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## Research Article

# THE PREVALENCE OF MUSCULOSKELETAL PROBLEMS IN SCHOOL TEACHERS IN DELHI- NCR: A CROSS SECTIONAL STUDY

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#### Key Words:

Work related Musculoskeletal Disorders (WMSDs), Teachers, Prevalence

### ABSTRACT

Background- To determine the prevalence of Work related Musculoskeletal Disorder (WMSDs) and its associated risk factors among school teachers in Delhi-NCR. A self-developed questionnaire which included three parts was distributed among 384 teachers from Government and Private schools of Delhi. In which standardized Nordic Musculoskeletal Questionnaire and teacher stress inventory Questionnaire was used. Results- Knee pain, ankle/feet, neck were the most prevalent musculoskeletal complaint, reported by 35.7%, 26.3%, 24.2% respectively of the respondents while chronic neck pain was also reported. The prevalence of musculoskeletal pain showed significant correlation with stress and BMI. Conclusion- School teachers are susceptible to WMSD with a significant prevalence for knee, ankle/feet, neck, shoulder, back, elbow, and wrist/hand. Moderate level of stress and high BMI are positively correlated to WMSDs.

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### INTRODUCTION

Musculoskeletal disorders represent one of the most common and most costly occupational health problems in both developed and developing countries (Erick pin, 2007). It has drawn significant amount of attention of health workers in recent times. According to Punnett L, Wegman DH (2004), Musculoskeletal disorders include a wide range of inflammatory and degenerative conditions affecting the muscles, joints, tendons, ligaments, nerves, bones and the localized blood circulation system, that may be caused by or aggravated by work tasks and by the effects of the immediate environment in which work is carried out. It can cause severe long term pain and physical disability.

WMSDs are the reasons for decreased productivity at work due to increased sick leave, absenteeism and early retirement. The work related musculoskeletal disorders has multiple causes. It just does not depend upon the nature of profession but other associated factors like age, work environment, experience etc. The prevalence of WMSDs linearly correlates with age and length of service. (Cardoso JP 2012). Thus it can only be dealt effectively by holistic and multifactorial approach.

One of the most affected profession by the work related musculoskeletal disorder is Teaching profession. According to Ministry of Human resource development, the total number of

teachers in 2008 - 2009 suggests about 5.79 million teachers are engaged in teaching in schools. All schools together had 43.46 percent of female teachers. Various researchers found that teachers are affected by the work related health issues as teaching profession is not only physically but mentally exhausting also.

Continuous head bent positions (Chiu TT 2007, Horng YS 2008), use of computers, blackboard writing etc. are adding stress on musculoskeletal system in teachers. Along with these factors psychological factors anxiety level, high job demand/workload, low peer/colleague support and poor mental status also contribute to work related problems. (Anotonelli BA, 2012).

There are various setups of schools. But majorly schools can be classified as government and public sectors schools. Though the teaching the subjects remain same but there are many differences in these set ups. Every set up has their own set of problems and advantages. It has been observed that there is a lot of difference in terms of Infrastructure, administrative policies, working hours, teaching techniques and tools, students to teacher ratio, other responsibility on teachers, work environment in government and private government. These differences will definitely have different impact on the musculoskeletal system in teachers in both the set ups.

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Occupational stress is another domain which needs to be addressed as the stress is a prevalent and costly problem in today's workplace. According to NIOH, about one-third of workers report high levels of stress. With continued stress at the workplace, workers will develop psychological and physiological dysfunction. Stress-related disorders encompass a broad array of conditions. Long standing stress can give rise to mental disorders and chronic physical conditions like diabetes, hypertension, weak immune system etc. These conditions not only diminish the well-being of workers but also contribute to increased injury incidence. Consistently high levels of stress increase the risk of occupational injury. The Physiological changes due to stress is the contributing factor to the musculoskeletal problems. In the current scenario, teaching profession has also become very demanding in nature. The work related stress amongst teachers is ever rising which can have effect on musculoskeletal system.

Teachers are the back bone of the total education system. They play important role capacity building of nation. Their health should be our prime concern as it affects work productivity of the teachers. Thus it is need of the hour to study not only musculoskeletal problems in teachers but also its association with various factors. This study aims to find out the prevalence of musculoskeletal problems and to study associated risk factors.

## MATERIALS AND METHOD

### Nature of Study

Observational cross-sectional survey

### Study Population

Teachers from Private and Government schools in Delhi- NCR were recruited in the study.

**Sample Size:** 84

**Sampling Method:** Convenience Sampling

### Sampling Criteria

### Inclusion Criteria

The subjects who met following criteria were recruited in the study.

