The correlation between the media usage, physical activities and nutritional approach for Romanian students

Marius Trandafir[1], Catalin Vasile Savu[1], Aurelian Gheorghiu[1], Cristian Serea[2], Octavian Barna[2]

[1]Faculty of Physical Education and Sport, "Dunarea de Jos" University of Galati, Galati, Romania; [2]Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Galati, Romania, *Corresponding author E-mail: octavian.barna@yahoo.com

Summary. The purpose of the present study was to determine the relationship between the media usage, physical activities (PA) and nutritional approach for Romanian students in the Eastern part of Romania, from Galati County. The cross-sectional study design was designed for this purpose in order to achieve the objectives. A total of 1143 subjects, male and female students aged between 19 ± 25 years old, answered self-reported anonymous questionnaires about their usage of the media in a typical week (from Monday to Sunday) (watching TV, computers or PC games). Also, the IPAQ questionnaires were designed to assess their physical activities (in which median values of combined activities were expressed in the metabolic equivalent task (MET) minute/week) and a self-reported anonymous Diet History Questionnaire III was created to establish their food habits quantified in Healthy Eating Index (HEI) 2015 score. Anthropometric measurements were used to calculate the body mass index (BMI) of the subjects. Within this study, randomly selected different subgroups of 212 subjects, male and female students, with the same age, between 19 ± 25 years old also participated in an ancillary similar study with a set of questionnaires and interviews about their time of viewing TV or using other ways of media, (e.g.: computers, PC games, etc.), and the physical activities and nutritional habits that they have during this time. In the main study, it was found the decrease of the number of hours allocated for TV or other forms of media, from 24.3 h/week to 13.6 h/week which was associated with the increase of physical activities of the male students from 386 MET to 5347 MET, and for female students, there was an increase in physical activity from 346 MET to 4525 MET. In terms of nutritional habits, there was an increase in the HEI index from 51.3 to 56.7 for male students and from 51.6 to 55.8 for female students. The BMI index fell from 25.12 to 21.18 for male students and from 26.32 to 20.64 for female students. The cross-sectional study of the results showed a correlation between media usage, PA and nutritional approach ($p \leq 0.05$). The statistical analysis showed that there are strong positive correlations between the indices calculated in the main study and in the ancillary study.

Key words: media usage, PA, nutritional approach, HEI 2015 index, IPAQ, BMI.

Introduction

During the last few years, specialists have discussed more and more related to health promotion about the decline of physical activity and of the fitness level among adolescents (1). On the other hand, the technological advances of the last decades have led to changes in the society that favors sedentary lifestyles.

Sedentary behavior is a major factor favoring obesity and cardiovascular diseases (1, 2, and 3). The economic and social costs of this pandemic are very high because obese people are at increased risk for a number of medical conditions, as well as long-term negative psychosocial consequences. The importance of physical activity and a healthy diet is recognized as a decisive factor in health (4).

The lack of regular physical activity is also associated with worsening of chronic disease conditions and health conditions, favoring the occurrence of strokes, certain types of cancer and type 2 diabetes as well as osteoporosis and hypertension (4, 5, 6, and 7). The most common sedentary behaviors among young people that are using media are watching TV, and playing PC/video games or usage of mobile phones (8, 9). Some studies show that excess TV viewing time, independent of the general level of physical activity, is negatively associated with metabolic risk factors (10, 11). Worldwide, but especially in the countries of Europe and North America watching TV shows and computer games are the main sedentary habits that affect the young generation leading to an increasing rate of obesity (12).

There are assumptions that say that these sedentary behaviors based on TV and PC games influence health by occupying time that in other conditions could have been used in physical or sports activities and these sedentary behaviors are encouraged by either the actual trends, either during media usage or as a result of food advertising especially for TV watching (12, 13). A third potential mechanism by which media consumption can lead to overweight is that TV and other media usage is reducing students' sleep time, which leads to more stress, which may lead to more snacking and a decrease in the consumption of slow food and thus leading to consumption of fast food with more calories (14, 15).

One of the first studies on the influence of media consumption on obesity was published in 1985 and concluded that the prevalence of obesity increased by 2% for every extra hour per day watched on TV (16).

