Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 11 (1), 98-107

Occupational health status of High School teachers in Tirur educational District ws.r. to musculoskeletal disorders –A Cross sectional study

Research Article

Rajarajeswary T R[1*], Surendran E[2], Sowmya C Nair[3]

1. Post Graduate scholar, 2. Associate Professor, 3. Assistant Professor
Department of Swasthavritta, V P S V Ayurveda College, Kottakkal, Kerala.

Abstract

A cross sectional study was carried out among 140 high school teachers selected from 4 sub educational districts of Tirur educational district through multistage sampling. Both sexes were included in the study. The tool used for the study was Dutch musculoskeletal questionnaire and filled up by personal interview. The data obtained was statistically analyzed by using Chi square test, Yates correction and Fisher's exact test. Most reported musculoskeletal complaints were knee pain (43%), shoulder pain (34%), Lower back pain (23%) and ankle pain (22%). This study shows that musculoskeletal disorders are prevalent among high school teachers of Tirur educational district. Musculoskeletal disorders are associated with factors such as age, gender and occupational factors such as prolonged standing and overtime work.

Key Words: *High school teachers, musculoskeletal disorders, occupational health, government school and aided schools, Kerala.*

Introduction

The prevention of disease and maintenance of highest degree of physical, mental and social welfare of workers in all occupations is the aim of preventive medicine and occupational health.(1) The World Health Organization considers work place as one of the priority settings for health promotion because it influences physical, mental, economical and social well-being and offers an ideal setting and infrastructure to support the promotion of health of a large audience. (2) Just like home , the place of work is also an important environment for an earning person. Such a person spends nearly 6 to 8 hours a day in the working place till the retirement for about 3 decades. The worker as well as the working environment should be healthy, safe and free from harmful agents.It is becoming more complicated as man is more ingenious because of industrialization and urbanization.(3)

Work related musculoskeletal disorders are one among the occupational health problem. The work of a teacher does not only involve teaching students but also preparing lessons, assessing students' work and also being involved in extracurricular activities such as sports. Teachers also participate in different school committees. In some areas, teaching is done under unfavourable circumstances, in which teachers must mobilize their physical, cognitive and affective capability to reach a teaching production objective, over demanding or generating effort to their psycho-physiology functions.(4) In our state educational issues such as working stress, reduction in size and number of classes have already drawn much public attention. However, very little attention has been given to somatic health problems of teachers. So there is a need to study the health problems among school teachers. This study is giving focus to musculoskeletal disorders among the high school teachers.

*** Corresponding Author:**
Rajarajeswary TR
Department of Swasthavritta,
V P S V Ayurveda College,
Kottakkal, Kerala – 676501.
Email id - rajarajeswarytr@gmail.com

Materials & Methods

A cross sectional survey conducted among teachers of Tirur educational district. Teachers were selected according to the inclusion criteria and who were willing to give written consent. A pamphlet in Malayalam language containing the details of the research was given to the participants. Consent form in Malayalam language was prepared and prior consent of all the participants were obtained on the consent form. They were given the freedom to quit from the study at any part of it at their own will.

Inclusion criteria

- High school teachers from government and aided schools

- At least 6 years of teaching experience
- 30- 60 years of age group from both sexes

Exclusion criteria

- Temporary staff
- Staff who had taken more than one year leave
- Teachers working in un-aided schools

The study was descriptive cross sectional study among 140 samples.

Sampling

Multi stage sampling was used in the study. The target population of this study was high school teachers of Kerala; from that group high school teachers of Tirur educational district selected as source of population. In Tirur educational district there are 7 educational sub districts. From these 4 educational sub district were selected by simple random sampling method. From each sub district 2 schools (1 government and 1 aided) was selected by purposive sampling method.

Teachers from each school were selected based on inclusion criteria and availability of teachers.

Table No. 1 Educational subdistricts & distribution of teachers

Edu-subdistricts	No.of teacher	Percentage
Tirur	46	33%
Kuttipuram	32	23%
Edappal	32	23%
Ponnani	30	21%

Assessment tools

1. Case record form - To collect personal data, history of illness, family history , occupational history
2. Dutch musculoskeletal questionnaire shortened version (5) contains

- Background variables (e.g. age, gender, education, duration of employment,
- work history, shift work);
- Tasks (prevalence rates and perceived heaviness of task demands);
- 9 sub domains (Musculoskeletal workload of different body parts)
- Work pace and psychosocial working conditions (demands, control and autonomy, work organization and social support, work satisfaction)

In the present study 9 subdomains were analysed. Pain/ discomfort on neck, upper-back lower back, shoulder, elbow, wrist/hands, hips, knees, ankles/ feet were statistically tested.

