



Work-related musculoskeletal complaints among school & college teachers of Pune: Cross-sectional study

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Abstract

Background & Objective: Teachers in education system have to undergo various difficulties during work tasks which have significant impact on physical health and quality of life of teachers. Prevalence of work - related musculoskeletal complaints among teachers lead to considerable effect on education system at each and every level. Therefore, this study focuses on evaluation of work-related musculoskeletal complaints among school and college teachers.

Method: The survey based cross-sectional study was conducted during Dec 2022 - Feb 2023 among 100 school & college teachers of south Pune. A self-administered questionnaire was used through direct interview method. The questionnaire was divided into two parts, first part consists of demographic information and second part consists of Modified Nordic Musculoskeletal Questionnaire. The gathered data was analysed using Microsoft Excel 2007 spreadsheet and results was obtained.

Result: Out of 100 participants, 48 were school teachers and 52 were college teachers. Among which school teachers reported chronic complaints for neck (54%), knees (50%) & lower back (42%) and college teachers reported for knees & lower back (42.3%). Acute complaints was at lower back (46%), knee (40%), neck & shoulder(35.5%) and at lower back & knees(27%) for college teachers.

Conclusion: The results obtained states that the school teachers are more prone for work-related musculoskeletal complaints than college teachers.

Keywords: work-related musculoskeletal complaints, school teachers, college teachers, south Pune, modified Nordic questionnaire

Introduction

Musculoskeletal disorders is a broad term which mostly involve inflammatory & degenerative conditions that affects muscles, tendons, ligaments, joints, peripheral nerves & supporting blood vessels. These include syndromes such as tendon pathologies like tenosynovitis, epicondylitis, bursitis, nerve compression condition like sciatica, carpal tunnel syndrome; degenerative joint disease & other conditions such as myalgia, LBP & other. These localized pain syndromes do not have any underlying pathology. Commonly involved body regions are lower back, neck, shoulder, forearm & hand along with lower extremities which recently are under consideration [2]. These disorders of muscles, skeletal system & soft tissues which are observed or asserted to be caused due to work are known as work-related musculoskeletal disorders [1].

On the basis of epidemiologic investigations & experimental science, the physical job patterns which are mentioned as dangerous for musculoskeletal complaints include, speedy work pace ; tedious movement patterns ; inadequate recovery time ; heavy lifting & forceful manual exertions ; prolonged static or dynamic body postures ; mechanical pressure ; vibrations ; exposure to heat /cold ; any of these in combination of each other along with patterns of psychosocial work environment (like high demands & low self – confidence for work). There is multifactorial etiology of these disorders among the population as whole. Everyone unprotected at work place won't develop musculoskeletal complaints & everyone with musculoskeletal complaints

might not have ergonomic exposure at work. The term 'work-related' disorders are appropriated in order to differentiate occupational disorders where single factor is sufficient to cause the disease [2].

Symptoms of work-related musculoskeletal complaints involve pain, paresthesia, strain & fatigue along with musculoskeletal system disease which was caused due to workers working condition. These symptoms can lead to individual's negative perception of health. In order to quantify prevalence & to evaluate different affected populations, assessment of work-related musculoskeletal-complaints are important as data collection [7].

Work-related musculoskeletal complaints are troublesome at rest as well as at work place. Almost in all works, upper limb is involved hence upper extremity is mostly involved in work-related musculoskeletal problems, moreover lower limbs & back also involved where these are utilized in work. Work-related musculoskeletal complaints do not develop within single trauma, it results because of repetitive trauma, and develops gradually & slowly [10]. Lengthened period of static sitting leads to tightness, reduced circulation & pain in joints. Extended duration of ceaseless work increases the risk of musculoskeletal difficulties which have consequences of lifelong disability [1]. The development of these disorders is made in stages from acute to chronic & from mild to severe. Hence it is important to quickly response to symptoms as soon as people notice them [8]. Universally, work-related musculoskeletal difficulties causes remarkable financial distress in terms of lost wages,

treatment & compensation & is responsible for significant impact on quality of life ^[1]. Less time for recovery from pain symptoms leads to high levels of absenteeism due to health condition. Hence it leads to stress, along with consequences on physical & mental health which is having impact on professional performance ^[1, 8].

