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Original Research Article

UNDERSTANDING THE IMPACT OF MUSCULOSKELETAL DISORDERS AMONG SCHOOL TEACHERS IN CHENNAI

Musabiha Thaseen *. Z, Keshav Tantry. S.

Senior consultant Physiotherapists and ergonomists, Revive physiotherapy & fitness centre, Anna Nagar East, Chennai, India.

ABSTRACT

Background: Human body is engineered to move and designed in a way to benefit the wellbeing of mankind. Musculoskeletal disorders represents one of the most common and important occupational problem in the working population which includes the teaching profession. This study aims to identify the occupational overuse disorders prevalent amongst school teachers in Chennai.

Methods: A survey study was conducted among the school teachers in Chennai using a self administered questionnaire which was distributed among 500 teachers and collected over a period of two months between January and February 2019. The questionnaire included their working lifestyles, pain assessment, medical conditions and demographical data. Data was analyzed using SPSS software.

Results: A total of 500 questionnaires were distributed among the teaching faculty, from whom 330 were returned, yielding a response rate of 66%. Exclusion of about 4 % results in a response rate of 62%. The results using SPSS software method revealed that female population of teachers was more affected by moderate pain musculoskeletal disorder compared to the male teachers.

Conclusion: In conclusion, this study showed that occupational overuse disorder is reasonably common among teachers in Chennai, particularly those of lower back, neck and ankle pain. Epidemiological data on work related musculoskeletal disorders in Chennai teachers are limited. Remedial measures such as emphasis on pain prevention, ergonomics and regular physical exercises will reduce the prevalence of musculoskeletal disorders.

KEY WORDS: Musculoskeletal disorders, school teachers, Body mass index, Pain region, Chennai.

Address for correspondence: Ms. Musabiha Thaseen, Senior consultant Physiotherapist and ergonomist, Revive physiotherapy & fitness centre, Anna Nagar East, Chennai, India.
E-Mail: thaseenphysio@gmail.com

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BACKGROUND

The physical health of teachers is assumed to be healthy compared to other occupations, but it's found that teachers are at a higher risk of certain ailments and musculoskeletal disorders. According to the world health organization [WHO], musculoskeletal conditions are leading to most of the disability and people with low back pain are contributing to the world's largest disability. With variation by age and diagnosis, at least 20-33% of people across the globe are suffering from a painful musculoskeletal disorder [1].

Musculoskeletal disorder [MSD] has been a significant public health problem among the human society due to its high impact on pain, discomforts, health sufferings and absenteeism from work. The most common cause of pain worldwide is found to be musculoskeletal pain disorders [2].

The term musculoskeletal disorder includes a wide range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels [3]. Work related musculoskeletal disorders occur due to a mismatch between the physical capacity and physical requirement for a particular job.

The causes of musculoskeletal disorder are repetitive or prolonged activities, awkward working postures for a longer period of time. When the musculoskeletal disorder prolong for a longer time, it leads to cluster of related problems such as chronic fatigue, sleep disturbances, withdrawal from physical activities discomfort and compromised immune function and mood disorders, sickness absenteeism among teachers [4].

Clinical symptoms include pain, numbness, tingling, burning sensations, cramping and stiffness. The signs include decreased range of motion, decreased grip strength, loss of muscle function and deformity [5].

The international association for the study of pain [IASP] defines pain, "as an unpleasant sensory and emotional experience associated with actual or potential tissue damage" [6]. Pain is not just a physical sensation. It is influenced by attitude, beliefs, personality and social factors and can affect emotional and mental wellbeing. Musculoskeletal pain (MP) is normally the body's warning signal when there is risk of tissue damage or when such damage has occurred. Pain can signal that there is a need for recovery of tissue [7].

Most of them attend to their musculoskeletal pain in their early stages whereas some of them train to tolerate the pain and continue with their daily living, while some people completely ignore the pain until it becomes chronic and doesn't allow them to do the movement. The job of a teacher is not confined only of taking classes but involves a wide variety of duties and responsibilities that maybe carried out under favorable and non favorable working conditions [8].

The activity of teachers involves teaching students, constructing lessons, evaluating the work of the student's (like paper preparations and corrections), explaining the lessons in simple terms so that the students understands and also encouraging students to involve in extracurricular activities such as innovative games and arts. On an average, the teachers suffer from more of spine pain when compared to the pain in extremities [9]. The prevalence rate of musculoskeletal disorders in occupation groups, it's found that the rate is between 40% and 95% amongst school teachers [10-14].