The data were collected by personal interview method from available samples at the time of study.The statistical analysis of data was carried out with the help of Statistical

Package for Social Sciences (SPSS) 21.0 version

Results & Discussion

Statistical analysis of the current study is done to find out the association between the musculoskeletal disorders prevalent in high school teachers and the risk factors present in the same occupation.

To find out the association Chi square test is applied.

The test is done to find out whether any association exists between

1. Musculoskeletal disorders and personal factors
2. Musculoskeletal disorders and occupational factors among high school teachers in Tirur educational district.

When the expected frequency is less than 5, Yates correction has been done. When the observed frequency is less than 5, Fisher's exact test is applied.

1.Association between age and musculoskeletal disorder

Table No.2 Association of age & MSD

		Age							Chi-square	p-value
		Count	30-35	36-40	41-45	46-50	51-55	Total		
Neck	Yes	Observed	1	4	7	11	6	29	12.031	p<0.01
	No	Observed	34	16	26	19	16	111		
	Total	35	20	33	30	22	140			
Upper back	Yes	Observed	7	3	6	4	5	25	0.998	p>0.05
	No	Observed	28	17	27	26	17	115		
	Total	35	20	33	30	22	140			
Lower Back	Yes	Observed	10	6	6	8	5	35	1.428	p>0.05
	No	Observed	25	14	27	22	17	105		
	Total	35	20	33	30	22	140			
Shoulder	Yes	Observed	10	4	13	10	10	47	3.94	p>0.05
	No	Observed	25	16	20	20	12	93		
	Total	35	20	33	30	22	140			

Elbows	Yes	Observed	4	1	1	4	4	14	4.423	p>0.05
	No	Observed	31	19	32	26	18	126		
	Total	35	20	33	30	22	140			
Wrists/ hands	Yes	Observed	1	0	1	4	4	10	9.124	p>0.05
	No	Observed	34	20	32	26	18	130		
	Total	35	20	33	30	22	140			
Hips/	Yes	Observed	0	1	5	5	2	13	7.308	p>0.05
	No	Observed	35	19	28	25	20	127		
	Total	35	20	33	30	22	140			
Knees	Yes	Observed	15	10	13	11	15	64	6.259	p>0.05
	No	Observed	20	10	20	19	7	76		
	Total	35	20	33	30	22	140			
Ankles/Feet	Yes	Observed	1	2	8	10	10	31	18.46	p<0.01
	No	Observed	34	18	25	20	12	109		
	Total	35	20	33	30	22	140			

The mean age in the present study is 42.22. In this study neck pain and ankle pain are significantly associated with age. Majority (36.7%) of teachers who reported neck pain comes under the age group 46-50. 27.3% comes under age group 51-55. 21.2% fall into the age group of 41-45. Study by Erick and D.smith states a positive association between increasing age and the development of MSD. These studies found that teachers aged 40 years or over were more likely to report MSD of different body sites. It has been suggested that the likely reason for a higher prevalence of MSD among older teachers is that as people age, there is a gradual decline in muscle mass and they lose connective tissue elasticity and undergo a thinning of the cartilage between joints.

Apart from natural wear and tear on the body, MSD among older teachers may also be influenced by work environment and the organisation of work. (6)

2. Association between Gender and musculoskeletal disorder

Table No. 3 Association of gender with MSD

		Sex				Chi-square	p-value
		Count	Male	Female	Total		
Neck	Yes	Observed	14	15	29	0.097	p>0.05
	No	Observed	50	61	111		
	Total	64	76	140			
Upper back	Yes	Observed	9	16	25	1.157	p>0.05
		Percentage	14.1%	21.1%	17.9%		
	No	Observed	55	60	115		
	Total	64	76	140			
Lower Back	Yes	Observed	15	20	35	0.154	p>0.05
	No	Observed	49	56	105		
	Total	64	76	140			
Shoulder	Yes	Observed	18	29	47	1.568	p>0.05
	No	Observed	46	47	93		
	Total	64	76	140			
Elbows	Yes	Observed	4	10	14	1.842	p>0.05
	No	Observed	60	66	126		
	Total	64	76	140			
Wrists/ hands	Yes	Observed	1	9	10	5.535	p<0.05
	No	Observed	63	67	130		
	Total	64	76	140			
Hips/	Yes	Observed	5	8	13	0.304	p>0.05
	No	Observed	59	68	127		
	Total	64	76	140			

