the main provocative aspects of MSDs and low back pain in the teaching staff of both sexes.

Material and methods- An extensive web-based search was done on various platforms, viz. PubMed, PubMed Central, Web of Science, Google Scholar, MEDLINE, Academia etc. with the help of keywords used for searching data related with work-related musculoskeletal disorder, low back pain, occupational hazards, prevalence, risk factors, academicians, teaching profession, etc.

Result and Discussion- The teaching staff were subjected to repeated work tasks, difficult postures, extended computer use as well as mentally demanding work conditions have been linked to an increased incidence of these illnesses. Similarly, low back pain has now become the most common problem among teachers, especially among the female teachers, affecting their personal and professional lives.

Conclusion- Some control strategies could be adopted such as reducing the loads addressing the issues which are related to both personal and work-related activities might lead to professional growth as well as improving quality of life.

Introduction

The most prevalent problems impacting the global population of working groups of developed and developing countries are mainly low back pain (LBP) and musculoskeletal disorders (MSD). Globally, MSDs account for around 33% of all work-related occupational illnesses, making it the single largest cause of work-related health conditions.¹

According to the World Health Organization (WHO), the term work-related musculoskeletal disorders (WMSDs) is described as a “wide range of inflammatory and degenerative diseases and disorders that result in pain and functional impairment. They arise when individuals are exposed to work activities and conditions that significantly contribute to their development or exacerbation, but which may not be their sole cause.” The WHO states that the work environment plays a significant role in developing work-related diseases, often due to unfavourable or intensified working conditions and exposure within the workplace.² Work-related musculoskeletal disorders result in significant financial losses for individuals and the society.³ Teaching profession is considered as human services to society. Teachers are essential members of our society. The teachers play a vital role in our society as they serve as knowledge of pillars, mentoring, guiding, and influencing our children's futures. The teachers belong to an occupational group that are exposed to high prevalence of musculoskeletal disorders (MSDs) ranging from 40% to 95%.^{2,4}

According to the Centres for Disease Control and Prevention (2012), MSDs are considered a condition that affects the muscles, tendons, nerves, and supporting tissues of the neck, upper and lower back and upper limbs hence, they are brought on by or made worse by physical stress or prolonged exposure to elements like vibration, force, repetition, or awkward postures. Certain degenerative as well as inflammatory diseases that hamper the local blood circulation system along with causing the derangement in tendons, ligaments, muscles,

joints, bones, and nerves must be connected to increasing musculoskeletal problems.⁶ Musculoskeletal problems affect the neck, back, and upper limbs more frequently than other body parts. However, there is a notable difference between the types of people affected and the affected body parts. Recent studies have found a connection between physical factors such as bad posture, extended standing, and extended sitting and a higher occurrence of musculoskeletal problems. Some research also suggests that psychological elements such as a demanding workload, high levels of stress, dissatisfying employment, and repetitive labour may be responsible for teacher musculoskeletal problems.⁷ As per Erick P. et al. (2013), the causes of MSDs are complex and multidimensional. In the teaching profession, the responsibility of teachers extends from instructing pupils to developing lesson plans, evaluating assignments as well as taking part in extracurricular events like seminars and workshops.⁸ Psychosocial factors such as an unwelcoming work atmosphere leading to excessive stress and anxiety caused due to low job satisfaction have been major contributors to MSD.⁹ In studies done by Beyen et al. (2013), age, sex, employment history, smoking habits, monthly salary, irregular physical activity, sleep disturbance, prolonged sitting, lifting heavy metals, office amenities, work environment, and workplace support systems were among the key risk variables for MSDs that lead to increase the likelihood of presenteeism, absenteeism which reduces productivity at work.¹⁰

Similarly, Low back pain (LBP) is also one of the common health hazards among the working population. LBP is caused by a number of variables, including ergonomic, psychological, and sociodemographic determinants. Lower back injuries leading to lower back pain (LBP) are often associated with workplace risks. Ergonomic factors, such as extended periods of sitting, lifting, bending, and twisting, account for 11% to 80% of these injuries. Additionally, psychosocial factors, including high job demands, job dissatisfaction, and workplace stress, are responsible for 14% to 63% of cases.¹¹ The prevalence of LBP is significantly influenced by socio-demographic factors, which include both lifestyle and individual factors. The most frequently identified factors include insufficient physical activity, growing age, obesity, smoking etc and are more prone in females.¹²

Low back pain (LBP) is defined as pain or discomfort starting from the region of the twelfth - (12th) rib to the region of the inferior gluteal folds, with or without accompanying leg pain. Work-related low back pain refers to any low back pain that arises during work and is clinically identified as being either partially or entirely caused by the work environment.¹³ The World Health Organisation has named it as one of the top three occupational health issues that need to be the focus of WHO surveillance. The presumed global burden of low back pain disease is around 37%, which is due to several occupational exposures.

