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Back pain – analysis of risk factors and the frequency of ailment occurrences

Zespoły bólowe kręgosłupa – analiza czynników ryzyka i częstości występowania dolegliwości

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Key words
Back pain ailments, risk factors, students.

Abstract
The aim of the study was to analyze the risk factors of back pain in M.A. students. The study involved 150 physical therapy students from the University School of Physical Education (AWF) in Krakow and 100 applied information technology (IT) students from the Cracow University of Technology. The study group was determined on the basis of dean's lists and quota sampling. The study was conducted using a proprietary questionnaire. The results showed that the level of knowledge on prevention of back pain in physical therapy students is greater than in science students. Physiotherapy students experience back pain more often than IT students. The physical activity level of physical therapy students is higher than the IT students. The type of activity may significantly affect the occurrence of back pain in students. The presented results may be indicative of the significant effect of stress on the occurrence of pain among students.

Słowa kluczowe
dolegliwości bólowe kręgosłupa, czynniki ryzyka, studenci

Streszczenie
Celem badań była analiza czynników ryzyka bólów kręgosłupa u studentów studiów magisterskich. W badaniu wzięło udział 150 studentów fizjoterapii AWF w Krakowie i 100 studentów informatyki stosowanej Politechniki Krakowskiej. Badaną grupę określono na podstawie list dziekańskich i doboru kwotowego. Badanie przeprowadzono za pomocą autorskiego kwestionariusza ankietowego. Wyniki wykazały, iż poziom wiedzy profilaktyki bólów kręgosłupa u studentów fizjoterapii jest większy niż u studentów informatyki. Studenci fizjoterapii częściej doznają bólów kręgosłupa niż studenci informatyki. Aktywność fizyczna studentów fizjoterapii jest większa niż studentów informatyki. Charakter zajęć, może w istotny sposób wpływać na występowanie dolegliwości bólowych kręgosłupa u studentów. Przedstawione wyniki mogą wskazywać, iż stres może w istotny sposób wpływać na występowanie dolegliwości bólowych wśród studentów.

The individual division on this paper was as follows:a – research work project; B – data collection; C – statistical analysis; D – data interpretation; E – manuscript compilation; F – publication search

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INTRODUCTION

The exact determination of the prevalence of back pain is difficult due to the heterogeneous ways of acquiring data in different countries, and problems with the accuracy and reliability of research. Although it can be determined that back pain is the second most common ailment, immediately following headaches[1]. It is estimated that back pain occurs in 50% to 75% of the general population. According to scientific research in Poland, back pain is experienced by 72% of the population before reaching the age of 40, and 66% of men and 30% of women over the age of 40[2]. Recent reports indicate that lower back pain is most common in the working population between the ages of 35-55[3]. The present priorities of life, especially of young people entering the workforce, are focused on a career, often acquired at the expense of their own health. Although, until recently the problems associated with back pain were attributed mainly to the elderly, the development of technology, computerization, domination of the so-called "sedentary job" and unfavorable changes in the employment market, which force an increasing number of hours to be spent at work, have caused the problem to increasingly touch young people[4]. 30% of patients affected by this ailment admit that back pain limits their normal activity. According to the reseach conducted by Taspinar, among the factors causing or intensifying the occurrence of back pain in young people, may be, time of working in a seated position, the position while working in front of a computer, ignoring the principles of ergonomics and limiting physical activity. It was estimated that in the United States, the annual expenses related to the treatment of backaches are about $100 million[6].

AIM

The aim of the study was to analyze the risk factors of back pain in M.A. students majoring in physical therapy and applied IT.

RESEARCH QUESTIONS

1. Is knowledge regarding back pain prevention higher in physical therapy students than applied IT students?
2. Do back pain ailments occur more often in applied IT students than physical therapy students?
3. Is the physical activity level higher in physical therapy students than applied IT students?
4. Does the type of activity the students undertake during their studies significantly affect the occurrence of back pain ailments in the mentioned groups of students?
5. Does the frequency of stress occurrences correlate with the frequency of back pain ailment occurrences in the physical therapy and applied IT students?

MATERIAL AND METHODS

Characterisation of the study group

The study involved a total of 250 full-time Masters students divided into two groups: the students of physiotherapy at the Department of Motor Rehabilitation, University School of Physical Education in Krakow and students of applied IT at the Faculty of Physics, Mathematics and Computer Science of Tadeusz Kosciuszko University of Technology in Krakow.

