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RESEARCH ARTICLE

Prevalence of the musculoskeletal disorder among school teachers

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) represent one of the most common and important occupational health problems in working populations, being responsible for a substantial impact on the quality of life and incurring a major economic burden in compensation cost and lost wages. School teachers represent an occupational group, among which there appears to be a high prevalence of MSD. **Aims and Objectives:** The aim of this study is to find out the prevalence of the MSDs among school teachers. **Materials and Methods:** The research project was conducted after getting clearance from Human Research Ethics Committee of the K M Patel Institution for Education and Research Centre. This study was conducted in the various schools. Three hundred and fourteen teachers were enrolled in this study. To investigate the MSDs among school teachers, they were interviewed with the modified Nordic questionnaire. **Results:** In the current study, a total of 314 participants have been recruited in that minimum age of participants is 22 and maximum age is 59 with mean 40.5 ± 9.88. Total prevalence of the MSD is 71.95% among the teachers. In that, female were more affected with 72% than the males with 28%. **Conclusion:** The teachers here in reported a high prevalence of musculoskeletal pain in the shoulder, knee, and back.

KEY WORDS: Repetitive Stress Injury; Pain; Occupational Hazards; Disability; Abneetism; Physical Health; Quality of Life

INTRODUCTION

Musculoskeletal disorders (MSDs) represent one of the most important and common occupational health problems in working populations, being responsible for a substantial impact on the quality of life and incurring a major economic burden in compensation cost and lost wages.[1]

MSDs are put into different categories according to pain location. One category is upper limb disorders which include any injury or disorder located from the fingers to shoulder or neck. Another category of musculoskeletal pain disorder is lower limb disorders which include injury and disorders from hip to toes. Possibly, the most common MSD is back pain.[2] MSDs can affect the body muscles, joints, tendons, ligaments, and nerves. Most work-related MSDs develop over time and are caused either by the work itself or by the employees' working environment.[3] The severity of MSD can vary. MSDs are extremely common and increases with age. Work is important in lives of men and women; nonetheless, it can become a health hazard when it is carried out in an inappropriate way.[4]

Employment is an essential part for the earning in the life of every human being, but it can become a health hazard if it is job is not carried out in an inappropriate way. Some groups of workers, due to occupational characteristics, are more exposed to work-related musculoskeletal pain. Teachers stand out among these groups. School teachers represent an occupational group among which there appears to be a high prevalence of MSDs with the prevalence rates of between

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40% and 95%.[5,6] MSD decreases the productivity at work due to sick leave, absenteeism, and early retirement.[1] The work task of school teachers often involves significant use of head-down postures, such as frequent reading and marking of assignments.[7,8] The work of teachers does not only involve teaching students but also preparing lesson, assessing student's work, and participating in different school committees. These may cause teachers to suffer from adverse mental and physical health issues due to a variety of job functions.[5] Nursery school teacher, however, also performs a wide variety of tasks combining basic health, childcare, and teaching duties and those that require sustained mechanical load and constant trunk flexion.[7]

Sometimes, teaching is carried out under unfavorable circumstances; in which teacher mobilize their physical, cognitive, and emotional capacity to reach the teaching productive objectives, overdemanding, or generating over the effort of their psychophysiological functions. If teachers do not get enough time for pain recovery, the pain symptoms that are causative for a high-level of absenteeism due to health conditions are triggered or aggravated. Thus, teaching leads to stress, mainly physical and mental health and leaves an impact on the professional performance. Thus, teaching leads to stress, with consequences to physical and mental health and with an impact on the professional performance.[9]

These may cause teachers to suffer adverse mental and physical health issues due to the variety of job functions. There are different patterns of musculoskeletal diseases among men and women, probably reflecting their segregation in different sectors and jobs. Education is a professional field, and proportion of female teachers is rising in most countries.[1,4,10] Differences between working conditions of men and women have been mentioned in different studies, and according to these studies, women were less qualified with low salary and had lower control over work and a higher level of demands in comparison to men. The prevalence of musculoskeletal pain disorder is positively associated with female gender. Thus, teachers suffer from mental and physical health hazard due to the occupation.[5]

