ORIGINAL ARTICLE

Prevalence, Pattern of Musculoskeletal pain disorders and related factors among female school teachers

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ABSTRACT

Aim: This study was conducted to determine the prevalence of musculoskeletal pain disorders and related factors among female school teachers of Peshawar.

Methodology: A descriptive cross-sectional survey was conducted from February 2019 to July 2019 among primary and secondary female school teachers (n=289) in Peshawar. Data was collected from using semi-structured questionnaire. Outcome measures were based on modified version of Nordic musculoskeletal questionnaire (NMQ) and Numeric Pain Rating Scale (NPRS). Descriptive statistics was used to summarize qualitative variables in the form of frequencies and percentages. Mean and standard deviation was calculated for quantitative variables. Chi-square test was used to find association. The significant P value was <0.05.

Results: Prevalence of musculoskeletal pain disorders was 82.7%. The overall mean age of sample was 37.5±8.47. Most common sites of pain were low back 60.2% followed by neck pain 50.2%, ankle pain 48.4% and shoulder pain 44.3%. Factors that showed significant relationship were long time standing (p=0.001), long time sitting (p=0.039), checking copy/paper marking (p value 0.023) and uncomfortable work chair/table (p = 0.012).

Conclusion: Female school teachers showed high prevalence of musculoskeletal pain disorders, low back was the most common site for pain followed by ankle and shoulder. Risk factors associated with pain were long time standing, long time sitting, checking copy/paper marking and uncomfortable work chair/table.

Keywords: Musculoskeletal disorder, ergonomics, Nordic musculoskeletal questionnaire, low back pain, neck pain.

INTRODUCTION

Pain is a symptom which is commonly experienced by people. Most common cause of pain is musculoskeletal disorders[1]. Musculoskeletal disorders (MSDs) are a general term used for pain, discomfort or injury to muscles, tendons, spinal disc, cartilage, ligaments, joint and nerve in various parts of body because of single trauma or over injuries. MSDs if not prevented early causes problems in carrying out activities of daily living (ADL)[2]. Musculoskeletal disorders are a result of multiple risk factors. Incorrect posture of body or sometime correct static posture for a longer duration can result in MSDs[3]. The developments in technology and science has led to an increase fatigue, inactivity and problems in musculoskeletal problems among individuals[4].

Musculoskeletal problems are mostly related to job work force and teachers presents a larger number of job-related musculoskeletal disorders. Musculoskeletal disorders results in more absentees and loss of productivity, both of these factors contribute to substantial economic losses[5,6]. Poor ergonomics at work place are the main reason for musculoskeletal disorders. Proper compliance of working environment with ergonomic principle can result in less person affected from musculoskeletal disorders[7]. Teachers often use head down posture while doing laptop tasks, reading and checking assignments of students[8].

Studies in different countries have shown high prevalence of musculoskeletal disorders among teachers leading to depression and anxiety among them, but no such study is conducted in this region[9-11].

The purpose of current study was to determine prevalence of musculoskeletal pain disorders and related factors among female school teachers.

METHODOLOGY

This descriptive cross-sectional study was conducted among primary and secondary female school teachers of Peshawar from February 2019 to July 2019. Ethical approval was obtained from NCS University System, Peshawar.

The inclusion criteria include primary and secondary school teachers of both public and private sectors with age group between 23 – 60 years, work experience of more than one year, willingness to participate in the study while male gender, participants who had a history of trauma, fracture conditions such as pregnancy, diabetes or having any other musculoskeletal or neurological disorders, use of walking or congenital disability were excluded from the study. Data was collected from 35 different schools, 25 private and 10 public by convenient non-probability sampling technique. Sample size of the study was calculated by using Slovin's Formula with a confidence level of 95 percent, at a margin error of 5 percent, and the estimated size was 289. Permission was taken from school Principals and the teachers were informed about the nature of the study and written informed consent was taken before recruitment. Data was collected by using a semi-structured questionnaire comprising of three parts. First part of the questionnaire was related to the participant's sociodemographic and work-related characteristics. Second part of the questionnaire inquired about the pattern of musculoskeletal pain by using a modified version of the Nordic musculoskeletal questionnaire (NMQ).

