

*Full Length Research Paper*

# Musculoskeletal pain, associated risk factors and coping strategies in school teachers

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Accepted 13 January, 2011

**Age, sex and working with improper position, physically and psychologically strenuous work increase risk of musculoskeletal pain (MSP) in some professions. The aim of this study was to determine prevalence of MSP and its characteristics among school teachers. Nine hundred teachers were evaluated. Pain characteristics, pain intensity, related factors, and activity limitation of the teachers with MSP were questioned. Coping strategies were also investigated. Comparison of the relevant data was done using Chi- Square Test. 463 (51.4%) teachers (269 female; 194 male; mean age= 38.08±9.2 yr.) reported MSP. Pain in neck, upper- back and shoulder region were common in female teachers ( $p<0.05$ ). Meanwhile, female teachers expressed that the pain severity increases with the overhead reaching and more activity limitations. While male teachers preferred thermal spring therapy, females preferred to take pain killers. Females also took sick-leave report from health providers more frequently. Both female and male teachers with MSP showed moderate depression according to the Beck Depression Inventory a significant difference between gender was found ( $p=0.05$ ). The female teachers reported more depressive symptoms. Gender, age, emotional status, and improper posture are significant risk factors in terms of developing MSP. Teachers were found to be at risk.**

**Key words:** Musculoskeletal Pain (MSP), teacher, risk factors, coping strategies, depression.

## INTRODUCTION

The incidence of musculoskeletal pain (MSP) has increased recently in industrialized nations. This results in musculoskeletal disorders representing a leading cause of physical and occupational disability among persons under the age of 45 years and the third leading cause of disability among those 45 years of age or older (McGeary et al., 2003). The etiology of MSP is now generally accepted to be multi-factorial, encompassing physical, psychological and social influences. Age, sex and working with improper position, daily lifting of loads and physically strenuous work increases the risk of MSP significantly (Miranda et al., 2002). Also, in working-age adults, psychological factors contribute to both the onset of pain, the transition from acute to chronic, and are typically more strongly associated with pain-related

disability than the biomedical and mechanical factors, considered (Vogt et al., 2003).

Many studies have been conducted to investigate the relationship between MSP and occupation. Some groups of workers, due to occupational characteristics, are more exposed to work related MSP. Cetisli and Kırdı from Turkey (2003) stated that MSP is extremely common in textile industry workers. Teachers also stand out among these groups. Sometimes, teaching is carried out under unfavorable circumstances, in which teachers mobilize their physical, cognitive, and affective capacity to reach teaching production objectives, over demanding or generating over effort of their psycho-physiologic functions (Cardoso et al., 2009). The economic impact of such widespread and disabling phenomenon is also enormous (McGeary et al., 2003). However, available studies on these issues among teachers are limited.

Therefore, this study aimed to investigate the prevalence of MSP among a well-functioning teacher cohort and to identify the impact of pain on physical

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functioning.

In addition to this, we planned to investigate the interrelationships between gender and experience of pain, pain intensity, individual factors (for example; age, teaching experience and so on), physical factors related to daily living activities, psychosocial variables (for example; depressive symptoms), coping strategies (for example; therapeutic approaches, sick leave), and function across the development of MSP in a Turkish sample.

## MATERIALS AND METHODS

### Participants and data collection

Nine hundred full-time school teachers evaluated in this cross-sectional survey recruited from the primary, secondary and high schools, whether they were from state or private schools in Turkey. Data were collected within the Turkish school period from the urban and non-urban communities (Table 1). Four hundred and sixty three teachers reported MSP. Co-workers of this study were selected among final year students in School of Physiotherapy and Rehabilitation at Pamukkale University. All were informed and trained about the purpose of the study, the use of the questionnaire, data collection and interview. Teachers with MSP completed a questionnaire during school time under supervision of a physiotherapist as they signed the informed consent form to participate in the survey. The internal validity of a cross-sectional survey depends on the presence, strength and direction of selection and information biases (Chiu and Lam, 2007).

In this study we tried to minimize information bias by using frequently asked questions and also with a valid and reliable questionnaire for depression. In order to reduce selection bias, teachers and schools were chosen randomly from all cities, not just from one city or region in Turkey. The first part of the questionnaire was designed to collect demographics.