Though teaching is said as 'Mother of all professions', it is also regarded as stressful profession ^[12]. Education ensures economic growth & technical & scientific developments in any society which in turn, work of teachers have fundamental social value. In order to guide & encourage students to develop & fulfil their academic potential, teachers plans, organizes & implements appropriate instructional program in learning environment ^[9]. Teachers working activities involves prolonged standing or sitting working in inappropriate posture, writing with elevated arm on board, hand activities such as writing & typing, etc., these all alone or in combination with others leads to musculoskeletal disorder symptoms ^[4].

Musculoskeletal disorders are increased in teachers as their job demands include prolonged period of static body postures for everyday throughout the year which stresses musculoskeletal system.¹⁴ Musculoskeletal pain ranks 6th, 7th & 10th for shoulder, neck & low back pain respectively as most often reported complaint among school teachers which is due to prolonged desk work, continuous standing, overhead writing on board, prolonged sitting due to frequent reading, preparing lessons & marking assignments & working on computer ^[6, 8].

Various factors are compromised with high prevalence of musculoskeletal pain among school teachers which include lifting loads, prolonged sitting, inappropriate posture, anxiety level, excessive workload, low colleague support & poor mental status. Most important aggravating factors for musculoskeletal pain are lack of social confidence, poor social support, low level of education, poor work content, low job satisfaction, inadequacy of income, hard physical work, smoking, obesity, frequent lifting & inappropriate posture. Also the factors significantly associated with musculoskeletal disorders include severe vitamin D deficiency, presence of chronic illness, anxiousness, feeling of bad mood, level of teaching, marital status & BMI. The hike of overused & tired body which includes bones, joints & muscles results in musculoskeletal pain. Mostly it is work – related & can be acute or chronic. And Teachers nature of work is responsible for development of musculoskeletal problems among them. As they are in standing for most of time moving around to monitor progress & to ensure students comprehensibility of subject content ^[6]. Adverse physical and mental health issues are caused to teachers as they spend more time in standing in classroom walking through the classroom & be able to work in tight spaces between desks, teaching students, writing on blackboard, preparing lessons, grading assignments & administrative work, etc ^[9].

College teachers uses computers for preparing presentations, e- learning activities, publications, research, etc. Excessive work – load less resting time, rigorous working pace & high level of stress, these along with excessive improper use of computers can lead to increment in risk of health issues. Working monotonously in faulty workplace & computer use leads for risk of development of work-related musculoskeletal disorders among college teachers ^[1].

Working in pressure situation contribute in causing work-related musculoskeletal problems. More experienced teachers are more prone for development of work-related musculoskeletal complaints ^[10].

As college teachers have administrative work, teaching, research & extensions exhibit numerous pressure sources which arise beyond changes in labour system like high workload, short rest intervals, vigorous working pace & requirement of high levels of attention & concentration. When these situations are related to high stress level, there is impact on quality of life which is having considerable effect on health disorders like musculoskeletal problems which have prevalence among college professors. Hence they require more attention for health risks & problems associated to their activity. Hence studies involving this population should justify physiotherapeutic actions on them along with preventive measures & actions alongside evaluation & intervention projects which will act to fight musculoskeletal pain & discomfort ^[7].

The rate of musculoskeletal complaints has increased in teachers with advancement in technology, inactivity & fatigue. Aging & changing work nature can lead to rise in development of occupational- health issue ^[13]. In order to full fill teaching objectives; teaching is executed under undesirable situations, in which teachers activate their physical, cognitive & affective capacity over demanding effort of their psycho-physiologic function ^[5]. Factors that are associated with professional work have impact on development of musculoskeletal disorders. Those can be physical factors like carrying weights, repetitive movements, etc; mechanical vibrations, noise, etc can lead to development of musculoskeletal disorders ^[11].