Musculoskeletal problems were identified and noted among nine parts of the body including neck, shoulders, elbows, wrists/hands, upper back, lower back, hip/thighs, knees, and ankles/feet during the last 12 months/7 days. However, pain intensity was documented by using the Numeric Pain Rating Scale (NPRS) as mild[1,2,3], moderate[4,5,6], and severe[7-10]. Height and weight were measured and Body Mass Index (BMI) was calculated with formula weight/height² and interpreted as underweight (<18.5 kg/m²), normal weight (18.5 to 24.9 kg/m²), overweight (25.0 to 29.9 kg/m²), and obese (> 30 kg/m²). The third part of the questionnaire was related to pain-related risk factors. Data evaluation was performed by using a statistical package for social sciences (SPSS) software version 24. Descriptive statistics was used to summarize the qualitative variables in the form of frequencies and percentages, mean and standard deviations were used for the quantitative variables. The Chi-square test was used to find an association. The significance level was P < 0.05.

RESULTS

The mean age of the female school teachers was 37.5±8.47. Majority participants (n=95, 32.9%) were in 37-43 years age group, maximum of them were married 172(59.5%). Most of them had 1-2 children 119(41.2%). The mean body mass index found in the study was 27.6±4.82, the majority of participants were overweight 28(44.3%) while 24.6% had a normal body mass index. The mean hours of sleep identified were 7.0±1.16, most of the study participants were sleep hours under the category of 6-8 hrs. 158(54.7%). It was also observed that more than half of the participants (n=183, 63.3) did not exercise in their daily lives. Furthermore, most of the teachers prefer to wear flat shoes 211(73%) during job timings (Table 1). A total of 33.2 % from public and 66.8 % teachers from private schools, moreover 55.4% from primary level and 44.6% from secondary teaching level participated in the study. In addition, most of the teachers had work experience of greater than 5 years (n=155, 53.6%). Working daily hours of the majority of participants ranged between 6 to 8 hours 185(63.3%), and most of them had 3-4 classes per day 173(59.9.3%). Around 174(60.2%), research participants have 41 to 50 students per class and 95(32.9) have 30-40 students per class. (Table 2)

The overall prevalence of musculoskeletal pain identified among our study sample was 82.7%. Pain patterns among the population under study showed the highest prevalence past 12 months in lower back pain 60.2%, followed by neck pain 50.2%, ankle pain 48.4%, then shoulder pain 44.3%, and upper back pain 43.3%. The least involved areas were knees 37.4%, hips/thighs 32.9% hands 30.8%, and elbows 26.3%. Lower back pain was the most prevalent pain site 44.3% over the past 7 days, then neck 37.0% followed by shoulders 32.5% and ankles 32.9%. Wrist/ hands 14.5% and thighs/ buttocks 15.2% were least involved sites over the past 7 days. Pain intensity reported mostly by teachers was mild 38.1% and moderate pain 31.5%, additionally most of the participants informed that they have pain at the end of the day 37.4% (Table 3).

Table 1: Socio Demographic characteristics of study participants (n=289)

Characteristics	*n*	*%*
Age (M±SD = 37.5±8.47)		
23-30 years	47	16.3
31-38 years	86	29.8
39-46 years	95	32.9
47-54 years	35	12.1
55-62 years	26	9.0
Marital status		
Single	81	28.0
Married	172	59.5
Divorced/widowed/separated	36	12.5
No. of children		
No child	93	32.2
1-2 children	119	41.2
>3 children	77	26.6
BMI (kg/m²) (M±SD =27.6±4.82)		
< 18.5	28	9.7
18.5-24.9	71	24.6
25.0-29.9	128	44.3
>30	62	21.5
Sleep hours per day (M±SD=7.0±1.16)		
3-5 hrs.	95	32.9
6-8 hrs.	158	54.7
>9 hrs.	36	12.4
Exercise frequency/week		
Not at all	183	63.3
1-2 times	67	23.2
3-4 times	36	12.5
> 5 times	3	1.0
Shoes		
Flat shoes	211	73.0
Heels	78	27.0