Material and Methods

An extensive web-based search was done on various platforms, viz. PubMed, PubMed Central, Google Scholar, Web of Science, MEDLINE, Academia etc., were searched with the following keywords: work-related musculoskeletal disorders, low back pain, occupational hazards, prevalence, risk factors, academicians, teaching profession and prevention strategies, etc. All studies written in simple English comprising of any design or methodological quality were included.

Discussion

Demographic variables - Work-related musculoskeletal disorders (WMSDs) and low back pain (LBP), are prevalent occupational health concerns among teachers worldwide. This study investigates the demographic data of WMSDs in the teaching profession, highlighting key factors that contribute to these conditions. Globally, the prevalence of WMSDs among teachers ranges from 40 percent to 95 percent among which low back pain being the most commonly reported issue. LBP affects 30–60% of teachers at least once during their careers, with a higher incidence among those over 40 years of age. Female teachers report higher rates of neck, shoulder, and upper limb pain, whereas male teachers are more prone to lower limb disorders. Some of the contributing factors such as prolonged standing, repetitive movements, and poor ergonomic design of classrooms are significant contributors.

Certain other factors such as age, teaching experience, and workload are also strongly associated with the prevalence and severity of WMSDs. Additionally, lifestyle factors, including lack of physical activity and improper posture, increase the risk. The findings highlight the urgent need for ergonomic interventions, supportive teaching environments, and targeted preventive measures to reduce the risk of WMSDs and improve teachers' overall occupational health.

A study by Gustavo et al. (2021) highlights that both urban and rural public school teachers experience significant rates of musculoskeletal disorders (MSDs) and obesity. Teachers with more severe MSDs face

negative impacts on their mental and physical quality of life (QoL). This underscores the importance of workplace interventions to address MSDs and prevent the decline of teachers' health.¹⁴

As per Chakravarthy et al. (2020) study indicate that 51 instructors (63.7%) had lower back pain as a result of occupational hazards affecting their professional growth. Thirteen male teachers (16.25%) and sixty-seven female teachers (83.75%) of this group reported having LBP. Female teachers are more prone to experience LBP than their male counterparts.¹⁵

Further, in another study done by Swati suman et al. (2021) states that 41.10% of Odisha's secondary school teachers had LBP, with female teachers having a higher frequency than male educators. The contributing factors that negatively impact teacher's health and welfare, such as an excessive workload, sleep disturbances (particularly for female educators), extended standing in the classroom, and physical inactivity, can lead to lower back pain (LBP).¹⁶

The higher incidence of MSDs and low back pain among the teaching group has been significantly increasing as a result of various factors like a negative workplace environment and increased workload.

Outcome of work-related musculoskeletal disorders (WMDs) and low back pain (LBP)

Author name & Year	Outcome	Specific Region affected
Indecon(2006)	WMDs are considered as one of the top illnesses experienced worldwide by working population and its incidence rates are gradually increasing annually. The working group had reported debilitating pain and suffering in their physical and mental health thereby imposing an early retirement. ¹⁷	-
Cardoso et al.(2009)	The rising incidence of musculoskeletal pain (MP) among teachers in Brazil had reported musculoskeletal pain in the upper limb's lower limbs and back. ¹⁸	Upper limbs lower limbs and back
Darwish et al.(2013)	MSD among secondary school Saudi female teachers reported that respondents had musculoskeletal pain in 79.17% of the respondents whereas back pain was reported by 63.8%, followed by shoulder pain at 45.5%, neck at 42%, leg at 40%, wrist at 16.2%, and elbow joint at 10%.. This predictor explains the differing prevalence rates between government and private schools, as most government school teachers are over 40 years of age. ¹⁹	Back pain(63.8%), shoulder pain(45.5%), neck(42%) leg(40%) wrist(16.2%) elbow joint(10%)
Smith et al.(2015)	Musculoskeletal disorder in the teaching profession for developing countries reported high frequency of MSD, varying between 40% to 95% among school teachers. The higher incidence is explained by the nature of a teacher's work, which involves not just teaching students but also the preparation of lesson plans, assessment of students and participation in extra-curricular activities. The exploration further revealed that teachers mostly appeared to suffer from MSD of the upper limbs, necks and back. ²⁰	Upper limbs, necks, and back