Self-reported symptoms or functional impairments are more enlightening than the physical assessment techniques ^[2]. Well-designed tool for analysis and detection of musculoskeletal symptoms Named Modified Nordic Musculoskeletal Questionnaire (NMQ) can be used. The questionnaire Consist of data on musculoskeletal symptoms in 9 parts of body (neck, shoulder, elbow, wrist/hands, lower back, hip/thighs, knee, ankle/feet) during last 12 months and last 7 days the problem affecting work. The Nordic Questionnaire has been used extensively in many projects as well as in day-to-day work in health care services for comparing results of different studies & populations ^[2].

It is therefore important that physiotherapist to collect information about musculoskeletal problems faced by teachers of school as well as college in order to evaluate and overcome difficulties. Hence the need is to study the impact of "Work - related musculoskeletal complaints among school and college teachers."

Materials & methodology

This survey based cross-sectional study was conducted during Dec 2022 - Feb 2023 among school & college teachers of south Pune. Teachers included in this study who satisfies inclusion criteria of age which should be more than 25 years, experience in teaching should be more than at least 1 year & teachers who involves in teaching for minimum 3 hours per day. Both male & female teachers were included & teachers who had recent trauma or injuries and teachers who have diagnosed with any systemic illness or musculoskeletal disorders were excluded from the study. After getting ethical approval from the college ethical committee, schools & colleges of south Pune were approached as per convenience and permission for data

collection was obtained from principals of schools & colleges. After getting valid consent from the participants the data collection was carried out.

A self-administered questionnaire was used through direct interview method among 100 teachers out of which 48 were from schools of south Pune and 52 were college teachers. The questionnaire was divided into two parts, first part consists of demographic information such as age, height, weight, hand dominance, working hours per day, teaching experience along with history of medical illness and recent trauma; second part consists of prevalidated Modified Nordic Musculoskeletal Questionnaire which involves questions over distribution of 9 different areas of body from 12 months which shows chronicity of complaints and last 7 days which reflects acute complaints. Along with this the questionnaire also focuses on whether these complaints lead to prevention of normal work or not, and at last whether these complaints required physician consultation or not.

The gathered data was analysed using Microsoft Excel 2007 spreadsheet and results was obtained.

Result and data analysis

Data analysis was carried out using Microsoft Excel 2007, and obtained results as described below.

Table 1: Distribution of socio-demographic variables of school & college teachers.

Demographic Data	School Teachers			College Teachers		
	Max.	Min.	Mean	Max.	Min.	Mean
Age (in years)	62	25	39.58	66	25	36.04
Height (in CMS)	178	150	161.81	183	150	162.5
Weight (in kgs)	90	47	68.31	120	38	70.87
Teaching Experience (in years)	43	2	12.74	35	1	10.2
Daily Working Hours	8	3	5.66	8	2	5.46

Interpretation

This table shows average age of school teachers is 39.58 & that of college teachers is 36.04 which is less than school teachers. Also, average teaching experience of school teachers was 12.74 & that of college teachers was 10.2 which indicates less number than school teachers. The average daily working hours of school teachers was 5.66 & that of college teachers was 5.46 which is almost equal to school teachers.

Table 2: Trouble during last 12 months

Body Regions	Trouble at last 12 months	
	School Teachers (n=48)	College Teachers (n=52)
Neck	54%	25%
Shoulders	33%	15%
Elbows	12.50%	4%
Wrist / Hands	18.75%	14%
Upper Back	27%	23%
Lower Back	42%	42.30%
Hips / Thighs	27%	11.53%
Knees	50%	42.30%
Ankles / Feet	37.50%	15.40%
None	12.50%	27%

Graph no 1: This graph shows the trouble of school and college teachers during last 12 months. According to this graph school teachers was prevalent for neck (54%), knee(50%) & lower back(42%) and college teachers have prevalence of symptoms at knee(42.3%) & lower back(42.3%). The graph interprets that school teachers have more complaints than that of college teachers.

