DOI:10.1515/tperj-2017-0013

Students' job-related physical condition. How fit are they ?

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Abstract

Objectives: To establish the physical condition of "Aurel Vlaicu" Arad University' students, in relation with declared weekly physical activity, assuming that there are statistically significant differences between BMI, recreational physical activities and performances of the monitored samples according to physical condition standards data.
Subjects. A number of 1169 students were evaluated, male (n=539), female (n=630), with gender median age: male 22.55y± 5.59y, female 21.61y ± 4.87y. *Methods*: Anthropometric parameters (height, weight, BMI) were measured. Also, the following tests were performed: running speed (S), standing long jump (LJ), pushup (P), trunk lift (TL), Home Step Test (HST); and questionnaire DWPA (declared weekly physical activities). The data was processed with *SPSS 14.0 for Windows* and *MedCalc*. *Results***:** By associating the declared weekly exercise with cardiovascular capacity, we found that although there is a positive correlation, for the results of the HST and the frequency of the declared weekly exercise this correlation is insignificant. *Conclusions***:** Those who tend to exercise for more than twice a week have small cardiovascular endurance and low level motor skills. This suggests that exercise intensity is inadequate and does not lead to morphological and functional adaptive changes in the cardiopulmonary system, nor do they improve the students' motor skills. The absence of proper physical condition, in addition to the mostly sedentary nature of future graduates', jobs increases the risk of occurrence of diseases associated with physical inactivity.
Key words*: fitness activities, health, exercises quality*

Rezumat

Obiective: Determinarea condiţiei fizice a studenţilor de la Universitatea "Aurel Vlaicu" din Arad, în legătură cu activitatea fizică săptămânală declarată, presupunând că există diferenţe semnificative statistic între IMC, activităţile fizice recreative şi performanţele probelor monitorizate conform datelor standard la probele fizice . *Subiecţi:* Un număr de 1169 de studenţi au fost evaluaţi, bărbaţi (n = 539), femei (n = 630), vârsta medie: bărbaţi 22,55ani ± 5,59ani, femei 21,61ani ± 4,87ani. *Metode:* Au fost efectuate măsurători antropometrice (talia, greutatea, IMC). De asemenea, au fost efectuate următoarele teste: alergare de viteză (V), săritura în lungime de pe loc (SLL), flotări (F), abdomene (A), rezistenţa cardiovasculară (home step test, HST); şi chestionarul AFSD (activităţi fizice săptămânale declarate). Datele au fost procesate cu SPSS 14.0 pentru Windows şi MedCalc. *Rezultate*: Prin asocierea exerciţiului săptămânal declarat cu capacitatea cardiovasculară, am constatat că există o corelaţie pozitivă nesemnificativă, pentru rezultatele la capacitatea cardiovasculară şi frecvenţa exercitării săptămânale declarate. *Concluzii*: Subiecţii care tind să efectueze activităţi fizice mai mult de două ori pe săptămână au o rezistenţă cardiovasculară mică şi un nivel scăzut al calităţilor motrice. Acest lucru sugerează că, intensitatea exerciţiilor este inadecvată şi nu duce la modificări morfologice şi funcţionale de adaptare a sistemului cardiovascular, şi nici nu îmbunătăţeşte calităţile motrice. Natura aproape sedentară a meseriilor viitorilor absolvenţi, în absenţa unei condiţii fizice adecvate, creşte riscul apariţiei bolilor asociate inactivităţii fizice.
Cuvinte cheie*: activităţi de fitness, sănătate, exerciţii de calitate*

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Introduction

There are alarming statistics regarding a continuos degradation of populations' general health caused by physical inactivity and more than 80% of world's adolescent population is physically insufficiently active [1].

Most professions generated by university studies (e.g. economic sciences, education sciences, humanities, exact sciences, or design) involve jobs at high risk of generating diseases associated with physical inactivity,

Our study aims to provide a scientifically grounded argument for finding solutions to reduce risk factors that generate diseases associated with physical inactivity, thus increasing the quality of people's lives.