To determine the number of persons to take part in the study, non-probability sampling (quota sampling) was deployed. Sampling was determined on the basis of up-to-date lists of students (including the number of women and men in each year). The representative group of students of physiotherapy was 150 persons (85 first-year students – including 64 women and 21 men, and 65 second-year students – including 50 women and 15 men) which represented 45 per cent of the general population of full-time Masters students of physiotherapy at the University School of Physical Education in Krakow during the 2013/2014 academic year. The students were aged 22 to 27 years.

The representative group of students of applied IT under study consisted of 100 people (53 first year students, including 5 women and 48 men, and 47 second year students, including 4 women and 43 men) aged 22 to 26 years. This group accounted for 40% of the general population of the students of full-time Masters students of the Faculty of Physics, Mathematics and Computer Science at Tadeusz Kościuszko University of Technology, in the 2013/2014 academic year.

Eligibility criterion for the study was to be confirmed as a student. The criterion for exclusion from the analysis of the study conducted was reporting on the questionnaire a history of serious spine damage (spinal injury requiring hospitalisation). On the basis of this criterion, 12 people were excluded from the study on the basis of the questionnaire (6 people studying physiotherapy, including 3 women from the first year, 2 women from the second year and 1 male from the second year, as well as 6 people from applied informatics, including 3 men from the first year and 3 men from the second year).

For the next stage, which involved the analysis of the questionnaire, 238 people were qualified:144 students of physiotherapy (82 people from the first year – 61 women and 21 men, and 62 people from the second year – 48 women and 14 men), as well as 94 students of applied informatics (50 people from the first year – 5 women and 45 men, and 44 people from the second year – 4 women and 40 men).

Characterisation of the study method

Surveys were conducted among students of Tadeusz Kosciuszko University of Technology and the University School of Physical Education in Krakow during the period from March to April 2014. Participation in the study was voluntary and anonymous, and respondents were informed about the purpose of the test and its consistence with the Polish regulations on the security of personal data.[1] The survey was conducted using an original questionnaire consisting of 3 parts: the

personal data section (consisting of 6 questions),a section on lifestyle and the occurrence of back pain (containing 16 questions) and two tasks, in which the subjects were asked to select those figures and statements that correctly described the rules of back pain prevention.

Characterisation of the statistical method

The results of the survey were calculated using IBM SPSS Statistics 22 and Microsoft Office Excel 2007 programs. Pearson's chi-squared test was used to answer survey questions and verify the study questions. The Chi-squared distribution table was used in order to determine the level of statistical significance. Graphic presentation of data includes tables, cross tables and pie charts.

RESULTS

The study results are presented as the sequence of answers to study questions posed earlier.

Is the knowledge of back pain prevention greater in students of physiotherapy or in students of applied IT?

On the basis of question 6. of the questionnaire which concerned adhering to the principles of back pain prevention, it was calculated that 78.4% of physiotherapy students and 29% of applied informatics students declare that they respect the aforementioned principles (Table 1).

The results obtained on the basis of the question 6. of the questionnaire were used to determine whether there was a relationship between the knowledge of the principles of back pain prevention and students' degree. In question 6. the respondents were asked to determine whether they respect the principles of back pain prevention; the question was also used to determine whether or not the respondents know these principles. Statistical analysis performed using Pearson's chi-squared test revealed statistical significance at $\chi^2 = 0.000$. According to this analysis, it can be said with 95% probability that the knowledge of the principles of back pain prevention is greater in physiotherapy students than in applied informatics students (Table 2).

Table 1

Opinions of physical therapy and IT students on the subject of following guidelines of back pain prevention

Do you follow the guidelines of back pain prevention?	Field of study		Total
	Physical therapy	IT	
Yes	**113**	**27**	140
No	31	67	98
Total	144	93	238

Table 2

Field of study and knowledge on back pain prevention – cross table

Knowledge on back pain prevention	Field of study		Total
	Physical therapy	IT	
Moderate	3	**31**	34
Good	**85**	**50**	135
Extensive	**56**	13	69
Total	144	94	238

Do students of applied IT suffer from back pain more often than students of physiotherapy?

On the basis of the question concerning the sections of the spine in which students experience pain, just two of the physiotherapy students declared that they do not feel any pain, which constitutes 1.4% of the physiotherapy students studied. In the case of applied informatics students, the group without symptoms consisted of 11 people or 11.7% of the respondents. The section of the spine most frequently reported to cause pain for both physiotherapy students and applied informatics students was the lumbar spine: 73.61% of the physiotherapy students and almost 55.32% of the applied informatics students declared that they experience pain in the lumbar spine (Table 3).