Table 2: Work-related characteristics of study participants (n=289)

Variables	*n*	*%*
Type of school		
Government	96	33.2
Private	193	66.8
Academic level of teaching		
Primary	160	55.4
Secondary	129	44.6
Job Duration		
1-3 years	43	14.9
3-5 years	91	31.5
>5 years	155	53.6
Working hours per day		
3-5 hrs.	95	32.9
6-8 hrs.	185	63.3
> 8 hrs.	11	3.8
Classes per day		
3-4 classes	173	59.9
5-6 classes	116	40.1
Students number per class		
30-40	95	32.9
41-50	174	60.2
51-60	20	6.9

Various factors were identified among participants which can cause significant pain, in which prolong standing 171(59.2%), uncomfortable work chair and table 125(43.3%), long time sitting in awkward posture 102(35.2%) and copy checking or paper marking in head down posture 91(31.5%) were associated with pain aggravation. Moreover rest 184(63.7%), and massage 127(43.9 %), were considered as pain decreasing factors among participants who reported musculoskeletal pain.

Table 3: Prevalence of MSDs

Variable	*n*				%			
Musculoskeletal pain								
Yes	239				82.7			
No	50				17.3			
Prevalence of MSDs								
Body Region	**Prevalence (Past 12 months)**				**Prevalence (Past 7days)**			
	Yes		**No**		**Yes**		**No**	
	n	%	n	%	n	%	n	%
Neck	145	50.2	94	32.5	107	37.0	132	45.7
Shoulders	128	44.3	111	38.4	94	32.5	145	50.2
Elbows	76	26.3	163	56.4	55	19.0	184	63.7
Wrist/Hands	89	30.8	153	52.9	42	14.5	197	68.2
Upper Back	125	43.3	114	39.4	91	31.5	148	51.2
Lower Back	174	60.2	65	22.5	128	44.3	111	38.4
One or Both Hips/Thighs	95	32.9	144	49.8	44	15.2	195	67.5
One or Both Knees	108	37.4	131	45.3	85	29.4	154	53.3
One or both Ankles	140	48.4	99	44.3	95	32.9	144	49.8
Pain Intensity (NPRS)								
Mild (1-3)	110				38.1			
Moderate (4-6)	91				31.5			
Severe (7-10)	38				13.1			
Time of day								
Morning	42				14.5			
Afternoon	89				30.8			
Evening	108				37.4			

Table 4: Pain Increasing and Decreasing factors in teachers affected with MSDs (n=239)

Variable	*n*	%	p-value
Pain Increasing factors			
Long Time Standing	171	59.2	0.001*
Long time sitting	102	35.2	0.039*
Copy checking/paper marking	91	31.5	0.023*
Overhead activity/reaching	80	27.7	0.109
Carrying Weight	58	20.1	0.789
Forward Bending	75	26.0	0.167
Uncomfortable work chair/table	125	43.3	0.012*
Pain Decreasing factors			
Pain killers	55	19.0	0.568
Exercise/stretching	48	16.6	0.354
Massage	127	43.9	0.005*
Cold/Heat Therapy	81	28.0	0.740
Rest	184	63.7	0.002*

*Statistically significant (p<0.05)

DISCUSSION

In this descriptive cross-sectional survey study, we explored musculoskeletal pain prevalence, pattern and related factors among female school teachers. The prevalence of musculoskeletal pain was 82.7% among study participants. The rate of prevalence of this study was alike to other previous studies done by María Teresa Solis-Soto et al in documented prevalence of MSD 86%[9]. In another study done by Ndwa Ancent Ndonye et al found the overall prevalence of musculoskeletal disorders among primary school teachers of Kenya was 85.10%[12]. Ranisha Kiran Chand and colleagues reported a high musculoskeletal pain prevalence of 88.9% among secondary school teachers of Fiji[13].