Among the teachers reporting MSP, further information was recorded on pain characteristics like body region, pain intensity (visual analogue scale, VAS) and time of onset (Kerssens et al., 2002). The factors related MSP and information about activity limitation were also questioned in the second part. The last part assessed coping strategies used by the teachers. The Beck Depression Inventory was used to detect the presence of depressive symptoms, which was developed to measure the severity of depression (Beck et al., 1961). It was shown that the Turkish version is a reliable and valid instrument to assess the severity of depression (Hisli, 1988).

All teachers reported pains were asked to fill the BDI. However, only 330 teachers accepted to fill it. 260 completed correctly the BDI. Teachers who had score between 0 to 9 were grouped in no depression, 10 to 17 in mild, 18 to 29 in moderate and 30 to 63 in severe depression.

### Statistical analysis

Descriptive statistics were given as number, percentage and mean  $\pm$  standard deviation (SD). Statistical significance was accepted as  $p < 0.05$ . The SPSS 13.0 package program was used for analysis, including Chi-Square and Independent Samples t tests.

## RESULTS

463 (51.4%) teachers reported MSP (269 female; 194

males) with a mean age of  $38.08 \pm 9.13$  years. Gender distributions were 269 (59.4%) females (mean age  $= 36.12 \pm 8.34$  yr.) and 194 (43.4%) males (mean age  $= 40.80 \pm 9.50$  year.) (Table 2). Majority of the teachers ( $n=359$ ; 77.5%) with MSP were not doing exercise regularly ( $p=0.000$ ). There were no differences in terms of teaching years, smoking between the teachers with MSP and without MSP ( $p > 0.05$ ) (Table 1). It was interesting that 260 teachers were seen to have moderate or severe depressive symptoms ( $28.62 \pm 6.34$ ). While 59 (42.8%) of 138 female teachers had severe depression, 40 (32.8%) of 122 male teachers had severe depression (Tables 1). Gender difference was significant regarding BDI scores ( $0.854$ ,  $p=0.05$ ) (Table 2).

The VAS scores were ranged from 4 to 8 in general meaning. Although female teachers' VAS scores in all body regions (except hip) were higher than the males', there were significant differences only for upper, lower-back and wrist pain VAS scores between genders (Table 2).

Most of the female teachers stated that they had pain in multiple body regions ( $p < 0.05$ ). It was also seen that females had pain in neck, upper-back and shoulder region than males ( $p < 0.05$ ). There were no differences in other body regions between females and males (Table 3). While no difference was found between gender in pain decreasing activities ( $p > 0.05$ ), differences were obtained just in overhead reaching from pain increasing activities and just in activities of daily life (ADLs) from limitations in activities ( $p < 0.05$ ) (Table 4). The females had more responsibility in housekeeping, and they had to do overhead reaching (for example; to shelves in kitchen) frequently. The ratio of pain in neck, upper-back and shoulder region was seen to be increased among the female teachers (Table 4). In pain coping strategies, female teachers (78.8%) stated that they used pain killer and more frequent usage. There was no significant difference between gender in terms of getting sick-leave report ( $p > 0.05$ ) (Table 5).

## DISCUSSION

Teachers were found to have a higher risk in developing MSP in this cross-sectional survey. Gender, age, depression and improper posture were found to be significant risk factors. Meanwhile, this study revealed a high prevalence of MSP and the level of MSP experienced was severe enough to interfere with activities of daily living and for some teachers resulted in work absence and frequent pain killer usage.

### Prevalence

269 female teachers (59.4%) had MSP. The prevalence of MSP was 42.5% for neck, 36.9% for upper-back,

