

## Study on the health status of students in higher medical education

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### Abstract

**Introduction:** The health benefits of regular physical activity are clear. More students should engage in physical activity every day of the week. Participating in physical activity from the sport lessons is very safe for most students. **Aim:** In this study we want to ascertain the health status of the students at the beginning of the academic year, in order to have a more efficient didactic design and to identify the possible medical conditions that can generate health risks during physical exercises. **Methods:** The study was performed using the PARQ+ questionnaire (The Physical Activity Readiness Questionnaire) and body mass index. These were applied to a number of 235 subjects, students in higher medical education. **Results:** The results showed that 71.07% of the students have no health problems and are fit for physical effort, and 28.93% of them were identified with various activity-limiting medical conditions. The results obtained by calculating the BMI show us that 69.79% of the subjects are in the normal weight category. **Conclusion:** In conclusion, for most students, physical activity does not involve any risk. Taking into account the high percentage of those with different conditions, knowing the health status of students should represent an important milestone in the activity of teachers, and help them eliminate the risk factors. Thus, almost 3 out of 10 students should check with a doctor about the risks associated with exercising before they begin to become more physically active.

**Key words:** *physical activity, students, health status, didactic design*

### Rezumat

**Introducere:** Beneficiile pentru sănătate ale activității fizice regulate sunt clare. Mai mulți studenți ar trebui să se angajeze în activități fizice în fiecare zi a săptămânii. Participarea la activitatea fizică de la lecțiile de sport este foarte sigură pentru majoritatea studenților. **Scop:** În cadrul acestui studiu dorim să constatăm starea de sănătate a studenților la începutul anului universitar, pentru a avea un design didactic mai eficient și pentru a identifica posibilele afecțiuni medicale care pot genera riscuri pentru sănătate în timpul exercițiilor fizice. **Metode:** Studiul a fost efectuat cu ajutorul chestionarului PARQ+ (Chestionarul de pregătire a activității fizice) și a indicelui de masă corporală. Acestea au fost aplicate unui număr de 235 de studenți din învățământul medical superior. **Rezultate:** Rezultatele au arătat că 71,07% dintre studenți nu au probleme de sănătate și sunt apti pentru efort fizic la 28,93% dintre aceștia am identificat diverse afecțiuni medicale care limitează activitatea. Rezultatele obținute prin calcularea IMC ne arată că 69,79% dintre subiecți se află în categoria de greutate normală. **Concluzii:** În concluzie, pentru majoritatea studenților, activitatea fizică nu implică niciun risc. Luând în considerare procentul ridicat al celor cu condiții medicale diferite, cunoașterea stării de sănătate a studenților ar trebui să reprezinte un reper important în activitatea cadrelor didactice și să îi ajute să elimine factorii de risc. Astfel, aproape 3 din 10 studenți ar trebui să consulte cu un medic cu privire la riscurile asociate exercițiilor fizice înainte de a începe să devină mai activi fizic. **Cuvinte cheie:** *activitate fizică, studenți, stare de sănătate, proiectare didactică*

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## Introduction

Health is a full physical, mental and social well-being, not only the absence of disease, as defined by the World Health Organization (WHO). In the modern sense, "health" is considered a condition, which has several components: physical, social and psychological, at any time of a man's life, and each of these components can be characterized as having a positive or a negative level.

The health status of the Central and Eastern Europe (CEE) population has improved since 1990 [1]. Physical activity is closely connected to health status and quality of life [2,3]. Low quality of life and inappropriate health status are often associated with low levels of physical activity or inactivity at the same time; an active lifestyle plays a preventional role in one's life [4].

In health and lifestyle studies related to health, young people are an under-researched group and there are few studies on the health of students from universities and other institutions. Many students leave home for the first time to study for a degree and create a lifestyle free from the influence of parents. After Stewart-Brown et al. [5], health habits formed during this period can be difficult to change later in life.

According to Rosenbaum & Ward [6], the benefits of engaging in regular physical activity are well established, but getting people to act on this simple truism is a challenge. Physical activity and its structured subset, exercise, contribute to weight management, prevention and treatment of cardiovascular diseases, improved sleep quality, and reduced overall metabolic risk.