The most predominant site on which teachers reported pain in the current study was lower back 60.2%, followed by neck pain 50.2%, ankle pain 48.4%, then shoulder pain and upper back pain 44.3% and 43.3% respectively. The least prevalent areas were knees, hips/thighs, hands and elbows at 37.4%, 32.9%, 30.8%, and 26.3% in prior the 12- months. A nearly similar prevalence of low back pain (LBP) reported in school teachers of Kenya was 58.60%[12] then knees, neck, and ankles were identified as most affected sites at 57.6%, 55.3%, and 53% . L.S. Eggers and his colleagues in their study found a high prevalence of neck and / shoulder pain NSP was 80.4% and LPB 68.0% among primary school

teachers[14]. Nirav P Vaghela et al found total prevalence of the MSD is 71.95% and reported back 49.92%, shoulder 33.12% and knee 49.92 most prevalent sites among school teachers[15]. Doaa M. Abdul Salam in their study on secondary school teachers of Saudi Arabia identified various musculoskeletal pain sites, most commonly affected sites were low back 68.4%, knee 58.6%, shoulder (47.7%) then neck, elbow, wrist at 45.4%, 23.6%, and 14.4% respectively[16]. Chioma Linda et al in their study on school teachers found work-related MSDs mainly in the shoulder (62.3%) and neck (57.9%) regions[17].

Thakir A. Alharbi et al in their work also found most the common site was the low back 59.2% among teachers, followed by the shoulder 47.9% the lower limb 43.3%, and the neck 41.3%[18]. In another study done on secondary school teachers found neck pain 48.5% most common, then shoulder pain 46.6%, and LBP 45.5%[13] in the previous 12 months. Ng Yi Ming et al in their survey on primary school teachers reported most MSDs discomfort was at neck/shoulder 56.5%, Lower extremity 48.9%, and middle to lower back 48.4% followed by arms, hands/ fingers at 40.7% and 36.5% respectively[19].

The significant factors that cause pain among school teachers prolong standing for hours (59.2%), uncomfortable work chair and table (43.3%), long time sitting in awkward posture (35.2%) and copy checking or paper marking in head down posture (31.5%), furthermore rest (63.7%), and massage (43.9%), were considered as pain decreasing factors. A previous study found that standing and bending posture for prolonged time were associated with LBP and marking assignments (forward bend posture), stretching arms above shoulder height were activities that linked to NSP[14]. In another study conducted on school teachers also pointed working hours and standing hours as significant risk factors of MSP[19]. It was also highlighted in previous work higher prevalence of musculoskeletal pain was significantly associated with obesity and prolong standing during work[18]. Significantly associated factors including teaching experience, static head down posture, elevated arm over the shoulder, and hypertension cause shoulder and/ neck pain among school teachers in Ethiopia. However regular physical exercise is

considered as a protective effect against shoulder and/or neck pain[20]. The Study conducted in Fiji secondary school teachers also pointed prolong standing, sitting, and carrying weight as pain aggravating factors, while taking rest, lying down, thermal therapy sick leaves, and massage as pain-relieving factors[13].

CONCLUSION

Female school teachers showed high prevalence of musculoskeletal pain disorders. MSDs were associated with long time standing, long time sitting, checking copy/paper marking and uncomfortable work chair/table. Environmental and personal factors can be modified to decrease high prevalence of MSDs, reduce long term disability and improve productivity of work.

Conflict of Interest: Nil
Funding Sources: Nil

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