As to the question concerning the situation in which back pain appears most frequently, both physiotherapy students (54.93% of respondents) and applied IT students (66.27% of respondents) replied that most often pain occurs during prolonged sitting. Among physiotherapy students, 21.83% declared that pain occurs in the period after lifting objects – which is the second most common circumstance for pain to occur in this group. Among applied informatics students similar results were obtained for the period after lifting objects and for periods of long standing – 12% and 10.84% of the students, respectively, connected them to back pain. Forced body position at work and menstrual pain were also found among the respondents' answers; however, since only three people mentioned those, these causes of pain to the back were not included in Table 4.

In order to investigate whether the students of applied informatics suffer from back pain more often than students of physiotherapy, a comparison was made that took involved the results obtained on the basis of the question concerning the frequency of back pain as perceived by both groups. Statistical significance was examined using Pearson's chi-squared test and was determined at the level of $\chi^2 = 0.003$, which means that it can be assumed with 95% probability that the physiotherapy students suffer from

* Act from 28 August 1997 on the protection of personal data. Dz. U. [Journal of Laws], 1997 No. 133, item 883, with later amendments.

Table 3

Sections of the spine in which students experience pain

In which spinal sections do you experience pain?	Field of study		Total
	Physical therapy	IT	
Cervical	12	**21**	33
Thoratic	20	3	23
Lumbar	**106**	**52**	158
Entire length	4	7	11
None	2	11	13

Table 4

Situations in which the students most often experience back pain

In what situations does pain usually occur?	Field of study		Total
	Physical therapy	IT	
After awakening	1	7	8
After sitting for a long period of time	**78**	**55**	133
After standing for a long period of time	24	9	33
After walking for a long period of time	5	2	7
After lifting	**31**	10	41

Table 5

Field of study and frequency of experiencing back pain – cross table

Frequency of experiencing back pain	Field of study		Total
	Physical therapy	IT	
Low	22	28	50
Moderate	81	33	114
High	41	33	74
Total	144	94	238

Table 6

Types of physical activity undertaken by students

Types of physical activity undertaken by students	Field of study		Total
	Physical therapy	IT	
Running	**61**	**29**	90
Swimming	34	11	45
Forms of dance and movement	**53**	5	58
Team sports	21	**20**	41
Gym	18	**19**	37

back pain more often than students of applied informatics. The result obtained shows a negative correlation as far as the initial assumptions of the study are concerned. Due to the fact that the number of people not reporting any pain was small, these people were assigned to a different group with a low incidence of feeling back pain. Connecting people without back pain with that group does not affect statistical significance (Table 5).

Is the level of physical activity in physiotherapy students larger than in applied informatics students?

As the answer to the question in which the respondents were asked to specify whether they engage in physical activity lasting at least 30 minutes in their free time, 13 physiotherapy students (9.02%) and 30 applied informatics students (31.91%) declared not practicing any sports whatsoever.

Respondents who declared practicing physical activity lasting at least 30 minutes (i.e. 131 physiotherapy students and 64 applied informatics students) were asked to identify the type of activity; one or two types of activity could be given as an answer to this question. The most common activities in students of physiotherapy were running (46.56%) and forms of dance and movement activities (40.45%). Students of applied informatics also preferred running (45,31%) and chose team sports (31.25%) and gym (29.69%) quite often as well. There was in the question the possibility of adding one type of activity that was not included among the two main types. The type of activity added most often was the gym, which was duly included in the table. Other types of physical activity like cycling, skating, gymnastics, climbing, skiing and martial arts were not included in the table due to the small number of times it had been mentioned (Table 6).

Pearson's chi-squared test was used in order to check whether there is a correlation between physical activity and degree. The correlation was checked on the basis of the results obtained from four questions included in the survey. The first question concerned participation in physical education classes during the winter semester: physical education classes were attended, in compliance with the curriculum, only by the second-year physiotherapy students; the master's degree curriculum for students of applied informatics does not include physical education classes. The second question concerned Academic Sports Association (Polish: AZS) membership: only 4 students of physiotherapy

belong to AZS. Another question was related to engaging in physical activity lasting at least 30 minutes, and the last question was to determine the frequency with which the activity referred to in the previous question was undertaken. Physical activity with the highest frequency (7 days a week and 3-5 times a week) is undertaken by physiotherapy students (Figure 1).

Statistical significance was determined at $\chi^2 = 0.000$, which means that it can be assumed wit 95% probability that the level of physical activity is higher in physiotherapy students than in applied informatics students (Table 7).