Knees	Yes	Observed	24	40	64	3.206	p>0.05
	No	Observed	40	36	76		
	Total	64	76	140			
Ankles/Feet	Yes	Observed	8	23	31	6.359	p<0.05
	No	Observed	56	53	109		
	Total	64	76	140			

In the current study neck pain is more reported by male participants (21.9%) and female participants of 19.7%. Musculoskeletal disorders of other body sites are more reported by the female teachers than male participants. There is statistically significant association shown by wrist pain and ankle joint pain with female gender (p<0.05). In a Chinese study, musculoskeletal complaints are often associated with the female gender. 93.5% women complained of musculoskeletal problems while 83.0% male teachers reported the same ;($p < .001$). Females, representing a higher proportion of teachers often have a higher prevalence of MSD. This study also found that women bore more heavy housework responsibilities than men in daily life. Differences in household task participation may also explain musculoskeletal differences.(7) In the present study musculoskeletal disorders in neck is more reported by male gender which is inconsistent with other study.

3.Association between addiction and musculoskeletal disorders

Table No.4 Association of addiction and musculoskeletal disorders

		Addiction				Chi-square	p-value
		Count	Smoking	None	Total		
Neck	Yes	Observed	2	27	29	0.608	p>0.05
	No	Observed	4	107	111		
	Total	6	134	140			
Upper back	Yes	Observed	1	24	25	0.006	p>0.05
	No	Observed	5	110	115		
	Total	6	134	140			
Lower Back	Yes	Observed	1	34	35	0.232	p>0.05
	No	Observed	5	100	105		
		Percentage	83.3	74.6	75		
	Total	6	134	140			
Shoulder	Yes	Observed	1	46	47	0.803	p>0.05
	No	Observed	5	88	93		
	Total	6	134	140			
Elbows	Yes	Observed	1	13	14	0.31	p>0.05
	No	Observed	5	121	126		
	Total	6	134	140			
Wrists/hands	Yes	Observed	0	10	10	0.482	p>0.05
	No	Observed	6	124	130		
	Total	6	134	140			
Hips/	Yes	Observed	0	13	13	0.642	p>0.05
	No	Observed	6	121	127		
	Total	6	134	140			
Knees	Yes	Observed	3	61	64	0.046	p>0.05
	No	Observed	3	73	76		
	Total	6	134	140			
Ankles/Feet	Yes	Observed	0	31	31	1.783	p>0.05
	No	Observed	6	103	109		
	Total	6	134	140			

In the present study there is no statistically significant association between addiction and musculoskeletal disorders.

4.Association between work experience and Musculoskeletal disorder

Table No.5 Work experience and musculoskeletal disorders

		Work Experience						Chi-square	p-value
		Count	6 to 12	13 to 19	20 to 26	27 to 33	Total		
Neck	Yes	Observed	7	7	11	4	29	6.644	p>0.05
	No	Observed	56	19	28	8	111		
	Total	63	26	39	12	140			
Upper back	Yes	Observed	11	6	5	3	25	1.582	p>0.05
	No	Observed	52	20	34	9	115		
	Total	63	26	39	12	140			
Lower Back	Yes	Observed	16	7	8	4	35	0.92	p>0.05
	No	Observed	47	19	31	8	105		
	Total	63	26	39	12	140			
Shoulder	Yes	Observed	18	10	12	7	47	4.422	p>0.05
	No	Observed	45	16	27	5	93		
	Total	63	26	39	12	140			
Elbows	Yes	Observed	5	2	4	3	14	3.455	p>0.05
	No	Observed	58	24	35	9	126		
	Total	63	26	39	12	140			
Wrists/ hands	Yes	Observed	1	2	4	3	10	9.283	p<0.01
	No	Observed	62	24	35	9	130		
	Total	63	26	39	12	140			
Hips/	Yes	Observed	1	4	7	1	13	9.068*	p<0.01
	No	Observed	62	22	32	11	127		
	Total	63	26	39	12	140			
Knees	Yes	Observed	27	13	15	9	64	5.374	p>0.05
	No	Observed	36	13	24	3	76		
	Total	63	26	39	12	140			
Ankles/ Feet	Yes	Observed	4	11	12	4	31	17.803	p>0.05
	No	Observed	59	15	27	8	109		
	Total	63	26	39	12	140			