Studies have recommended that young people should not spend more than 120 minutes a day watching TV and PC games. In this context, it has been stated that this general inactivity level will let too many overweight students, who will be added to the adult persons affected by obesity and other metabolic and many other chronic diseases like hyperglycemia, dyslipidemia, atherosclerosis, etc. (17, 18, and 19). In general, the attitude towards alimentation and the PA are factors connected to the lifestyle and nutritional behavior, having an important role in the etiology and prophylaxis of numerous chronic diseases (16-19).

There is no sufficient data for Romania able to quantify the correlation between the media usage,

physical activities and nutritional approach level during the last 10-20 years, as well any conclusive data concerning this type of research. The practical implications both economic and social of this type of research are important, considering as well the enormous expenses assumed by the health programs addressed to the persons suffering from obesity and its complications and also other social implications for the students (15).

From another point of view, the more it will be acknowledged the nutritional approach and the relationship between the media usage and the physical activities for the students, the more applicability will be added to this study by the implementation of effective measures with a prophylactic character, which will reduce the costs, economically and enhance the health status of individuals, thus decreasing the categories of chronic patients suffering from disorders of the nutritional status for the future (20, 35).

This study from one point of view aimed to underline the unbalances present in the students' daily life, associated with the reduction of the PA, during this important period for forming future adults and from another point of view it was set in order to determine the relationship between the media usage, physical activities (PA) and nutritional approach for Romanian students.

Methods

The performed study was a cross-sectional study, searching to establish a relationship between two or several variables. In this project, it had been used questionnaires for determining the physical activity (PA) ratio and for evaluating the nutritional approach. The statistical analysis was applied separately for male and female students and also for the whole group of students participating in the main and ancillary study.

Main study: For the main study, a set of data was collected using self-report questionnaires about the time of media usage spent in the typical week from Monday to Sunday.

In order to reach the aim of this study, the cross-sectional survey was used on a total group of 1143

subjects, between 19 ± 25 years old, athletic and non-athletic students, males and females from several faculties from the University of Galati, Romania (Table 1). Furthermore, it has been compared the time of watching TV, computers or PC games (media usage), the level of PA for the students that participated in this survey, BMI index and their nutritional approach.

The IPAQ questionnaires were designed to assess the PA expressed in the metabolic equivalent task (MET) minute/week for the students interviewed and a self-reported anonymous Diet History Questionnaire III was also created to establish their nutritional approach quantified in Healthy Eating Index (HEI) 2015 score.

Anthropometric measurements: Anthropometric measurements were used in this study to calculate the BMI of the subjects. To calculate the BMI index, the height and weight of the subjects were measured (21). It has been used the formula $BMI = weight/height^2$ (kg/m^2). A stadiometer device Seca 217 (Seca, Germany) was used to measure the body height. The measurement was made with a precision of $\pm 0.1cm$, with the subjects being assessed in bare feet. The weight of the subjects was measured by weighing with an accuracy of ± 0.1 kg and was performed with an electronic medical scale Wunder (Wunder, Italy).

PA: PA was established as an interview with a dietician, in order to establish their nutritional approach, by completing the International Physical Activity Questionnaire (IPAQ) (20) to assess their PA and a self-reported anonymous diet history questionnaire (DHQIII) (20) to establish their food behavior.

An important point to be mentioned is that the students 'PA was assessed based on the short version of the IPAQ questionnaire, translated into Romanian (14).

The total weekly activity was expressed in the metabolic equivalent task (MET) minute/week. One MET is equal to energy expenditure during rest and is approximately equal to 3.5 ml $O_2\,kg^{-1}\,min^{-1}$ in adults. The questionnaires estimated the time spent being physically active in the last 7 days. The questions assessed the duration ("how much time did you usually spend…") and frequency (how many days/week") of vigorous, moderate physical activities and walking.

Both male and female students were classified into three main categories: Low physical activity (< 600 MET min/week), moderate physical activity (600 – 2999 MET min/week), and high physical activity (> 2999 MET min/week) (20).

Nutritional approach: A nutritional approach for the students that participated in this study was assessed using the HEI index 2015 score, a tool developed by the U.S. Department of Agriculture. The HEI 2015 index score is a 13-component 100-point scale that assesses the adequacy and moderation components of the diet. Higher scores are associated with better dietary compliance (21). HEI 2015 index score was calculated by means of a self-reported DHQIII questionnaire (22).

