Original Article

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Incidence and Risk Factors of Low Back Pain in Students Studying at a Health University

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ABSTRACT

Objective: The aim of this study was to determine the incidence, severity, and risk factors of low back pain in students studying at a health university.

Methods: The study was conducted on students of dentistry, pharmacy, health sciences, and medicine faculties of Bezmialem Vakif University. The data were gathered using a 35-question survey. Five hundred and twenty students completed the questionnaire. Four hundred and seventy-one (90.57%) of them answered pain-specific questions. Visual analogue scale was used to assess pain intensity. The presence of low back pain and pain severity were determined as two dependent variables. $p<0.05$ was considered as significant.

Results: Of the participants, 131 (25.19%) were male and 389 (74.80%) were female. Differences of low back pain incidence were significant between the students of medicine faculty and other faculties (p=0.004), between those who had weight exchange and non-weight exchange (p=0.023), and between those who were not pleased with the desk and those who were pleased (p=0.000). Pain intensity in female students (p=0.003); those with hereditary disease in the spine (p=0.022), and those with economical, familial, or school-related anxiety (p=0.001) were higher than in others.

Conclusion: This study confirmed whether the risk factors indicated in literature were valid in the study university. Courses, which are devoted to risk factors, may be added to education programs to prevent problems related to low back that may occur because of attending classes.

Keywords: Non-specific low back pain, risk factors, university students

Introduction

Non-specific low back pain is a common case and generally not directly related to a disease or an injury. There are many studies demonstrating that low back pain, which most adults experience at least once in their lives, results from occupational factors (1, 2). However, low back pain is one of the issues that must be dealt with particularly in professions related to health (3, 4). Because students studying at health departments often have to manipulate patients in their practices, they are at risk for low back pain. These students, who do not work yet, may develop low back pain that can cause permanent symptoms later in life (2-5).

There are some studies that showed the cause of low back pain in students. However, low back pain is not associated with only one factor. Many mechanical, physical, behavioral, and psychological factors have a role in the development of low back pain (6). Students' anthropometric features, gender, smoking habit, time spent on computer, school furniture, and ergonomic problems, including sitting position, are the risk factors for the occurrence of low back pain (2, 6-8). Sitting for prolonged periods is important for the onset of low back pain (9, 10). Ayanniyi et al. (11) emphasized that the most important cause of low back pain among adolescents was being in a sitting position for a long time.

In the literature review, it is seen that most studies on low back pain have been conducted on adolescents or female students (2, 6). There are also some studies on low back pain among students studying at other faculties such as engineering and education (2, 12). However, there is no study investigating students at health-related faculties of a university by

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considering many variables together. The aim of this study was to reveal the incidence, severity, and risk factors of low back pain among students studying at health-related faculties of a university.

Methods

This cross-sectional study was conducted on the students studying at the Faculties of Dentistry, Pharmacy, Health Sciences (Physiotherapy and Rehabilitation, Nursing and Audiology), and Medicine at Bezmialem Vakıf University in the spring terms of 2012-2013 and 2013-2014 academic years. Because the university was newly founded and there were no advanced-year students, the population of the study consisted of only first-year students who were in the campus at the time of study. Ethics Committee Approval for the study was obtained from Bezmialem Vakıf University (BVU 71306642/050-01-04/257, 17.09.2014).

Written questionnaires completed by individuals are among the most common methods used for determining the frequency of low back pain (13). The data of this study were collected by using a questionnaire including 35 items that were prepared in accordance with literature by the researcher. The questionnaire was applied by the coordinator of the study at the end of a course after getting permission from the instructor. Verbal informed consent for the study was received from the students before giving the questionnaire forms. Female students were asked to answer the questions by considering low back pain apart from that during menstruation period. The choices of yes/no were mostly sought for the questions. The time for the completion of the questionnaire was approximately 15 minutes.

Of 682 students, 536 students (78.59%) who accepted to participate in the study completed the questionnaire form. The forms of 520 students (97.01%) were complete without any mistake. Four hundred and seventy-one students (90.57%) who had low back pain in the past year answered pain-specific questions. The region of the waist was defined as the area from the end of the ribs to the hip, and it was shown in a body diagram (14).