Musculoskeletal disorders in hip region and wrists show statistically significant association with work experience (p<0.01). 25% teachers who reported wrist pain have work experience ranging from 27-33 years. 10.3% teachers with wrist pain have an experience 20-26 years. 7.7% teachers come under 13-19 years of experience and only 1.9% teacher comes under 6-12 years of experience. In the case of hip pain 17.9% teachers have an experience of 20-26 years. 15.4% teachers with hip pain have an experience of 13-19 years. Only 8.3% teachers with experience of 27-33 years reported hip joint pain. This is a contradictory finding between length of employment and development of musculoskeletal disorders. Longer length of employment is positively associated with wrist pain. This finding go hand in hand with the study by T.Mariammal et al done among teachers in thoothukudi town. It is stated that as the experience of teachers increased, the development of the disorders were also high. The much affected disorders observed were Neck and shoulder pain and pain in joints of legs and hands.(8) It can been interpreted that longer the exposure time to occupational risk factors higher the chance of getting job related disorders.

5.Association between working hour and Musculoskeletal disorder

Table No.6 Association of working hour and Musculoskeletal disorder

		Working hour					Chi-square	p-value
		Count	6 hours	7 hours	8 hours	Total		
Neck	Yes	Observed	27	0	2	29	4.18	p>0.05
	No	Observed	109	1	1	111		
	Total	136	1	3	140			
Upper back	Yes	Observed	25	0	0	25	0.895	p>0.05
	No	Observed	111	1	3	115		
	Total	136	1	3	140			

Lower Back	Yes	Observed	33	0	2	35	3.15	p>0.05
	No	Observed	103	1	1	105		
	Total	136	1	3	140			
Shoulder	Yes	Observed	47	0	0	47	2.081	p>0.05
	No	Observed	89	1	3	93		
	Total	136	1	3	140			
Elbows	Yes	Observed	14	0	0	14	0.458	p>0.05
	No	Observed	122	1	3	126		
	Total	136	1	3	140			
Wrists/ hands	Yes	Observed	10	0	0	10	0.317	p>0.05
	No	Observed	126	1	3	130		
	Total	136	1	3	140			
Hips/	Yes	Observed	13	0	0	13	0.421	p>0.05
	No	Observed	123	1	3	127		
	Total	136	1	3	140			
Knees	Yes	Observed	63	0	1	64	1.048	p>0.05
	No	Observed	73	1	2	76		
	Total	136	1	3	140			
Ankles/ Feet	Yes	Observed	30	0	1	31	0.503	p>0.05
	No	Observed	106	1	2	109		
	Total	136	1	3	140			

There is no significant association with working hours musculoskeletal disorders in neck, shoulder, elbows, wrists, upper back, lower back, hip, knees, ankles and feet

6. Association between time of standing and Musculoskeletal disorder

Table No.7 Time of standing and musculoskeletal disorders

		Time of standing					Chi-square	p-value
		Count	4-5hrs	6-7 hrs	8-9hrs	Total		
Neck	Yes	Observed	22	5	2	29	4.196	p>0.05
	No	Observed	94	16	1	111		
	Total	116	21	3	140			
Upper back	Yes	Observed	20	5	0	25	1.189	p>0.05
	No	Observed	96	16	3	115		
	Total	116	21	3	140			
Lower Back	Yes	Observed	28	6	1	35	0.3	p>0.05
	No	Observed	88	15	2	105		
	Total	116	21	3	140			
Shoulder	Yes	Observed	39	8	0	47	1.709	p>0.05
	No	Observed	77	13	3	93		
	Total	116	21	3	140			
Elbows	Yes	Observed	13	1	0	14	1.161	p>0.05
	No	Observed	103	20	3	126		
	Total	116	21	3	140			
Wrists/ hands	Yes	Observed	5	5	0	10	10.429	p<0.05
	No	Observed	111	16	3	130		
	Total	116	21	3	140			
Hips/	Yes	Observed	12	1	0	13	0.972	p>0.05
	No	Observed	104	20	3	127		
	Total	116	21	3	140			