Studies conducted in Hong Kong found that 95.1% and in the United States, 91% of the teachers had some kind of musculoskeletal pain. Although many studies have been conducted internationally which indicates the high risk of occupational health hazards in teachers, there is a shortfall among the studies conducted in Chennai to investigate the prevalence and risk factors of musculoskeletal disorders. Therefore, this study aims to assess the prevalence and the impact of musculoskeletal disorders among the functioning teaching faculties in Chennai.

METHODOLOGY

Study design and period: To assess the prevalence of musculoskeletal pain among school teachers in Chennai, the study was conducted over a period of two months between January and February, 2019.

Study area: This study was conducted among the schools which granted permission to proceed with the study.

Sample size: In total, 310 usable questionnaires were collected.

The overall response rate was 66 % from schools. 43.9 % teachers were primary school teachers. 36.7 % teachers were secondary school teachers. 19.4 % were teachers who used to handle both primary and secondary school students. 22.2 % teachers were men 77.7 % teachers were women. 37.7 % teachers had more than 20 years of teaching experience. 4% of the teachers were excluded due to their 0-2 years of teaching experiences. Male and female teachers of primary, secondary and primary plus secondary school teachers were included in the study.

Data collection: Data on musculoskeletal pain, socio demographic characteristics, health issues, inclusion of exercises in daily living, pain

intensity were collected using self administered, structured questionnaire to address the objective of the study. The questionnaire was prepared in English and which can be easily understood by the teaching faculties. There were 30 objective type of questions prepared to match the aim of the study. There were 10 questions which were used to access the pain scale during work and after work. The items covered a wide range of most of the health complaints. The teachers were given about 20 minute to fulfill the questionnaire.

Data analysis: Data obtained were entered and edited using SPSS software. Descriptive statistics of the collected data were obtained for most of the variables in the study, using statistical measurements. Frequency tables, graphs, percentages were used.

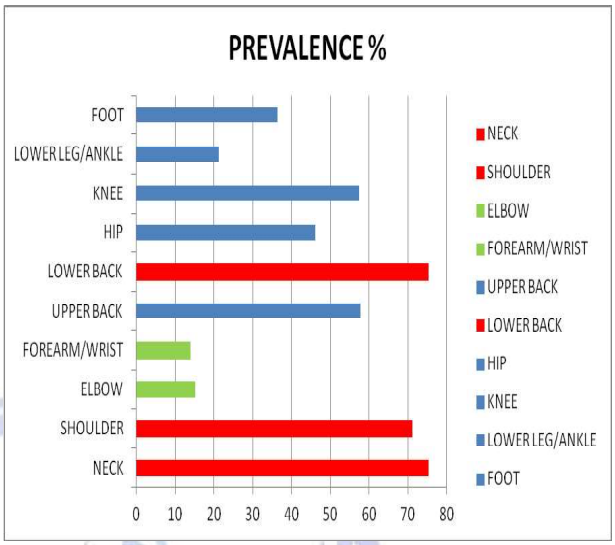
Ethical consideration: The study was carried out after getting permission from the management board from the schools in Chennai. An informed consent was obtained from each institution and subjects to participate in the study. Those teachers who refused to participate in the study were not forced. Confidentiality was granted for the information collected by keeping the privacy of the respondents while filling the questionnaire.

RESULT

Participant demographics: A total of 500 questionnaires were distributed among the teaching faculties, from whom 330 were returned, yielding a response rate of 66%. Exclusion of about 4% of teachers was found. Out of the 62 % responses, 43.9 % were teaching for the primary classes, 36.7% handling the secondary classes and 19.4% were teaching both the primary as well as secondary school students. The average pain intensity was found to be moderate of 60%, which predicts that the female teachers have been ignoring the pain and continuing with their occupation. The male teachers had a mild pain intensity of 17% on an average.

Musculoskeletal pain was found to be higher in the neck and lower back of about 75.1%. The shoulder pain constitutes about 70.9 % of the musculoskeletal disorders. Knee pain was about 57.4 % among teachers. Teachers of about 36.4 % were suffering from foot pain. Teachers working for more than 20 years had a pain prevalence of about 40.1 % in the lower back, 11.9 % in the upper back, 10.2 % in the neck regions. Teachers between the age range of 31 to 40 year constituting of about 42 % in the schools.

Fig. 1: contains the region of pain and the prevalence percentage of pain among the teaching faculties at schools in Chennai.



