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| Original Article |

Effects of musculoskeletal system problems on quality of life and depression in students preparing for university entrance exam

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Background: This study was planned to investigate the relationship between musculoskeletal problems, depression, and quality of life in students preparing for university entrance exams.

Methods: A total of 180 students were included in the study, 104 were female (57.77%), and 76 were male (42.22%). Students were reached through the cram schools ("dershane") in Denizli. Musculoskeletal system problems, depression status, and quality of life were determined with the Musculoskeletal-Postural Discomfort Scale (MDS), Boratav Depression Screen Scale (Bordepta), and Short Form-36 (SF-36), respectively. Demographic data, daily study, and sleep duration were also recorded.

Results: Students have moderate musculoskeletal discomfort. Musculoskeletal disorders and depressive symptoms are more observed in female students than male students ($P = 0.000$). The SF-36 results were significantly negatively correlated with the MDS and Bordepta scores. A significant positive correlation was found between musculoskeletal disorders and depression status ($r = 0.351$, $P = 0.000$). Sleep duration was negatively correlated with the MDS and Bordepta ($r = -0.209$, $P = 0.005$; $r = -0.148$, $P = 0.047$, respectively) and positively correlated with the SF-36 role limitation/emotional and social functioning subscales ($r = 0.225$, $P = 0.002$ and $r = 0.191$, $P = 0.010$ respectively).

Conclusions: Musculoskeletal problems and depression status negatively affects general health status especially in female students who are preparing for university entrance examinations. Students should be informed about musculoskeletal problems by healthcare professionals and the study room, tables, and chairs should be arranged ergonomically. Further studies might be determined that why musculoskeletal disorders and depression status are more widely among female students. (Korean J Pain 2017; 30: 192-6)

Key Words: Depression; Female; Musculoskeletal pain; Sleep; Students; Quality of life.

INTRODUCTION

Students are exposed to various kinds of stressors, such as exams, the pressure of teachers and families, a feeling of obligation to succeed, and an uncertain future. The examinations which affect the student's career choice and future, and the inadequacies of coping strategies, cause many problems such as depression, sleep disorders, and musculoskeletal system problems. They have negative effects on the physical, mental, and social lives of students [1,2].

Non-ergonomic chair seating and poor working posture are among the causes of musculoskeletal problems. They are a major cause of severe long-term pain and disability, productivity loss, and reduced quality of life, which can lead to reduced educational attainment among students [3].

Intensive academic workloads, prolonged working hours, and an obligation to learn a lot of information in less time cause physical and psychologically destructive problems in students in Turkey. Musculoskeletal problems are increasing during this period but none of the studies have focused on students' postural problems and the negative effects of these problems.

The objective of this study is to investigate the relationship of musculoskeletal system problems with depression and quality of life in students preparing for the Transition to Higher Education Examination.

MATERIALS AND METHODS

1. Study group

This research was conducted on 12th grade high-school graduate students prepared for the 2011 Higher Education Transition Examination in the Denizli city center. Students were reached through cram schools ("dershane") and volunteer students participated in the study.

The authors state that the study was undertaken in compliance with the Helsinki Declaration.

2. Data collection methods

All self-reported assessments were answered by students 15 days before the Transition to Higher Education Examination and demographic data and the daily working and sleeping hours of students were recorded by assessors.

Musculoskeletal system problems were evaluated using the Musculoskeletal Discomfort Scale (MDS). In this 22-question scale, how frequently hand, arm, leg, upper trunk, and waist discomfort and general disorders recurred was evaluated. The scale was composed of 4-point Likert-type measurements. A higher score means severe musculoskeletal discomfort [4].

Depression status was evaluated using the Boratav Depression Screening Scala (Bordepta). The scale was developed by Boratav in 2003. It consists of 16 Yes/No items, and can be easily applied to individuals or groups and detects people who are clinically depressed in a short time. The lowest score is 0, the highest score is 16, and higher scores indicate severe clinical depression. The Cronbach's alpha coefficient of the scale was found to be 0.90. Sensitivity and specificity calculations showed 85.7% sensitivity and 95.1% specificity at 7.5 cut-off points. A strong correlation was found between the Bordepta and Beck Depression Inventory (0.812) [5].