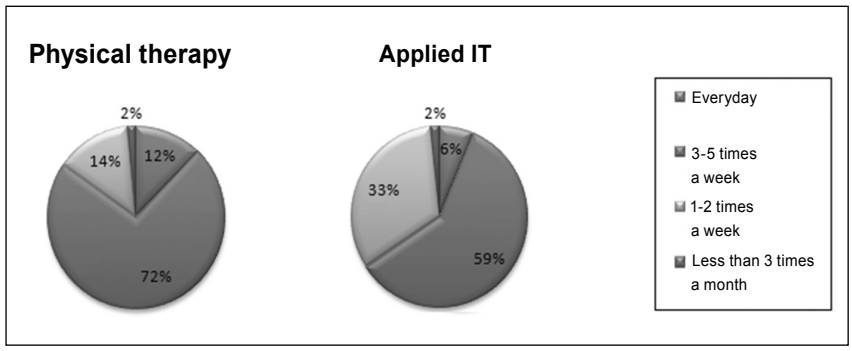

Figure 1

Frequency of undertaking physical activity in free time

Table 7

Field of study and students' physical activity – cross table

Students' physical activity	Field of study		Total
	Physical therapy	IT	
Low	14	**31**	45
Moderate	**71**	**59**	130
High	**59**	4	63
Total	144	94	238

Does the nature of the activities in which students participate in the course of study affects significantly the occurrence of back pain in the students of physiotherapy and applied informatics?

The determination of a statistically significant relation between the frequency of back pain and the nature of activities in which students participate was correlated on the basis of three questions from the questionnaire. The first question considered was to determine whether the respondent considers himself or herself to be a person exposed to back pain because of their profession. All students of physiotherapy believed they were exposed to back pain, while 13 students of applied informatics (i.e. almost 14% of them) thought that they are not at risk of pain due to their chosen profession.

The next question concerned the amount of time spent in sitting position during the day. It is the students of applied informatics who spend most of the time during the day in a sitting position. More than a half of the group declares that time to be more than 12 hours. The greatest percentage of students of physiotherapy spend up to 6 hours during the day in a sitting position. Not a single student of physiotherapy spends over 12 hours during the day in a sitting position (Figure 2).

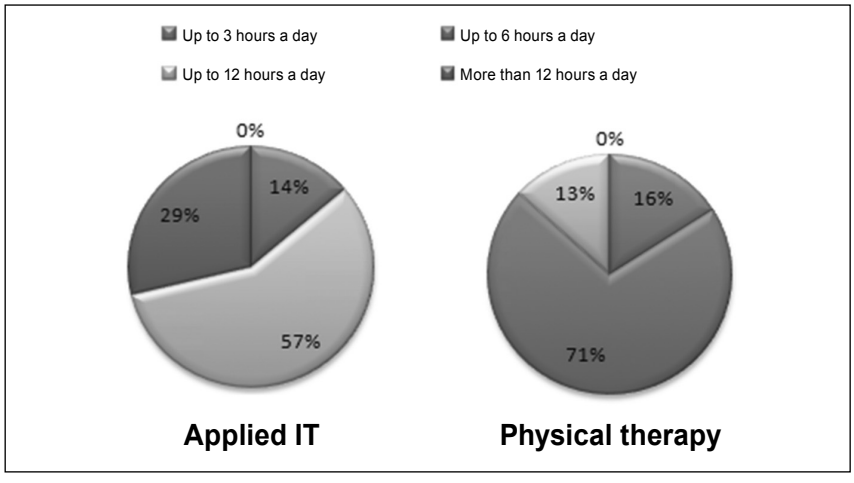

Figure 2

Amount of time spent in seated position during the day

The last question to be taken into account when determining the correlation concerned the possibility of adapting the workplace during practical classes to the individual needs of the subject. Only 8 students of applied informatics and 31 students of physiotherapy students find their workplace adapted to their needs.

The results showed statistically significant correlation at $\chi^2 = 0.048$. As a result of such a level of statistical significance, it can be assumed with 95% probability that the nature of the activities in which students participate during the course of study has significant impact on the frequency of suffering from back pain (Table 8).

Does the frequency of the occurrence of stress correlate with the incidence of pain in physiotherapy and applied informatics students?