Plotnikoff et al. [7] says, higher education institutions are an appropriate framework for promoting a healthy lifestyle. First, universities and colleges have the potential to engage a large number of students in behaviour-shifting interventions, and the estimated number of people participating in higher education continues to grow. After Pop [8], at the individual level, health status depends on many interrelated factors, such as genetic inheritance, social position, lifestyle choices, behaviours, attitudes and values adopted regarding health status. Although genetic inheritance plays an important role in the predisposition for certain health problems, social factors are essential in maintaining health and health care. Social position is a complex factor that contributes to the state of health through its compositions: age, gender, socio-economic status (educational level, occupation, income).

Moreover, after Basch [9], the idea that healthy students learn better is empirically supported and well accepted, and multiple studies have confirmed that health benefits are associated with physical

activity, including cardiovascular and muscle fitness, bone health, psychosocial outcomes and cognitive and brain health, according to Strong et al.[10].

According to specialists at the U.S. Institute of Medicine [11], as many students as possible should be involved in physical activities every day of the week. Participation in physical activities in sports lessons is very safe for most students. Regular physical activity promotes growth and development and has multiple benefits for physical, mental and psychosocial health, which undoubtedly contribute to learning.

Referring to the importance of practicing physical and sporting activities in the medical academic environment in accordance with the Chekroud et al. [12], in a large United States sample, physical exercise was significantly and meaningfully associated with a self-reported mental health burden in the past month.

*The aim of the study:* In this study we want to ascertain the health status of the students at the beginning of the academic year, in order to have a more efficient didactic design and to identify the possible medical conditions that can generate health risks during physical exercises.

## Research methods

The study was carried out using the Physical Activity Readness - Questionnaire for Everyone (PAR-Q+) and Body Mass Index (BMI). The questionnaires were applied in October, the academic year 2018/2019, on a number of 235 subjects (105 girls and 130 boys), students in medical higher education, at the University of Medicine and Pharmacy Carol Davila in Bucharest. They represented the faculties of General Medicine (166 subjects), Dental Medicine (13 subjects) and Pharmacy (56 subjects), from all academic years.

The Physical Activity Readness - Questionnaire for Everyone (PAR-Q+) is a physical activity training questionnaire, which includes a set of questions about the subject's health. PAR-Q+ (variant 2017) is a simple self-screening tool that can be used by people who are about to start an exercise/physical activity program, which can determine the level of safety or possible risks that may arise based on the history of health status and current symptoms.

This study chose the 2017 version of PAR-Q+ because it is considered to be more suitable for today's public, being designed based on a huge research project that has reviewed over 1 million papers. It incorporates high blood pressure and diabetes that PAR-Q did not have, it is limited to participants aged 15 to 69 years, and recognizes that the risk of inactivity is considerably higher than the risk of regular exercise in participants with

controlled or asymptomatic medical conditions. For most populations living with a chronic medical condition, the risk of premature death is much higher than the acute risks of a structured and supervised exercise program, with PAR-Q+ clearly adopting the position that physical activity and exercise with dosage, intensity and the right environment are good for everyone, especially those with chronic medical conditions [13].

Healthy persons as well as many persons with cardiovascular diseases, including those with heart failure, can improve exercise performance with training. This improvement is the result of an increased ability to use oxygen to derive energy for work [14].

The questionnaire consists of two sets of questions. The first set of 7 questions refers to the general state of health, designed to determine whether the respondents are able to become more physically active or engage in a physical activity, after Bredin et al. [15], where all subjects have answered mandatorily.

Completing the second set is conditioned by the answers to the first set, so it is used only if an

answer is affirmative at least once to one of the questions in the first set.

**Results**

Following the questionnaire applied, the results showed that 71.07% of the students have no health problems and are fit for physical exertion and 28.93% of them were identified with various medical conditions that limit the intensity/duration of physical exertion or even total relief for physical exertion.

In terms of body mass index, the group of subjects is presented as follows: more than half of the total subjects are normal-weight (69.79%), 17.02% are overweight, and about 3.83% of the total subjects are Class 1 and 2 obese. Of the 69.78% who belong to the category of normal-weight people, 21.28% are students with various medical conditions and 48.51% are those considered healthy.