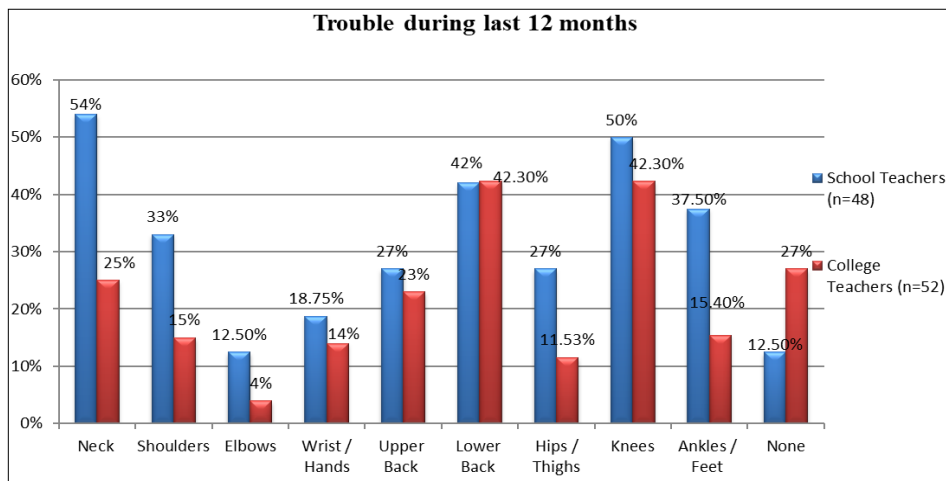


Fig 1

Table 3: Prevented from doing normal work because of trouble in last 12 months.

Body Regions	Prevented from doing normal work	
	School Teachers (n=48)	College Teachers (n=52)
Neck	31.25%	8%
Shoulders	15%	5%
Elbows	4.16%	2%
Wrist / Hands	8.33%	3.85%
Upper Back	16.70%	9.62%
Lower Back	31.25%	25%
Hips / Thighs	16.70%	8%
Knees	25%	23%
Ankles / Feet	22.90%	9.62%
None	29.16%	53.84%

