

## **Exploring the infrastructure and community programs accessed by medical students when being physically active** **Explorarea infrastructurii și a programelor comunitare accesate de studenții mediciniști pentru practicarea activităților fizice**

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### **Abstract**

*Background.* Medical students' physical activity preferences are important to explore, as this population subgroup represents future models in society.

*Aims.* To explore the infrastructure and community programs accessed by medical students when being physically active.

*Methods.* Online questionnaire administered to medical school students in Cluj-Napoca and Iasi.

*Results.* 65% of the options expressed accessed free-of-charge infrastructure (outdoor, university and home or around home). Students in the 1<sup>st</sup> and 2<sup>nd</sup> years of study accessed the University infrastructure significantly more than their 3<sup>rd</sup> to 6<sup>th</sup> year peers. Only 16% of the respondents accessed community programs for practicing physical activity in the last 12 months.

*Conclusions.* Medical school students prefer free-of-charge (outdoor) sport infrastructure and have a very low participation rate in community physical activity programs. Efforts should be directed into research and policy for ensuring proper physical activity services to medical school students.

**Keywords:** medical school students, physical activity, preferences, infrastructure, community programs.

### **Rezumat**

*Premize.* Preferințele studenților mediciniști în practicarea activităților fizice trebuie explorate, aceste persoane având rolul de viitoare modele în societate.

*Obiective.* Explorarea infrastructurii și a programelor comunitare accesate de studenții mediciniști pentru practicarea activităților fizice.

*Metode.* Chestionar electronic administrat studenților la medicină din Cluj-Napoca și Iași.

*Rezultate.* 65% dintre opțiunile exprimate au fost reprezentate de infrastructură gratuită (outdoor, infrastructura universității, în locuință). Studenții din anii de studiu 1 și 2 au accesat semnificativ mai mult infrastructura Universității față de colegii lor din anii 3 până la 6. Doar 16% dintre respondenți au accesat programe comunitare de practicare a activităților fizice în ultimele 12 luni.

*Concluzii.* Studenții mediciniști preferă infrastructura de practicare a activităților fizice (outdoor) gratuită și au nivele foarte scăzute de participare în programe comunitare de practicare a activităților fizice. Eforturi de cercetare și politici trebuie făcute pentru a asigura servicii adecvate de practicare a activităților fizice de către studenții mediciniști.

**Cuvinte cheie:** studenți mediciniști, activitate fizică, preferințe, infrastructură, programe comunitare.

## **Introduction**

Chronic non-communicable diseases represent the most important causes of death, approximately 38 million deaths being attributed to these diseases worldwide. In the European Region of the World Health Organization, chronic diseases account for 86% of total deaths and 77% of general morbidity (2). In Romania, chronic non-

communicable diseases account for 92% of total deaths, cardiovascular diseases (58%), cancers (20%) and other chronic diseases (10%), being the most important contributors to the total number of deaths caused by non-communicable diseases (3).

Physical inactivity, smoking, alcohol abuse and unhealthy diets represent the most important risk factors for mortality from chronic disease, being estimated that

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insufficient physical activity can be attributed a number of approximately 3.2 million deaths each year, worldwide (4).

Children and youth are population subgroups of major interest in the strategies for promoting healthy lifestyles (Mocean, 2007) from two perspectives: 1) overweight and obesity at the age of adolescence and youth represent important predictors for overweight and obesity and associated non-communicable diseases at the age of adulthood. Thus, preventing the onset of these conditions in young people and adolescents could limit the increasing incidence and prevalence of non-communicable diseases (Meiro-Lorenzo, Villafana & Harrit, 2011) (5); 2) Children and youth's health related behaviors are predictors for the future adults' health related behaviors: physically active adolescents and youth are more prone to become physically active adults, whereas sedentary adolescents and youth are more prone to become sedentary adults (Jose et al., 2011; Weiss et al., 2007). However, it is estimated that worldwide more than 80% of adolescents do not meet physical activity levels recommended by the World Health Organization (6).