Social changes leading to educational reforms and needed new teaching models have influenced current teaching methodology, leading to changes in the teaching world. Therefore, the teachers have to push themselves beyond their comfort zone at work to match to new, precarious, and unregulated working modes. In the past decades, the professional teaching profession went through changes that led to the increase of teachers' activities and to increasingly precarious conditions in work relations. To maintain the reputation of institute market demands in the economic globalization process, educational institutions have begun to face new obstacles, especially in relation to meeting their educational commitments appropriately and satisfactorily to cop up with the other professional institute. The process generates a major problem for teachers, which are also affected by the other social demands of teachers' role which are the demands of quality teaching and positive results and also have to look in the scenario of mass production, scarcity of material, and human resources. Moreover, that creates the hazardous atmosphere for the school professional to matchup the standards without appropriate and necessary tools. This scenario tends to generate the lack of prestige and underrating of teachers, already overloaded by the need to respond to the new demands of education.

In several studies, musculoskeletal pain or painful feeling has been checked in teachers as a major health issue. These pain and feelings are mainly because of the musculoskeletal system disorders are the main causes of absenteeism and professional diseases in this category. Everyone, excluding individuals with congenital insensitivity, has already felt pain sometime in their lives. However, when symptoms continue, they become a problem, a reason for reducing work activity, work leaves and absence, in addition to the possibility of developing depression. Several sociodemographic, psychosocial, physical, and organizational factors are related to triggering, developing, and maintaining the musculoskeletal pain. However, there are the few references quoting the problems of the teachers on that basis the current problems can be resolved for the teachers.

Medical and social costs due to these problems have grown incessantly in the past years and currently reach figures of roughly billions of dollars in several countries, representing a significant impact on the health and the quality of life of workers.[7,9,10,11] Therefore, the analysis and appropriate determination of the problem, and the investigation of its associated factors, are relevant to the design measures that may intervene on the problem.[11-13] Epidemiological data such as on neck pain, shoulder pain, and low back pain (LBP) in Indian teachers are less. This study aims to describe the prevalence of musculoskeletal pain according to the sociodemographic and teaching characteristics among teachers.

MATERIALS AND METHODS

- Study design: Cross sectional descriptive study.
- Study population: All the teachers from the schools which granted permission and who fulfill the inclusion criteria.
- Sample size: Three hundred and fourteen school teachers.
- Source of sample: Various schools in Anand district, Gujarat, India.

Criteria of Selection

- Inclusion criteria: All teachers of the primary and secondary school.

- Exclusion criteria: (i) Any recent fracture, trauma, or any other musculoskeletal or neurological condition; (ii) participants will not be a part of other ongoing departmental research project.

Methodology of Study

The research project was conducted after getting clearance from Human Research Ethics Committee of the institution to conduct the study; we had contact various schools in the District. The study was conducted in those schools in which permission was granted. Thereafter, we had contacted the HOD/Principal of various schools and explain the purpose of the current study and after that written approval/permission was taken from the school principal. We collected a list of teachers teaching different subjects in the school. Once the permission was granted from the principal and as per the list we had obtained, we had contact concern teachers randomly, and we explained them about the need for the study. After explaining the teachers, written consent was obtained from them. To investigate musculoskeletal disorder among the teachers, we had use modified Nordic questionnaire. For data collection, we had conducted a one-to-one base interview with the teachers. While collecting data, we had taken care of schedule of the teachers that work does not get affected, and according to their convenient, we collected the data.

RESULTS

A total of 314 participants have been recruited in that minimum age of participants is 21 and maximum age is 59 with mean 38.8 ± 9.94.

From analysis found that total prevalence of the MSDs is 74.47% among the teachers. In that, female were more affected with 74.47% than the males with 25.53%. In total MSDs, the upper limb was affected 20.06% in which shoulder pain is 33.12%, elbow 4.3%, and wrist/hand 15.75%. The prevalence of lower limb pain was 22.07% in which the prevalence of pain in hip/thigh is 7.01%, knee is 33.73%, and ankle is 25.41%. The prevalence upper back pain was 29.97%, and lower back pain was 49.92% (Tables 1-4).