**Table 1.** Characteristic of the teachers with MSP.

Variable		Female	Male	Total	x <sup>2</sup>	p
		n (%)	n (%)	n (%)		
Age, yr	50 to 63	14 (5.2)	38 (19.6)	52 (11.2)	31.02	0.000*
	40 to 49	84 (31.2)	73 (37.6)	157 (33.9)		
	30 to 39	93 (34.6)	46 (23.7)	139 (30.0)		
	20 to 29	78 (29.0)	37 (19.1)	115 (24.8)		
Dominancy	Right	241 (89.6)	171 (88.1)	412 (89.0)	0.12	0.734**
	Left	28 (10.4)	23 (11.9)	51 (11.0)		
Marital status	Married	203 (75.5)	155 (79.9)	358 (77.3)	4.61	0.100*
	Single	9 (3.3)	1 (0.5)	10 (2.2)		
	Widowed	57 (21.2)	38 (19.6)	95 (20.5)		
Education, yr.	21-↑	62 (23)	92 (47.4)	154 (33.3)	30.35	0.000*
	11-20	97 (36.1)	45 (23.2)	142 (30.7)		
	10-↓	110 (40.9)	57 (29.4)	167 (36.1)		
Working hours	10↑	21 (7.8)	18 (9.3)	39 (8.4)	0.87	0.646*
	6 to 10	159 (59.1)	119 (61.3)	278 (60.0)		
	1 to 5	89 (33.1)	57 (29.4)	146 (31.5)		
Exercise frequency	Never	215 (79.9)	144 (74.2)	359 (77.5)	2.53	0.112***
	Weekly, 1 to 2	35 (13.0)	29 (14.9)	64 (13.8)		
	Weekly, 3 to 4	10 (3.7)	11 (5.7)	21 (4.5)		
	Weekly, 5-1	9 (3.3)	10 (5.2)	19 (4.1)		
Smoking	Yes	123 (45.7)	141 (72.7)	264 (57.0)	33.42	0.000*
BDI return rate	Refused	88 (32.7)	45 (23.2)	133 (28.7)	6.57	0.037*
	Missing data	43 (16.0)	27 (13.9)	70 (15.1)		
	Eligible	138 (51.3)	122 (62.9)	260 (56.2)		
Depression	Moderate	79 (57.2)	82 (67.2)	161 (61.9)	2.73	0.099*
	Severe	59 (42.8)	40 (32.8)	99 (38.1)		

\*Chi-Square tests (Pearson Chi-Square), \*\*Continuity correction (Yate's chi-square), \*\*\*Linear by linear association, BDI: Beck depression inventory.

43.8% for lower-back, 28.7% for shoulder, 8% for elbow, 13.4 for wrist, 8.4% for hip, 32% for knee and 21.8% for ankle (Table 3). In our literature research it was seen that Chiu and Lam (2007) just focused on neck and upper limb pain among secondary school teachers and reported a higher prevalence compared to our results. These findings indicate that teachers are in high-risk group of occupational related lower-back, neck, upper-back, knee and the shoulder MSP.

### Age

In the literature it was stated that there is a connection

between increased age, health problems, high risk for MSP, high consumption of pain drugs and pain-related disabilities and between occupation, ethnicity and increasing risk for pain problems (Soares et al., 2004). Regarding age group, an increase in MSP with age was observed and the highest prevalence was among the 40 to 49 ages group. It was 17.4% in total sample and It was 33.9% in teachers with MSP (Table 1). Findings strengthen the assumption that prolonged exposure to teaching is associated with a higher occurrence of MSP.

In this case the association between MSP and age over 40 years may be explained by the natural wear of the body (Cardoso et al., 2009).

**Table 2.** Age, VAS and BDI scores.

Variable			Female (n=269)		Male (n=194)	F	p
	Mean±SD	Min-Max	Mean±SD	Mean±SD	Mean±SD		
Age	37.83±9.29	22 to 63	38.08±9.13	36.12±8.34	40.80±9.50	8.20	0.000
<b>VAS</b>							
Neck		0.30 to 10	4.56±2.13	4.75±2.19	4.16±1.96	0.64	0.075
Upper-Back		1.30 to 10	4.95±2.17	5.26±2.28	4.32±1.79	3.76	0.008
Lower-Back		0.10 to 10	5.41±2.26	5.71±2.43	4.97±1.91	6.38	0.022
Shoulder		0.90 to 10	4.96±2.08	5.15±2.21	4.52±1.69	4.50	0.113
Elbow		0.30 to 10	4.26±2.29	4.79±2.26	3.27±2.08	0.02	0.052
Wrist		0.20 to 10	4.26±2.51	4.75±2.82	3.43±1.61	7.92	0.044
Hip		1 to 10	4.67±2.28	4.28±2.22	5.36±2.32	0.05	0.161
Knee		0.10 to 10	5.14±2.15	5.45±2.38	4.77±1.79	8.16	0.053
Ankle		0.50 to 10	4.81±2.41	5.09±2.42	4.42±2.36	0.03	0.173
BDI Score (n=260)		21 to 56	28.62±6.34	29.34±6.46 *	27.80±6.12 **	0.85	0.050

VAS: Visual analog scale, BDI: Beck depression inventory. \* 138 female teachers filled out the BDI, \*\* 122 male teachers filled out the BDI.