Knees	Yes	Observed	51	12	1	64	1.434	p>0.05
	No	Observed	65	9	2	76		
	Total	116	21	3	140			
Ankles/ Feet	Yes	Observed	22	8	1	31	3.997	p>0.05
	No	Observed	94	13	2	109		
	Total	116	21	3	140			

Wrist pain shows statistically significant association with time of standing and MSD ($p<0.05$). Musculoskeletal disorders in other body sites do not show any statistical significance. This is supported by another study by T.mariammal et al in which 66.59% reported pain in hands. Lifting of hands and head during writing in the black board may be the causative factor for neck and shoulder pain and also pain in hands and joints of hands.

7.Association between duration of computer use and musculoskeletal disorders

Table No.8 Duration of computer use & musculoskeletal disorders

		Duration of computer use (in hours)							Chi-square	p-value
		count	0 hr	Upto 1 hr	1-2hr	2-3 hr	>3hr	Total		
Neck	Yes	Observed	12	10	3	3	1	29	3.136	p>0.05
	No	Observed	37	54	13	5	2	111		
	Total	49	64	16	8	3	140			
Upper back	Yes	Observed	10	10	2	2	1	25	1.516	p>0.05
	No	Observed	39	54	14	6	2	115		
	Total	49	64	16	8	3	140			
Lower Back	Yes	Observed	14	15	3	2	1	35	0.861	p>0.05
	No	Observed	35	49	13	6	2	105		
	Total	49	64	16	8	3	140			
Shoulder	Yes	Observed	21	20	4	2	0	47	4.356	p>0.05
	No	Observed	28	44	12	6	3	93		
	Total	49	64	16	8		140			
Elbows	Yes	Observed	7	5	1	1	0	14	1.979	p>0.05
	No	Observed	42	59	15	7	3	126		
	Total	49	64	16	8		140			
Wrists/ hands	Yes	Observed	5	4	1	0	0	10	1.635	p<0.05
	No	Observed	44	60	15	8	3	130		
	Total	49	64	16	8		140			
Hips/	Yes	Observed	7	6	0	0	0	13	4.219	p>0.05
	No	Observed	42	58	16	8	3	127		
	Total	49	64	16	8		140			
Knees	Yes	Observed	20	34	7	3	0	64	4.659	p>0.05
	No	Observed	29	30	9	5	3	76		
	Total	49	64	16	8		140			
Ankles/ Feet	Yes	Observed	12	13	3	3	0	31	2.335	p>0.05
	No	Observed	37	51	13	5	3	109		
	Total	49	64	16	8		140			

Wrist pain shows statistically significant association with computer usage ($p<0.05$). Inappropriate support and positioning of hands while using computers may be the reason for wrist pain.

8. Association between mode of transport and Musculoskeletal disorders

Table No.9 Mode of transport and musculoskeletal disorders

		Mode of Transport								Chi-square	p-value
		Count	Walk	2-wheeler	Car	Bus	Train	More than one Mode	Total		
Neck	Yes	Observed	5	9	2	10	0	3	29	1.728	p<0.01
	No	Observed	14	36	5	41	4	11	111		
	Total	19	45	7	51	4	14	140			
Upper back	Yes	Observed	5	2	1	14	0	3	25	10.698	p>0.05
	No	Observed	14	43	6	37	4	11	115		
	Total	19	45	7	51	4	14	140			
Lower Back	Yes	Observed	4	10	1	13	1	6	35	3.159	p>0.05
	No	Observed	15	35	6	38	3	8	105		
	Total	19	45	7	51	4	14	140			
Shoulder	Yes	Observed	10	18	1	15	1	2	47	7.959	p>0.05
	No	Observed	9	27	6	36	3	12	93		
	Total	19	45	7	51	4	14	140			
Elbows	Yes	Observed	4	3	0	5	0	2	14	4.645	p>0.05
	No	Observed	15	42	7	46	4	12	126		
	Total	19	45	7	51	4	14	140			
Wrists/ hands	Yes	Observed	4	3	0	2	0	1	10	7.202	p>0.05
	No	Observed	15	42	7	49	4	13	130		
	Total	19	45	7	51	4	14	140			
Hips/	Yes	Observed	1	6	0	3	0	3	13	5.518	p>0.05
	No	Observed	18	39	7	48	4	11	127		
	Total	19	45	7	51	4	14	140			
Knees	Yes	Observed	12	18	3	23	2	6	64	3.028	p>0.05
	No	Observed	7	27	4	28	2	8	76		
	Total	19	45	7	51	4	14	140			
Ankles/ Feet	Yes	Observed	7	6	1	14	0	3	31	6.633	p<0.01
	No	Observed	12	39	6	37	4	11	109		
	Total	19	45	7	51	4	14	140			

