



Low back pain among medical students

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Low back pain (LBP) is known to affect both older and younger adults. Medical schools tend to have time-consuming curricula, possibly perpetuating a sedentary lifestyle, and a high prevalence of LBP among medical students. The purpose of this study was to evaluate the extent of sedentary lifestyle and the 12-month prevalence of LBP in a sample group of medical students in comparison to a random sample of physical education students. A retrospective study involving a questionnaire-based inquiry of 103 medical students showed that they were approximately 2.5 times less physically active than the 107 physical education students ($p < 0.001$) and spent 3 more hours per day sitting ($p < 0.001$). The 12-month prevalence of (sub)acute and chronic LBP in the sample group of medical students was 53.4% (95% CI : 43.8%-63.0%), as compared to 60.7% (95% CI : 51.4%-70.0%) in the sample group of physical education students, yielding no statistically significant difference ($p = 0.329$). These data reveal a high prevalence of low back pain among students, which is rather alarming considering their young age. Strangely, the prevalence of LBP was not higher in medical students than in physically more active students, in spite of their sedentary lifestyle. According to the literature, the sitting position is no longer considered as a risk factor for low back pain.

Keywords : low back pain ; medical students ; physical education students.

INTRODUCTION

Low back pain (LBP) is the leading cause of medical consultations (10), and it has a major

economic impact on the healthcare system in many countries. In the United States total costs related to this condition reportedly exceed \$100 billion per year (9). LBP is known to affect both older and younger adults (5), interfering with their quality of life and work performance (10).

Brennan *et al* (5) reported a 32% annual prevalence of LBP in students participating in a physically demanding college academic program. The authors hypothesized that physically less active students could be at an even higher risk for suffering from LBP : medical schools tend to have time-consuming curricula with a great deal of learning material (14). The academic rigor of such a curriculum might perpetuate a sedentary lifestyle among medical students, possibly making them prone to the occurrence of LBP (15,17,18). However, to the authors' knowledge, no studies have been conducted on the physical activity level and extent

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of sedentary lifestyle among medical students and its possible association with the occurrence of LBP.

The aim of this retrospective study was to compare the 12-month prevalence of LBP and the Oswestry Disability Index (ODI) for LBP in a sample group of medical students to the prevalence and ODI for a random sample of physical education students who are expected to have a less sedentary lifestyle.

PATIENTS AND METHODS

Definition of acute and chronic low back pain

In the current study, LBP was defined as chronic or acute/subacute, as a function of the time course. Given the lack of international agreement on the definition of chronic LBP (3), it was defined as “pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without referred leg pain persisting for at least 12 weeks”, according to the European guidelines for the management of chronic non-specific LBP (1). Likewise, acute/subacute LBP was defined as pain lasting less than 12 weeks.

Questionnaire Design

A questionnaire including 26 open or single choice questions was elaborated for this 12 month retrospective study. General questions about age, gender, height, weight, physical activity and time spent sitting were asked. The height and weight of each student were used to calculate the corresponding Body Mass Index (BMI). If the student reported back pain, he or she had to answer further questions regarding localization, duration, occurrence, intensity, diagnosis and pain management. A drawing was added to make it easier for the students to localize the pain. Since standards for the assessment of the severity of LBP are lacking (1), the validated (6) Oswestry Low Back Pain Disability Questionnaire (11) was used for objective assessment purposes. It includes questions about the pain intensity during personal care, lifting weights, walking, sitting, standing, sleeping, sex life, social life and travelling, and provides an overall pain intensity score ranging from 0% to 100% disability.

Data Collection

The questionnaire was made accessible online to every 1st, 2nd and 3rd year medical student at the

Paracelsus Medical University, Salzburg, Austria. From a total of 121 medical students 103 (85%) completed the questionnaire. Fourth and fifth year medical students were not included in this study, since they mostly participate in clinical rotations/research fellowships abroad and do not attend regular lectures anymore. The questionnaire was also made accessible to a random sample of students, participating in the Sports Sciences Program of the University of Salzburg which features a physically demanding curriculum. The response rate for the physical education students was 107 of 152 (70%). Altogether, 210 correctly completed questionnaires were submitted.

Statistical methods

All retrieved data were analyzed using SPSS version 15.0 (Chicago, Illinois, USA). First descriptive statistics (mean and standard deviation) were calculated. Concerning the prevalence, confidence intervals were computed. Subsequently the values of each variable (e.g. age, BMI, physical activity, time spent sitting) were tested for normal distribution by using the One-Sample-Kolmogorov-Smirnov Test. For non-normally distributed data a non-parametric analysis (Mann-Whitney) was used to find out possible differences between the two sample groups. Accordingly, a parametric analysis (t test) was used for normally distributed data. A Pearson's chi-square test was applied to compare the prevalence of LBP in the two sample groups.

RESULTS

The sample group of medical students consisted of 54 women (52.4%) and 49 men (47.6%) (Table I). The average age was 21.1 ± 1.8 years in the medical group, and significantly lower ($p = 0.004$) than the average age in the physical education group (22.5 ± 3.2). Forty-three physical education students were female (40.2%) and 64 were male (59.8%), yielding no statistically significant difference between the two sample groups ($p = 0.096$). The two sample groups did not differ in their average BMI scores ($p = 0.131$): medical students had an average BMI of 21.6 ± 2.4 kg/m² and the physical education students of 22.1 ± 1.9 kg/m².

