

Prevalence and Risk Factors of Musculoskeletal Pain among Governmental Male Secondary School Teachers

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Abstract

Objective: To explore prevalence and risk factors of musculoskeletal pain among male secondary school teachers.

Methodology: Following a cross-sectional study design, 400 male secondary school teachers in Abha City were included in this study. A self-administered study questionnaire was designed in a simple Arabic language by the researchers and was applied for data collection. It comprised personal and work-related characteristics in addition to the Örebro Musculoskeletal Pain Screening Questionnaire.

Results: About two-thirds of participants (62.5%) had musculoskeletal pain, mostly in multiple sites (38.5%). The most common sites for musculoskeletal pain were the low back (59.2%), the shoulder (47.9%) the limbs (43.3%) and the neck (41.3%). Duration of pain was mainly more than 3 months (43.3%). Risk factors for musculoskeletal pain included duration of sleep ($p=0.020$), obesity ($p=0.027$), and prolonged standing ($p=0.016$). Teachers' control over work differed significantly according to prevalence of musculoskeletal pain ($p=0.004$).

Conclusions: Prevalence of musculoskeletal pain among secondary school male teachers is high, mainly affecting the neck, shoulder, low back and the lower limbs. Experienced pain is significantly associated with low control over work. Risk factors for musculoskeletal pain include prolonged standing, obesity and duration of sleep.

Key words: Musculoskeletal pain, Teachers, Secondary School, Prevalence, Risk factors.

Introduction

Musculoskeletal disorders and the subsequent experienced musculoskeletal pain are common occupational health problems linked to inadequate workplace support and subsequently affect the quality of life of those affected (1).

Buckle and Devereux (2) stated that musculoskeletal disorders become work-related when work conditions and activities significantly contribute to their development. Greater prevalence rates of musculoskeletal disorders have been noted amongst school teachers (3).

The high prevalence rates of musculoskeletal disorders were linked to activities such as heavy lifting, awkward postures, bending, twisting or stooping, prolonged sitting or standing and repetitive motions that teachers often engage in while doing their jobs (3).

Teachers are among a group of workers exposed to occupational musculoskeletal disorders due to the inappropriate occupational characteristics they carry out (4). In China, Yue et al. (3) reported high prevalence rates (44% to 75%) for low back pain, 43% to 48% for neck pain and 29% to 56% for shoulder pain.

In Jeddah, Saudi Arabia, Abalkhail et al. (5) reported a prevalence of 26.2% of low back pain among school workers and predicted that the high magnitude of this condition could be as prominent as in industrialized countries.

Musculoskeletal pain is one of the leading causes for ill health retirement among school teachers (6). School teachers in general, have been demonstrated relative to other occupational groups, to report high rates of musculoskeletal disorders of between 40% and 95% (7).

The work of a teacher involves not only teaching students, but also preparing lessons, assessing students' work and extracurricular activities, such as sports. Teachers also participate in different school committees. These may cause teachers to suffer adverse mental and physical health issues due to the variety of job functions and their unique and wide variety of job functions (8).

Chaiklieng and Suggaravetsiri (9) pointed out that among teachers, prolonged posture, static work and repetition are the cause of repetitive strain injuries, which are one type of musculoskeletal disorder that directly causes pain to the areas of upper limbs, neck, shoulder and low back.

The impact of musculoskeletal disorders within the teaching profession has not been given sufficient attention in the literature. Studies on the prevalence and risk factors of musculoskeletal disorders among teachers are quite scarce (10-12).

Aim of Study

To explore prevalence and risk factors of musculoskeletal disorders among secondary school teachers in Abha City.

Subjects and Methods

Following a cross-sectional research design, the present study included 400 male governmental secondary school teachers in Abha City. Any teacher with obvious somatic disability was excluded.

A study questionnaire was designed by the researchers and was adapted from the studies of Darwish and Al-Zuhair (13) and Sjolie (14). It included personal characteristics, e.g., basic anthropometric measures, special habits and work place risk factors. Severity of musculoskeletal pain was assessed based on the Örebro Musculoskeletal Pain Screening Questionnaire (15).