It should be noted that of the 2.55% subjects enrolled in the Class 1 obese, 1.70% are healthy, double the percentage of those in the group of students with medical conditions, namely 0.85%.

**Table I:** Results of the BMI

Category	BMI range - kg/m <sup>2</sup>	No. of subj.	%	With medical conditions n= 68	% of n=68	% of N=235	Healthy n= 167	% of n=167	% of N=235
Severe Thinness	< 16	1	0.43	1	1.47	0.43	0	0	0
Moderate Thinness	16 - 17	3	1.28	1	1.47	0.43	2	1.20	0.85
Mild Thinness	17 - 18.5	18	7.66	4	5.88	1.70	14	8.38	5.96
Normal	18.5 - 25	164	69.79	50	73.53	21.28	114	68.26	48.51
Overweight	25 - 30	40	17.02	8	11.76	3.40	32	19.16	13.62
Class 1 Obese	30 - 35	6	2.55	2	2.94	0.85	4	2.40	1.70
Class 2 Obese	35 - 40	3	1.28	2	2.94	0.85	1	0.60	0.43
Class 3 Obese	> 40								

Results – the first part of the questionnaire (Table II)

“Has your doctor ever said that you have a heart condition or high blood pressure?” In the first question about the existence of a heart condition or hypertension, 22.06% of those with medical conditions who answered in the affirmative, representing 6.38% of the total subjects.

“Do you feel pain in your chest at rest, during your daily activities of living, or when you do physical activity?”, to the second question, 26.47% of the 68 subjects with problems answered that they had

these symptoms, representing 7.66% of all subjects. “Do you lose balance because of dizziness or have you lost consciousness in the last 12 months? (Please answer no if your dizziness was associated with over-breathing (including during vigorous exercise)”. To the third question, regarding the occurrence of dizziness or loss of consciousness in the last year, 25% of the 68 subjects stated that they had these symptoms, these representing 7.23% of the total subjects.

“Have you ever been diagnosed with another chronic medical condition (other than heart disease or high blood pressure)? Please list the condition(s)”. 33.82% of the subjects with problems

reported having chronic conditions other than high blood pressure and heart conditions, accounting for 9.79% of the total number of subjects referring to question no. 4.

"Are you currently taking prescribed medications for a chronic medical condition? Please list the condition(s) and medications". Only 17.65% of the subjects declared they currently take prescription drugs for chronic conditions, this representing 5.11% of the total subjects referring to question no. 5.

Question no. 6, "Do you currently (or have had in the last 12 months) a bone, joint, or soft tissue

**Table II:** The percentage of answers to each question, first part PARQ +

Questions	With medical conditions			Healthy	
	No of subj.	Yes % of 68	% of 235	No NO	No. of subj. % of 235
Question no.1	15	22.06	6.38	220	93.62
Question no.2	18	26.47	7.66	217	92.34
Question no.3	17	25.00	7.23	218	92.77
Question no.4	23	33.82	9.79	212	90.21
Question no.5	12	17.65	5.11	223	94.89
Question no.6	17	25.00	7.23	218	92.77
Question no.7	8	11.76	3.40	227	96.60

Referring to the 68 subjects in the category of those with medical conditions, we identified that more than half of them, i.e. 54.41%, have a single medical condition and subjects with multiple conditions were identified as follows: with two medical conditions - 35.29%, with three medical conditions - 5.88%, with four medical conditions - 2.94% and with five medical conditions - 1.47% (figure 1).

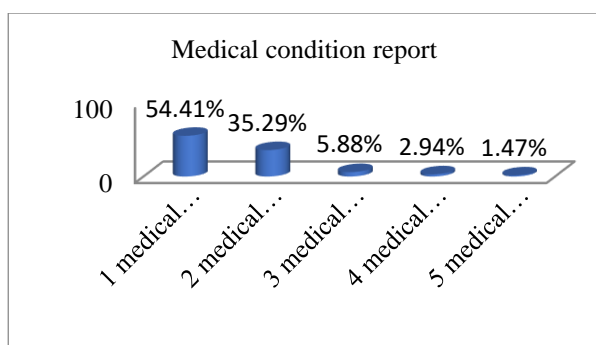


Figure 1: Referring to the 68 subjects in the category of those with medical conditions

The results in the second part of the questionnaire "The Physical Activity Readiness Questionnaire for Everyone" are presented and analyzed in the text below.

