Social and Educational Sustainability of the Physical Education of Romanian Students and the Impact on Their Physical Activity Level

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Abstract: Nowadays, a descending trend concerning physical activity levels among youth has been recorded, as well as differences between males and females; more than half recorded a low level of the physical activity. The aim of this study was to investigate the social and educational sustainability of physical education and to determine the level of physical activity by using the International Physical Activity Questionnaire (IPAQ) short form for Romanian undergraduate and graduate students. In our study, we included students and applied the IPAQ short form anonymously. They gave their consent to use these personal data only for scientific purposes. Overall, two thirds of the subjects (according to the IPAQ scoring protocol) and more than half (according to the World Health Organization recommendation for physical activity) consider themselves to be active. The present study showed that there is a prevalence of insufficient physical activity among Romanian University students (around 40%). The situation seems to be better than in other countries, but in self-evaluation, many people tend to overestimate their potential. To avoid this aspect and gain some objectivity, it is better to use a gadget in order to measure the level of their physical activity.

Keywords: physical education; evaluation; youth; questionnaire; sustainability; objectivity

1. Introduction

The physical education (PE) curricula for primary and secondary education includes 2 h per week, and at the academic level, there is 1 h of physical education per week (the universities are autonomous in deciding to include PE in their curricula). Compared to other European countries, there is a low number of PE lessons, and there is a correlation between weekly hours of physical activity (PA) and the physical fitness level.

One way to determine the level of physical activities is to use questionnaires, and one of the most used is the International Physical Activity Questionnaire (IPAQ), among others: Global Physical Activities Questionnaire, Leisure Time Physical Activity Questionnaire, Godin-Shephard Leisure-Time Physical Activity Questionnaire, and Physical Activities Index.

This questionnaire (IPAQ) is widely used and has a short and a long form with the purpose of obtaining data concerning health-related physical activity. The long form consists of five activity domains (job-related physical activity; transportation physical activity; housework, house maintenance,

and family caring; recreation, sport, and leisure-time physical activity; time spent sitting) and comprises 27 questions. The short form counts four generic items (vigorous activities, moderate activities, walking, sitting) with a total of seven questions. The questionnaire helps in order to find out information about the physical activities that people do as part of their everyday lives and the time spent that way in the last 7 days, the level of physical activities being classified as low, moderate, and high [1]. Each piece of information concerning the type of the activity (vigorous, moderate, walking) and the time spent help us to obtain metabolic equivalent minutes per week (MET), the energy cost for sitting, equivalent to a consumption of 1 kcal/kg/h [2].

Recent studies showed there was a descending trend concerning PA levels among youth and children, but also differences between males and females; more than half of the subjects recorded a low level of the physical activities [3–9].

For trained youth, the level of preparation including high-intensity training had a very good impact on physical fitness components, but the training load must be adapted to personal physical conditions. The data analysis showed, on average, a moderate level of the PA measured by IPAQ [10].

The university students who practice regular daily PA had an optimal body mass index (BMI), and the applied IPAQ to determine MET consumption showed differences for some variables such as weight, height, BMI, and gender [11].

PA level (assessed by IPAQ) showed differences between males and females, but the level was good for both genders [12].

A correlation was not found between health-related fitness knowledge and the level of PA for youths, and this means that the knowledge will not determine that people are more active, and it is possible that the personal lifestyle and beliefs could help individuals to the adherence of PA [13]. A short form of the IPAQ and test concerning health applied to the students with teaching specialization did not show a correlation between knowledge about health and health education and the level of PA, but more important for youth is for them to form healthy habits, which must include regular PA with moderate to vigorous intensity [14]. Concerning the healthy eating habits and physical activity for youth, no differences between vegetarians, vegans and omnivores were shown, but the first two categories had healthier eating habits than the third one [15]. Around half of the youth population (students) is inactive by measuring PA level by IPAQ (long form) and some explanations for this are a lack of support to engage in sports activity, lack of motivation for physical exercise, and academic activities. The negative aspect is that education did not change their option for PA and a healthy lifestyle [16]. This is needed to develop intervention programs in order to develop a healthy lifestyle and active habits to practice daily moderate to vigorous PA [17].

In the self-evaluation of the PA by IPAQ, measurements of the anthropometric parameters (body mass index, fat-free mass index, percent fat mass, and waist–hip ratio) and health-related quality of life did not show a positive correlation between physical activity reported by subjects and the investigated parameters [18,19].