The questionnaire form consisted of questions prepared for determining following socio-demographic features and situations of the students: age, gender, height, weight, dominant hand, smoking, the habit of doing sports, being satisfied with the study subject, anxiety (economic, familial, or school-related), change in body weight within the past 6 months, working outside school, position while studying (sitting on a chair, lying, sitting on floor or on foot), daily durations of watching TV and using computer (hour), a history of spinal trauma, a history of a hereditary disease, and mattress firmness (soft, medium, firm) (2, 15).

Body mass index (BMI) was calculated as body weight divided by height squared. The values of BMI between 18.5 and 25.0 were accepted as normal. Smokers were asked to write for how long they smoked (months) and how many cigarettes they smoked in a day. The students doing sports were asked about which sports they did, how long they had been doing it (month), how often they did in a week, and for how long they did in a day. Daily walking distance was recorded in kilometer (km). The students were asked to write how many hours a week they stayed in the position that they stated during studying.

The participants were questioned about whether they had pain in the previous month, in the previous week, and at the time of questionnaire. The severity of pain in the students having low back pain was evaluated through visual analog scale (VAS). They were asked to rate their pain on a 10 cm line. According to VAS, 0 showed no pain and 10 showed that the pain was extremely severe (12). The students were asked about whether they knew the cause of their low back pain and, if they did, they were required to write about the cause of pain.

Statistical analysis

Statistical analysis was performed for revealing the incidence of low back pain and the factors affecting low back pain according to different variables in the questionnaire. SPSS version 18.0 (Statistical Package for the Social Sciences Inc., Chicago, IL, USA) was used. For descriptive data, the values of means and standard deviations (x±SD) and medians were presented. Categorical data were shown as n (%). The comparison of variables according to categorical data was performed through chi-square and Fisher's exact test. Quantitative data were analyzed using t-test, and countable data were compared using the Mann–Whitney U test. The presence of low back pain and VAS showing the severity of pain were identified as two dependent variables. Independent variables that could explain the cause of pain were investigated. The relationship was evaluated through Spearman's correlation coefficient test. The p value of <0.05 was accepted to be significant.

Results

The mean age of students included in the study was 19.9±1.2 (17–26) years. Of the participants, 131 (25.19%) were male and 389 (74.80%) were female. The mean height was 168.8±8.5 (150–200) cm, and the mean weight was 61.8±11.5 (40–117) kg. A total of 355 (91.3%) of 471 students with the complaint of low back pain in the past year were female. Of the participants, 174 (33.46%) were from the School of Dentistry, 110 (21.15%) were from the Faculty of Pharmacy, 153 (29.42%) were from the Faculty of Health Sciences, and 83 (15.96%) were from the School of Medicine.

Of the students, 15.19% stated that they smoked and 42.11% specified that they did sports. The most common types of sports were fitness (73, 14.03%), walking/jogging (42, 8.07%), football (32, 6.15%), swimming (29, 5.57%), pilates (19, 3.65%), basketball (10, 1.92%), and volleyball (8, 1.53%). They did sports for approximately 34.8±42.9

(0.5–156) months, for 2.9±1.4 (1–7) days in a week, and for 1.8±1.2 (0.25–3) hours in a day on average.

The mean duration of watching TV in a day was 1.9±1.1 (0.0–10.0) hours in students with low back pain and 1.9±0.8 (0.5–3.5) hours in students without low back pain (p>0.05). The mean time spent on computer in a day was 1.7±1.3 (0–10) hours in students with low back pain and 1.9±1.1 (0.5–5) hours in students without low back pain (p>0.05). Forty students (7.7%) had firm mattress, 401 (77.1%) had medium-firm mattress, and 58 (11.2%) had soft mattress.