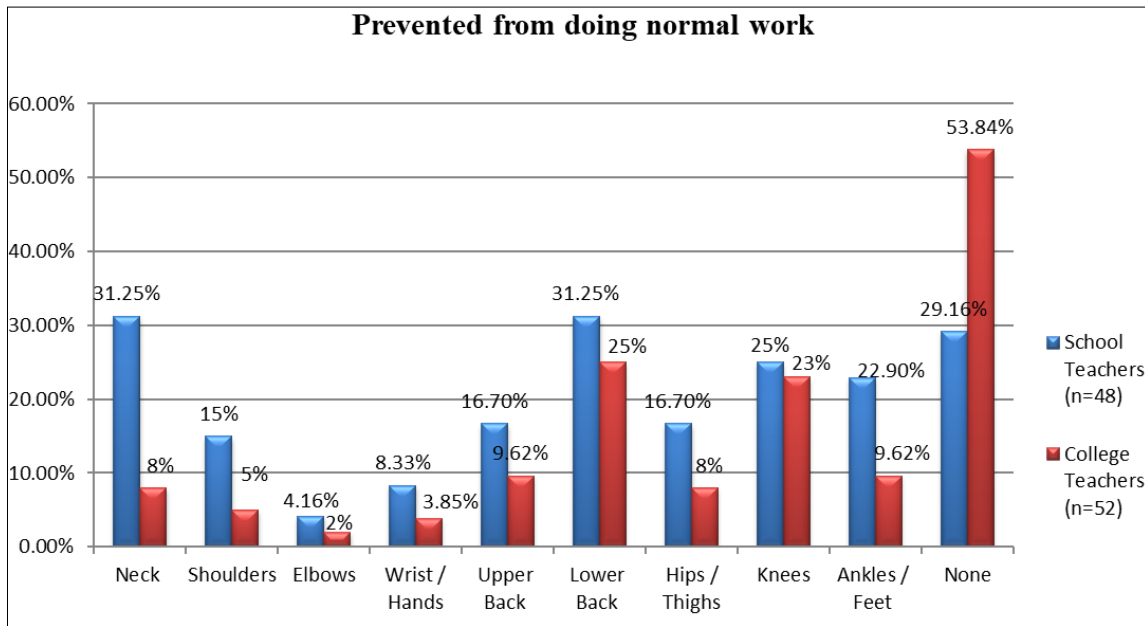


Fig 2

Graph no 2: Shows the data about school and college teachers been prevented from doing normal work because of complaints during last 12 months. This graph indicates that neck (31.25%) & lower back (31.25%) among school

teachers and lower back(25%) & knee(23%) among college teachers are the complaint sites which prevented their normal work.

Table 4: Trouble for last 7 days

Body Regions	Trouble for Last 7 Days	
	School Teachers (n= 48)	College Teachers (n= 52)
Neck	35.50%	15.40%
Shoulders	35.50%	5%
Elbows	10.42%	3.85%
Wrist / Hands	12.50%	3.85%
Upper Back	18.75%	9.62%
Lower Back	46%	27%
Hips / Thighs	15%	14%
Knees	40%	27%
Ankles / Feet	20.80%	11.54%
None	20.80%	58%

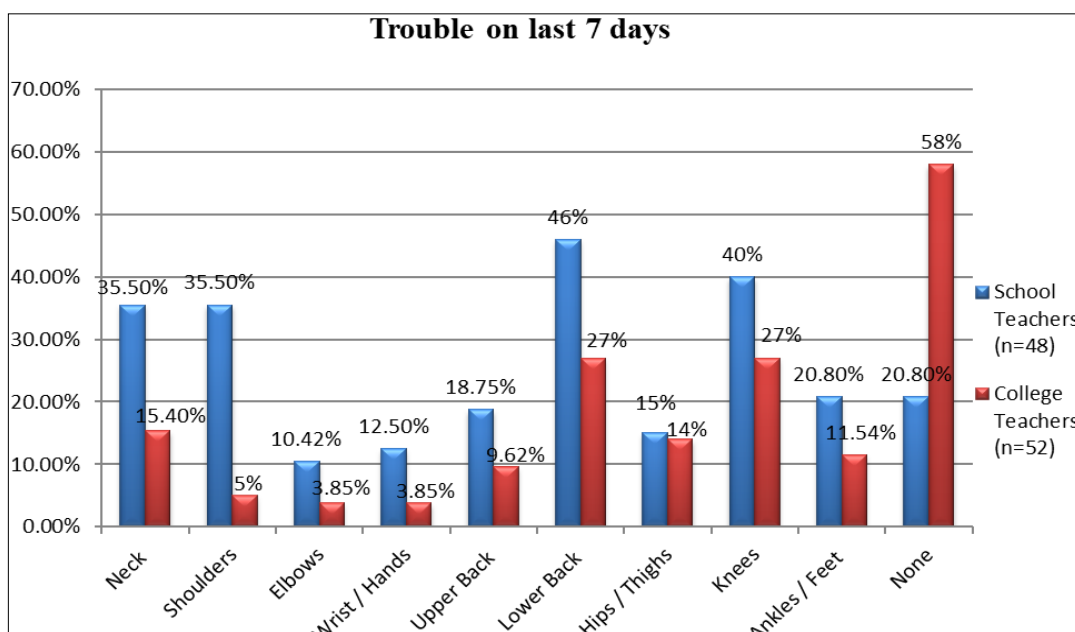


Fig 3

Graph no 3: Shows the data about school and college teachers who had trouble during last 7 days. According to this graph school teachers have acute complaints at lower back (46%), knee (40%), neck (35.5%) & shoulder (35.5%)

and college teachers have acute symptoms at knee (27%) & lower back (27%). The graph interprets that school teachers have more acute complaint sites than that of college teachers.