In order to determine the relationship between the incidence of stress among students and the incidence of back pain experience, the results ob-

Table 8

Type of activities in which students participate and the frequency of experiencing back pain – cross table

Frequency of experiencing back pain	Type of activities in which students participate			Total
	Favourable	Moderately favourable	Favourable	
Low	20	27	3	50
Moderate	35	**75**	4	114
High	**36**	38	0	74
Total	91	140	7	238

Table 9

Frequency of stress occurrences in students and frequency of experiencing back pain – cross table

Frequency of experiencing back pain	Frequency of stress occurrences in students			Total
	Low	Moderate	High	
Low	21	26	3	50
Moderate	13	**84**	17	114
High	5	**55**	14	74
Total	39	165	34	238

tained from the question concerning the frequency of experiencing stress were used. An attempt at verifying if there is a correlation between those factors showed statistical significance at $\chi^2 = 0.000$. On this basis, it can be assumed with 95% probability that the prevalence of stress correlates with the frequency of experiencing pain in both physiotherapy students and applied informatics students; stress affects the pain (Table 9).

DISCUSSION

Back pain syndrome is a condition affecting approximately 80% of the population. Due to the large number of people suffering from it, the disease has been classified as one of the "diseases of civilization". The main reasons of back pain occurring are limited physical activity, overweight and obesity, injuries and overload to the spine, as well as incorrect body posture.[7] The present study determined the relationship between the pain affecting physiotherapy students and applied informatics students and factors such as knowledge of the methods of back pain prevention, the level of physical activity, the nature of students' classes and stress.

In 2013, Sieradzki et al.[8] decide to conduct a study to assess the occurrence of lower back pain in the population of the students of physiotherapy of the Faculty of Health Sciences in Bialystok. The study involved 110 randomly selected graduate students of physiotherapy: an original questionnaire, the visual analogue scale, the Oswestry Disability Index and scale and health behaviour inventory were used. According to the study, 54% of the students surveyed reported suffering from pain in the lower spine, out of whom only 20%described the pain as appearing sporadically.[8] In comparison with the results obtained by Sieradzki et al., the data obtained in the present study seems disturbing. The present study, conducted on a group of 45% of the graduate students of physiotherapy of the University School of Physical Education has shown that almost 98% of the group reported pain, with nearly 74% reporting lumbar spine as the location of pain. The second most common location was thoracic spine – pain occurred there in 14% of the students. Back pain usually appears after prolonged sitting and after lifting objects.

According to the present study, despite much more extensive knowledge on the part of physiotherapy students, it is them who suffered more from back pain than applied informatics students. Any similar study was impossible to find in the literature available, preventing any attempts at comparing the results obtained. One of the reasons behind such results would be that with the knowledge of the problems of back pain and the character of their studies, physiotherapy students pay closer attention to the back pain they suffer from; therefore any problems, even episodic, are underestimated by them less often than by the applied informatics students.

Derewieckiet al.[7] decided to check the knowledge of back pain prevention among the residents of the Zamosc county. They examined the answers of 1,014 people to an original questionnaire. The respondents were divided into two groups: the first group consisted of 811 people suffering from back pains and the other of 203 people without any pains; n the course of the study, both groups were asked i to state three rules of back pain prevention. The answer given by the respondents most often was physical activity (46.86% of the respondents in the first group and 39.41% in the second group gave this answer). Other answers that were also correct were: correct sitting and standing position, normal weight, avoiding tilted posture and avoiding turns to the sides. To the question whether the respondents know the principles of back pain prevention, 40.20% of the first group and 50.25% of the second group answered that they did not know any rules. Only 16.15% of the first group and 8.87% of the second group were able to correctly enumerate the first three principles of back pain prevention; as many as 444 respondents could not name any rules. The authors of the present study note that the knowledge of the rules among the study group is insufficient[7].

In their study, Leboeuf-Yde et al.[6] drew attention to the lack of studies on the subject of pain in the thoracic spine. Usually, the study of back pain is divided into three areas: the study of the pain of the lumbar spine, of

the pain of the cervical spine, or of pain that affects the entire spine. The authors decided to conduct a study, which presents the consequences of pain in each of the three spine sections, depending on age and gender. The study, conducted by means of a survey, included 34,902 people over the age of 20. The effects of back pain put under analysis were, among others, reduced physical activity, taking sick leaves, changes to the situation at work and becoming a pensioner. Most people reporting back pain did not report any serious consequences following the onset of pain. Pain in the lumbar spine affected the vast majority of respondents. Regardless of the spine section studied, the most commonly reported result of back pain was reduced physical activity. Unfortunately, the study, due to the small number of people reporting pain in the thoracic region, concentrated on the analysis of the lumbar spine. Another factor considered in the study and not included in the present study, was gender. Leboeuf-Yde et al. observed that men experience back pain more often than women, and back pain seldom affected people under the age of 50[6].