Table 1: Distribution of the participants according to gender

Gender	Percentage
Female	72.21
Male	27.79

Table 2: Distribution of the participants according to teaching subject

Teaching subject	Percentage
Science	86.66
Maths	64.50
Language	72.18

Table 3: Job-related parameters

Parameters	Minimum	Maximum	Mean±SD
Age year	21	59	38.8±9.94
Job duration year	1	36	18.5±8.86
Total job hours per day	3	11	7±1.16

SD: Standard deviation

DISCUSSION

With the line of objectives of the present study, current study reveals that 74.47% school teacher suffers from the MSDs in that moreover the females were more affected. School teachers who are involved in teaching various subjects, among them teachers who are teaching the science subjects were more affected due to their activities as they have to do didactic lectures along with the practical where they have to do and teach the practical in various head down position or trunk bend down position. In teachers, mainly there was more problem in the lower back, upper back, knee joint, and shoulder joint.

In the current study, the prevalence of MSDs among the school teacher is 74.47% for the present study. MSDs in school teachers can be due to various factors such as high physical workload, long working hours, job demand-support imbalance, monotonous work, lack of educational resources, and awkward posture.[1,8,9] In one of the studies in 2010, the prevalence of MSD was 66.7% among the school teachers.[1] Similarly, school teachers in Hong Kong found that 95.1% had experienced some form of pain in the previous month. Another study in Estonia which looked at physical activity, MSD was found 66.7% of teachers reported MSD in the previous 12 months. Furthermore, a study of Swedish music teachers found that 92% had experienced some form of pain in the previous 12 months.[10] In another Swedish study, 40% of school teachers and nursery school teachers were found to have reported MSD. In more studies, MSD prevalence rates have been found to be 55% and 51.4% for school teachers in Brazil and Turkey, respectively. As per Table 2, the present study found that female-to-male ratio is 72.21:27.7% for this study. Thus, females are more affected than males because women have lower physical strength, pressure from family and career prospects, or simply the fact that men and women have different thresholds for when and how they report pain.[14] The current study found the subject-wise prevalence of MSD in Science 86.66%, Language 72.18%, and Maths is 64.5% (Table 3). The prevalence of MSD is more in Science subject because the teachers have to repeatedly do laboratory works and there is continuous head-down posture and prolongs standing during classes as well as in practical

Table 4: Involvement of joint

Neck (%)	Shoulder (%)	Elbow (%)	Wrist/hand (%)	Upper back (%)	Lower back (%)	Hip/thigh (%)	Knee (%)	Ankle/foot (%)
27.07	33.12	4.3	15.75	29.97	49.92	7.01	33.73	25.41