Among the adolescent and young population subgroup, medical school students represent an important target population for health promotion strategies and programs, because: 1) It has been acknowledged in the literature that the physical activity levels of medical school students are important predictors for their perceptions of physical activity and their consecutive behavior related to promoting physical activity among their patients. It has been thus revealed that physically active medical school students and young doctors promote physical activity as a health promotion tool to their patients more than their sedentary peers. Also, the level of knowledge regarding the benefits of physical activity as well as their own level of physical activity are factors that increase the self-confidence of doctors in promoting and prescribing physical activity to their patients (Frank et al., 2008; Stanford et al., 2014); and 2) Doctors represent trustworthy sources of information for their patients, when these patients want to acquire health related information, thus making the doctors (especially general practitioners) key persons in developing effective health promotion programs and campaigns. This is an important argument for taking into consideration the medical school students and young doctors' knowledge, attitudes and behavior related to health promotion and specifically to physical activity (Petrilli et al., 2015; Griffin et al., 2004). Hence, the physical activity knowledge, perceptions, attitudes and behavior of medical school students in regards to (health enhancing) physical activity are important to explore and describe, as these persons have the potential to become models as well as educators in society, the positive impact of influencing the behavior of this population subgroup having the potential to positively influence society as a whole.

The aforementioned arguments support the importance of studying the levels of physical activity of medical school students and their preferences regarding community based physical activity infrastructure and programs.

## Material and methods

### *Research protocol*

The approval of the Ethics Board of the "Iuliu

Hatieganu" University of Medicine and Pharmacy Cluj-Napoca for conducting the current study was obtained, reference number 204, 4/06/2014. The participants in the study were all 18 years old and above, and agreed to participate in the study by checking off "Yes, I want to participate" on the online informed consent presented at the beginning of the online questionnaire.

### a) *Period and place of the research*

An online cross-sectional observational study was conducted between November - December 2014, by means of an online questionnaire. The questionnaire was emailed to medical students through email groups via student representatives. In this way, all students from the 1<sup>st</sup> to 6<sup>th</sup> year of study at the Faculties of Medicine of the two universities had equal chances to participate in the study. For maximizing the participation rate, the invitation to participate in the study (along with the link to the online questionnaire) was sent three times to the medical school students, at a 2-3 week interval. The Qualtrics quantitative data collection software was used for administering the online questionnaire.

### b) *Subjects and groups*

The study included medical school students from the 1<sup>st</sup> to the 6<sup>th</sup> year of study at the Faculties of Medicine of the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca and "Gr.T. Popa" University of Medicine and Pharmacy Iasi. The only inclusion criterion was being a student at the Faculty of Medicine in one of the two selected Universities.

### c) *Tests applied*

An online questionnaire was administered to medical school students from both centers, Cluj-Napoca and Iasi. Socio-demographic data were collected, along with the self-reported levels of physical activity and physical fitness. The two questions presented in the current paper were developed by the first author of the paper. Respondents were asked to mention the three most frequent places they accessed in the last 12 months when practicing leisure time physical activity. Also, respondents were asked to indicate if they participated in physical activity community programs in the last 12 months.

### d) *Statistical processing*

Data collected by means of online questionnaires using the Qualtrics quantitative data collection software were exported to Microsoft Excel. Statistical analysis was performed using the SPSS 20.0 statistical package. Data in tables are presented as arithmetic mean  $\pm$  standard deviation (SD), or absolute frequencies (n) and relative frequencies (%). The Mann-Whitney statistical test was applied to check for statistically significant differences between the respondents' expressed preferences.

## Results

### a) *Socio-demographic characteristics of the respondents*

A total number of 386 respondents from Cluj-Napoca and Iasi answered the online questionnaire. Out of this total number, following the cleaning of the database we obtained a final number of 334 respondents, of which 138 were from the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca, and 196 from the "Gr.T. Popa"

University or Medicine and Pharmacy Iasi.

Regarding the socio-demographic characteristics of the respondents, we observed a much higher percentage of female students responding to the questionnaire, and there were no significant differences in male and female participation between different years of study ( $p=0.63$ ). However, a significant statistical difference ( $p=0.007$ ) could be observed in the sex distribution between the two centers, Cluj and Iasi.

In regards to the study year, more respondents were in the 1<sup>st</sup>, 2<sup>nd</sup> and 5<sup>th</sup> study years, the 3<sup>rd</sup>, 4<sup>th</sup> and 6<sup>th</sup> years being less represented. However, this difference was not statistically significant ( $p=0.08$ ). Also, for UMF Iasi, there was no statistically significant difference in sex distribution between the different years of study ( $p=0.15$ ).