Results of several research undertaken in this direction point out the close relationship between life quality, physical inactivity and the risk of diseases such as obesity, various forms of cancer, diabetes or cardio-vascular diseases [2-7]. The increased risk of physical inactivity is associated with an unhealthy diet [8-10].

On the other hand, preliminary results of the survey – in progress [11] – regarding the biomotric potential of the students of "Aurel Vlaicu" University lead us to make some remarks regarding the concept physical activity in relation to health and work place. At the same time, good physical condition and an appropriate maintenance program are required for reducing the risk of developing job-related diseases [12-13]. The specialized literature provides sufficient scientific arguments in favor of the close link between physical activity and health [14-20]. Generally speaking, physical activity includes any movement of the human body – and of its segments – with the help of skeletal muscles that help increase energy consumption.

Between 150-200 min. of moderate-intensity physical activity are recommended per week in order to maintain general health [21]. But simply increasing energy consumption relative to the baseline does not improve health. Only physical condition, viewed as the ability to perform physical activity under various physiological conditions (exercise intensity) can define best health. In other words, a physically active person may have a precarious general health, just as a person with a good physical condition – and therefore healthy – may be physically inactive. Physical inactivity has not only major effects on people's health, but also serious economic implications [22, 27]. This is due to the fact that physical activity – as defined earlier – may include only current daily activities, such as: sitting on a chair, walking, dressing, cooking, job or school related activities ; such activities "consume" energy but produce no morpho-functional improvement. Conversely, what defines the healthy individual from a physical perspective is *physical condition*, which results from a systematic and planned practice of *physical activities* (whether games, jogging, aerobics, swimming or sports and PE classes, etc.) and which triggers morpho-functional modifications at the level of all bodily systems and organs [23]. In the case of these exercises, energy consumption difers from one sports branch to another [24]. Whether the physical activity is moderate or intense, replenishing energy is closely related to nutrition. An unhealthy diet is reflected in the body mass index.

Hypothesis

Physical inactivity is reflected in the low level of the motric qualities, with low adjustment to effort and with increased relative risk for ventricular allure in the context of maximum intensity effort.

Methodology

We used health related physical activity for motric qualities (speed, length, abdomen, push-ups, cardiovascular endurance) according to gender and age groups between 18-65 years. The measurements used were: BMI, gender, age category, residence and declared weekly physical activity.

Study design

We used a cross sectional observational study design, nonrandomized. This study included students enrolled in the university, the batch containing no high performance athletes, but merely persons who say they practice physical activities as a form of recreation. The measurements were made in the period November 2013 – January 2014 for students of non-sporting faculties, during the physical education classes and with the help of the Physical Education and Sports students, who were previously trained regarding

the measurement and testing procedures. We measured anthropometric variables:heigh (Medical Export taliometer, Italy, 2010), weight (electronic scales, China, 2014) and the body mass index (BMI). Although determining the physical activity is no simple process – due to the multidimensional character of the term [18, 19] – it was performed with the help of a simple questionaire. For determining motric qualities and cardio-vascular resistance we employed the protocols described in *101 Performance, Evaluation Test* [28]. Data processing was performed with *SPSS14.0 for Windows, MedCalc.*

The correlation between the analyzed variables was also calculated. Results are reported as mean ±SD, for a confidence interval (CI) of 95%. Significance was set at p≤ 0.05.

Results

A number of 1169 students participated in the study (confidence level CL 95%, error margin 2.3 and distribution of answers 20% of the general population), of which 630 females and 539 males (Table I).