Ancillary study: After two weeks from the main study, a subgroup of 212 subjects aged 19 ± 25 years old (with an age of a median value of 22.6 years old) also participated in an ancillary study including interviews about the time of media usage in a week, anthropometric measurements, PA and nutritional habits. The use of an ancillary study in addition to the main study ensured the validation of the results obtained. The use of interviews within the ancillary study increased the accuracy of the students' answers by reducing the calculation errors.

Statistical analysis

In order to obtain the statistical significance of the noted difference, descriptive statistical tests using SPSS version 23, were performed (SPSS Inc., USA) and Pearson coefficient. The results were statistically significant at $p < 0.05$. The correlation coefficient of Pearson (r) was calculated, as well as the associated probability, taking into account a significance threshold $\alpha = 0.05$. The Levene test was performed to verify that the dispersions of the two samples are similar to choose to perform the t-test for similar dispersions or the t-test for different dispersions. The t-test was performed having numeric type-dependent variables (BMI index, MET, HEI index, media usage) and as the dependent variable with two values such as students (males or females).

All the questionnaires were administered during the classes to encourage participation. The students were chosen randomly, by distributing the questionnaires in classrooms with different profiles, within different faculties from the University of Galati, Romania. It is to be mentioned that there were no preference

criteria for certain classrooms, profiles or faculties. Participation in the study was voluntary and anonymous.

Results and discussions

__Main Study__: After the filling of the questionnaires, it has been carried on to the processing of the recorded results, to the statistical analysis and to the interpretation of the significance of the results.

In the main study, it was found that the percentage of male students classified in the category high (intense) PA is 27.02% being 5.32% higher than the proportion of female students who reported intense PA in the proportion of 21.7%. (Table 1). On the other hand, in the ancillary study, the proportion for the male students was 25.7 %, being 1.5% higher than the propor-

tion of female students of 24.2 % engaged in intense PA. Similar trends were found by Pinto et al. 1995 (23).

*Media usage in relation to PA for male students*

The results obtained in the main study have shown that for male students, as the number of hours spent on media usage decreased from 24.3 h/week to 13.6 h/week, PA increased from 386 MET to 5347MET (Figure 1). Similar results were obtained by Keim et al. 2004 (24) and Nelson et al. 2007 (25).

The statistical analysis of the main study for male students resulted in a probability value associated with the Pearson test $p = 0.033 < \alpha = 0.05$. This showed that the variables media usage and MET were correlated.

The value of the coefficient $r = -0.758$ indicated a very strong negative correlation, showing that the val-

Table 1. Demographic data of students participating in the main study and ancillary study

Boys 586(51.3%)		Main study			Ancillary study		
		Girls	Total	Boys	Girls	Total	
		557(48.7%)	1143	113	99	212	
PA level	Low	193(32.9%)	211(37.9%)	404(35.3%)	38(33.6 %)	37(37.4%)	75(35.4%)
	Moderate	234(39.9%)	225(40.4%)	459(40.2%)	46(40.7%)	38(38.4%)	84(39.6%)
	Intense	159(27.2%)	121(21.7%)	280(24.5%)	29(25.7%)	24(24.2%)	53(25.0%)
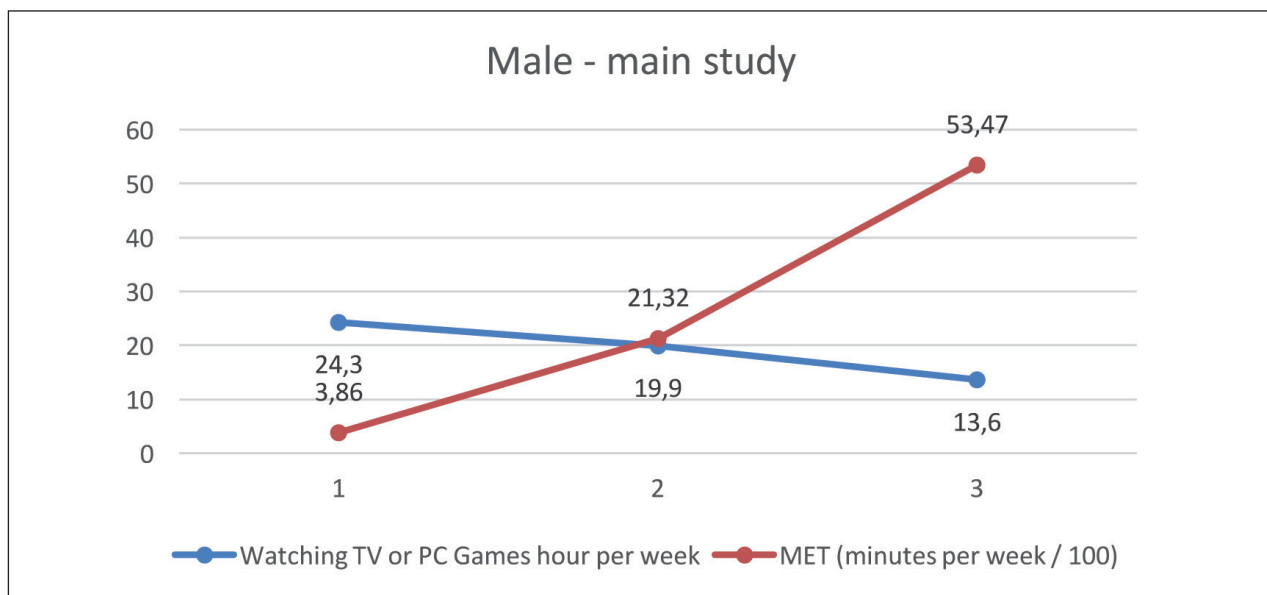
Figure 1. Main study. Male students. Media usage and MET variation.