The data on students' dominant hand, satisfaction level from their faculties, anxiety, change in weight, working at a job, position during studying, and history of spinal trauma are given in Table 1. The comparisons of students with and without low back pain in terms of mean BMI, duration and amount of smoking, duration and frequency of doing sports, and daily walking distance are presented in Table 2 (p>0.05).

The mean duration of staying in the study position was found to be 9.1±8.8 (0–80) hours in a week in the students with low back pain and 7.7±6.3 (0–30) hours a week in the students without low back pain (p>0.05). Of all participants, 398 students (76.5%) had low back pain in the previous month and 264 students (50.8%) had low back pain in the previous week. And the number of students who had pain at the time of questionnaire was 180 (34.6%).

In Table 1, the incidence of low back pain was compared according to the variables investigated in the questionnaire. In this evaluation, the differences in the incidence of low back pain were significant between the students in the faculty of medicine and in other faculties (p=0.004), between the students with and without change in body weight (p=0.023), and between the students who were satisfied and unsatisfied with the desks and chairs in the classroom (p=0.000).

All 19 students having a hereditary spinal disease had low back pain. The mean value of VAS was 3.5±1.9 for the students with low back pain. In Table 3, the means of pain severity were compared according to the variables in the participants with low back pain. In this comparison, the severity of pain was significantly higher in women (p=0.003) then men, in students with a hereditary disease (p=0.022) then those without a hereditary disease, and in students who had anxiety (p=0.001) then who did not have.

No relationship was found between mattress firmness and VAS (r_s=0.08, p=0.06). Table 4 shows the effect of quantitative parameters on the severity of pain. According to this, there was a positive correlation between the walking distance and the severity of pain (r_s=0.167, p=0.002).

Of the students, 406 (86.2%) stated that they knew the cause of low back pain. Their responses were as follows according to the order of frequency: sitting for a long time (254, 62.6%), lifting and carrying something heavy (184, 45.3%), bending the body down (182, 44.8%), doing sports (31, 7.6%), watching TV (10, 2.5%), and other causes such as walking and standing (36, 8.9%).

Discussion

In this study investigating the frequency of low back pain and factors affecting low back pain in the health-related faculties of a university, the incidence of low back pain was found to

Table 1. Comparison of the incidence of low back pain according to variables

Variables		Low back pain n (%)	P
Gender	Male (n=131)	116 (88.5)	0.358*
	Female (n=389)	355 (91.3)	
Department	Dentistry (n=174)	161 (92.5)	0.004*
	Pharmacy (n=110)	102 (92.7)	
	HS (n=153)	128 (83.7)	
	Medicine (n=83)	80 (96.4)	
Dominant hand	Right (n=488)	444 (91)	0.21**
	Left (n=32)	27 (84.4)	
Satisfaction with department	Yes (n=437)	393 (89.9)	0.248*
	No (n=83)	78 (94.0)	
Anxiety	Yes (n=459)	420 (80.7)	0.119*
	No (n=61)	51(83.6)	
Smoking	Smokers (n=79)	75 (94.9)	0.150*
	Non-smokers (n=441)	396 (89.8)	
Change in weight	Yes (n=79)	77 (97.5)	0.023*
	No (n=441)	394 (89.3)	
Exercising	Yes (n=219)	194 (88.6)	0.197*
	No (n=298)	277 (92.9)	
Working outside school	Yes (n=18)	18 (100)	0.394**
	No (n=495)	453 (91.5)	
Studying position	Sitting on a chair (n=451)	410 (90.9)	1.000**
	Lying on bed (n=66)	61 (92.4)	0.064**
	On floor (n=21)	17 (81)	1.000**
	On foot (n=18)	15 (83.3)	0.136**
Watching TV	Yes (n=381)	346 (90.81)	0.519*
	No (n=136)	125 (91.9)	
History of spinal trauma	Yes (n=16)	16 (100)	0.384**
	No (n=504)	455 (90.3)	
History of hereditary disease	Yes (n=19)	19 (100)	0.24**
	No (n=501)	452 (90.21)	
Satisfaction with desk/chair	Yes (n=117)	94 (80.3)	0.000*
	No (n=403)	377 (93.5)	
Total (n)	520	471 (90.6)	