Table I. Physical and performance characteristics of subjects (mean ±SD)

Subjects	Female	Male
Age(y)	21.61±4.87	22.55±5.59
Height(m)	1.64±0.06	1.78±0.06
Weight(kg)	59.11±10.34	77.21±12.65
BMI (kg/m2)	21.59±3.57	24.24±3.67
Residence (v/c)*	224/406	165/374
Trunk lift 30s(TL) nr	18.64±4.56	23.68±5.57
Jump**(LJ)(m)	1.49±0.21	2.04±0.25
Pushups 30s(P) nr	13.49±6.53	24.43±8.38
Speed 30m(S) (sec.)	4.97±0.56	4.41±0.91
Home Step Test*** (HR/min)	123±20.55	120.80±22.22
DWPA****	3.65±0.80	4.14±087

Note: *v-village; c-city; **long jump from a point; ***322 female & 345 male valid measurements; ****DWPA-declared weekly physical activity (3-never; 4-once/week; 5- more than twice/week.

Only 677 participants from the total were validated for this last test, 345 males and 322 females, after exclusion of the cases where measurements were not made according to methodology. Table I presents the results as mean±SD. Table II presents the correlation between BMI and the variables, while Table III presents the correlation between DWPA and the variables in the study. The Ethics Commission of the university has consent the study.

Table II. Pearson correlation coefficients for body mass index (BMI) and declared physical activity (DPWA), trunk lift (TL), long jump from a point (LJ), pushups (P), speed (S) and home step test (HST); variables (n= 1169)

	BMI
DWPA	0.062
Trunk lift 30s(TL)	-0.023
Long jump from a point (LJ)	0.097
Pushups (P)	0.153
Speed (S)	0.065
Home step test (HTS)*	-0.054

*for n=667 valid measurements

Table III. Pearson correlation coefficients for declared physical activity (DPWA)and body mass index (BMI), trunk lift (TL), long jump from a point (LJ), pushups (P), speed (S) and home step test (HST); variables (n= 1169)

	DWPA
BMI	0.062
Trunk lift 30s(TL)	-0.332
Long jump from a point (LJ)	0.332
Pushups (P)	0.314
Speed (S)	-0.148
Home step test (HTS)*	-.041*

*Kendall's tau value for n=667 valid measurements; r=.3-5 moderate

Discussion

Health-related physical fitness is dependent on both the person's health and his physical condition. BMI is a reasonable descriptor for health, while physical condition can be appreciated by the level of basic motric qualities,which are largely determined by the physical activity deployed.

In what concerns weekly recreational physical activities (fig.1), almost half of the subjects are physically inactive (n=524 scores < 3.65 DWPA); the physically active subjecs represent only 1/3 of the total number (n=1169), with 250 male and only 134 female. The greater preoccupation of the male

participants for physical activities is also confirmed by other studies [12].

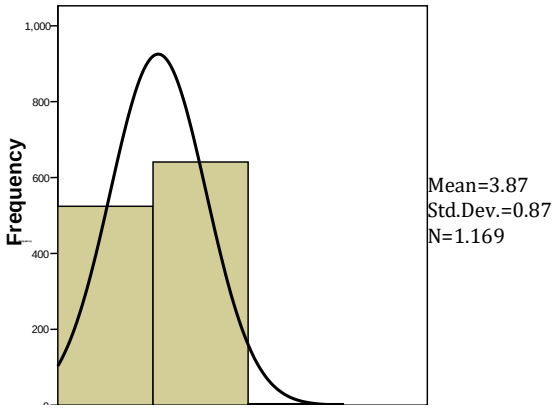

Figure 2. DWPA Frequency

Physical inactivity is also reflected in the low level of the motric qualities monitored. Table III shows that the influence of DWPA on motric qualities is moderate (exception BMI r= .062 and HST Kendall's τ= - .041, which are very weak). The percentage of subjects with poor physical condition according to age and gender in non-sporting population is low (TL=44.9%, LJ=28%, S=40.9%, HST=57%, exception P=75%). Adjustment to effort is low (fig.2), which enhances the risk of cardio-vascular diseases.