Erick et al.(2015)	Primary and secondary school teachers were more prone to neck, shoulder and back pain. A variety of occupational factors, such as the school's location, carrying heavy loads, extended periods of computer use, and awkward postures, along with psychosocial elements like a unhealthy work environment, heightened anxiety, and job dissatisfaction, can all contribute to the prior onset of musculoskeletal disorders (MSDs). ²⁰	Neck, shoulder and back pain
Barbosa et al.(2015)	Back pain in Brazilian school teacher during pandemic reported that extended computer use has been linked to musculoskeletal disorders (MSDs) in various body areas among school teachers. During the pandemic, teachers who used a computer or tablet for a period of five to six hours or more hours were more likely to experience back pain as compared to those who did not use such devices. ²¹	Back pain
Vaghela et al.(2017)	The occurrence of musculoskeletal disorder among school teachers in Gujrat concluded that a high rate of MSD with pain in the shoulder, knee, and back as a result of hazard of occupation. ²²	Shoulder, knee, and back pain
Mahadik et al.(2017)	Musculoskeletal disorders among academicians from higher education reported that professional factors play a significant role in the development of joint diseases, surpassing the effects of aging or body weight. The study emphasises the importance of creating and implementing effective intervention strategies to prevent joint diseases within the higher education profession. ²³	Joint pain
Solis-Soto et al.(2017)	In this study observed the occurrence of musculoskeletal disorders among school teachers in Bolivia is significant that falls within previously reported ranges. The teachers in rural areas had experienced a higher prevalence with severe symptoms as compared to their counterparts in urban areas. ²⁴	-
Eggers (2018)	The study done at Durban, South Africa for one year the prevalence of neck-shoulder pain among primary school teachers was reported as 80.4%. They observed 'neck pain' and 'shoulder pain' as leading cause of musculoskeletal disorders. ²⁵	Neck pain, shoulder pain
Nilani (2014)	The low back pain among primary school teachers due to excessive work load had reported the prevalence of LBP varies	Lower back pain

	from 12% to 95% among school teachers, which is significantly greater than that of other professional categories. Teachers who participate in high-intensity sports and gymnastics programmes at their schools run a greater risk of suffering from acute and chronic lower back pain (LBP) injuries, which frequently leave them permanently disabled. ²⁶	
Gupta et al.(2018)	This study indicates that occurrence of low back pain (LBP) among higher secondary school teachers of India, isn't very high. The disability resulting from LBP impacts the daily performance of over one-third of these teachers. Consequently, LBP affects their work efficiency and overall psychological well-being. ²⁷	Low back pain
Sankar et al. (2023)	This study concludes that the overall prevalence of musculoskeletal pain was significant with 69.8% as neck pain being the most common, followed by pain in other areas such as the hips/thighs, knees, and shoulders. The factors such as gender and teaching-related aspects, including teaching hours, the average class size, and continuous teaching sessions, were identified as key contributors to musculoskeletal pain among school teachers. ²⁸	musculoskeletal pain (69.8%)

Risk factors associated with WRMSDs and LBP- The common factors responsible for MSDs nowadays are due to the increasingly sedentary lifestyle, unsocial behavior, use of electronic gadgets such as smartphones, tablets and computers etc. are severely affecting the physical and mental health. Similarly, Low back pain (LBP) is a prevalent musculoskeletal disorder affecting teachers worldwide, potentially impacting their productivity and quality of life. The contributing factors for LBP were static posture, muscle tension, muscle fatigue, mental stress and poor fitness which are also considered to be aggravating cause for MSD.²⁹

A study done by Anuar et al. (2016) reported that teachers with MSDs have also been connected to carrying large weights. About twice as many Brazilian instructors in the Londrina region have reported carrying didactic materials complained of upper limb pain as those who did not.³⁰ In Putrajaya, Malaysia, secondary school teachers also reported having LBP after lifting weights with their hands.³¹ Such teachers are at risk for developing severe neck and shoulder discomfort, back pain, and pain in upper limbs.³² A persistent forward posture of head and continual flexion of neck results in overdue stress among the neck and shoulder muscles resulting in aggravating pain. Shoulder and neck pain are more likely to occur in conjunction with movements associated with input devices.³³

According to a study conducted among primary school teachers in Egypt bad posture was linked to MSDs.³⁴ Long periods of sitting and standing, working with one's head bowed, and bending or twisting one's upper body have all been found to be strongly linked to MSDs among Cairo, Egypt's preparatory government school teachers. The study also discovered that extended work in the same position, encouraging pupils to adopt a flexed posture, and performing the same arm- or hand movement repeatedly throughout a minute were all substantially associated with MSDs.³⁵

Some studies also indicate use of uncomfortable furniture as an aggravating factor for MSDs. In two different investigations conducted in Egypt, a strong correlation between MSDs and uncomfortable furniture's among instructors was discovered. Women who worked as sonographers, nurses, or teachers in Sweden were more likely to report shoulder pain, neck pain than those who had satisfied computer workstation arrangements.