1. Teachers from Private and Government Schools in Delhi- NCR region.
2. Teachers who teach primary/ elementary /secondary level.
3. Teachers who can read and understand English.

### Exclusion Criteria

The subjects who were suffering from following conditions were excluded from the study:

1. Any surgery in last 6 months
2. Any diagnosed neurological conditions.
3. Recent trauma, fracture.
4. Pregnant women.
5. Any diagnosed gynecological conditions like dysmenorrhea, PCOS, PID etc.

### Study / Setting Sites

Various government and private schools in Delhi and NCR

### Outcome Measures: Nordic Questionnaire

**Procedure of Study:** The study was approved by the ethical committee of Institutional Review Board.

List of private and government schools in Delhi- NCR was prepared and school authorities were approached to conduct the study. A questionnaire was developed by the researcher which included three parts. Part A included questions regarding participants' demographic data like name, age, gender, height, weight, type of job, teaching level, type of work etc. Part B included Nordic Questionnaire regarding musculoskeletal problems, work-related characteristics. Part C included Teachers stress inventory and lifestyle and physical activity level questions.

The volunteers were explained about the procedure of research and the consent was taken. After that questionnaires were personally distributed to 384 school teachers in Delhi and NCR region. Height and weight of the teacher were recorded by researcher. Teachers filled the Nordic questionnaire and Teacher's stress Inventory as per their convenient time. The researcher received the questionnaires back and data was analysed.

### Statistical Analysis

Data of this study was compiled in Microsoft excel sheet and it was been analyzed on descriptive statistic of SPSS version 23. Descriptive statistics were performed to reveal the response distribution for each question in the domain capturing participants' personal and institutional variables and for questions from the WMSD and stress domains.

Additional analyses were performed using the pearson (2-tailed) and analyses of correlation between prevalence of musculoskeletal and BMI, LEVEL and stress were done. The level of significance was set to 0.01.

## RESULTS

### Demographic Data

The response to participate in the study was 90% (90/100 respondents). The principal reasons for non-participation were sickness leave, lack of time, and refusals. Collected sample was 450 out of which 384 were valid consisted of equal number of school teachers from Government and Private schools of Delhi (192 each). The mean age of participants was 25.99 years with standard deviation of 3.6. In the study, the percentage of female was 79.4 % and male was 20.6 %.The average BMI of teachers was 38.32 with a standard deviation of 9.4. Maximum number of the participants lies between BMI 25-29.9 i.e overweight.

**Table 1** Demographics

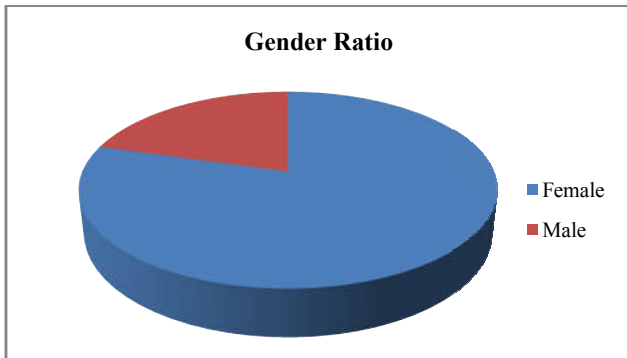
Demographics	Teachers (N)	MEAN±SD
AGE (Years)	384	25.99±3.6
BMI(Kg/m <sup>2</sup> )	384	38.32±9.4

Most of the teachers were secondary school teachers (45.6%). The numbers of teachers who were doing administrative work was 0.2%, those who were doing teaching work were 85.2% and 13.8% were doing both administrative and teaching work. The school teachers had worked in average 11.02 years. more than 10 years of experience has the highest frequency of 177 respondents (46.1%). 7.3 % respondents work between 21-30

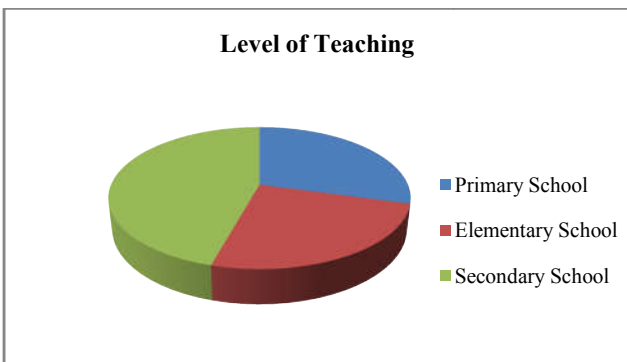
hours, 67.2 % work between 31-40 hours, 24.7% work between 41-50 hours and 0.8 % work between 51-60 hours. Most of the respondents were doing normal hours of working i.e 67.2%.The percentage of respondents those were involved in any type of physical activity was 40.6% and those who didn't was 59.4 %. If we talk about mode of transportation then, Most of the respondents i.e 54.2 % are using their own vehicle for transportation. The characteristics of respondents are presented in Table 2