Table 5: Seen by a doctor because of trouble during last 12 month

Body Regions	Seen by doctor during last 12 months	
	School Teachers (n=48)	College Teachers (n=52)
Neck	25%	2%
Shoulders	18.75%	2%
Elbows	4.16%	5%
Wrist / Hands	8.30%	5%
Upper Back	12.50%	3.85%
Lower Back	31.25%	21.20%
Hips / Thighs	10.42%	3.85%
Knees	31.25%	13.50%
Ankles / Feet	14.58%	11.54%
None	35.42%	58%

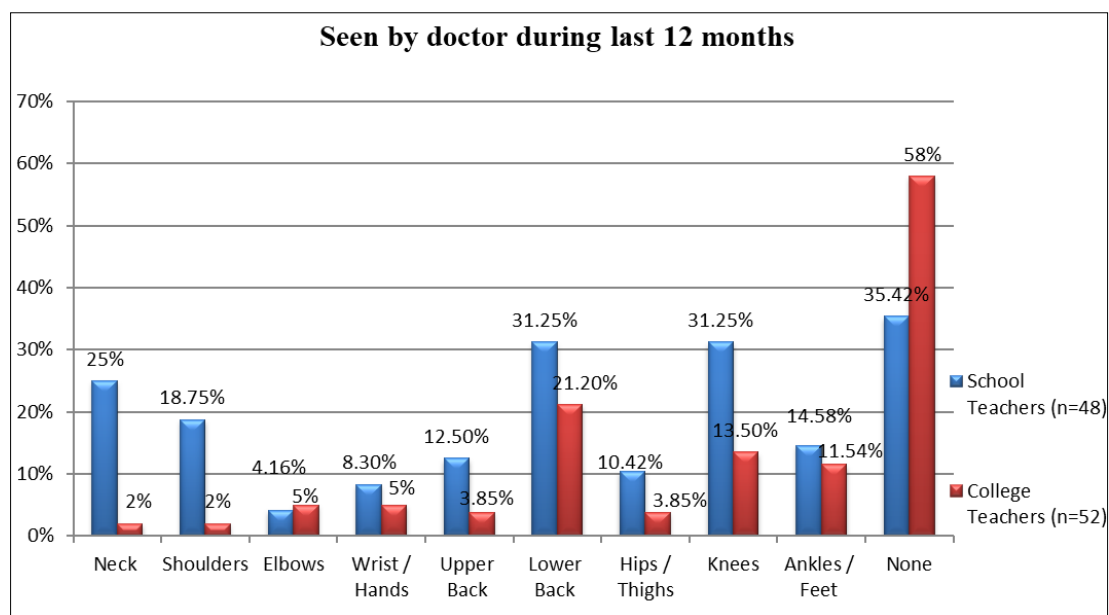


Fig 4

Graph no 4: Shows about the distribution of school and college teachers who have seen by a doctor because of trouble during last 12 months. According to this school teachers seek help of physician for complaints at lower back, knees & neck. And college teachers had taken help of doctor for symptoms at lower back & knee region.

Discussion

The aim of the present study is to study work related musculoskeletal complaints among school & college teachers of Pune. The study is focused to compare the work-related musculoskeletal complaints to among school & college teachers using modified Nordic musculoskeletal questionnaire.

Work – related musculoskeletal complaints are disorders of muscle, skeletal system & soft tissues which are observed or asserted to be caused due to work & work related factors. these mostly involve symptoms like pain, paraesthesia, numbness, fatigue along with conditions such as tenosynovitis, nerve compression disorders, degenerative disease or other localized pain syndromes.

Teachers involves in work activities such as prolonged sitting, standing, working in awkward postures, writing with

elevated arm on board, hand activities such as reading, writing, typing etc can lead to musculoskeletal complaints because of their working conditions.