HS: health sciences; *categorical chi-square; **Fisher exact test

Table 2. Comparison of quantitative variables between students with and without low back pain

	In students with low back pain	In students without low back pain	t	p
BMI	**x±SD 21.64±2.85 x±SD [median]**	**x±SD 20.94±2.38 x±SD [median]**	**-1.650 z**	**0.100* p**
Smoking (number)	10.80±9.52 [8] (n=69)	8.67±1.15 [8] (n=3)		
Smoking (month)	29.64±22.85 [24] (n=72)	28.00±13.47 [22.00] (n=4)		
Doing sports (month)	32.9±41.07 [12.00] (n=180)	51.38±54.62 [36.00] (n=21)	-1.454	0.146**
Doing sports (day)	2.97±1.38 [3] (n=191)	2.62±1.20 [3.00] (n=21)	-0.928	0.353**
Doing sports (hour)	1.86±1.28 [1.75] n=169)	1.58±0.89 [1.5] (n=19)	-0.945	0.344**
Walking (km)	2.06±1.87 [1.50] (n=358)	1.75±1.88 [1.00] (n=33)	-1.399	0.162**
Computer (hour)	1.70±1.34 [1.50] (n=455)	1.91±1.14 [2.00] (n=43)	-1.630	0.103**

BMI: body mass index; x±SD: mean±standard deviation; *t-test; **Mann–Whitney U test

Table 3. Comparison of pain severity levels among students with low back pain according to variables

Variables		**VAS**		
		x±SD [median]	**z**	**p**
Gender	Male (n=116)	3.11±2.01 [3.00]	-2.980	0.003*
	Female (n=355)	3.67±1.89 [4.00]		
Satisfaction with department	Yes (n=393)	3.51±1.91 [3.00]	-0.508	0.612*
	No (n=78)	3.63±2.07 [4.00]		
Smoking	Smokers (n=75)	3.67±2.06 [4.00]	-0.540	0.589*
	Non-smokers (n=396)	3.51±1.92 [3.00]		
Exercising	Yes (n=194)	3.46±1.97 [3.00]	-0.835	0.403*
	No (n=274)	3.58±1.91 [3.00]		
Working outside school	Yes (n=18)	3.72±170 [4.00]	-0.593	0.553*
	No (n=448)	3.52±1.95 [3.00]		
Watching TV	Yes (n=343)	3.47±1.92 [3.00]	-1.227	0.22*
	No (n=125)	3.69±1.96 [4.00]		
History of hereditary disease	Yes (n=19)	4.71±2.28 [4.00]	-2.294	0.022*
	No (452)	3.48±1.91 [3.00]		
Satisfaction with desk/chair	Yes (n=94)	3.31±1.97 [3.00]	-1.345	0.179*
	No (n=377)	3.58±1.92 [3.00]		
Department	Dentistry (n=161)	3.72±2 [4.00]	5.065	0.167**
	Pharmacy (n=102)	3.49±1.79 [3.00]		
	HS (n=128)	3.61±2.02 [3.00]		
	Medicine (n=80)	3.09±1.84 [3.00]		
Anxiety	Yes (n=51)	3.37±2.15 [3.00]	0.158	0.001*
	No (n=420)	3.93±2.04 [4.00]		
Mattress firmness	Firm (n=37)	3.95±2.26 [4.00]	-0.014	0.755*
	Soft (n=54)	3.38±2.05 [3.00]		
	Medium (n=380)	3.51±1.89 [3.00]		

VAS: visual analog scale; HS: health sciences; x±SD: mean±standard deviation; *Mann–Whitney U test; **Kruskal–Wallis test

Table 4. Effect of quantitative variables on the severity of low back pain

Variables	VAS	
	r_s	p
Age	-0.023	0.617
BMI	0.01	0.818
Smoking (number/day)	-0.056	0.191
Smoking (month)	-0.056	0.639
Doing sports (day/week)	-0.038	0.605
Doing sports (hour/day)	0.078	0.315
Doing sports (month)	0.063	0.401
Walking distance (km/day)	0.167	0.002
Computer (hour/day)	0.064	0.170

BMI: body mass index; VAS: visual analog scale; km: kilometer; r_s: Spearman correlation coefficient

be higher in the students from the School of Medicine, in the students with change in weight within the past 6 months, and in the students who were unsatisfied with the comfort of chairs and desks in the classrooms. The severity of pain was higher in female students, in students with hereditary spinal diseases, and in students with economic, familial, or school-related anxiety.