For the Lithuanian population, the validity for total PA (assessed by IPAQ) and the results obtained by accelerometers showed a low correlation [20] compared to other studies [21]. For the Spanish population, the IPAQ results showed that more than half were inactive and the profile for an active person (male, youth, non-smoker, normal weight, living with a partner, living in a medium-sized town) was associated with a healthy lifestyle and a good level for PA [6]. For the Polish population, 53% of population reported no vigorous activity, around 40% no moderate activity, and 12% had not even walked in the last 7 days, as measured by IPAQ short version [8]. For the Croatian population (adults and students groups), the reliability of the IPAQ long form was satisfactory [22]. The reliability and validity of the Global Physical Activity Questionnaire (GPAQ) and IPAQ for the French population (students and university staff) were acceptable, and the solution was using an objective instrument, such as an electronic device or gadget, to measure the level of physical activity and the caloric expenditure [23]. In Central European countries (Czech Republic, Slovakia, Hungary, and Poland), more than half of the youth population had a high level of physical activity measured by IPAQ and

about 80% of them met the health recommendations concerning physical activity (PA); also, in other studies, males recorded a higher level of PA than females [24,25].

The validity and reliability of the IPAQ were good, but some differences were found for lower-educated males and for overweight or obese subjects [21]. For the Spanish population, the validity was acceptable (for vigorous activity) and poor (for moderate activity), and the reliability was good for IPAQ long form [26]. The use of accelerometers and pedometers to monitor PA and IPAQ short form for students showed a good to very good correlation and also improved the validity and reliability of the questionnaire for this category of population [27,28]. In opposition, for Chinese students, there was found a low correlation between physical activity (measured by the IPAQ-SF) and physical fitness [29,30]. The IPAQ could be applied both in printed and electronic versions, but no significant differences were found between these two forms [31].

Regarding the Croatian University students, low levels of PA were found for many of them and also differences between males (more active in the leisure-time domain) and females (domestic domain) measured by the IPAQ long form [7]. A ten-year study (2001–2011) that involved medical students showed a decrease in the percentage that met the recommendations (from 75.2% to 47.8%) measured by IPAQ long and short forms, and this is an alarming situation because lower levels of PA prevail among youth population and students [9].

In self-evaluation (IPAQ-short form), the subjects report more vigorous PA compared to the accelerometer collected data. The results are influenced by gender, age, and level of education. Usually, people tend to overestimate their PA level in questionnaire answers (where there is a high degree of subjectivity) comparing to the objective instruments such as accelerometers, pedometers, and other gadgets [3].

Significant correlations between fitness test results and IPAQ short form answers for healthy males were found [32]. A good physical fitness is associated with wellbeing and a good level of PA (assessed by IPAQ) had positive effects on personal mood state and on psychological health [33].

Obesity had a negative impact on the quality of life, especially for physical and mental level, and this category of subjects prefers physical activities based on light effort [4].

By using the IPAQ, a great proportion of the students meet physical activity guidelines in their self-report, but an objective assessment tool is necessary, and the questionnaire results must be interpreted with caution [34].

The level of weekly MET consumption influences the health-related quality of life (HRQoL) and the subjects with moderate and high MET showed a better HRQoL regardless the low level MET category (usually associated with occupational physical activity) and with a negative impact on these indicators [35].

The personal example of the physical education teacher could be a positive example for students. A teacher practicing daily vigorous PA will have a moderate to high physical fitness level and will teach and assess health-related fitness components more easily, being a healthy lifestyle model for students [36].

The environmental space influenced the frequency and intensity of PA in open areas (parks, nature); the participants became more active, and the questionnaire data analysis reflected this aspect [37].

Regular physical activity had favorable effects on sleep and improved psychological functions, this aspect being very important to design-specific PA programs adapted to the individual possibilities in order to increase these positive effects on one's body and mind [38].

There is a correlation between monthly income and the level of PA (assessed by IPAQ), and the results showed that people with medium and high income were more physically active. This study also reveals a social issue—poor people (with a low income) who are less active may be negatively impacted over time, and this situation will affect their health status and quality of life [39,40].

A study that used IPAQ and also collected data about the distance to the sport facilities concluded that increasing the number of facilities (indirectly meaning to reduce the distances) might increase the PA of the population [41].

The main issue concerning PE curricula is the number of hours per week—only two in primary and secondary school and just one hour at academic level. With these facts, it is hard to act efficiently in order to improve physical fitness, to form healthy habits including PA in the daily schedule.