Quality of life was evaluated using the Short Form-36 (SF-36). It has eight subscales: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. The lowest and highest possible scores are 0 and 100, respectively [6].

3. Data analysis

Data were analysed using SPSS for Windows (Version 16.0). Continuous variables were given as average ± standard deviation. Pearson's correlation coefficient was used to analyze data. For comparison of the female and male students' data when parametric test assumptions were enabled, Independent Samples t-test; when parametric test assumptions were not enabled Mann-Whitney U test was used and the level of significance was accepted as 0.05.

RESULTS

A total of 180 students were included in the study; 104 were female (57.77%), and 76 were male (42.22%). The mean age was 18.62 ± 1.05, mean body mass index (BMI) was 21.83 ± 2.48 kg/m^2. The average daily study duration and sleep duration of students were 10.02 ± 1.36 hour, 7.56 ± 1.07 hour, respectively. Descriptive information of students was shown in **Table 1**.

Table 1. Descriptive Information of Students

Variables	Students (n = 180)	
	Min−Max	Mean ± SD
Age (year)	17.00−23.00	18.62 ± 1.05
Study duration (hour)	7.00−12.5	10.02 ± 1.36
Sleep duration (hour)	6−10	7.56 ± 1.07
	n	%
Gender		
Female	104	57.8
Male	76	42.2
Category		
Quantitative	95	52.8
Verbal	45	25
Equally weight	40	22.2

Male students had significantly better scores than female students in the MDS (P = 0.000), Bordepta (P = 0.000), role limitations due to emotional problems (P = 0.001), social functioning (P = 0.008), and energy/fatigue (P = 0.005) subscales of SF−36 (**Table 2**).

Except physical functioning subscale, scores from all remaining the subscales of the SF−36 were significantly negatively correlated with the MDS and Bordepta. A significant positive correlation was found between the MDS and Bordepta (r = 0.366, P = 0.000) (**Table 3**).

Daily sleep duration negatively correlated with the MDS and Bordepta (r = −0.190, P = 0.011; r = −0.148, P = 0.047, respectively) and was positively correlated with role limitations due to emotional problems and social func−

Table 2. Comparison of Musculoskeletal Disorders, Depression Status and Quality of Life Among Female and Male Students

Variables	Female	Male	t	P
	Mean ± SD	Mean ± SD		
MDS	38.25 ± 11.02	31.07 ± 8.74	4.18	0.000
Bordepta	8.38 ± 4.32	5.38 ± 4.09	4.70	0.000
SF-36				
Physical functioning	78.91 ± 22.17	83.64 ± 21.10	−1.44	0.151
Bodily pain	66.24 ± 22.37	69.66 ± 26.28	−.94	0.348
Role limitations/physical	61.61 ± 35.18	67.63 ± 34.87	−1.13	0.257
Role limitations/emotional	46.58 ± 38.98	65.95 ± 39.98	−3.25	0.001
Emotional well-being	55.37 ± 21.61	61.43 ± 20.63	−1.89	0.060
Social functioning	61.56 ± 26.71	71.90 ± 24.03	−2.67	0.008
Energy/fatigue	51.75 ± 22.57	61.13 ± 20.94	−2.84	0.005
General health perceptions	59.42 ± 21.87	58.78 ± 20.51	0.19	0.842

MDS: Musculoskeletal Discomfort Scale, Bordepta: Boratav Depression Screening Scala, SF-36: Short Form-36.

Table 3. The Relationship between Musculoskeletal Disorders, Depression Status and Quality of Life

	MDS		Bordepta	
	r	P	r	P
SF-36				
Physical functioning	−0.076	0.312	−0.303	0.000
Bodily pain	−0.392	0.000	−0.345	0.000
Role limitation/physical	−0.223	0.003	−0.337	0.000
Role limitation/emotional	−0.236	0.001	−0.585	0.000
Emotional well-being	−0.218	0.003	−0.611	0.000
Social functioning	−0.309	0.000	−0.524	0.000
Energy/fatigue	−0.298	0.000	−0.599	0.000
General health perceptions	−0.240	0.001	−0.385	0.000
MDS			0.366	0.000

MDS: Musculoskeletal Discomfort Scale, Bordepta: Boratav Depression Screening Scala, SF-36: Short Form-36.