**Table 3.** Ratio of the MSP by gender.

Variable		Female	Male	Total	x <sup>2</sup>	p
		n (%)	n (%)	n (%)		
Pain	Yes	269 (59.4)	194 (43.4)	463 (51.4)	23.00	0.000*
Painful region	4-1	53 (19.7)	20 (10.3)	73 (15.8)	18.69	0.000**
	2-3	146 (54.3)	89 (45.9)	235 (50.8)		
	1	70 (26.0)	85 (43.8)	155 (33.5)		
Neck Pain	Yes	135 (50.2)	62 (32.0)	197 (42.5)	15.32	0.000*
Upper-Back Pain	Yes	114 (42.4)	57 (29.4)	171 (36.9)	8.17	0.004*
Lower-Back Pain	Yes	123 (45.7)	80 (41.2)	203 (43.8)	0.92	0.337*
Shoulder Pain	Yes	92 (34.2)	41 (21.1)	133 (28.7)	9.40	0.002*
Elbow Pain	Yes	24 (8.9)	13 (6.7)	37 (8.0)	0.48	0.487**
Wrist Pain	Yes	39 (14.5)	23 (11.9)	62 (13.4)	0.47	0.493**
Hip Pain	Yes	25 (9.3)	14 (7.2)	39 (8.4)	0.39	0.532**
Knee Pain	Yes	80 (29.7)	68 (35.1)	148 (32.0)	1.46	0.227*
Ankle Pain	Yes	59 (21.9)	42 (21.6)	101 (21.8)	0.00	0.942*

\*Chi-Square tests (Pearson Chi-Square), \*\*Continuity correction (Yate's chi-square).

Chiu and Lam (2007) stated that there was a significant difference among different age groups in the prevalence of neck and upper limb pain. In our study, the age group with the highest prevalence of pain was 40 to 49 for males, and 30 to 39 for females (Table 1).

### Gender

Characteristic differences associated with acquiring more physical and psychological factors of male and female have been mentioned in a different study with teachers

(Cardoso et al., 2009). The prevalence of MSP in the population studied was higher among females than males for the three body segments: neck, upper-back and shoulder pain. The results of studies done in the literature demonstrated that females were significantly at risk for both lifelong prevalence of neck pain and upper limb pain developed after teaching (Chiu and Lam, 2007; Chiu et al., 2006). In contrast, in their literature search Chi and Lam found that both males and females had similar prevalence of neck pain in general Chinese population.

The higher risk of developing neck pain after teaching in female might be due to their lower pain threshold (Chiu

**Table 4.** Percentages of the teachers with MSP in relation to gender and various pain increasing factors, limitations in activities and pain decreasing factors.

Variable	Female		Male		Total n (%)	x <sup>2</sup>	p
		n (%)		n (%)			
<b>Increasing factors</b>							
Standing long time	Yes	194 (72.1)	135 (69.6)	329 (71.1)	0.35	0.553*	
Sitting long-time	Yes	38 (14.1)	36 (18.6)	74 (16.0)	1.65	0.199*	
Carrying	Yes	69 (25.7)	41 (21.1)	110 (23.8)	1.27	0.260*	
Lifting	Yes	65 (24.2)	47 (24.2)	112 (24.2)	0.00	0.987*	
Bending	Yes	58 (21.6)	29 (14.9)	87 (18.8)	3.23	0.072*	
Overhead reaching	Yes	38 (14.1)	12 (6.2)	50 (10.8)	6.58	0.010**	
Others	Yes	37 (13.8)	26 (13.4)	63 (13.6)	0.01	0.913*	
<b>Activity limitation</b>							
Walking	Yes	62 (23.0)	50 (25.8)	112 (24.2)	0.46	0.499*	
Sexual Activity	Yes	3 (1.1)	1 (0.5)	4 (0.9)	0.47	0.491*	
Sitting	Yes	26 (9.7)	22 (11.3)	48 (10.4)	0.18	0.668**	
Standing	Yes	103 (38.3)	76 (39.2)	179 (38.7)	0.04	0.847*	
Stairs	Yes	58 (21.6)	52 (26.8)	110 (23.8)	1.71	0.191*	
ADL	Yes	134 (49.8)	47 (24.2)	181 (39.1)	30.99	0.000*	
Others	Yes	35 (13.0)	35 (18.0)	70 (15.1)	2.22	0.136*	
<b>Decreasing factors</b>							
Rest and lay down	Yes	179 (66.5)	120 (61.9)	299 (64.6)	1.08	0.298*	
Ice	Yes	13 (4.8)	7 (3.6)	20 (4.3)	0.17	0.683**	
Exercise	Yes	56 (20.8)	53 (27.3)	109 (23.5)	2.65	0.104*	
Others	Yes	23 (8.6)	19 (9.8)	42 (9.1)	0.09	0.767**	
Sit and Rest	Yes	44 (16.4)	25 (12.9)	69 (14.9)	1.07	0.301*	
Hot	Yes	28 (10.4)	29 (14.9)	57 (12.3)	2.15	0.142*	