**Table 2** Characteristics of Respondents

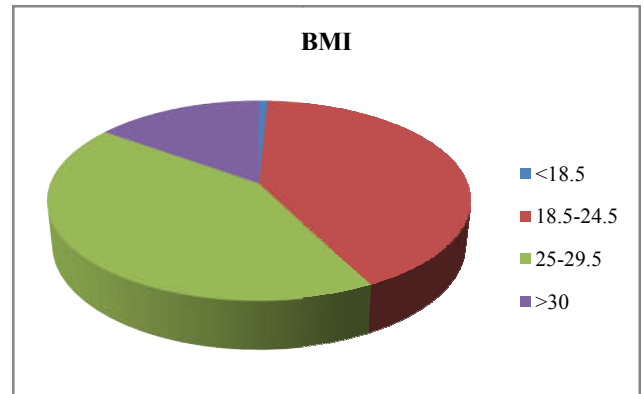
	N=384	Frequency	Percent
Gender	Female	305	79.4
	Male	79	20.6
BMI	<18.5	3	.8
	18.5- 24.5	160	41.7
	25- 29.5	163	42.4
	>30	58	15.1
Teaching Level	Primary	112	29.2
	Elementary	96	25
	Secondary	175	45.6
Duty Hours	21-30	28	7.3
	31-40	258	67.2
	41-50	95	24.7
	51-60	3	.8



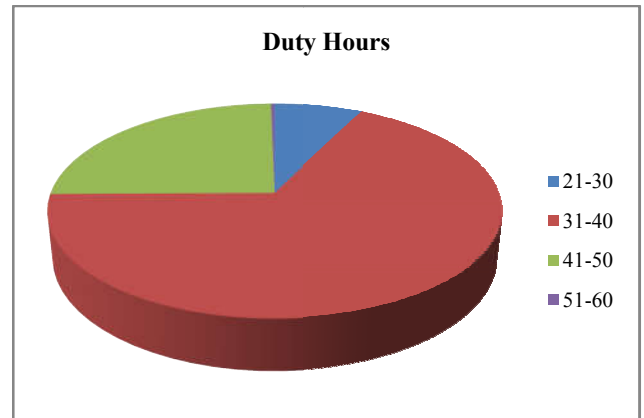
**Figure 1** Gender Ratio



**Figure 2** Levels of Teaching



**Figure 3** BMI



**Figure 4** Duty Hours

**Prevalence**

**Overall**

The overall prevalence of musculoskeletal disorders in Government and Private teachers is 65.1% and the independent prevalence of musculoskeletal disorders in government school teachers is 59.89% and in private school teacher is 70%. Among this the most affected area of pain are knee (35.7%), ankle/feet (26.3%) and neck (24.2%) respectively.

The prevalence of pain in different regions of body are given in table 3.

**Table 3** Prevalance of Pain

Area of pain	Overall (N=384)	Government (N=192)	Private (N=192)
Neck	24.2%	22.8%	24.9%
Shoulder	16.7%	11.2%	21.8%
Upper back	10.9%	8.6%	13%
Elbows	18.5%	11.7%	24.9%
Low back	15.9%	15.7%	15.5%
Wrist/hands	7.8%	5.1%	10.4%
Hip/thighs	15.4%	9.1%	21.2%
Knees	35.7%	31%	39.4%
Ankles/feet	26.3%	19.8%	32.1%

**Government**

The prevalence of musculoskeletal disorders in Government school teachers is found to be 59.89%.out of which the most affected areas are knee (31%), neck (22.8%) and ankle/feet (19.8%) respectively.

### Private

The prevalence of musculoskeletal disorders in Private school teachers is 70% and out of which the most affected areas are knee (39.4%), ankle/foot (32.1%), neck (24.9%) respectively.

The prevalence of musculoskeletal disorders between Government and Private school teachers was compared and it was found to be more in Private school teachers than the Government school teachers.

### Stress Score

#### Overall

The mean value of stress level in both Government and Private school teachers is 2.48 with standard deviation of 0.77. which means they have moderate level of stress and about 41.66% respondents fall into this.

If we have a look on stress level of Government and Private school teachers, then 43.22% respondents of private school teachers have significantly strong level of stress and only 8.33% respondents of Government school teachers were found to have significantly strong level of stress.

The stress score is in table: 5.