Table 4. The Relationship between Daily Study Duration and Sleep Duration with Musculoskeletal Disorders, Depression Status and Quality of Life

Variables	Study duration (hour)		Sleep duration (hour)	
	r	P	r	P
MDS	−0.081	0.279	−0.190	**0.011**
Bordepta	−0.091	0.226	−0.148	0.047
SF-36				
Physical functioning	−0.032	0.672	0.091	0.226
Bodily pain	0.058	0.439	0.094	0.211
Role limitation/physical	0.036	0.633	0.052	0.486
Role limitation/emotional	0.075	0.318	0.225	**0.002**
Emotional well-being	0.095	0.207	0.122	0.104
Social functioning	0.093	0.214	0.191	**0.010**
Energy/fatigue	0.025	0.740	0.135	0.071
General health perceptions	−0.050	0.505	0.060	0.426

MDS: Musculoskeletal Discomfort Scale, Bordepta: Boratav Depression Screening Scala, SF-36: Short Form-36.

tioning subscales of the SF−36 (r = 0.225, P = 0.002 and r = 0.191, P = 0.010 respectively) (**Table 4**).

DISCUSSION

This study was planned to investigate the relationship of musculoskeletal system problems with depression and quality of life in students preparing for the Transition to Higher Education Examination. According to our study, students have moderate musculoskeletal discomfort. Musculoskeletal disorders and depressive symptoms are more observed in female students than male students. The SF−36 was significant negatively correlated with the MDS and Bordepta scores. Significant positive correlation was found between musculoskeletal disorders and depression status. Sleep duration was negatively correlated with the MDS and Bordepta and positively correlated with the SF−36 role limitation/emotional and social functioning subscales.

The Turkish education system is focused on exams and the preparation for university entrance is a difficult process throughout students' high school education. This exam has become one of the significant sources of stress for candidates and their families. Starting from the elementary school years, students preparing for the university entrance exams; they continue their school courses as well as private evening and weekend cram schools ("dershane"), and the daily lives of students are shaped by focusing on their exam. Students travel for hours on public transport

or school bus with improper posture, and they are spending unnecessary time and energy. In addition to this, students take improper posture during studying and resting. All of these reasons can cause moderate musculoskeletal discomfort in students. Musculoskeletal problems increase anxiety, psychological distress, somatic awareness, and depressive symptoms [7,8].

Exams can be stressful, especially if they affect students' career choice and future life [9]. In two different studies conducted in Turkey, depressive symptoms were reported in 37−47% of the high school students [10,11]. We used the Bordepta for investigating depression status and accepted the cut−off point as 7. We determined that, 54.4% of the students had depressive symptoms.

Depressive symptoms are more observed in female students than male students [11−13]. In our study, 38.1% of male students and 66.1% of female students had depressive symptoms. Female students may be more determined to get a high score, might consider the exam as the milestone of their life, and may also be under more family pressure. All the above may result in high levels of depressive symptoms among female students. We think that severe depressive symptoms may have increased musculoskeletal disorders in female students.

In this study, sleep duration was negatively correlated with the MDS and Bordepta and positively correlated with the SF−36 role limitation/emotional and social functioning subscales. The sleep disturbances cause increased stress in daily life. Musculoskeletal problems may lead to sleep

disorders and depressive symptoms and as a consequence students' quality of life may be negatively affected. In order to break this vicious cycle, further studies are required to investigate musculoskeletal problems in adolescence.

An intensive study period and non-ergonomic working conditions cause adverse effects on the psychological state of students, and this leads to loss of motivation and reduction of work efficiency. Therefore, ergonomic evaluation of the student's work environment and working posture, detailed analysis of symptoms such as fatigue, muscle spasms, pain which occurs during working, and regulation of the ergonomic work environment are important to increase academic achievement.

Further studies might determine why musculoskeletal disorders and depression status are found more widely among female students. Moreover, parental awareness would be helpful in this respect. Thereby, both student academic achievement is increased, and depression prevented. The effectiveness of the guidance services in schools should be increased and psychological and health consulting services should be reorganized.

Based on these research results, students should be informed about musculoskeletal problems by healthcare professionals, and the study room, tables, and chairs should be arranged ergonomically. In addition to information and ergonomic regulations, proper working posture and postural exercises should be taught and done regularly.

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