Falavigna et al. (16) conducted a study by comparing students from all years of medical faculty and physiotherapy department. They found that 77.9% of students had low back pain in the past year and the incidence of low back pain in physiotherapy students (80.03%) was higher than that in medical faculty students. In another study, the incidence of low back pain was detected to be lower in students from the faculty of medicine than in students from the department of physical education teaching (5). In our study, the incidence of low back pain was found to be higher at the rate of 90.6% than that in the study by Falavigna et al. (16). Moreover, it was higher among the students at the faculty of medicine (96.4%) than those at other faculties. In the studies in literature, all years were included. Accordingly, higher incidence of low back pain among the students in the department of physiotherapy might have resulted from intensive practical courses and techniques used in clinical studies. On the other hand, our study included only first year students. Indeed, in a study conducted on dentistry students, it was specified that students had low back, neck and shoulder pain once they started clinical practices (9).

Nyland and Grimmer (10) emphasized that the frequency of low back pain was higher at the end of first year when compared to other years. This study, which was performed on low back pain in students at the department of physiotherapy, included 72% of students. The incidence of low back pain was found to be 63% in the past year, 44% in the previous month, and 28% in the previous week. Most of students participated in our study (76.2%). The incidence of low back pain was detected to be 76.5% for the past month and 50.7% for the past week. The rates of low back pain in our study are higher than those in literature. Further comparative studies can be conducted with all years of the departments. If a similar study is performed on senior students, the effects of their departments on students can be understood better. Such a study will allow comparisons among departments. In literature, studies comparing departments are also common (2, 12). It was reported in a study that there was no significant difference among the departments in terms of smoking and exercising habits and the positions of sitting, lying, and weight carrying (12). In this study, because the students were first year and they did not study occupational courses yet, no comparison among variables was performed in the departments.

Ünalan et al. (15) reported that pains were more commonly seen in the lumbar region in the body diagram of vocational school students (34.1%). In this study, the mean severity of low back pain, which was calculated through VAS, was 5.5±2.1. In our study, the mean severity of pain was found to be 3.5±1.9 by using the same scale. In another study, VAS scores of university students were compared among the departments, but no difference was found (12). In our study, although not statistically significant, VAS scores of dentistry students were revealed to be higher than those of other departments' students.

In our study, most of students specified that they studied in sitting position on a chair (451, 86.7%). The students mostly attributed low back pain to sitting for a long time (254, 53.9%). 403 of the students (77.5%) stated that desks and chairs in the classrooms were not comfortable and most (93.5%) had low back pain ($p<0.01$). These results of our study support the literature demonstrating that low back pain is resulted from staying in sitting position for a long time (7-10). On the other hand, in another study, it was reported that sitting position was not a risk factor for back pain anymore (5). Therefore, more studies should be conducted on this issue.

In a study conducted on adolescents, it was reported that gender and exercising affected low back pain (1). Korovessis et al. (6) revealed that the factor of gender was against the females for the severity and frequency of low back pain and that there was a relationship between physical activity and low back pain. Consistent with literature, the incidence and severity of low back pain were higher in female students (91.3% and 3.7±1.9, respectively) than in male students in our study. Women are more sensitive to pain and men disregard pain (17).