A pilot study was carried out, on a purposive sample of 20 male secondary school teachers from schools which were not included in the main study. The pilot study aimed at testing the feasibility of the study and clarity of questions. However, these data were not included in the main data of the study.

A multistage stratified random sample was applied to select schools and teachers at governmental secondary schools in Abha City according to a list of secondary schools and teachers provided by Aseer Directorate of Education. The total number of study schools was selected so as to fulfill the required sample size of teachers.

The Institutional Research Board approval was obtained from the Research Ethical Committee at King Khalid College of Medicine. Participation in the present study was based on written informed consent that was signed by each participant. All collected data were kept completely confidential and were used only for research purposes.

The Statistical Package for Social Sciences (IBM SPSS, version 23) was used for data collection and analysis. Descriptive statistics of data was applied (Mean+SD for quantitative data as well as frequencies and percentages for qualitative data). The chi square (χ^2) test of significance was applied to compare observed differences. P-values less than 0.05 were considered as statistically significant.

Results

Table 1 shows that 49.5% of participants were aged 40-50 years, while 42.2% were aged less than 40 years and 8.3% above 50 years (Mean±SD: 41.2±6.7 years). The majority were married (94.5%) while 4.2% were single and 1.3% were divorced. About two-thirds of participants (62%) had 1-4 children, while 12.2 had no children and 25.8% had 5 children or more (Mean±SD: 3.3±2.2). Most participants (88.5%) had a Bachelor Degree, while 11.5% had postgraduate degrees. About one quarter of participants (22.7%) were smokers. About one quarter of participants (25.8%) were obese, 43% were overweight and 31.3% had normal body mass index. About half of the participants (52.6%) had 7-8 hours sleep per day, 43% had less than 7 hours daily sleep while 4.4% had more than 8 hours daily sleep (Mean±SD: 7.0±4.3 hours/day). Most participants (85.4%) had 10000 SR monthly income or more, while 14.6% had less than 10000 SR income per month.

Table 2 shows that more than half of participants (58.1%) had 10-20 years' experience in teaching, 10.7% had less than 10 years' experience, and 31.1% had more than 20 years' experience, (Mean±SD: 17.0±7.0 years). Regarding weekly workload, 87% had 10-20 hours, 8.9% had less than 10 hours and 4.2% had more than 20 hours. During work, 31.3% always undergo prolonged standing, 56% sometimes have prolonged standing and 12.8% never have prolonged standing. During work, 47.4% always have prolonged sitting, 50.3% sometimes have prolonged sitting, and 2.3% rarely do that. About two-thirds of participants (64.6%) claimed to have low control over work, 29.9% have intermediate control, and only 5.5% have high control.

Table 3 shows that 62.5% of teachers have musculoskeletal pain (Figure 1), mostly in multiple sites (38.5%), as shown in Figure 2. The most common sites for musculoskeletal pain were the low back (59.2%), followed by the shoulder (47.9%) the lower limbs (43.3%) and the neck (41.3%), as shown in Figure 3. The duration of pain was mainly more than 3 months (43.3%). Out of a maximum severity score of 10, participant mean severity score was 5.43±2.22. The risk for work disability was present among 46.3% of participants.

Table 4 shows that participants whose average duration of sleep is 7-8 hours/day had the least prevalence of musculoskeletal pain (55.9%). Those who sleep more than 8 hours/day had the highest prevalence (70.6%), followed by those who sleep less than 7 hours/day (69.7%). Differences in prevalence of musculoskeletal pain among participants differed significantly according to their duration of daily sleep ($p=0.020$). Moreover, obese teachers had the highest prevalence of musculoskeletal pain (72.7%). Differences in prevalence of musculoskeletal pain according to teachers' body mass index were statistically significant ($p=0.027$). However, differences in prevalence of musculoskeletal pain among participants did not differ significantly according to their age group, marital status,

number of their children, smoking status, qualification, years of experience, or monthly income.