In the current study statistically significant association is shown by neck pain and ankle joint pain with mode of transport (p<0.01). 28.6% who reported neck pain travel by the car, 20% by two wheeler and 19.3% by bus. It may be due to inappropriate upper back support. In the case of ankle joint pain 27.5% travel by bus and 36.8% travel by walk. It may be due to the unscientific construction of steps of bus.

9.Association between distance travelled to work place and musculoskeletal disorders

Table No.10 Association of distance travelled to work place and musculoskeletal disorders

		Distance to work place						Chi-square	p-value
		count	0-10 KM	10-20KM	20-30KM	>30KM	Total		
Neck	Yes	Observed	20	4	0	5	29	1.163	p>0.05
	No	Observed	70	20	3	18	111		
	Total	90	24	3	23	140			
Upper back	Yes	Observed	13	4	0	8	25	5.882	p>0.05
	No	Observed	77	20	3	15	115		
	Total	90	24	3	23	140			
Lower Back	Yes	Observed	23	5	0	7	35	1.599	p>0.05
	No	Observed	67	19	3	16	105		
	Total	90	24	3	23	140			
Shoulder	Yes	Observed	31	10	0	6	47	2.83	p>0.05
	No	Observed	59	14	3	17	93		
	Total	90	24	3	23	140			

Elbows	Yes	Observed	8	5	0	1	14	4.403	p>0.05
	No	Observed	82	19	3	22	126		
	Total	90	24	3	23	140			
Wrists/ hands	Yes	Observed	9	0	0	1	10	3.456	p<0.05
	No	Observed	81	24	3	22	130		
	Total	90	24	3	23	140			
Hips/	Yes	Observed	10	3	0	0	13	3.312	p>0.05
	No	Observed	80	21	3	23	127		
	Total	90	24	3	23	140			
Knees	Yes	Observed	38	14	1	11	64	2.209	p>0.05
	No	Observed	52	10	2	12	76		
	Total	90	24	3	23	140			
Ankles/ Feet	Yes	Observed	21	5	1	4	31	0.617	p>0.05
	No	Observed	69	19	2	19	109		
	Total	90	24	3	23	140			

Wrist pain shows statistically significant association with distance travelled ($p<0.05$). In the case of wrist pain 10% travel within 10 km, only 4.3% travel more than 30 km. Musculoskeletal disorders in other body sites shows no significant association with distance travelled.

10.Overtime work and musculoskeletal disorders

Neck pain shows statistically significant relation with overtime work ($p<0.01$). Wrist pain and ankle joint pain shows a positive association with overtime work ($p<0.05$). These findings are consistent with other studies. Prolonged standing in an inappropriate way for several hours inside the class room resulted in musculoskeletal pain among teachers. Lifting of hands and head during writing in the black board may be the causative factor for neck pain and also pain in hands and joints of hands. Teachers involved to a considerable physical load remaining in the orthostatic position up to 95% of activities, with varied levels of flexion of the backbone resulted in several types of physical inability.(10)

.