IPAQ is generally considered as a reliable and valid tool to assess the level of PA. Previous studies showed that the number of youth with a low level of PA had increased [3–9], but there is a lack of information concerning Romanian youth/students. For this reason, it is essential to determine the social and educational sustainability of the PE by using IPAQ in order to assess their level of PA. One way to improve or solve this issue is to involve the students in the assessment process, and maybe, they will become more conscious concerning the importance of the PA in daily life.

2. Materials and Methods

The aim of this study was to investigate the social and educational sustainability of the physical education and to determine the level of physical activity by using the International Physical Activity Questionnaire (IPAQ) short form at Romanian undergraduate and graduate students.

2.1. Participants

In our study, 285 students participated (female undergraduate—119, male undergraduate—88, female graduate—34, male graduate—44) (Table 1).

Table 1. Group characteristics.

		Gender		Degree	
Students	N	Male	Female	Undergraduate	Graduate
	285	132 (46.3%)	153 (53.7%)	207 (72.6%)	78 (27.4%)

2.2. Instruments

The IPAQ short form (comprising 7 questions with 4 generic items—vigorous activities, moderate activities, walking, and sitting) was anonymously applied, and participants were asked to answer about their PA over the last 7 days. They had to fill information on a sheet form for each item and to mention how many days they practiced that kind of activity for at least 10 min during the last 7 days and how long daily (minutes or hours). They gave their consent to use these personal data only for scientific purpose. The IPAQ short form was applied to participants during January–March 2020, in university campus. To fill all the required information concerning their PA in the last 7 days, the participants needed less than 10 min.

According to the IPAQ guidelines, the obtained data were presented as estimated caloric expenditure in MET minute/week in each of four items [1]. Total PA was calculated as the sum of all four items (vigorous activity, moderate activity, walking, sitting).

Due to the fact that in Romania we did not have any official or scientific PA recommendation, our results were compared to:

- IPAQ scoring protocol short form where walking means 3.3 METs, moderate intensity (4 METs) and vigorous intensity (8 METs), and subjects were ranked in three score categories: low—no activity reported or less than 600 METs (combined activities), moderate—between 600 and 3000 METs (combined activities), and high—more than 3000 METs per week (combined activities for each category) [1];
- The standard PA recommendation (at least 150 min of moderate PA, or more than 75 min of vigorous intensity PA per week, or an equivalent combination of these two categories) and PA recommendation for additional health benefits (at least 300 min of moderate, or more than 150 min of vigorous intensity PA, or an equivalent combination of these two categories) [2].

2.3. Data Analysis

Two types of analysis were made: descriptive for the mean (X) and standard deviation (SD) for each analyzed group and differences between groups (gender, study level) by using Wilcoxon ranks test. The level for statistical significance was set at $p < 0.05$. In our study, for statistical analysis, the authors used the IBM SPSS Statistics program (version 26).

3. Results

Intergroup analysis (male–female, graduate–undergraduate, graduate male–graduate female, undergraduate male–undergraduate female, graduate male–undergraduate male, graduate female–undergraduate female) showed statistical significance at Wilcoxon ranks test for two (graduate male–graduate female, male–female) out of six analyzed situations (Table 2).

Table 2. Statistical significance at intergroup analysis.

Statistical Parameters/Groups	X ± SD (MET-Min per Week)	Z	Asymptotic Significance
Graduate male vs. Graduate female	6583.10 ± 5337.02 4103.30 ± 4398.39	2.129	0.033 *
Ungraduate male vs. Ungraduate female	6893.46 ± 7313.07 5476.33 ± 4597.55	0.834	0.404
Graduate male vs. Ungraduate male	6583.10 ± 5337.02 6893.46 ± 7313.07	0.175	0.861
Graduate female vs. Ungraduate female	4103.30 ± 4398.39 5476.33 ± 4597.55	1.103	0.270
Graduate vs. Ungraduate	5502.14 ± 5072.40 6078.78 ± 5931.92	0.229	0.819
Male vs. Female	6789.99 ± 6699.93 5171.21 ± 4575.74	2.539	0.011 *

* significance level 0.05.