Table 5 shows that the highest prevalence of musculoskeletal pain was among participants who have more than 20 hours/week (87.5%), while the least was among those whose workload is less than 10 hours/week. However, differences in prevalence of musculoskeletal pain did not differ significantly according to participants' workload. Regarding prolonged standing of teachers during their work, the highest prevalence of musculoskeletal pain was among participants who always stand during their work (68.3%), while the least was among those who rarely stand during work (44.9%). Differences in prevalence of musculoskeletal pain differed significantly according to participants' prolonged standing during work ($p=0.016$). Regarding prolonged sitting during work, the highest prevalence of musculoskeletal pain was among those who rarely have prolonged sitting during work (77.8%). However, differences in prevalence of musculoskeletal pain did not differ significantly according to having prolonged sitting during work. Differences in control over work differed significantly according to prevalence of musculoskeletal pain, with least prevalence being associated with highest control over work and highest prevalence being associated with lowest control over work, while high (47.6% and 68.5%, respectively, $p=0.004$).

Table 1: Sociodemographic characteristics of study sample

Personal characteristics	No.	(%)
Age (in years)		
• <40	162	(42.2)
• 40-50	190	(49.5)
• >50	32	(8.3)
• Mean±SD		41.2±6.7
Marital status		
• Single	16	(4.2)
• Married	363	(94.5)
• Divorced	5	(1.3)
No. of children		
• None	47	(12.2)
• 1-4	238	(62.0)
• 5+	99	(25.8)
• Mean±SD		3.3±2.2
Qualification		
• Bachelor Degree	340	(88.5)
• Postgraduate	44	(11.5)
Smoking status		
• Smoker	87	(22.7)
• Non-smoker	297	(77.3)
Body mass index (BMI)		
• <25 kg/m ²	120	(31.3)
• 25-29.9 kg/m ²	165	(43.0)
• ≥30 kg/m ²	99	(25.8)
Average sleeping hours (hours/day)		
• <7	165	(43.0)
• 7-8	202	(52.6)
• >8	17	(4.4)
• Mean±SD		7.0±4.3
Monthly income		
• <10000 SR	56	(14.6)
• 10000+ SR	328	(85.4)

Table 2: Participants' work-related characteristics

Work-related characteristics	No.	(%)
Years of experience in teaching		
• <10 years	41	(10.7)
• 10-20 years	223	(58.1)
• >20 years	120	(31.3)
• Mean±SD		17.0±7.0
Workload		
• <10 hours/week	34	(8.9)
• 10-20 hours/week	334	(87.0)
• >20 hours/week	16	(4.2)
Prolonged standing during work		
• Always	120	(31.3)
• Sometimes	215	(56.0)
• Rare	49	(12.8)
Prolonged sitting during work		
• Always	182	(47.4)
• Sometimes	193	(50.3)
• Rare	9	(2.3)
Control over work		
• Low	248	(64.6)
• Intermediate	115	(29.9)
• High	21	(5.5)

Table 3: Participants' musculoskeletal pain characteristics

Pain characteristics	No.	%
Musculoskeletal pain		
• Absent	144	(37.5)
• Present	240	(62.5)
- No. of pain sites		
• One site	92	(24.0)
• Multiple sites	148	(38.5)
Pain site (n=240)		
• Neck	99	(41.3)
• Shoulder	115	(47.9)
• Elbow	28	(11.7)
• Wrist	21	(8.8)
• Low back	142	(59.2)
• Lower limb	104	(43.3)
Duration of pain (n=240)		
• <1 month	70	(29.2)
• 1-3 months	66	(27.5)
• >3 months	104	(43.3)
Severity score of musculoskeletal pain (Mean±SD)		5.43±2.22
Risk for work disability (n=240)		
• Absent	129	(53.8)
• Present	111	(46.3)

Table 4: Participants musculoskeletal pain according to their personal characteristics