With respect to the respondents' age, most of the respondents (95%) fit into the 19-24 age group, the 19, 20, 21 and 23 ages being the most frequent ones and correlating with the 1<sup>st</sup>, 2<sup>nd</sup> and 5<sup>th</sup> study years, which were better represented (Table I).

**Table I**  
Socio-demographic characteristics of the respondents.

Parameters	U.M.F. Cluj (n=138)	U.M.F. Iasi (n=196)	p
Age (mean±SD)	21.58±1.78	21.62±2.46	0.400
Male sex, n (%)	36 (26.1)	28 (14.4)	0.007
Year of study, n (%)			
I	23 (16.7)	47 (24.2)	
II	30 (21.7)	45 (23.2)	
III	16 (11.6)	27 (13.9)	0.083
IV	15 (10.9)	24 (12.4)	
V	39 (28.3)	29 (14.9)	
VI	15 (10.9)	22 (11.3)	
BMI (mean±SD)	21.18±2.95	20.97±3.51	0.190

Using height and weight, the body mass index (BMI) of the respondents was computed. Thus, the average BMI was 21.06, with a standard deviation of 3.28. According to the World Health Organization classification, most

of the participants had a normal BMI (18.50-24.99) (1). Statistically significant differences between the average BMI of female (20.61±2.87) and male (21.18±2.95) respondents from the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca were observed. These differences could be explained by either real differences or systematic bias introduced by the social desirability concept - female respondents might have declared a lower body weight, even though the questionnaire was administered online and no personal data of respondents were collected.

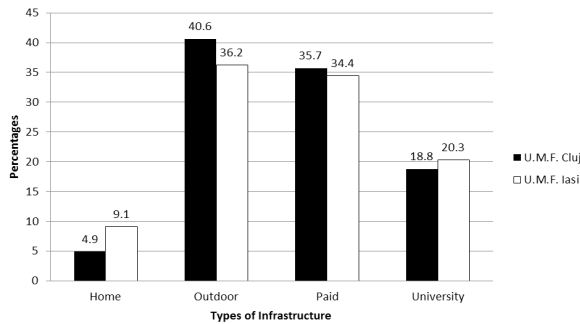
b) *Infrastructure accessed by medical students when being physically active*

Respondents to the online questionnaire were first asked to mention the three places they went to most frequently in the last 12 months when they wanted to have leisure time physical activities (*Please mention three places you frequented most in the last 12 months, when you went to do physical activities (e.g. university sport hall, parks, gyms, etc.)*).

The total number of options (frequent places to practice physical activities) expressed by the 334 respondents was 606, distributed in the following categories (see Fig. 1): The apartment/home or the surrounding areas (answers included: my own home, home, my dorm room, my yard, my neighborhood, the alley behind my block of flats) (CJ, n=13; IS, n=31); 2) Free-of-charge outdoor infrastructure (answers included: park, stadium, running track, streets, hills, forest, mountain, beach) (CJ, n=108; IS, n=123); 3) Paid sport infrastructure (answers included: gyms, synthetic football pitch, swimming pool, dance hall) (CJ, n=117; IS, n=117); 4) Free-of-charge university infrastructure (answers included: university, university sport hall, university sport field) (CJ, n=50; IS, n=69). There were no significant differences in the types of infrastructure accessed by medical school students from Cluj and Iasi ( $p=0.20$ ).

**Table II**  
The distribution of preferences for physical activity infrastructure by socio-demographic characteristics of the respondents.

Parameters	Home	Outdoor	Paid	University	p
U.M.F. Cluj					
Age (mean±SD)	22.69±1.38	21.89±1.64	21.79±1.93	20.80±1.50	<0.001
Male sex, n (%)	2 (15.4)	30 (27.8)	21 (22.1)	15 (30.0)	0.552
Year of study, n (%)					
I	1 (7.7)	12 (11.1)	15 (15.8)	12 (24.0)	
II	1 (7.7)	23 (21.3)	19 (20.0)	18 (36.0)	
III	0 (0.0)	11 (10.2)	11 (11.6)	8 (16.0)	0.020
IV	1 (7.7)	9 (8.3)	11 (11.6)	3 (6.0)	
V	6 (46.2)	38 (35.2)	31 (32.6)	6 (12.0)	
VI	4 (30.8)	15 (13.9)	8 (8.4)	3 (6.0)	
BMI (mean±SD)	20.90±2.65	21.35±2.75	21.69±3.15	21.53±2.79	0.802
U.M.F. Iasi					
Age (mean±SD)	21.65±2.26	22.03±2.79	21.54±2.37	20.77±2.33	0.004
Male sex, n (%)	1 (3.2)	13 (10.7)	23 (19.8)	11 (15.9)	0.057
Year of study, n (%)					
I	8 (25.8)	26 (21.7)	34 (29.6)	23 (33.3)	
II	5 (16.1)	28 (23.3)	24 (20.9)	32 (46.4)	
III	5 (16.1)	13 (10.8)	8 (7.0)	5 (7.2)	0.002
IV	5 (16.1)	16 (13.3)	17 (14.8)	2 (2.9)	
V	2 (6.5)	18 (15.0)	17 (14.8)	3 (4.3)	
VI	6 (19.4)	19 (15.8)	15 (13.0)	4 (5.8)	
BMI (mean±SD)	20.83±3.02	21.14±3.91	21.25±3.37	20.15±3.04	0.069