In individuals doing exercises, the risk of chronic back pain is lower (18). In a study, it was stated that 23.5% of students did sports for less than 1 hour in a week and 20.0% did sports for more than 4 hours in a week (19). While the rate of exer-

cising among university students was found to be 33.4% in the study by Ünalan et al. (20), it was 43.7% in the study by Korkmaz (21). In our study, for the students who did sports (42.1%), the frequency of exercising was found to be approximately 2.9±1.4 days in a week and the mean duration was 1.8±1.2 hours in a day. Although there was no statistically significant relationship between exercising and low back pain, it was observed that 298 of students (57.3%) never did sports. Some factors such as high number of courses and inadequate sports facilities should be investigated for revealing the cause of low rate of exercising among students. While informing students about the importance of doing sports, they should also be motivated for appropriate branch of sports. Football, gymnastic, weight lifting, wrestling, and rowing are the sports branches that can cause back pain (18). In our study, the rate of students who played football was 6.1%, which was lower compared to other branches of sports.

Increased weight and tall height is a risk factor for low back pain (18). There are some studies showing the relationship between obesity and low back pain among university students (7, 8). Avşar et al. (19) found the value of BMI to be normal in 76.5% of students. In our study, it was revealed that low back pain was not affected by the value of BMI because BMI values of students with and without low back pain were within normal intervals. However, the relationship between change in weight in the past 6 months and low back pain was found to be statistically significant.

Studies have demonstrated that smoking affects low back pain and there is a relationship between daily amount of cigarette and chronic back pain (2, 22). Bertan et al. (23) conducted a study on the first year students of eight universities and they found the rate of smoking as 22.5%. In a study performed in Kırıkkale University, the rate of smoking among students was detected to be 45.4% (24). In our study, the rate of smoking was 15.19%, which was lower than in literature. This rate might have been due to the fact that our participants were the students of health-related departments. Even if the rate of smoking is low, encouraging students to give up smoking is important during health services and educations given to them. In another study, the rate of smoking among the students of medical faculty was found to be lower than those in other faculties (25). This might be due to awareness of students, education level, and being informed on smoking-related health risks. Kutsal et al. (18) stated that the risk of low back pain increased in people at the age of 45 years and above, who smoked 50 and more packs per a year. In our study, no relationship was found between the duration and daily amount of smoking and the severity of pain. This result might be due to the fact that degenerative results do not occur yet because university students are young.

Psychosocial factors such as economic problems, dissatisfaction, anxiety, and interpersonal communication difficulty are the risk factors for low back pain (18). Muscle strain that occurs in such situations leads to the development of pain. In our study, most of students (84%) were satisfied with their departments, but 88.2% had anxiety due to economic, familial, or school-related factors. In parallel to literature, the difference between the students with and without anxiety with regard to the severity of pain was found to be statistically significant.

Low back pain is commonly seen in degenerative spinal diseases (26). In this study, low back pain was observed in all of students with a history of congenital spinal disease and the severity of low back pain was detected to be higher than in other students.

The most important approach in the treatment of low back pain is to inform and educate the individual. Hence, it was demonstrated that physical fitness education that was given particularly to the senior students of dentistry improved lumbar health and protected from pain (27).

Limitations of the study

The strength of this study was that most of students could be reached and students being first year increased the homogeneity of the study. On the other hand, the study had some limitations. Because this was a cross-sectional study, which also revealed whether risk factors in literature were valid for our university or not, no relationship was found between low back pain and many variables. In this study, standardized questionnaires that were available in literature were not used, but a more detailed questionnaire was designed by benefiting from them. Although it was a specific study on low back pain, detailed questioning on the duration, feature, and characteristic of pain was not performed. This study presents the results of a university.

Conclusion

With this study on first year students, awareness was created about lumbar health and pain among students. The incidence of low back pain was high in the first year of students in their departments. Considering the fact that more severe problems can be encountered with the effect of occupational practices in the following years, courses on lumbar health should be added to the educational curriculum of health-related departments. An effective educational program and ergonomic designs, which can reduce or prevent back pain, are necessary as a protective approach for preventing serious problems that may occur in future. In the forthcoming years, further research can be performed on the same students in the first and last years of education.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bezmialem Vakıf University (BVU 71306642/050-01-04/257, 17.09.2014).

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