Personal characteristics	Present		Absent		P Value
	No.	%	No.	%	
Age groups					
• <40 years	108	66.7	54	33.3	0.173
• 40-50 years	116	61.1	74	38.9	
• >50 years	16	50.0	16	50.0	
Marital status					
• Single	10	62.5	6	37.5	0.718
• Married	226	62.3	137	37.7	
• Divorced	4	80.0	1	20.0	
No. of children					
• None	31	66.0	16	34.0	0.250
• 1-4	154	64.7	84	35.3	
• 5+	55	55.6	44	44.4	
Smoking status					
• Smoker	57	65.5	30	34.5	0.509
• Non-smoker	183	61.6	114	38.4	
Qualification					
• Bachelor Degree	210	61.8	130	38.2	0.408
• Postgraduate	30	68.2	14	31.8	
Body mass index (BMI)					
• <25 kg/m ²	69	57.5	50	52.5	0.027
• 25-29.9 kg/m ²	98	59.4	67	40.6	
• >30 kg/m ²	72	72.7	27	27.3	
Average sleeping hours					
• <7 hours/day	115	69.7	50	30.3	0.020
• 7-8 hours/day	113	55.9	89	44.1	
• >8 hours/day	12	70.6	5	29.4	
Monthly income					
• <10000 SR	32	57.1	24	42.9	0.370
• 10000+ SR	208	63.4	120	36.6	

Table 5:

Work characteristics	Present		Absent		P Value
	No.	%	No.	%	
Years of experience in teaching					
• <10 years	22	53.7	19	46.3	0.110
• 10-20 years	149	66.8	74	33.2	
• >20 years	69	57.5	51	42.5	
Teaching workload					
• <10 hours/week	20	58.8	14	41.2	0.103
• 10-20 hours/week	202	61.7	128	38.3	
• >20 hours/week	14	87.5	2	12.5	
Prolonged standing during work					
• Always	82	68.3	38	31.7	0.016
• Sometimes	136	63.3	79	36.7	
• Rare	22	44.9	27	55.1	
Prolonged sitting during work					
• Always	113	62.1	69	37.9	0.632
• Sometimes	120	62.2	73	37.8	
• Rare	7	77.8	2	22.2	
Control over work					
• Low	170	68.5	78	31.5	0.004
• Intermediate	60	52.2	55	47.8	
• High	10	47.6	11	52.4	

Discussion

Musculoskeletal pain among teachers is mostly work-related and mainly due to an exhausted body (16). Although prevalence of musculoskeletal pain among teachers is relatively high, (13; 17-18), studies on its prevalence and risk factors are scarce (12). Therefore, the present study aimed to explore prevalence and risk factors of musculoskeletal pain among secondary school teachers.

The present study revealed that the self-reported prevalence of musculoskeletal pain among secondary school teachers was as high as 62.5%, mostly in multiple sites. The low back was the most common site (59.2%), followed by the shoulder (47.9%) the lower limb (43.3%) and the neck (41.3%).

This finding is in accordance with those reported by several studies. In five different regions in Saudi Arabia, Alsiddiky et al. (1) reported a high prevalence of musculoskeletal pain particularly low back pain (66.9%), neck pain (58.2%) and shoulder pain (60.6%). In Dammam, Saudi Arabia, Darwish and Al-Zuhair (13) reported the overall prevalence of musculoskeletal pain disorders among secondary school Saudi females was 79.71% and the most common site for pain was the back, followed by shoulder pain, and neck pain (63.8%, 42.1% and 54.4%, respectively), while the prevalence of lower limb pain was 40%. Pain duration among participants was mainly more than six months (56.3%). In Al-Jouf Region, Saudi Arabia Abdel-Salam et al. (19) reported that prevalence of musculoskeletal pain

among secondary school female teachers was 68.5%, mostly in multiple sites. The main sites of pain were the low back (68.4%), knees (58.6%), shoulder (47.7%), and the neck (45.4%).

In Botswana, Erick and Smith (20) reported that prevalence of musculoskeletal disorders among school teachers was 83.3%. The most commonly affected sites were the upper neck (52.6%), shoulder (52.5%), feet (33.8%) and wrists (30.7%).

In Brazil, Cardoso et al. (4) reported that the overall prevalence of musculoskeletal pain related to any of the three body segments was 55%. In Ethiopia, Temesgen et al. (21) reported that the prevalence of musculoskeletal pain among school teachers was 57.3%. They emphasized that teachers who have musculoskeletal pain usually suffer a low quality of life, functional impairments and work disability.

Results of almost all studies indicate that musculoskeletal pain among teachers constitutes a common and important occupational health problem. Therefore, preventive control measures should be urgently applied in order to minimize associated work disability. Moreover, the study of teachers' sitting and standing postures and their training to follow healthy postures can help avoid musculoskeletal pain.