The means for every analyzed situation in the IPAQ short form data are represented in Figure 1 to easily distinguish among group characteristics concerning the level of PA. The difference between gender concerning MET minutes per week consumption is evident, and also the comparation for study level shows relatively close values.
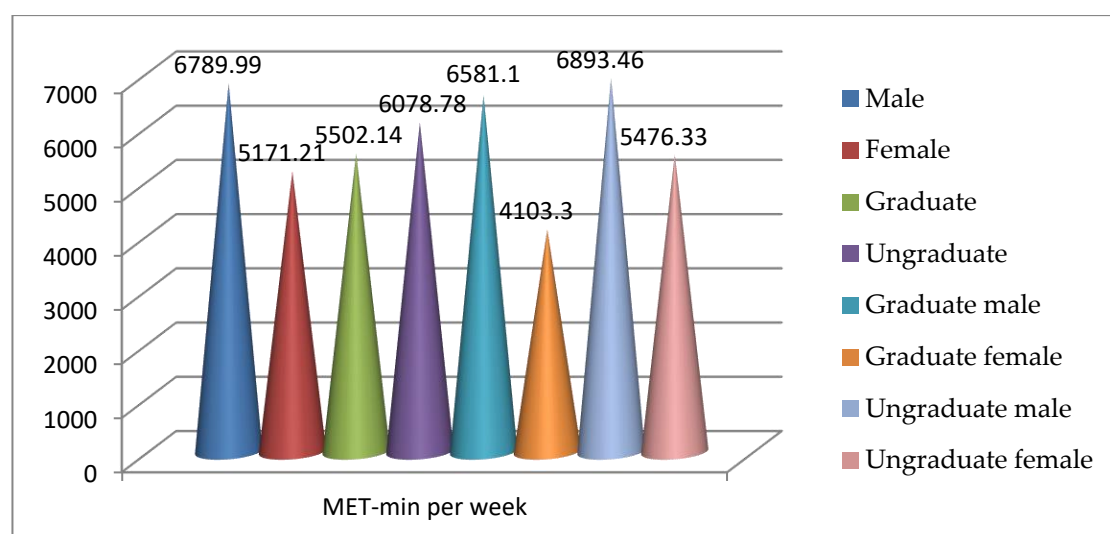
Figure 1. The distribution of results at analyzed situations.

4. Discussion

Between male and female graduates, there was a difference of 64% in MET minutes per week (6583 for males and 4103 for females), and at Wilcoxon ranks test, there was a recorded significance of $p < 0.033$. Overall, female graduates meet the requirements for a high level of PA, but 12% are in the low category, 48% in the moderate category, and 40% in the high category level of PA. For male graduates, 2.2% are in the low category, 27% in the moderate category, and 70.8% in the high level of physical activity according to the IPAQ scoring protocol. Comparing the results to the World Health Organization PA recommendations, for graduates, 41% of males and 68% of females did not reach standard PA recommendations; only 41% of males and 21% of females met the standard PA recommendations, and 18% of males and 11% of females met the PA recommendations for additional health benefits.

At undergraduate level, the MET difference between males and females was around 18% (males—6893, females—5476), and there was no statistical significance for $p < 0.05$ (at Wilcoxon ranks test). According to the IPAQ scoring protocol, 6.7% of females were in the low category, 26.9% in the moderate category, and 66.4% in the high category; but comparing to the World Health Organization (WHO) PA recommendations, 40% (44) did not meet the standard and 21% (25) of the female subjects had no moderate or vigorous activities; 19.3% (23) met the recommendation and 43.7% (52) had additional health benefits. For males, the situation was better, because there were no subjects in the low category; in the moderate category, there were 26.1%, and the rest (73.9%) were in high category; regarding the WHO recommendation, 21.6% did not practice at least 150 min PA per week; 6.8% met standard requirements, and 71.6% met standards for additional health benefits.

The analysis of graduate male vs. undergraduate male did not show any statistical significance between groups, the same situation being also between graduates vs. undergraduates and graduate females vs. undergraduate females.

A comparison between male (132) vs. female (153) groups showed a statistical significance for $p < 0.011$ at Wilcoxon ranks test. According to the IPAQ scoring protocol, 7.8% of females and 0.76% of males are in the low category, 31.4% of females and 26.51% of males were in the moderate category, and 60.8% of females and 72.73% of males were in high physical activities category. The comparison of data to the WHO recommendation showed that 20.2% (31) of females and 9.1% (12) of males did not practice any kind of PA; 39.2% (60) of females and 20.5% (27) of males did not meet standard recommendation, 17.6% (27) of females and 6.8% (9) of males met standard recommendation; 43.2% (66) of females and 72.7% (96) of males met the level for additional health benefits, the results being in line with other studies' data [7,12].

For the entire group analysis at IPAQ scoring protocol, 4.6% (13) of the subjects were in the low category, 29.1% (83) were in the moderate category, and 66.3% (189) in the high category. According to the WHO recommendation, 87 out of 285 subjects (30.5%) did not met the standard; 36 out of 285 subjects (12.6%) met the standard, and 162 out of 285 subjects (56.9%) had additional health benefits due to the practice of PA.