where they teach as well as show to students. However, in Language and Maths, teacher also shows a high-level of the MSDs. Other sociodemographic factors such as marital status, education level, and salary per month did not show a significant correlation to the musculoskeletal pain in this study. Musculoskeletal pain disorder showed significant correlation with weight of teachers as the previous study showed (P = 0.007). Increasing the weight of secondary school female teachers was associated with more pain. The association of musculoskeletal pain with obesity has been reported around the world. In sexes, self-reported work-restricting pain in the neck, back area, hip, knee, and ankle joints was more common in obese patients than in a general Swedish population.[15] Overwork was indicated as a factor having an association with arm pain in our study. In general, exposure to workloads would be increased, and time for recovery from musculoskeletal stress during work would be cut down if working hours increase. Thus, overwork may accumulate the effects of work on musculoskeletal system and accelerate the development of disorders. This speculation is partly supported by Ono et al. who compared the sick leave statistics of sewing machine operators on full-time schedules with that of part-time operators.[13] As per the Table 4 study shows knee and thigh pain occur in teachers due to prolong standing for several hours in school and repetitive stair climbing in school during working hours. Overall physical work load seem to be the most important risk factor. In the present study, mean of working hours is seven with standard deviation (SD) 1.16 which also shows the significant risk factors for MSD in teachers. Furthermore, overweight is assumed to cause pain by increasing the mechanical stress on the weight-bearing joints.[5] Chronic pain is associated with the prevalence of MSDs where a study conducted in Thailand by Pornnapa Suggaravetsirib shown that chronic disease had significantly 1.6 times higher risk for developing MSD compared to without chronic disease.[16] Table 4 shows the association of the length of employment with musculoskeletal pain could be interpreted as the effect of aging or a cumulative effect of workloads on the musculoskeletal system of the workers. Age and length of employment were highly correlated in this study, and it is difficult to clearly separate their effects. However, aging may not be a plausible explanation because the mean age of the participants was still 38.8 years with SD 9.94. That would be too young to develop highly prevalent symptomatic degenerative changes of musculoskeletal system, or a reduction of muscular strength sufficient to induce frequent musculoskeletal injuries. Thus, the cumulative effect of workloads may be a more plausible interpretation than aging. Our finding of the association of the length of employment with musculoskeletal pain agrees with that by some studies. Cardoso et al.[1] reported that the prevalence of musculoskeletal symptoms increased with the length of employment in NS teachers, although participants' mean age (27.6 years, SD 4.9) was younger, and length of employment (5.5 year, SD 3.2) was shorter than that in ours. In our study, this dependency of the prevalence of pain on the length of employment was seen. Table 5 shows the prevalence for this study of the neck and upper limb is 27.07%, 20.06%, respectively. In this prevalence of MSD in shoulder, elbow, and wrist is 33.12%, 4.30%, and 15.75%, respectively. In the study carried out in turkey, the prevalence of neck pain is 25% and that of upper limb pain is 23.7%.[1] Repetitive strain injury is one type of MSDs affected to the area of upper limb, neck, shoulder, and low back. The disorder is one of the leading causes for ill-health retirement among school teachers. The job nature of school teachers involves a lot of head-down postures, such as frequent reading, assignment correction, and writing on board. Activities of sustained sitting in front of computer, standing up teaching in class, repetitively, overhead writing on the board are also unsafe act found in teachers.[13] Neck pain among the school teachers is mainly due to awkward posture - sitting with poking chin which induce considerable load on the posterior structures of spine, leading to increased tension on non-contractile structures and posterior cervical structures.[14] Table 4 shows the prevalence of upper back and lower back pain is 29.97% and 49.92%, respectively, for the present study. In one of the study by Hirohito TSUBOI*and Kiyomi TAKEUCH, the prevalence of subjective LBP was 23.2% among school teacher.[17] The risk factors for LBP have been identified by (i) individual factors such as body weight and age, (ii) biomechanical factors such as heavy physical load, lifting, twisted posture and vibration, and (iii) psychosocial factors such as job control, job satisfaction, etc. Chairs without proper back support are the main factor to cause back pain as teachers sit with flexion of trunk without back support to write and read text and excessive flexion of hip and knee.[10] Table 5 states the prevalence of lower limb is 22.07%. The prevalence of thigh/hip, knee, and ankle pain is 7.01%, 33.73% and 25.41%, respectively. In the study carried out in Turkey, the prevalence of lower limb pain was 33%.[18]

Limitations of this study that it is purely based on a questionnaire; so whatever participants felt and understood according to that results are concluded, so there is a chance of responder's bias on results. The main limitation of the present study was that it was cross-sectional design and all risk factors assumed as being important were predictive and seen as exploratory rather than an examination of pain and causal factors. Future recommendation of the study can be

done to find out risk factors in school teachers. We can also find out the effectiveness of ergonomics in school teachers or to find the effect of health education and promotion programs aiming to encourage maintaining ideal weights and wearing flat medical shoes to reduce the MSD in school teachers. To find the effect of planning exercise sessions and ergonomic classes to teach how to avoid/decrease MSDs.

CONCLUSION

Hence, from the present study, we concluded that the teachers had reported a high prevalence of musculoskeletal pain in shoulder, knee, and back. Hence, there are more prone to have MSDs due to their profession of school teaching.

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