The present study showed that musculoskeletal pain among participant teachers was mainly chronic, of more than 3 months' duration, with an average severity score of 5.43 ± 2.22 (i.e., moderate severity). The risk for work

disability was present among 46.3% of participant teachers with musculoskeletal pain. The highest prevalence of pain among teachers was associated with their lowest control over their work and vice versa.

These findings are consistent with those of Ebied (22), who reported that pain severity among almost half of school teachers was mainly moderate (49.5%), while it was severe among 47%. The duration of musculoskeletal pain was more than 6 months among 76% of teachers. Darwish and Al-Zuhair (13) in Dammam, Saudi Arabia, reported that the pain duration was more than 6 months among 56.3% of teachers, while the study of Abdel-Salam in Al-Jouf, Saudi Arabia, reported that musculoskeletal pain was disabling among 35.6% of teachers. (19)

Regarding the risk factors for musculoskeletal pain among teachers, the present study showed that sleep for 7-8 hours/day was associated with the least prevalence of musculoskeletal pain ($p=0.020$). In addition, significantly higher prevalence of musculoskeletal pain was present among obese teachers ($p=0.027$). Moreover, higher prevalence of musculoskeletal pain was significantly associated with prolonged standing during work. However, it did not differ significantly according to other work-related characteristics.

These findings are mostly consistent with those reported by other studies. Darwish and Al-Zuhair (13) in Saudi Arabia, reported significant associations between musculoskeletal pain and increasing years of teaching and teachers' body mass index.

In Cairo, Egypt, Ebied (22) reported a significant association between musculoskeletal pain among teachers and both obesity and prolonged standing. The association of musculoskeletal pain with obesity has been also reported by Peltonen et al. (23), while length of employment in teaching was reported to be associated with musculoskeletal pain by both Chiu et al. (24) in China and Cardoso et al. (4) in Brazil.

Skoffer (25) suggested that, to prevent musculoskeletal pain among teachers, appropriately designed, ergonomically equipped infrastructure should be fulfilled inside classrooms to facilitate modern methods of teaching. Thus, prolonged standing and uncomfortable postures for several hours during teaching can be avoided.

Erick and Smith (20) reported that, as a result of musculoskeletal pain, some teachers could not carry out normal activities, sought medical advice, changed their duties and became unable to work for several days. In Dammam, Saudi Arabia, Darwish and Al-Zuhair (13) reported that within an academic year, 5.4% of teachers with musculoskeletal pain reported 6-10 days of absenteeism.

Erick and Smith (20) concluded that musculoskeletal pain is significantly associated with teachers' work disability. It negatively affects their wellbeing and the whole teaching profession. Therefore, in order to decrease its high

prevalence and negative impact on teachers and teaching, teacher's working conditions should be improved in addition to enforcing ergonomics education of teachers. In addition, it is important to optimize working daily hours for teachers, to plan ergonomic classes for teachers on how to avoid musculoskeletal pain (13).

Study limitations

The assessment of musculoskeletal pain in this study was mainly subjective, through self-reported information provided by a self-administered questionnaire. Moreover, the generalizability of findings of the present study should be considered cautiously since it included only male teachers at governmental secondary schools for boys in Abha City.

Conclusions

Prevalence of musculoskeletal pain among secondary school male teachers is quite high, mainly with moderate severity, and more than three months' duration. It is most commonly affecting the neck, shoulder, low back and the lower limbs. The risk for work disability is present among almost half of teachers with musculoskeletal pain. Experienced pain is significantly associated with low control over work. Risk factors for musculoskeletal pain include prolonged standing, obesity and duration of sleep.

Therefore, measures to minimize the high prevalence of musculoskeletal pain among teachers need to be implemented by the school health program to avoid its harmful impact on teachers' personal and work productivity. Further studies are needed to explore prevalence and risk factors for musculoskeletal pain among both male and female teachers at all educational school levels in Abha and other cities in the Kingdom of Saudi Arabia. Clinical examination to identify musculoskeletal disorders among teachers, rather than self-reporting, will add further accuracy to research results related to prevalence of musculoskeletal pain among teachers.

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