**Table 5** Stress Score

	Overall (N=384)	Government (N=192)	Private (N=192)
2.00 OR Below (Significantly weak)	32.55%	34.3%	32.81%
2.01 TO 3.27 (Moderate)	41.66%	59.37%	23.95%
3.28 or Above (Significantly Strong)	25.75%	8.33%	43.22%

### Correlation

In this study, there is a significant correlation between the prevalence of musculoskeletal disorders and BMI at 0.01(2-tailed) with the p value = 0.002 and It is also interesting to see that the correlation between prevalence of musculoskeletal disorder and stress is significant at the 0.001 level with p value of <0.05. There is also significant correlation between prevalence of musculoskeletal disorders and level of teaching at the 0.05 level with p value = 0.026.

## DISCUSSION

The present study was conducted to find out the prevalence of musculoskeletal problems in school teachers. The results showed that, School teachers were susceptible to work related musculoskeletal disorders with a significant prevalence for knee, ankle/ foot, neck, elbow, shoulder and back pain. The results were similar to study done by Cheng *et al* in 2013. School teachers, spends substantial portion of their work-days in tasks involving movements and postures, which stress their bodies. In this study knee pain was the most prevalent musculoskeletal complaint, reported by 35.7% of the respondents while chronic knee pain was also reported by the teachers (37.5%). Korkmaz *et al* (2011) also reported, 32% teachers from turkey suffer from knee pain. This may be due to prolonged standing postures during teaching hours and other school related activities which in turn increases load on the knees joints. In this study, neck pain was the third most prevalent musculoskeletal complaint, reported in 24.2% of the total respondents among which 22.21% of the school teachers

reported chronic neck pain. Prolonged working nature like bending the neck forward and significant use of 'head down' posture such as frequent reading, marking of assignments and writing on a black board might have caused this significant percentage of teachers to complain neck pain (Chiu & Lam, 2007).

The findings of this study was supported by a similar study of secondary school teachers in Hong Kong, where the life-long prevalence of neck pain has been reported at 69.3%, within 12 month prevalence of 66.7%, and the prevalence after becoming a teacher being 59.7% (Horng *et al*, 2008). In this study 16.7% reported shoulder pain. Same movements with arms, hands or fingers many times, hands above the shoulder level, reaching with arms or hands and standing are important factors which affect the occurrence of musculoskeletal symptoms at shoulder joint. In Turkey, 28.7% of school teachers had experienced MSD symptoms in the shoulder area (Korkmaz, Cavlak & Telci, 2011). Where as in a study conducted on chinese school teachers, the highest shoulder pain prevalence was found to be 73.4% for the previous month (Chong & Chan, 2010). The prevalence of low back pain was found to be more than upper back pain in this study. 10.9% of teachers in this study reported upper back pain where as 15.9% teachers reported lower back pain. The finding of this study is supported by a study on Turkish school teachers, which found that 43.8% of the studied participants reported low back pain, compared to 36.9% of whom reported upper back pain (Cavlak, 2011). This might be due to more of standing postures used while teaching and poor posturing while seated works mostly forward bending of neck and upper back.

The overall prevalence of musculoskeletal disorders in Private school teachers was significantly high as compared to Government school teachers. This may be due to increase level of work demands as a result of competition in education system.

As no study was done reporting the stress level of teachers, so in this study, we included three levels of stress which were significantly weak, moderately weak and significantly high level of stress. Most of the respondents had moderate level of stress (41.66%), which had a significant co-relation between stress and prevalence of musculoskeletal disorders at 0.001 level.

The self-reported risk factors found in this study were BMI, type of work, lifestyle Work place and psychosocial working conditions were also found to be important risk factors for WRMDs in teachers. In a Chinese study of secondary school teachers, low colleague support, high anxiety, and high workload were significantly associated with neck pain (Chiu & Lam, 2007). As teachers work in stressful conditions with large classes, lack of educational resources and limited reward for their work, the psychosocial stress affects their mental health (Cardoso, 2009). In this study, the prevalence of musculoskeletal disorders was directly associated with BMI and stress level. Most of the respondents were overweight and having moderate level of stress. The limitations of the study were: the questionnaire was self reported and the stress inventory questionnaire was too long for the candidates. The future researches could be posture evaluation for the candidates according to the musculoskeletal problems, so as to plan a

rehabilitation program or computerized posturography can be done for posture evaluation.

## CONCLUSION

The prevalence of Work related Musculoskeletal Disorders among school teachers is higher especially pertaining to neck, elbow, knees and ankle/feet. There was high prevalence of musculoskeletal disorders in Private school teachers as compared to Government school teachers and also there was high level of stress in private school teachers as compare to government school teachers. Risk factors like BMI, stress, teaching level, duty hours leads to more musculoskeletal problems among school teachers.

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