\*Chi-Square tests (Pearson Chi-Square), \*\*Continuity correction (Yate's chi-square).

and Lam, 2007). This matched with the study in the literature.

### Professional experience

The most of the teachers' were working as a teacher less than 10 years, relatively lower in comparison to the studies in the literature. Although teachers with ten or less years of profession had a higher prevalence of MSP it was not at statistically significant levels. But there was a significant difference between the genders. While the prevalence of females was higher in younger ages, the males' prevalence increases with the aging. In the literature it was stated that younger workers face greater work demands, being exposed to risk factors, as they take over more activities and tasks in the beginning of the career.

In addition to the reason that the new female teachers were not adapting well to the new working environment, marriage, child care and the physical and psychological

stress might affect the well beings of their musculoskeletal conditions. After a while, they get used to it. This may be because of that female teachers with more professional experience are less susceptible to the negative effects of work on health (Cardoso et al., 2009; Chiu and Lam, 2007).

### Socio-Demographic factors

Analyses of socio-demographic factors have identified higher age, female gender, poor housing tenure, bad working conditions, low self-rated health, physical inactivity, smoking, unemployment and dissatisfaction with current work status as factors significantly associated with chronic pain and with a twofold to fivefold increase in odds persistent symptoms (Brekke et al., 2002). Brekke et al. (2002) obtained that, people in "west" were better educated; they smoked less and exercised more often. Life dissatisfaction and sleep disturbances indicated a higher level of mental distress in "east" (Brekke et al.,

**Table 5.** Various pain coping strategies of teachers in relation with gender.

Variable		Female	Male	Total	$\chi^2$	P
		n (%)	n (%)	n (%)		
Pain killer	Yes	212 (78.8)	139 (71.6)	351 (75.8)	3.15	0.076*
	Daily, 3-1	8 (3.0)	2 (1.0)	10 (2.2)	16.45	0.006*
Number of pain killer	Daily, 2	15 (5.6)	5 (2.6)	20 (4.3)		
	Daily, 1	48 (17.8)	34 (17.5)	82 (17.7)		
	Weekly, 1 to 2	85 (31.6)	39 (20.1)	124 (26.8)		
	Monthly, 1 to 2	56 (20.8)	59 (30.4)	115 (24.8)		
	No	57 (21.2)	55 (28.4)	112 (24.2)		
Surgery	Yes	23 (8.6)	13 (6.7)	36 (7.8)	0.31	0.577**
PTR	Yes	62 (23)	40 (20.6)	102 (22)	0.39	0.534*
Sick-leave	Yes	59 (21.9)	32 (16.5)	91 (19.7)	2.11	0.146*
Number of sick-leave in a year	4-1	4 (1.5)	3 (1.5)	7 (1.5)	8.70	0.069*
	3 times	10 (3.7)	1 (0.5)	11 (2.4)		
	2 times	24 (8.9)	9 (4.6)	33 (7.1)		
	1 time	21 (7.8)	19 (9.8)	40 (8.6)		
	Any time	210 (78.1)	162 (83.5)	372 (80.3)		
Herbal medicine	Yes	25 (9.3)	8 (4.1)	33 (7.1)	3.80	0.051**
Thermal springs	Yes	16 (5.9)	31 (16.0)	47 (10.2)	11.36	0.001**
Yoga	Yes	4 (1.5)	0 (-)	4 (0.9)	1.43	0.231**
Others	Yes	54 (20.1)	45 (23.2)	99 (21.4)	0.65	0.419*

\*Chi-Square tests (Pearson Chi-Square), \*\*Continuity correction (Yate's chi-square), PTR: Physiotherapy and rehabilitation.