**Fig. 1** – The distribution of physical activity infrastructure types accessed by medical school students from Cluj and Iasi.

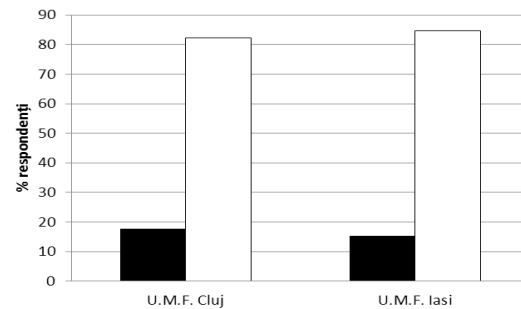
As it can be observed in Fig. 1, only 35% of the total options expressed by medical school students from Cluj and Iasi involved the accessing of paid sport infrastructure, the rest of 65% being represented by the types of infrastructure that are free-of charge, i.e. university infrastructure, outdoor infrastructure and home or around home opportunities. This results could be interpreted as a preference of most students to get physically active in the university infrastructure (e.g. for playing sports with colleagues) or in free-of-charge outdoor facilities such as parks. The results can also be interpreted as the avoidance of paid infrastructure, for limiting the costs associated with the practice of physical activities in these settings. Only about 20% of the options expressed by students from each center referred to the university infrastructure. This might have a set of explanations such as the (lack of) availability and accessibility of this infrastructure or the students' preferences for certain favourite sports, not offered by the university infrastructure.

Regarding the types of infrastructure accessed by medical students when being physically active, a statistically significant difference ( $p=0.002$ , IS;  $p=0.020$ , CJ) in the preferences for a certain type of infrastructure was observed between the different years of study, i.e. the 1<sup>st</sup> and 2<sup>nd</sup> years accessed more the university infrastructure than the other years of study (3<sup>rd</sup> to 6<sup>th</sup>). This result might be explained by the fact that in the first two years of medical school, students have compulsory physical education and sport classes, so they might get more opportunities to use the university infrastructure for practicing physical activities in comparison with their older colleagues. Not least, a statistically significant difference ( $p=0.004$ ) could be observed in the mean age of students accessing different types of infrastructure (Table II).

c) *Community programs accessed by medical students when being physically active*

In this section of the online questionnaire, the respondents were asked to mention if they participated in the last 12 months (prior to the moment of filling in the questionnaire) in any community programs for practicing physical activities (*Please mention three community programs in which you have participated in the last 12 months*). These programs were defined as courses for learning a certain sport, sports events organized by the local public administration or by student NGOs, running events, etc.

The vast majority of the respondents (84%) declared that they did not participate in physical activity community programs in the last 12 months prior to their participation in the study (Fig. 2).



**Fig. 2** – The distribution of participation of students from Cluj and Iasi in physical activity community programs

No statistically significant differences between participants and non-participants in physical activity community programs from Cluj and Iasi could be observed (Table III).