ues of the variables were inversely proportional.

Analysis of the variation in media usage and HEI index showed that for male students participating in the main study, there was an increase in the HEI index from 51.3 to 56.7 and a decrease in the weekly time spent on media usage from 24.3 h/week to 13.6 h/week. (Figure 2).

Similar results were also observed by Harrison and Cantor. 1997, (26) and Pyle et al. 1990. (27).

From the statistical analysis, a value of p = 0.041 <α = 0.05 showed that there is a link between media usage and the HEI index. The coefficient r = -0.702 shows a strong negative correlation and that the values of the variables are also inversely proportional.

Media usage in relation to PA for female students

In the case of the female students participating in the main study, there was an increase of the PA from 346 MET to 4525 MET correlated with a decrease of the time spent on media usage per week from 25.4 h/week to 12.7 h/week (Figure 3). Similar results were obtained by Gore et al. 2003 (28) and Harrison.1994 (29).

The results of the Pearson correlation test are similar for female students. There is a strong correlation between the average use and the opposite MET (p = 0.005 r = -0.744).

Analyzing the evolution of HEI index for female students participating in the main study, the same trend was observed as for male students, with an increase of HEI index from 51.6 to 55.8 in the case of reducing the number of hours allocated to media usage from 25.4 h/week to 12.7 h/week (Figure 4). The same trend was observed by Nelson et al. 2007 (25) and Bowman et al. 2006 (30).

Statistical analysis showed that there was a strong correlation of the opposite direction between media usage and HEI (p = 0.008, r = -0.751).

Media usage in relation to BMI for male students

The BMI variation in the male students tested in the main study decreased from 25.12 to 21.18 for a decrease in the number of hours spent on media usage from 24.3 to 13.6 h/week (Figure 5). Similar data were obtained by Oppert et al. 2005 (31) and Ballard et al. 2009 (32).

Statistical analysis showed that between BMI and media usage there was a strong positive correlation (p = 0.045 <α = 0, r = 0.691).