2002).

In our survey we obtained that just 104 teachers with MSP and 159 teachers without MSP were doing exercise regularly, especially just 4.1% were doing exercise 5 times in a week. Meanwhile there was no difference between genders (Table 1). We did not separate our teachers according to west or east part of Turkey, but these numbers are quite low. Smoking rate was higher in all teacher groups, but males were smoking more. It was thought that, if the teachers could gain good habits (exercising) and give-up bad habits (smoking, physical inactivity), MSP prevalence would drop.

### Psychosocial factors

The pain was often associated by musculoskeletal system and connective tissue. Meanwhile, chronic pain is often associated with depression or other kinds of psychological distress. Kerssens et al. (2002) in the literature review found that those who were interfering pain in chronic pain patients underwent some psychological distress. Vogt et al. (2003) declared that the proportion of individuals with current depressive symptoms increased with increasing pain intensity; participants with current

depressive symptoms had six times the odds of reporting severe/extreme pain. Totally just 260 of 463 teachers with MSP completed the BDI as a psychological risk factor depression. We did not apply BDI to the teachers without MSP. Although females' prevalence was slightly higher than the males', most of the females did not want to fill the BDI. Interestingly all of these were grouped in moderate (61.9%) or severe (38.1) depression group, with no significant difference in prevalence and conflictingly significant difference in scores between genders (Tables 1 and 2). There is moderate evidence that there was a strong relationship between long duration of pain complaints and high depression scores.

In the future studies questioning them will be useful to determine the severity and effect of pain and depression to each other. Chi and Lam (2007) founded in their literature search that, some researches reported high job demands, poor coworker support, low job control, low skill discretion, and low job satisfactions had a positive relationship with pain. Even so we did not review the physical and psychological effects of working conditions; in the future studies questioning them will be purposive in this aspect. Because, researches support that fear-avoidance beliefs are related to chronic pain and

disability.

The other prominent role is given to avoidance of activity, largely fueled by the fear that physical activity will cause harm and will worsen the pain problem (Boersma and Linton, 2005; Severeijns et al., 2002).

### **Pain location**

Number of pain locations is an important contributor to disability in females report more locations of MSP than males. Pain location was more strongly associated with functional limitations than either pain intensity or frequency (Leveille et al., 2005). In the literature it was also stated that patients with MSP had pain in more than three major sites (Keressens et al., 2002). Our cross-sectional survey matched with these studies in the literature, because 74% of female teachers stated that they have MSP more than 2 and more regions which was statistically significant (Table 3). Spinal pain is a common problem in modern day society; approximately 85% of the population suffers from it, at some time point in life. Where, an estimated 3 to 10% continues to develop a long-term (work) disability (Boersma and Linton, 2005).

MSP in the cervicobrachial region is considered a major problem among adults of working age. Although most reported neck and shoulder pain is relatively mild and causes only minor limitations, nearly 5% of the working population are significantly disabled by neck pain (Vogt et al., 2003). In our survey in all regions, more female have MSP, especially in neck, upper-back and shoulder region. Meanwhile the prevalence was incredibly lower for wrist and elbow region (Table 3). As physical function of the muscles of the neck and the upper limb is closely related, it is reasonable to suggest that problems in any one group of muscles may affect the other. In the literature it was suggested that teachers are high-risk group of occupational related neck pain. The problem of upper limb pain was not as serious as that of neck pain. Chiu and Lam (2007) stated that majority (71.6%) of those teachers who have both neck pain and upper limb pain reported that the two pains were related.