In 2011, a study conducted by Falavigna et al.[9] compared the incidence of pain of the lower spine in students of physiotherapy and students of medicine. A questionnaire involved 416 students, out of whom 207 (49.76%) were students of medicine and 209 (50.24%) were students of physiotherapy. They were asked to indicate in the questionnaire the onset of pain. The survey took into account such circumstances as: pain at some point in life, pain in the last year, and pain during the time of the survey. The analysis of the results showed that in all circumstances, students of physiotherapy showed a significantly higher frequency of suffering from lower back pain than students of medicine[9].

Due to the similarities between the work of a nurse and a physiotherapist, the results of various studies on these two groups are worth comparing. Dobrowolna and Hagner[10] decided to investigate the epidemiology of back pains in 125 nurses working at the University Hospital in Bydgoszcz. The study was conducted on the basis of an epidemiological survey and a modified version of the Oswestry Low Back Pain Disability Questionnaire. Pain was reported by 91.2% of the nurses. This result is very similar to the results obtained in the present study, conducted on a group of students of physiotherapy. Another similarity is the time of the occurrence of pain. In the study by Dobrowolska and Hagner, the average time of the onset of pain is two years after the test, whereas in the present study it is an average of three years. Pain affected nurses usually after lifting objects, which also indicates a similarity with the test group of physiotherapists. Unfortunately, the amount of pain the nurses suffer is so great it effectively limits their activity in everyday life. This was reflected in inability to sit for long periods, limited ability to lift objects, difficulty standing for 30 minutes (in 40% of the nurses) or a locomotive disorder of not being able to march for more than half a kilometre(in 40% of the respondents). These restrictions translate to both professional and social life. The study noted that these complaints already appeared at the beginning of the nurses' professional careers, which, according to the authors, may indicate incomplete preparation for the profession – insufficient knowledge of ergonomics and mismanagement of body mechanics.[10] The cause may also be found in too small amount of sports during the training, which possibly increases the risk of back pain resulting from being unprepared for the overload to the musculoskeletal system during work.

One of the goals of the study by Rok et al.[11] was to assess the incidence of lumbar spine pain as well. Put under study were 102 professionally active nurses aged over 22 years who simultaneously studied extramurally at the Poznan University of Medical Science. This study showed high incidence of pain in the group. It appeared several times a week in 33% of the nurses and daily in 26% of the nurses. In addition, 74% of the respondents identified their pain as chronic. The study is another example of research, according to which back pain appeared in the subjects while working in a forced position and when lifting objects[11].

Maciuk et al.[12] decided to examine the self-assessment of back pains, taking as subjects a group of a hundred randomly selected, professionally active nurses working in the Provincial Hospital in Biala Podlaska. The study used an original questionnaire, as well as VAS and ODI scales. The results are also very similar to those quoted earlier: 81% of respondents felt pain in the lower spine while 51% suffered from pain in the cervical region. The symptoms increased with job seniority. An important conclusion on the part of the authors was that the nurses studied did not have proper knowledge of the standards of manual lifting of objects at work[12].

Świątkowska[13] also pointed out in her work that health care workers are a professional group which, in addition to exposure to a variety of infections and physical and chemical agents dangerous to health, are particularly susceptible to pain associated with excessive work overload (a problem already shown on the example of the physiotherapy students)[13].

A view has been around for many years that working in a sitting position for long periods of time can adversely affect the spine, causing pain. There are many divergent views on whether sitting position is actually the main cause of pain, especially in the lumbar region. No clear answers can be found in the works on the subject published so far. A study by Lis et al.[14] was concerned with a review of 24 studies conducted between 1990 and 2004. An analysis of the studies showed that the relationship between back pain and the sitting position occurs only in combination with other factors such as incorrect postures or trembling[14]. On the other hand, Zejda et al.[15] decided to estimate the incidence and severity of pain in the upper limbs, neck, and back among workers who regularly use computers. The second objective of this study was to determine whether the pain dependents on the duration and type of work. The study group

consisted of 477 office workers from Krakow and Warsaw. The survey was conducted using the Polish version of the Nordic Questionnaire. In the analysis, information on working conditions were used. The pain of the cervical spine was reported by 55.6% of people, out of whom 61.5% were women. Pain in the lower back was reported by 50.1%, out of whom more than half were also women. According to the authors of the publications mentioned above, the factors influencing the occurrence of pain it is age, gender (more common in women) and seniority. Borderline statistically significant factors related to the location of the keyboard and adjustability of the seat. According to the results of the study, frequent pain of the cervical spine occurs in people who use computers regularly at work; sedentary work has effect on pain perception in the lumbar area[15].