Previous studies conducted were done for school teachers and college teachers individually. These concluded that neck, back & knee was the most prevalent site for musculoskeletal complaints among school as well as college teachers. various studies also found that the factors which could be associated for these complaints among school and college teachers involves number of teaching tasks such as preparing lessons, assessing students work, checking exam work, overhead writing on board, computer work, and administrative work etc. These along with other risk factors such as inappropriate sitting & standing postures, high work load, low colleague support, anxiety level, etc can lead to musculoskeletal complaints among teachers.

On the other hand, this cross-sectional survey documented work-related musculoskeletal complaints among school as well as college teachers. Total 100 teachers were participated in study out of which 48 were school teachers & 52 were of college teachers. There was predominance of female participants in both categories over males. The participants female school teachers (83%) & male school

teachers (17%); female college teachers (64%) & male college teachers (36%).

Table no. 1 shows the distribution of demographic categories where average age of school teachers was 39.58 & that of college teachers was 36.04. The average teaching experience was 12.74 years of school teachers & 10.2 years was of college teachers. The daily working hours of school teachers was as average 5.66 & of college teachers was 5.46.

Graph no. 1 shows musculoskeletal complaints of teachers during last 12 months. School teachers reported to have most painful sites as neck, knees, lower back with average of 64%, 50% & 42% respectively. College teachers reports most painful site as knee & lower back with average rate of 42.3% each. Other sites are also involved in school as well as college teachers but with less frequency. Hence it infers that teachers are involved in musculoskeletal difficulties which is because of their working conditions.

Graph no. 2 shows complain sites because of which participants were unable to carry out their normal work. Among which neck (31.25%) & lower back (31.25%) was the sites among school teachers which prevented their work & among college teachers lower back (25%) & knee (23%) were the sites leading to work prevention.

Graph no. 3 shows the acute complaints of teachers which is of last 7 days. Lower back(46%), knee(40%), neck (35.5%) & shoulder (35.5%) was the acute pain sites in school teachers while lower back (27%) & knees (27%) were the pain sites in college teachers.

Graph no.4 shows the complaint sites which lead to seek help of doctor involves lower back, knees & neck among school teachers with 31.25%, 31.25%, & 25% respectively. And college teachers involve lower back at rate of 21.2% & knee at rate of 13.50%.

Overall, our study found that there is high prevalence of musculoskeletal complaints among school teachers than college teachers, which can be because of various factors such as, working conditions, which contributes to stress on anatomical areas, poor ergonomic consideration, high demanding activities and age-related changes.

Therefore, in order to prevent or overcome these musculoskeletal complaints among all teachers, regular fitness training program, exercise sessions which includes muscular strengthening and endurance along with postural correction and ergonomic modification are required for reducing the present complaints and to avoid the occupational hazards.

Conclusion

Out of 100 participants, 48 were school teachers and 52 were college teachers of south pune involved in the study. Out of these, chronic complaint site for school teachers was neck (54%), knees (50%) & lower back (42%) and for college teachers was knees & lower back (42.3%). Acute complaint for school teachers was at lower back (46%), knee (40%), neck & shoulder (35.5%) whereas for college teachers was at lower back & knees (27%). These complaints lead to prevention of normal work activities & resulted to seek medical help among school as well as college teachers.

One of the factors for higher musculoskeletal complaints among school teachers can be of mean age which is significantly higher than college teachers. Hence, it is concluded that school teachers are more prone to work-related musculoskeletal complaints than college teachers.

Limitations

Study population was selected from single zone of Pune, which may not be representative of all as whole.

The study was conducted for short period with short sample population, hence very few areas of south Pune was included for both population.

The cross-sectional design of this study only determines self – reported work-related musculoskeletal complaints among school & college teachers which limits generalizability & association found just infers that two factors are related without establishing cause & effect relationship.

Future scope

This study involves small number of population involving both school & college teachers, future studies can administer large sample size.

The study was conducted for single zone of Pune, future studies can include more zones or other cities can be administered.

The study have comparison of only school & college teachers irrespective of their level of work, hence future studies can include various levels & qualification in educational field.

Conflict of interest

There is no conflict of interest.

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