PAIN REGION:

Neck pain: Teachers in Chennai of about 75.1 % have been suffering from neck pain due to repetitive movements of the neck like bending to do correction work or by typing or writing notes. Female teachers suffered from neck pain more than the male staffs due to wide variety of duty and responsibilities. Neck pain also triggers shoulder strain in more amount of teachers.

Shoulder pain: The other possibility of pain by repetitive movement is overhead [extension] of the head to write on the blackboard. While performing these daily tasks repeatedly, these movements cause a lot of strain to the neck and shoulder which causes the muscles to contract and tighten to aggravate the pain. On an average, 70.9% of teachers suffer from shoulder pain irrespective of their gender. In the year 2010, China conducted a study on musculoskeletal disorders and found 73.4% of the teachers were vulnerable to shoulder pain [15].

Elbow pain: Elbow pain is a painful condition caused by overuse of the elbow by frequent bending and straightening of hand producing stress to the flexor and extensor muscles of the forearm, particularly where the tendons are attached to the lateral and medial epicondyles of the humerus. These repeated motions cause stress to the tissues in series of tiny tears in the tendons attached to the bony prominence. Prolonged activities with the forearm can cause pain in the elbow region, making the daily living activities difficult.

Forearm/wrist pain: Occupational overuse to the forearm and wrist causes muscle strain from being mild discomfort to severe pain depending on the level of usage. The most common conditions in the wrist appear to be nerve entrapment like carpal tunnel syndrome or tendon inflammation like De Quervain's tenosynovitis.

Upper back: The reason for upper back pain is most commonly from poor posture. It causes shortening of chest muscles and pulling the muscles on the upper back due to slouching, physical inactivity, overuse or inappropriate posture. Weakening of the muscles may lead to pain in the thoracic region and increase the pressure on the spine, discs and ligaments. More than 50 % of the teachers are suffering from upper back pain.

Lower back pain: Pain in the lower back is common among teachers, although it can be felt anywhere along the spine from the neck till the hips. The spine is a remarkably well engineered structure interconnecting the muscles, nerves, ligaments, joints, disc which provides strength, stability and flexibility to the whole body. In spite of the complex structure, lower back is more susceptible to injury and pain due to overuse, stress to the joints and awkward posture.

There are various studies done on teachers which indicates higher incidence of low back pain. Study conducted in Turkey, found that almost 80% of the teachers comprise of back pain inclusive of upper and lower back (Korkmaz, 2011). The global study conducted in 2010, stipulates that low back pain has been ranked as the highest among the terms of disability. [Girish MM, Anthony D (2003)].

Hip: Hip pain is found in 46% of teachers of which the female primary school teachers are more affected. The tendons attached to the hip and pelvis work together to stabilize pelvis and support hip mobility during day to day activities such as walking, climbing stairs. Frequently sitting with cross legged can also cause hip pain.

Knee: Knee pain can originate in any of the structures such as joint, ligaments, cartilage or the muscles. The knee is one of the joints prone to injury. Knee pain can be aggravated by physical overuse inactivity, obesity and even by restriction of movement caused by the surrounding muscles. 57.4% of the teachers suffer from knee pain causing early replacements and surgeries.

Lower leg/ ankle: The ankle joint provides stability and also functions as the weight bearing joint for the body during standing and walking. Ankle sprains are more commonly happens when there is a preexisting ligament weakness in the ankle area or history of previous ankle injuries.

Foot: Foot pain is due to tightness of the calf muscles causing a common condition, "plantar fasciitis." The reason for foot pain can be due to uncomfortable or worn out footwear.

Pain intensity:

Suffering from pain: Out of the 500 questionnaires distributed among the teaching faculties, it was found that most of the teachers are suffering from pain from one region to the other.

Difference by teaching: According to the teaching levels irrespective of their gender, it was found that the primary school teachers had 44 % of pain, the secondary school teachers had 37% of pain and 19% of the teachers who handle both primary and secondary classes were suffering from musculoskeletal disorders. The teachers with teaching career of more than 20 years had 38 % pain, the teachers with 10-20 years had 29 % pain, the teachers with 5-10 years of teaching experience had 20 % the teachers with 2-5 years of teaching experience had 13 % of pain.

Impact of musculoskeletal disorder: The result of the study showed that musculoskeletal disorder does not only affect the individuals but also their families, workplace and health care system. Some of the teachers who reported

musculoskeletal disorder in this study reported: Statistically Significance of less pain in all the teachers after working, after a week away from school. Length of employment, unstable working conditions, awkward postures and reduced physical activities has triggered the teachers with ill health disorders.

Table 2: BMI interpretations by teaching levels.