Back pain has been identified as the leading cause of disability among persons under the age of 45 years and the third leading cause of disability among those 45 years of age or older. Although 90% of all patients who experience low-back pain in their lifetime will experience an amelioration of their symptoms in 3 to 4 months, approximately 10% develop low-back pain with pain and disability often lasting over 2 years (McGeary et al., 2003). While 36.9% have MSP in upper-back, 43.8% have MSP in lower-back region. In addition to this, both females and males suffer from lower-back pain. Thus there was a statistically significant difference for upper-back and there was not any for lower-back region between the genders (Table 3). Lower extremity pain is

common musculoskeletal symptom among working-age people. The prevalence of lower extremity, especially knee pain varies from 10 to 60%, depending on age, occupation and the definition of lower extremity pain, yet only few epidemiological studies exist on lower extremity pain and its risk factors.

The knowledge of the risk factors for lower extremity pain, particularly with respect to occupational physical loading, overweight and physical exercise is still limited, mainly due to a very small number of prospective studies (Miranda et al., 2002). The prevalence was higher for knee with 32%, and it was 21.8% for ankle and 8.4% for hip, but there was no difference between genders (Table 3). Standing for a long time, stereotyped repetitive usage, heavy external loading, awkward working positions, and injuries are those potential risk factors which can be related to many physical work tasks. Frequent lifting of heavy loads has biomechanical grounds to be a potential risk factor for lower extremity MSP disorders. Overall physical work load seem to be the most important risk factor. Also overweight is assumed to cause pain by increasing the mechanical stress on the weight-bearing joints.

Overweight may also be an indicator of other factors, such as lack of physical fitness (Miranda et al., 2002).

### **Pain intensity**

It is the most important contribution to the pain experience, as demonstrated by its interference with quality of life and functioning. However, there is also an increasing demand for more simplified and easier measuring and evaluation methods, and very often one-dimensional pain intensity rating scales are used (Jensen et al., 2004). In general meaning MSP severity differs from 0.10 to 10 according to VAS. While female teachers have slightly more severe pain in all regions except hip, there was a statistically significant difference just for wrist, upper and lower-back regions (Table 2).

### **Increasing factors**

Unfavorable working conditions may be factors influencing the occurrence of MSP have appointed in the previous studies. Therefore, the prolonged exposure to these unfavorable working conditions becomes a health risk factor. These unfavorable working conditions among teachers may be high physical exertion and occupational loading like remaining in the orthostatic position during up to 95% of activities, stereotyped repetitive use, head-down posture, heavy external loading, and frequent lifting of heavy loads, awkward working positions and injuries. Also long duration of work with the hands above shoulder level, which was another physical factor, showed

significant relationship to both neck and shoulder pain. All these have biomechanical grounds to be a potential risk factor for MSP (Miranda et al., 2002; Cardoso et al., 2009; Chiu and Lam, 2007). Also teachers in Turkey had to stand for a long time in addition to improper sitting in their day time.

Standing up is not the only factor contributing to MSP, but other situations such as carrying material to school/classroom, installation of equipment/teaching resources, walking inside and outside the school may be associated with the occurrence of MSP (Cardoso et al., 2009). Overall physical work load seems to be the more important risk factor. While 329 (71.1%) of 463 teachers with MSP stated that standing for a long time increases or causes pain, just 16% for sitting, 23.8% carrying, 18.8% bending activities causes or increases pain. May be most of the teachers were not exposed to this potential risk factor for a considerable length of time and this might be the reason for the low prevalence. For overhead reaching, prevalence of females' was 14.1% and males' was 6.2% (Table 4). This statistically significant difference might be because of the many ADLs with overhead reaching especially at home for female teachers. In general meaning females height was lower than the males', therefore they might have problems in reaching top of the boards while writing during their teaching activities. In relation to ergonomic loads, inappropriate furniture has a positive association with inappropriate body position and MSP.

The adoption of inappropriate postures by teachers, influenced mainly by environment with inappropriate conditions, like the lack of chairs, tables and boards in sizes and shapes appropriate for teachers obliges them to develop positions unfavorable to the musculoskeletal system (Cardoso et al., 2009). In the future surveys also detailed ergonomic analysis could be done.