There are differences between the World Health Organization (WHO) PA recommendation and the IPAQ scoring protocol, mainly because the WHO PA recommendation comprises only moderate and vigorous activities and in the IPAQ scoring protocol walking is also included, meaning that, with a daily 30 min effort, individuals can reach a moderate level.

Overall, two thirds of the subjects (according to the IPAQ scoring protocol) and more than half (according to the WHO recommendation for PA) consider themselves to be active [6–8,10,16,25,33,42]. We can consider that our subjects obtained moderate results concerning physical fitness level assessed by the IPAQ short form.

The present study showed that there is a prevalence of insufficient PA among Romanian university students (around 40%). Lack of PA was associated with female gender, where the percent is almost double compared to male gender.

Besides, at least 39.2% of female students and 27% of male students did not meet the PA recommended levels for additional health benefits [2], and it is important to increase the adherence rate of the population to the PA guidelines [43].

There are major differences between individual answers, confirmed by high values for standard deviation in each of the analyzed situations and that means a small homogeneity of the group.

The situation seems to be better than in other countries, but in self-evaluation, many people tend to overestimate their potential. To avoid this aspect and gain some objectivity, it is better to use a gadget or specific field tests in order to measure the level of the PA [3,22,23,26,29,30,34,44].

The curriculum changes concerning physical education (PE) in schools did not help much, because there is 1 or 2 h of PE per week [45] for all levels of education, and in this context, it is hard to promote and form healthy habits, including adherence to daily physical activities. Therefore, many decisions concerning the importance of practicing regular PA depend on personal beliefs, knowledge, and the desire of the youth, and there are necessary special programs designed for them to be encouraged in this direction [46].

5. Conclusions

In Romania, the state social policies for population did not register many changes during the last 30 years regarding the impact of PA on quality of life [46], and also, there are no studies concerning the level of PA within the population. In addition, in curricula for primary and secondary education, there are only 2 h of physical education per week and at the academic level, on average, just 1 h of physical education per week. With this background, it is hard to form strong personal beliefs amongst children and youth concerning the importance of daily PA.

The lack of PA will lead to a sedentary lifestyle with an influence on health status, the tendency to be overweight or obese, and the probability of developing certain diseases with a bad perspective concerning our personal and social perception. This aspect could affect a person physically, physiologically, and more importantly, psychologically, and in this situation, we found that 15% of the subjects (43 out of 285) did not report any PA, meaning a sedentary lifestyle with the risk of developing certain diseases and affecting one's personal health status.

Daily PA is an important factor in order to prevent people from developing certain kinds of diseases. Our lifestyle and daily schedule do not include, in many cases, time for physical activities, and in this routine, using new brands of technologies that theoretically improve our life, make us become sedentary and captive to electronic devices, gadgets, different kind of applications, and social media. Our study reveals that, on average, the subjects spend 4.7 h per day sitting, and this sitting time is mainly associated with the use of technology (applications, social media profiles).

There are some factors that could positively influence lifestyle (health-related fitness knowledge, healthy habits, health-related quality of life) in order to achieve wellbeing. In addition, the level of the income is directly connected to the adherence of PA practice and the number of sport facilities in an area, but the most important is one's personal belief concerning the impact of daily PA practice and the influence for life quality.

According to the results of the study, we can consider that the perception of the physical activities in the daily life of the students had a place, but not an important one compared to their professional tasks and leisure time. In this context, we can consider that the social and educational sustainability of the PE on Romanian students had a low impact, and it is important to act in order to improve the efficiency of PE activity at all levels of education and to promote a healthy lifestyle that includes regular PA.

Our study had several limitations: there are students only from north-east of Romania, the collected data might have been limited by measurement error inherent to self-reports, the number of participants, and subjectivity. In addition, the study was made during the winter when usually the people practice indoor physical activities and less outdoor ones, and it is possible to influence the MET individual score.

The questionnaire was applied at the beginning of 2020, before the pandemic context, and nowadays, it is possible that the situation has become more critical. This context emphasizes the importance of sustainable education and social action in order to prepare a healthy youth generation for future challenges.

For further studies, it is necessary to increase the number of participants from Romanian universities (across all country) in order to collect valuable data and to determine the portrait of the Romanian student concerning physical activities in his/her daily schedule, and also the sustainability of the PE lessons in order to form healthy habits concerning regular PA.

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