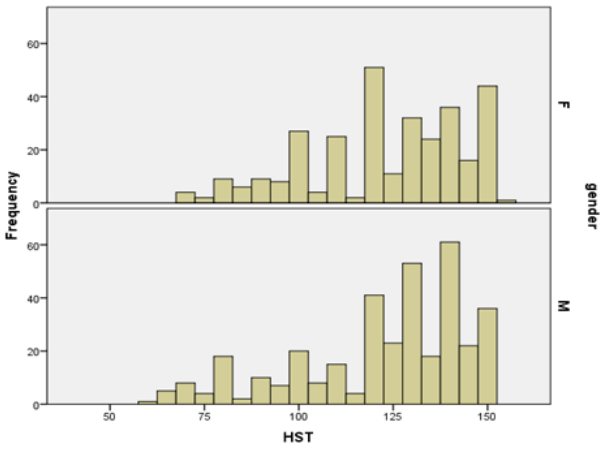

Figure 2. HST Frequency by gender

Relative risk for ventricular allure is high in the context of maximum intensity effort (220-age). This is 1.404 times higher for those who declare that they do not practice physical activities at all, compared to those with declared physical activity (p = 0.3536, no statistic significance). As for BMI, it is not influenced by age, gender or residence. Similarly (table II), there are no positive or significant correlations observable with the motric qualities (exception, TL r= - .023 and HST r= - .054). And yet, it was found that the number of overweight and obese subjects is higher in urban areas (n=174) than in rural areas (n=80). It also seems that female participants are more preoccupied of dieting (76 female overweight and 178 male overweight). What is really worrying, though, is the almost equal number of overweight and obese subjects (fig.3) both among those who practice physical activities weekly (n=96) and those who do not practice physical activities (n=97). In other words, in the case of our sample, BMI depends not so much on physical activity as, probably, on an unhealthy diet. In this case, too, the relative risk for ventricular allure is increased in the context of maximum intensity effort (220-age); this is 2.2407 times higher for overweight and obese people compared to normal BMIs (P = 0.0091). Such data suggest that we must continue our study, determining the students' eating habits and correlating them with the indicators analyzed.

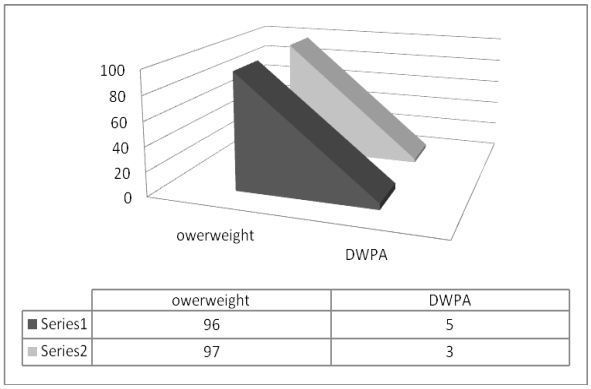

Figure 3. A roughly equal number of active (DWPA5) and inactive (DWPA3) overweight and obese subjects

Conclusion

We can assert that the "Aurel Vlaicu" Arad University students (who do not practice performance sports) present a poor physical condition, as a result of non-practicing physical activities on a systematic basis.

Also, those who declare that they practice physical activities weekly, have a poor capacity of

adjustment to effort and, irrespective of the profession chosen, they have a high risk of developing cardio-vascular diseases. In other words, the physical activities practiced do not produce morpho-functional modifications. In addition, there is also the issue of an unhealthy diet, which enhances the risk of diseases associated with physical inactivity. Our conclusion is that only physical activities consisting on planned and systematically done exercises, coupled with a healthy diet to control body mass index, can guarantee good physical condition, optimal health and a low risk of developing diseases.

Recommendations

Improving the content of physical education and sports classes for students from all faculties other than sports.

Diversifying the educational offer by including all students in sports activities and creating a culture of movement; and, last but not least, physical activities must aim at developing a good physical condition.

Acknowlegments

We want to thank all the students who participated in this study. The authors declare no conflict of interests.

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