Table No.11 Association of overtime and musculoskeletal disorders

		Overtime						Chi-square	p-value
		Count	Never	Rarely	Very Frequentl y	Always	Total		
Neck	Yes	Observed	10	10	2	7	29	13.624	p<0.01
	No	Observed	47	46	14	4	111		
	Total	57	56	16	11	140			
upper back	Yes	Observed	8	9	5	3	25	3.311	p>0.05
	No	Observed	49	47	11	8	115		
	Total	57	56	16	11	140			
Lower Back	Yes	Observed	12	17	2	4	35	3.422	p>0.05
	No	Observed	45	39	14	7	105		
	Total	57	56	16	11	140			
Shoulder	Yes	Observed	18	17	8	4	47	2.336	p>0.05
	No	Observed	39	39	8	7	93		
	Total	57	56	16	11	140			
Elbows	Yes	Observed	6	5	1	2	14	1.157	p>0.05
	No	Observed	51	51	15	9	126		
	Total	57	56	16	11	140			
Wrists/ hands	Yes	Observed	3	3	2	2	10	3.286	p<0.05
	No	Observed	54	53	14	9	130		
	Total	57	56	16	11	140			
Hips/	Yes	Observed	5	7	1	0	13	2.006	p>0.05
	No	Observed	52	49	15	11	127		
	Total	57	56	16	11	140			

Knees	Yes	Observed	26	22	9	7	64	3.072	p>0.05
		Percentage	45.6%	39.3%	56.3%	63.6%	45.7%		
	No	Observed	31	34	7	4	76		
		Percentage	54.4%	60.7%	43.8%	36.4%	54.3%		
	Total	57	56	16	11	140			
Ankles/ Feet	Yes	Observed	10	11	4	6	109	7.677	p<0.05
		Percentage	17.5%	19.6%	25%	54.5%	22.1%		
	No	Observed	47	45	12	5	31		
		Percentage	82.5%	80.4%	75%	45.5%	77.9%		
	Total	57	56	16	11	140			

Conclusion

The present study was an attempt to assess the prevalence of musculoskeletal disorders among high school teachers of Tirur educational District.

Hypotheses formulated by the cross sectional analysis of high school teachers of Tirur educational district are:

1. Among high school teachers neck pain and ankle pain are associated with age.
2. Among high school teachers wrist pain and ankle pain are associated with female gender.

1. Among high school teachers wrist pain and hip pain is associated with years of teaching.
2. Among high school teachers neck pain ,wrist pain and ankle pain is associated with overtime work

Limitation - Study conducted only in one educational district among 140 teachers which may under estimate the prevalence.

Recommendations - A comparative study can be done including private school teachers. An observational study can be conducted in all Kerala Basis.

References

1. Park K. Park's text book of preventive and social medicine. 24th edit. Jabalapur: M/S Bhanot publisher; 2017. 14 p
2. Vidya Ratan, Hand book of preventive and social medicine, 9th edition, NewDelhi: Jaypee Brother's Medical publishers (p) Ltd; 2010.1p
3. Suryakantha A.H Community medicine with recent advances 3rd ed. jaypee brothers medical publishers (p) Ltd 2014. 6p.
4. Erick P, Smith D. Musculoskeletal disorder risk factors in the teaching profession: a critical review. OA Musculoskeletal Medicine 2013 Dec 01;1(3):29. Available from http://www.oapublishinglondon.com/images/article/pdf/1399319378.pdf
5. Hildebrant V H, Bongers PM,Van Dijk FJH Kemper,H.C.G and J.Dul(2001) Dutch Musculoskeletal questionnaire:description and basic qualities Ergonomics,44(12), 1038-1055. Available from ergo.human.cornell.edu/studentdownload/DEA4700pdfs/DMQ.pdfs
6. Erick P, Smith D. Musculoskeletal disorder risk factors in the teaching profession: a critical review. OA Musculoskeletal Medicine 2013 Dec 01;1(3):29. Available from http://www.oapublishinglondon.com/images/article/pdf/1399319378.pdf
7. Chong EY, Chan AH. Subjective health complaints of teachers from primary and secondary schools in Hong kong. Int J occup Saf Ergon. 2010;16(1):23-29. Available from https://www.ncbi.nlm.nih.gov>pubmed
8. Mariammal T, Amrita Jaisheeba A,Sornaraj R.Occupation influenced physical illness observed among the teachers of Thoothukudi town. Int.J.PharmTech Res.2012,4(3): 1274-1278. Available from sphinxsai.com>pharm>pdfpharm
9. ibid .
10. Mesaria S. and Jaiswal N. musculoskeletal disorders among teachers residing in various nations: A review. Research journal of recent sciences.4; 23-27. Available from www.isca.in.

*****