Team Kaczor et al.[16] also decided to deal with the issues relating to the occurrence of pain in the lower spine and motor habits of people who lead a sedentary lifestyle as a result of the nature of their professional work. The study was conducted using an original questionnaire. The subjects were divided into 2 groups: the first group consisted of 57 office workers, and the second of 43 bus and taxi drivers. The respondents were aged 21 to 63 years. It was observed that among the respondents' motor habits, positions during brushing teeth and making the bed were the most incorrect. The results also showed that patients with a high BMI (25 or more) experienced pain in the lumbar spine, but people whose BMI was equal to or greater than 30 experienced it much more often[16].

Similar results were obtained by Żurek et al.[1] The study was carried out, with the use of a questionnaire, to 30 patients staying in the Neurosurgery ward of Regional Hospital in Grudziadz. The study demonstrated that overweight and obesity is connected with a higher risk of incidence of back pain syndromes[1].

The present study failed to assess the impact of BMI on the incidence of pain, due to normal body mass index in the majority of respondents. Some individuals had a slightly increased BMI, which could be due not to body fat but to muscle mass, as most of the subjects with a BMI above the norm was going to the gym regularly.

Korpinen and Pääkkönen[17] conducted an analysis in which they tried to determine if pain is associated with the use of computer and mobile phones. To determine this, a questionnaire was set randomly to 15 000 employed Finns aged 18 to 65 years. The scientists analysed 1,563 responses to the questionnaire. The study showed that 53.3% of the people declared pain with accompanying numbness of the cervical area, while 32.2% of the people declared pain in the hip and in lower spine. The study also showed that pain in the cervical spine was more often felt by women (65%). The authors suggest that this state of affairs can be a result of poor ergonomics, working long hours at the computer and of physical exhaustion[17].The present study on a group of applied informatics students showed, however, that they experience pain in the lumbar spine more often than in the cervical spine.

The impact of working long in front of the computer screen was also examined by Hakala et al.[18] The study group consisted of young people from 14 to 18 years of age. The analysis showed that the risk of pain of the cervical spine increases when using the computer over 2-3 hours. The risk of pain in the lumbar spine increases after at least 5 hours of using the computer[18]. In connection with the results obtained by Hakala et al., it is disconcerting to observe in the present study how much time the students of applied informatics spent daily in front of the computer. More than a half of the students of applied informatics spend up to twelve hours in a sitting position; 29% of the students spend more than twelve hours daily in a sitting position.

Madelelein et al.[3], using an online questionnaire, sought the relationship between the pain in the cervical spine and gender. The study took into account variables such as anthropometric data, working conditions, lifestyle and physical activity. 690 office workers were studied. According to the study, it was women who declared pain of the cervical spine of greater intensity and longer duration. The study also evaluated that women display a poorer ability to work and lesser efficacy than men, due to a more intensive experience of pain in the cervical spine.[3] This is yet another study in which the authors note that gender has an impact on pain. Unfortunately, due to the low number of women studying applied informatics, the present study could not consider gender as a factor possibly affecting the perceived incidence of back pain.

Another area of research in the present study was the physical activity of students of both physiotherapy and applied informatics. According to the assumptions supported by the results of the study, physical activity of physiotherapy students was significantly higher than of applied informatics students. Unfortunately, it was impossible to find in the available literature a study on the impact of physical activity on pain in groups of students of physiotherapy or applied informatics. However, a work has been found that examined the relationship between back pain and physical activity.

Nilsen et al.[2] analysed a study whose aim was to verify the relationship between physical activity, BMI, and the occurrence of chronic pain in the lower back and in the neck and shoulders. For this purpose, about 30,000 people of over 20 years of age were studied in two rounds: the first round was conducted from 1984 to 1986 and concerned people not suffering from pain. The second study, conducted from 1995 to 1997 involved the same patients and analysed the surveys of those people who have experienced pain. The survey was conducted by means of a questionnaire at the beginning of the study, a medical examination which assessed weight and height, and a second questionnaire, filled in at home by the respondents. 1,824 (11%) women and 1,490 (10%) men declared chronic pain of the lower lumbar spine. As many as 21% of women and 17% of men were affected by chronic pain in the cervical re-

gion. The study showed that a high BMI and lack of physical activity correlate with the occurrence of chronic back pain in both the lumbar and cervical regions, regardless of gender. The authors report that a person exercising at least an hour a week lowers the risk of experiencing chronic pain[2].

Similar conclusions about physical activity were drawnby Bohman et al.[19] in 2013. The object of the study was to evaluate the effect of physical activity undertaken in the free time, as well as the BMI to reduce back pain in women and men. 1,836 people were studied by means of a questionnaire. The only statistically significant relation was the impact of physical activity in the free time to reduce back pain in women. For men, neither BMI nor physical activity revealed any statistical significance[19].