(muscle, ligament, or tendon) problem that could be aggravated by becoming more physically active?", a quarter (25%) of respondents with various medical problems answered "yes", representing 7.23% of the total number of subjects.

Question 7, "Has your doctor ever said that you should only do medically supervised physical activity?" those who answered in the affirmative are only 11.74% of the subjects, with medical problems, representing 3.40% of the total subjects.

Following the completion of the second part of the questionnaire by the subjects who had at least one affirmative answer to the first part, we identified the following diseases with the highest prevalence: a large part of the subjects had disorders of the osteoarticular and muscular system, allergies and, in particular, asthma, cardio-vascular disorders, arterial hypertension, spinal deficiencies, and respiratory diseases.

Subjects who answered "no" to the first set of 7 questions of the PARQ+ questionnaire can safely participate in physical activities without an identified risk, starting with light exercise, then gradually, reaching moderate physical activities, and even an assessment of their physical condition. Subjects who have answered "yes" at least once in the first part of the PARQ+ questionnaire fall into the risk category where a doctor's opinion is recommended before increasing physical activity and assessing their physical condition; they can do any activity starting with light exercises, gradually performed in terms of intensity, according to Warburton et al.[16].

Taking into account the body mass index, calculated in this study, we can say that in our case, the data obtained cannot be directly correlated with the results of the questionnaire and we cannot consider

it as a factor influencing the subjects' health level. Thus, we can declare that in studies like this, in which the health status and level of physical activity are analyzed, it is still useful to calculate the Body Mass Index to establish with certainty the role it has in the relationship between physical activity and health.

### Discussions

The risk assessment/stratification process by applying specific questionnaires is necessary to identify persons who should undergo a specialized medical examination before starting a physical exercise program. The health assessment process focuses on determining risk factors for cardiovascular, lung or metabolic diseases and recognizing signs and symptoms suggestive of the disease and recording the presence of diseases or sufferings already diagnosed. After Albert et al. [17] the prospective data from a study on U.S. male physicians suggest that habitual vigorous exercise diminishes the risk of sudden death during vigorous exertion and according to Pate et al. [18] regular, physical activity is associated with increased life expectancy and reduced risk of coronary heart disease, stroke, diabetes, hypertension, obesity, and osteoporosis.

Therefore, this process can begin with completing a questionnaire in which subjects must answer a series of questions without difficulty. When there are difficulties in completing a self-administered questionnaire, certain clarifications may be requested from qualified persons in the centers offering services in this field of activity.

The specialized staff must adapt the exercise program to reduce the risk of accidents; the exercise program must correspond to the functional capacity of the subject and establish a rate of progress according to the possibilities of the subject.

The contemporary world is constantly changing, and physical education and sports teachers should change with it, so as to be promoters of change, specialists in educational methods, experts in teaching, people sensitive to the needs of pupils and students. According to Muszkieta et al. [19], the attitude of physical education teachers has a significant impact on participation in physical activity, especially of the younger generations. The attitudes and skills of a physical education teacher influence the effects and quality of their work and, above all, the achievements of each student. The teacher, immediately after the parents, is the main figure acting on the multidirectional and harmonious development of the student, on his/her behaviours and attitudes.

Sport is an effective vector in promoting body and mental health, a lifestyle capable of combating the

diseases of modern civilization. The lack of physical activity leads to excess weight, promotes obesity and chronic conditions such as cardio-vascular diseases and diabetes, which affect the quality of life, endanger people's lives and create problems for the state economy and health budget. Sedentary lifestyle, and as a consequence of it, obesity, occur as a result of a drastic decrease in or lack of motor activities of a sporting nature.

### Conclusions

In conclusion, for most students' physical activity does not involve any risk. Taking into account the high percentage of those with different medical conditions, knowing the health status of students should be an important milestone in the work of teachers and come to their aid in eliminating risk factors. Thus, almost 3 out of 10 students should check with a specialist doctor the risks associated with exercise before they begin to become more physically active.

**Conflicts of interest:** The authors report no conflicts of interest.

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