### Activity limitation

Epidemiological studies have also shown that pain interferes with work and social activities (Bergman et al., 2004). Chronic neck pain was found to be associated with pain at multiple joint sites, reduced ability to carry out domestic chores and leisure time activities in adults. For example, as physical function of the muscles of the neck and the upper limb is closely related, it is reasonable to suggest that problems in any one group of muscles may affect the other (Chiu and Lam, 2007). Vogt et al. (2003) found that severe neck pain was strongly associated with difficulty in grasping small objects and loss of manual dexterity. Even with unknown pathophysiology, pain tends to create a cluster of related problems such as chronic fatigue, sleep disturbance, excessive rest and withdrawal from activity, compromised immune function and mood disorder (Kerssens et al., 2002).

In our survey, teachers reported that their ADLs and standing was limited more than the other activities. In general meaning females' prevalence was slightly higher than the males, especially for ADLs, difference was not significant for the rest of the activities (Table 4). This result was coherent with the Mantyselka et al's study (2001). They stated that in general, females more frequently reported activity limitations, though males more frequently reported limitations associated with work, sleep, and sex life.

### Decreasing factors and coping strategies

The multivariate analyses confirmed that passive coping was associated with increased age, but also with female gender, blue-collar worker, foreign background, low educational levels, financial and employment problems, and pain variables. Active coping was associated with younger age, being single, foreign background, blue-collar worker, several types of pain and the use of painkiller. Older age reduces physical, cognitive and emotional capabilities to effectively manage pain, and thus increase tendencies to use passive strategies to cope with it (Soares et al., 2004). Teachers prefer to take a rest with laying down (64.6%) and with sitting (14.9%) as a passive coping strategies and exercising (23.5%) as an active one, but there was no difference in relation to gender. While the active exercise is effective in the management of pain, it was lower than the expected.

Female are regularly reported to use more analgesics, more sick-leave in a year and more usage of herbal medicine than male, while male were preferring thermal springs. Therefore, females were more likely to use passive strategies for pain than males. The higher preponderance of females using passive coping may be due to their responses to MSP. They may be more worried about pain than males and may attend to pain sooner than males in order to reduce its impact on day-to-day tasks (for example; child-caring). Passive coping may also be the result of suffering a deeper impact from their pain suggested by data on disability. This, in turn, may be related to gender differences in nociceptive mechanisms, muscle fiber composition, biologic responses to pregnancy and childbearing responses to stress, total work load or a combination of these (Soares et al., 2004; Bingefors and Isacson, 2004).

MSP is common in the general population, and is costly in terms of treatment, individual suffering and time lost due to work absenteeism. Meanwhile, taking sick leave might be the last choice to cope with their pain. This might be due to the reason that teachers were afraid of losing their job if they had taken too many sick leaves, especially who were working in private schools. From those who sought medical help it was found that doctors (pain killers) and physiotherapists were the most



preferred choices which were similar to previous studies (Chiu and Lam, 2007; Chiu et al., 2006; Kerssens et al., 2002). Therefore, the physiotherapists and doctors should make every effort to prevent pain and to relieve pain promptly and effectively when it occurs, because teachers were found to be a high-risk group in developing wide-spreading MSP. Gender, age, depression and improper posture were found to be significant risk factors.

Furthermore, this study revealed a high prevalence of MSP and the level of pain experienced was severe enough to interfere with activities of daily living and for some teachers resulted in work absence. Therefore it is advisable for teachers to recognize and minimize occupational risk factors, if possible, in order to decrease the chance of getting MSP. Furthermore, the fact that pain intensity turned out to be such a potent predictor of function in this study stresses that the importance of pain intensity and coping strategies should not be forgotten and that more research that focuses on the impact of MSP on function is needed. As a result of all these, it is advisable for school administrators, teachers and physiotherapists to work together to develop a well-organized health and safety program to prevent musculoskeletal pain in teachers. For example, workshops or seminars on stress and pain management should be conducted as a preventive measure for building up anxiety and occupational musculoskeletal pain.

In order to reduce the risk of having musculoskeletal pain, teachers are advised to have “breaks” and to do “exercises” at their office. Even if good epidemiological studies have been difficult to do, we know that MSP is a major problem in the community; future studies might utilize longitudinal designs and repeated measures to tease out the role of various factors in the development of disability.

## ACKNOWLEDGEMENT

The authors thank the student investigators from School of Physical Therapy and Rehabilitation at Pamukkale University in Denizli, Turkey for their meaningful help. The authors also acknowledge the help of the teachers living in Turkey.

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