Other interesting results, when compared with the works by Nilsen et al.[2] and by Bohman et al.[19], were obtained by Taspinar et al.[5]. The aim of the study by Taspinar et al. was to analyse the factors affecting the non-specific low back pain. The study was conducted on 514 students (311 women and 203 men) between 17 and 29 years of age. A special form and the VAS scale were prepared, with which the impact of various factors on the occurrence of pain was assessed. According to the survey, height, weight, BMI or physical activity do not affect the intensification of non-specific pain, as opposed to factors such as smoking, age, working in front of the computer screen and the lack of lumbar spine support[5].

Derewiecki et al.[20] used a questionnaire to investigate the relationship between systematic physical activity and the incidence of bacland peripheral joints pain in people living in the Zamosc county. 194 people aged 18-82 years were examined. According to these studies, back pain occurs in physically inactive people and also in people who started engaging in physical exercise only recently. The authors note that regular and properly chosen physical activity reduces pain in the spine, therefore it is advisable to consult a specialist before starting regular physical activity[20].

Sitthipornvorakul et al.[21], in connection with the controversial relationship of physical activity and the pain to the cervical and lumbar spine, decided to do a review of the available literature dating from 1980 to 2009. The final analysis of the literature included 17 articles, 13 of which were highly rated. The highest-rated studies did not state a clear relationship between physical activity and neck pains among employees. In the case of children on the other hand, physical activity is not related to suffering from pain in the cervical region. Contradictory conclusions of various studies were observed while trying to determine the relationship between physical activity and pains in the lower spine in both children and adults. There are no studies In the available literature that could determine clearly whether physical activity has a positive effect on relieving pain, or a negative effect and is indeed the cause of pain or an intensifier. It is therefore necessary to continue exploring and conducting research in this area[21].

The problem of pain in learners is a subject of current relevance because of the large amount of classes students take . The present study sought to answer the question whether the nature of activities in which students participate affects the occurrence of pain. The results showed that there is indeed a correlation between the nature of the activities in which students participate and the occurrence of pain. The nature of the classes in which students take part was defined by them as moderately favourable or unfavourable. The nature of the classes students or pupils participate in is associated mainly with working in a sitting position, often combined with incorrect posture which may arise both from physical exhaustion as well as from the desks and chairs being unsuited to individual needs of particular persons.

Sieradzki et al.[8] conducted a study, using an original questionnaire, to check the severity of pain in students after a week, a month and a year of learning. Most people experiencing weak, medium and strong pain felt it increase over time. In the case of weak pain, out of 54% of people who declared the presence of symptoms after a week of classes, pain was felt by 26.4% of the students; the number increased to 34.5% after a month and to 37.3% after a year. The study shows that along with the duration of studies, the severity of lower back pain increased[8].

Stress is an integral part of students' everyday experience, especially during the examination session. It was decided In the present study to see whether the incidence of stress correlates with the incidence of pain. The results showed that there is a relationship between back pain and stress. It was observed that people with average and high incidence of back pain felt stressed at least once a week. Stress felt that often may contribute significantly to the deterioration of the quality of life. Unfortunately, this analysis was based solely on one variable, it is therefore recommended that further research should be carried out. However, the results obtained draw attention to the enormous problem of stress among students; it can be a prerequisite for the introduction of classes at universities aimed at relaxation and learning about methods of coping with stress.

The study pointed out to the factors that may influence the occurrence of back pain. Both the present study and the works by other authors points to the inability to determine whether a factor affects pain directly, and if so, then to what extent. Despite the diversity of the results obtained in the studies cited, it cannot be denied that the effects of the risk factors described can lead to a deterioration in the quality of life. Given the deteriorating health of students, it is believed that the topicality of this issue will increase over time. Therefore it is a good area for putting forward scientific hypotheses and formulating conclusions aimed at improving the quality of students' life.

CONCLUSIONS

1. Physical therapy students have greater knowledge regarding back pain prevention than applied IT students.

2. Physiotherapy students more frequently suffer from back pain than applied IT students.
3. The physical activity of physical therapy students is greater than the applied IT students.
4. The type of activity, which is mainly linked with prolonged periods of maintaining a seated position or the lack of possibility to adjust the work post to individual needs, may significantly influence the occurrence of back pain in students.
5. The presented results indicate that stress can significantly affect the occurrence of back pain in students.

Conflict of interest: none declare

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