**Table III**  
The distribution of participation in physical activity community programs by socio-demographic characteristics of the respondents

Parameters	Participation	Non-participation	p
<b>U.M.F. Cluj</b>			
Age (mean±SD)	21.37±1.74	21.85±1.77	0.296
Male sex, n (%)	5 (25.0)	23 (24.7)	1.000
Year of study, n (%)			
I	2 (10.0)	14 (15.1)	0.104
II	8 (40.0)	16 (17.2)	
III	3 (15.0)	8 (8.6)	
IV	2 (10.0)	10 (10.8)	
V	2 (10.0)	35 (37.6)	
VI	3 (15.0)	10 (10.8)	
BMI (mean±SD)	20.77±2.12	21.46±3.06	0.547
<b>U.M.F. Iasi</b>			
Age (mean±SD)	21.50±2.77	21.65±2.48	0.596
Male sex, n (%)	6 (27.3)	14 (11.7)	0.088
Year of study, n (%)			
I	4 (18.2)	31 (26.1)	0.456
II	8 (36.4)	28 (23.5)	
III	2 (9.1)	13 (10.9)	
IV	4 (18.2)	11 (9.2)	
V	3 (13.6)	18 (15.1)	
VI	1 (4.5)	18 (15.1)	
BMI (mean±SD)	20.25±2.25	20.87±3.55	0.902

The respondents who declared having participated in such programs were asked to mention three programs in which they participated in the last 12 months prior to filling in the questionnaire. The results were grouped into the following categories: 1) types of events attended: courses, competitions, other events, 2) sports practiced and 3) organizers. From the total of 47 entries (i.e. community programs accessed), 32 were sports competitions, 13 were courses, the rest of 2 being a training session and a social cause.

The most practiced sports in the community programs were running, dancing, table tennis and swimming. More rare sports were also practiced, such as kayak or qwan-qi-do. In terms of organizers, most of them were sport NGOs and student NGOs, followed by sport associations



and public institutions such as universities or public local administration authorities.

## Discussions

The current study adds to the literature approaching the physical activity levels and preferences for physical activity in youth and adolescents. The results presented indicate a higher tendency of medical school students to access sport infrastructure for practicing leisure time physical activities such as home and around home, outdoor infrastructure and university infrastructure. The results of the current study are in accordance with the results of a study conducted in Romania on a national representative sample of youth aged 14 to 35, which reported that outdoor sport fields (29%), public spaces (21%) and one's own home (17%) were the most accessed places by youth when practicing physical activities. In terms of paying for accessing the sport infrastructure, the same study showed that 56% of the respondents did not spend any money on sport per month, whereas 21% spent between 10 and 50 RON and only 2% spent over 200 RON (\*\*\*, 2014).

The fact that only about 20% of the medical school students access the university infrastructure might be related to motivations or reasons such as the quality of the infrastructure, opportunities to play favourite sports or safety. A study conducted in a sample of Australian students concluded that the use of university sport facilities declined after the introduction of a tax for accessing this infrastructure (Jones & Barrie, 2011). This might also be the case of students from the Cluj and Iasi universities, as results show that 1<sup>st</sup> and 2<sup>nd</sup> year students, who have free access to the university sport infrastructure during their physical activity classes, access this infrastructure significantly more than their 3<sup>rd</sup> to 6<sup>th</sup> year peers, who probably would have to pay for access to the university infrastructure.

Thus, acquiring an increased knowledge and understanding of the infrastructure and community programs preferred by the medical school students for practicing physical activities is very important in order to make evidence informed decisions regarding the organization and delivery of these types of services for this particular population subgroup.

Positively influencing the attitudes and knowledge related to physical activity as well as physical activity behavior of these individuals can provide multiple benefits from the aforementioned perspectives, i.e. more physically active and more knowledgeable medical doctors (in regards to the benefits of physical activity) represent models in society and are more prone to promote the practice of physical activities to their patients (Frank et al., 2008; Stanford et al., 2014).

More in-depth research into the preferences for the types of physical activities and places for practicing physical activities of medical school students should be conducted and the results obtained should be presented to universities, in order to obtain the highest possible impact of the research results on the target population.

## Conclusions

1. A majority of medical school students (65%)

prefer free-of-charge sport infrastructure, 20% of which is university infrastructure.

2. First and 2<sup>nd</sup> year students access university sport infrastructure significantly more ( $p=0.002$ , IS;  $p=0.020$ , CJ) than their 3<sup>rd</sup> to 6<sup>th</sup> year peers.

3. A large majority (84%) of the medical school students did not access any type of physical activity community program in the last 12 months prior to participation in the study and there are no statistically significant differences between participants and non-participants in these programs.

4. Increased efforts should be oriented towards offering accessible and enjoyable physical activity services to medical school students, as physical activity related behaviors in this population subgroup can exert a high influence on the general population.

## Conflicts of interests

The authors have no conflict of interest.

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