The two sample groups showed significant differences in time spent sitting ($p < 0.001$) and physical activity ($p < 0.001$). The medical students spent an average of 12.0 ± 1.9 hours per day sitting,

Table I. — Sample groups' characteristics

	Medical Students	Physical Education Students	p-value
Age (years)	21.1 ± 1.8	22.5 ± 3.2	0.004
Gender	F 52.4% / M 47.6%	F 40.2% / M 59.8%	0.096
BMI (kg/m ²)	21.6 ± 2.4	22.1 ± 1.9	0.131
Sitting (hours/d)	12.0 ± 1.9	9.0 ± 2.5	<0.001
Physical Activity (min/d)	56.6 ± 41.7	147.5 ± 77.2	<0.001

Table II. — Prevalence of Low Back Pain and Oswestry Disability Index (ODI)

	Medical Students	Physical Education Students	p-value
(Sub)acute + chronic LBP	53.4%	60.7%	0.329
ODI	3.7 ± 4.9%	3.3 ± 3.5%	0.909
Acute/subacute LBP	37.9%	41.1%	0.673
ODI	2.3 ± 3.5%	2.5 ± 3.0%	0.558
Chronic LBP	15.5%	19.6%	0.473
ODI	7.3 ± 6.1%	5.0 ± 3.8%	0.244

of which 10.0 ± 1.6 hours were spent either studying or listening. The average time spent sitting by the physical education students was 9.0 ± 2.5 hours per day, of which 5.6 ± 2.1 hours were spent either studying or listening. For the medical students the average time of physical exercise per day was 56.6 ± 41.7 minutes in comparison to 147.5 ± 77.2 minutes for their counterparts (Table I) ($p < 0.001$). The most popular sports activities in the medical group were jogging (53%), cycling (48%) and team sports (40%). Among the physical education students the most popular sports activities were team sports (64%), jogging (36%) and swimming (26%).

The 12-month prevalence (Table II) of (sub)acute and chronic LBP was 53.4% (95% CI: 43.8%-63.0%) in the medical group, versus 60.7% (95% CI: 51.4%-70.0%) in the sports group. The difference was not statistically significant ($p = 0.329$). The medical students suffering from (sub)acute or chronic LBP showed an average Oswestry Disability Index (ODI) for low back pain of $3.7 \pm 4.9\%$ (0% = no disability at all), which was not significantly higher ($p = 0.909$) than the average score in the other group ($3.3 \pm 3.5\%$). Table II shows that the findings for (sub)acute or chronic LBP, considered apart, were comparable. Of all the

medical students suffering from LBP, 16.4% sought professional medical assistance, mostly from orthopaedic surgeons (55.5%), while 60.0% tried self-therapy by exercising their trunk musculature and being more physically active. Twenty-one percent of the physical education students sought professional medical assistance, mostly from physiotherapists (64.3%), and 67.7% tried self-therapy.

DISCUSSION

These data reveal an alarmingly high prevalence of low back pain among students in general. However, the hypothesis that the prevalence of LBP amongst medical students is higher compared to physically more active students could not be confirmed. The 53.4% 12-month prevalence of (sub)acute and chronic LBP among medical students scores relatively high as compared with the prevalence rates for the general population (from 15% to 63%) (3,5,15); this indicates a serious health threat to our young generation. The same is true for the physical education students. The early onset of low back pain in young adults is a condition which should not be ignored. A prolonged lifetime exposure to risk factors increases wear and tear in the

lower back leading to elevated injury rates at older age (5). Therefore increasing age is considered to be a risk factor for the occurrence of LBP (18), although the risk decreases after a certain age. Even though the average age in the medical group was only 21.1 years, its 15.5% prevalence of chronic LBP almost reached the 19% prevalence reported in a large cross-sectional study conducted in the Netherlands including 22,415 relatively older people from 20 to 59 years (16).

Influence of the sitting position. The medical students were approximately 2.5 times less physically active than the science of sport students. They spent 3 more hours per day sitting, in the first place because lectures and study time engaged them almost twice as much. In other words, the medical students had a considerably more sedentary lifestyle. Nyland and Grimmer (15) also observed a 63% 12-month prevalence of LBP in physiotherapy students and felt that “a sitting and looking down position” could be an additional risk factor for LBP for other university students. However, Hartvigsen *et al* (12) stated in a critical review that the epidemiological literature does not support the popular opinion that sitting is associated with LBP. Recently a systematic review conducted by Chen *et al* (7) confirmed these findings, claiming that a sedentary lifestyle is not necessarily associated with LBP. The genesis of LBP rather seems to be multifactorial, depending on genetics, environment and other possible risk factors (5). These negative reports about the influence of sitting offer a potential explanation why the sample groups in this study showed no statistically significant difference in the occurrence of LBP in general, acute/subacute LBP, or chronic LBP, despite the medical students having a considerably more sedentary lifestyle. Also the corresponding Oswestry Low Back Pain Disability Indexes did not differ significantly, showing that the pain intensity levels in both sample groups were approximately the same.

The influence of other risk factors, such as an increased female/male ratio (13,18) or an increased BMI (4), could be partially excluded, as the groups were comparable from that viewpoint. However, the significantly higher age of the sports students was a real risk factor. Variables which were not

assessed in this study, but should be investigated in further studies, are smoking (2) and psychological distress (8,18).

A weakness of this study was the fact that its retrospective character made it subject to a potential sampling and recall bias.

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