While writing on or reading from a board, these heights may force people to adopt extended neck extension positions, which ultimately causes neck pain.³⁶

The teachers in schools are thought to be under a lot of psychological strain. Among school teachers in Botswana, high psychological job demands have been linked to LBP³⁷. Another study done among the Malaysian secondary school teachers reported that those who claimed high psychological job demands were more likely to experience LBP than those who reported low psychological job demands. Low back, neck, and shoulder pain among Malaysian instructors have been correlated with low skill discretion as well as low supervisor support.³⁸

The study done by V.N. Luine et al.(2007) indicates that a teacher's mental health can be influenced by both external and internal factors. The external factors were reports as high workloads, a sense of unfairness regarding work sharing as giving more work to the lower staff members, inadequate pay, insufficient administrative backing, poor teaching conditions, understaffing and a lack of mental health training. These factors can lead to stress burnout and worsen existing mental health issues among teachers. Internal factors may include personal life challenges, such as financial or relationship difficulties, as well as individual personality traits and coping strategies that also had a serious impact on the individual quality of life.³⁹

A study done by Aregawi et al. on low back pain and associated factors among primary school teachers in Mikelle City, North Ethiopia, reported that factors linked to low back pain include gender, age, marital status, work tenure, monthly earnings, sleep disturbances, stress levels, inconsistent physical activity, prolonged standing, extended periods of disrupted sleep, break duration, asthma, and a history of back injuries.⁴⁰

Another study on high school teachers suggests they are more susceptible to low back pain (LBP) as compared to primary school teachers. The contributing factors such as age, body mass index (BMI), years of employment, and job satisfaction have been associated with the prevalence of LBP and elevated risk among educators. Additionally, work-related tasks like grading exams, extended periods of sitting or standing, and long hours spent working on computers were identified as common contributors to LBP in teachers.⁴¹

Preventive strategies - Work-related musculoskeletal disorders (WMSDs), particularly low back pain (LBP), are prevalent occupational health concerns among teachers worldwide. This study focuses on the demographic data of WMSDs in the teaching profession, highlighting key factors that contribute to these conditions. The study done by Korkmaz et al.(2011) suggests that school administration, teachers, and physiotherapists can collaborate to create a well-structured health and safety program aimed at preventing musculoskeletal pain among teachers. This could include organising workshops or seminars on stress and pain management as preventive measures against anxiety and work-related musculoskeletal pain. Additionally, to lower the risk of developing musculoskeletal pain, teachers are encouraged to take regular breaks and perform exercises in their workplace.⁴² Shuai et al. (2014) suggested that a comprehensive ergonomic intervention program can effectively reduce musculoskeletal symptoms among teachers. The rising work demands, teachers need to recognize the risks associated with work-related musculoskeletal disorders (WRMSDs) and adopt strategies to mitigate them for their health and well-being. Interventions that include occupational health education sessions, on-site ergonomic training and the distribution of educational materials such as brochures and posters have been shown to play a significant role in preventing and managing WMSDs in the teaching profession.⁴³ A range of broad initiatives and government schemes targeting occupational health and safety, thereby focusing on enhancing workplace conditions and minimising risks. A global preventive program for addressing work-related musculoskeletal disorders (WRMSDs) and low back pain (LBP) in the teaching profession should focus on a comprehensive approach to reduce risk factors and enhance workplace health. This multi-faceted program can help reduce the incidence of WRMSDs and LBP among teachers, improving their overall well-being and productivity.

Conclusion

This study emphasises on the provocative factors, as well as physical and psychological factors, that are responsible for MSD and low back pain. Further, to understand the problem of MSD among teachers, the study focuses on the potential broader use of ergonomic principles. Simple control strategies could be suggested that would be a significant advancement in the prevention of MSD in teachers. It is necessary to identify risk factors for the condition to suggest effective control and reduction techniques for MSD in teachers. Hence, considering the high reported incidence of MSD in the working population, teaching groups could be educated on the adoption of different techniques to avoid these problems in future. Similarly, low back pain had a serious impact on teaching groups, affecting their personal and professional growth. The prevalence of low back pain is high among those who adopt teaching methods like prolonged standing and also have irregular physical activity. The female teachers are more prone to low back pain than the males. Therefore, reducing the loads

requires addressing the issues that are related to both personal and work-related activities that lead to professional growth as well as improving quality of life.

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