Teaching levels by %	Primary %	Secondary %	Both %
Underweight	3	3.5	0
Normal	37	37	17
Overweight	41	53.5	68
Obese	19	6	15

Table 1: Ratio of musculoskeletal disorders among teachers in Chennai.

Variables	Female		Male		Total		X2	P value
	N	%	N	%	n	%		
Neck	184	79	49	21	233	100	0.644	0.422*
Shoulder	174	79.8	44	20.2	218	100	1.56	0.210*
Elbow	41	87.2	6	12.8	47	100	2.3	0.129*
Forearm/wrist	14	32.6	29	67.4	43	100	58.61	0.000*
Upper back	130	79.3	34	20.7	164	100	0.515	0.473*
Lower back	191	82.3	41	17.7	232	100	11.64	0.001*
Hip	112	78.3	31	21.7	143	100	0.065	0.798*
Knee	140	79.1	37	20.9	177	100	0.486	0.486*
Lower leg/ ankle	51	77.3	15	22.7	66	100	0.008	0.930*
Foot	96	85	17	15	113	100	5.45	0.020*

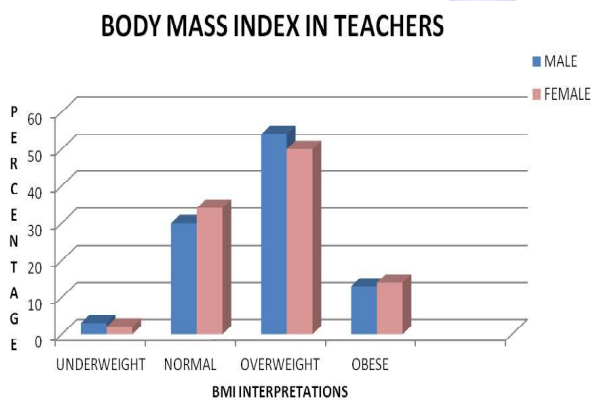
*Pearson chi square test.

BODY MASS INDEX:

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2) [16].

There was a significant difference among the BMI distribution for the different teaching levels. The primary school teachers constituted about 41% of overweight while 37% were under normal body mass index, 19% were obese and 3% had underweight BMI. The secondary school teachers constituted about 53.5% of overweight while 37% were under normal body mass index, 6% were obese and 3.5% were underweight. The school teachers taking care of both primary and secondary classes constituted about 68% of overweight while 17% were under normal body mass index, 15% were obese and no one had underweight.

Fig. 3: Graphical interpreations of body mass index between male and female teachers.



DISCUSSION

In the population studied, there was a predominance mean age of about 31 to 40 years. The finding confirms that the higher percentage of female teachers are in the educational sector. The introduction of women in the working world as: teachers, doctors, nurses, architects, housewives etc is conceived as a “care activity”. The response rate among the study examined was about 66%.The most prevalent body region of which teachers reported MSD has been lower back, neck and shoulder pain. Spinal pain is the most common problem in modern society; approximately 62 % of the teaching population suffers from it. Overweight is assumed to cause pain by increasing the mechanical stress on the weight bearing joints. It can also be an indicator of the other factors such as lack of physical fitness. 34 % of persons selected for this study didn’t complete the questionnaire as their health status might be different from that of the respondents or maybe they were not willing to share their health condition.

Significant difference was found between male and female teachers. If there is no enough time for recovery, pain symptoms that account for higher level of absenteeism due to health conditions are triggered or prompted. Overall, this study suggests that while musculoskeletal disorder is most likely an under researched topic among teachers, teaching itself represents a high risk occupation for musculoskeletal disorder. Thus teaching leads to stress with consequences to physical and mental health with an impact on professional performance if proper attention is not given to the health.

CONCLUSION

In conclusion, this study showed that musculoskeletal disorder is reasonably common among teachers in Chennai, particularly those of lower back, neck and shoulder regions. Preventive strategies that minimize the occurrence of these disorders especially in those who are at an increased risk should be practiced by teachers.

Undertaking regular exercises can be introduced to contribute the reduction of musculoskeletal disorder among teachers. To help reduce the prevalence, progression and burden of musculoskeletal disorder among Chennai teachers, a greater emphasis maybe placed on ergonomic education, regular physical exercises and occupational stress.

As teachers are the main resources for developing the potential of students and making them the useful citizens of the country, teachers' health must be given priority. Thus prevention of work related musculoskeletal disorders of teachers should be an important rehabilitation goal.

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Conflicts of interest: **None**

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