Media usage in relation to BMI for female students

After centralizing the results obtained from the questionnaires completed by the female students, a BMI decreased from 26.32 to 20.64 was obtained fol-
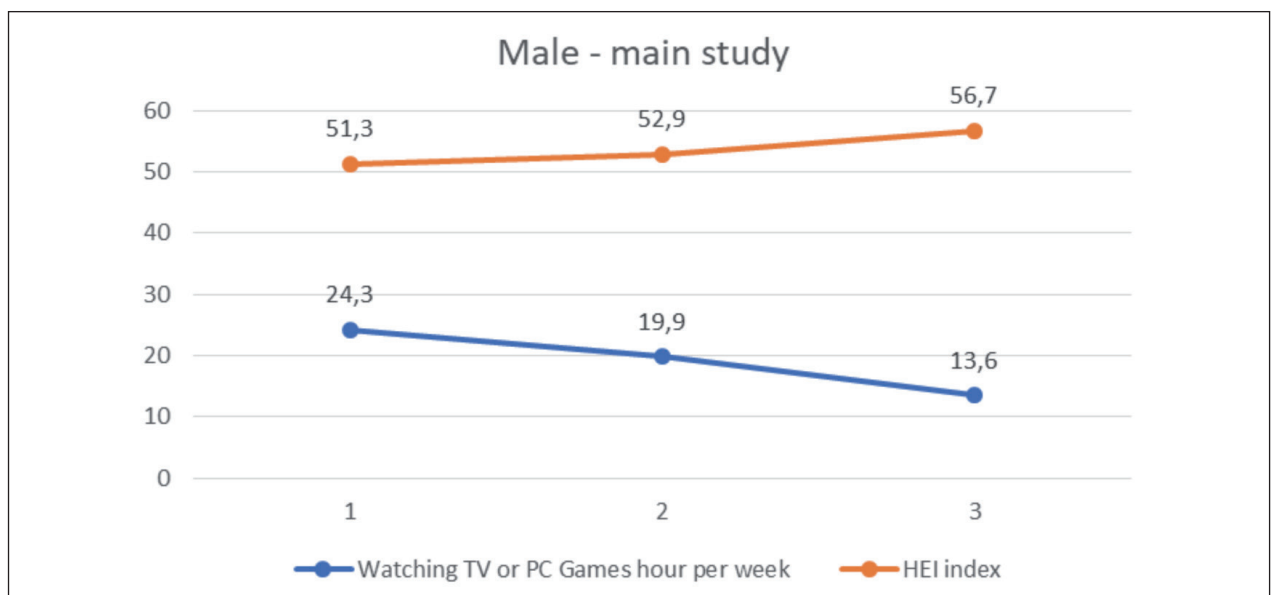
Figure 2. Main study. Male students. Media usage and HEI index variation.
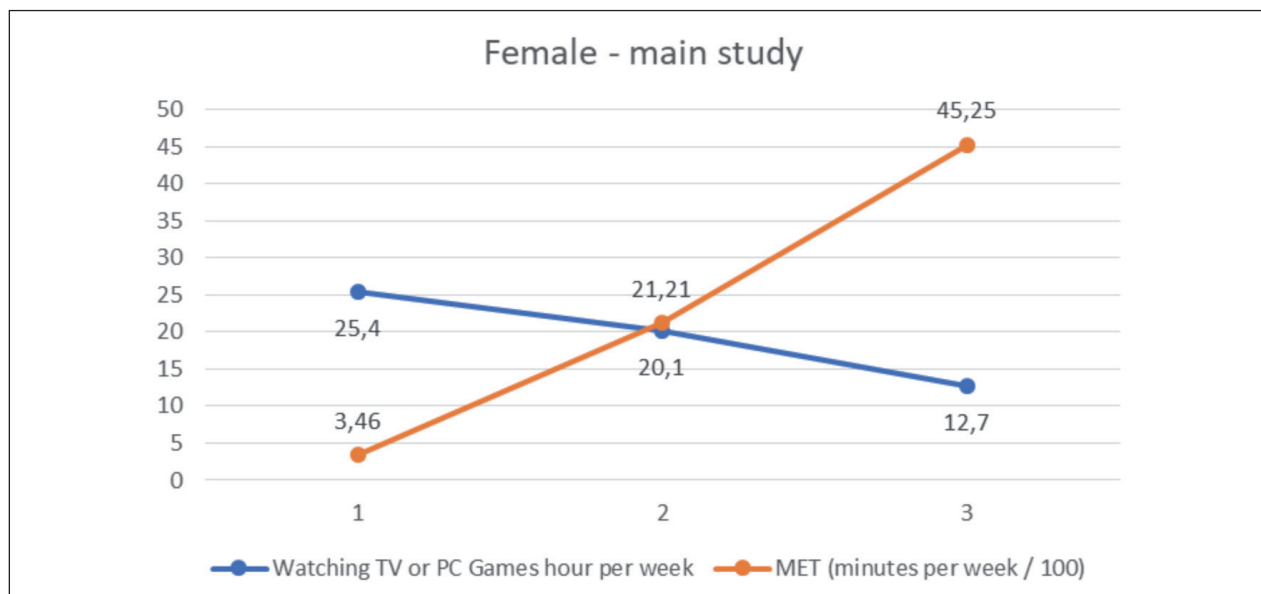
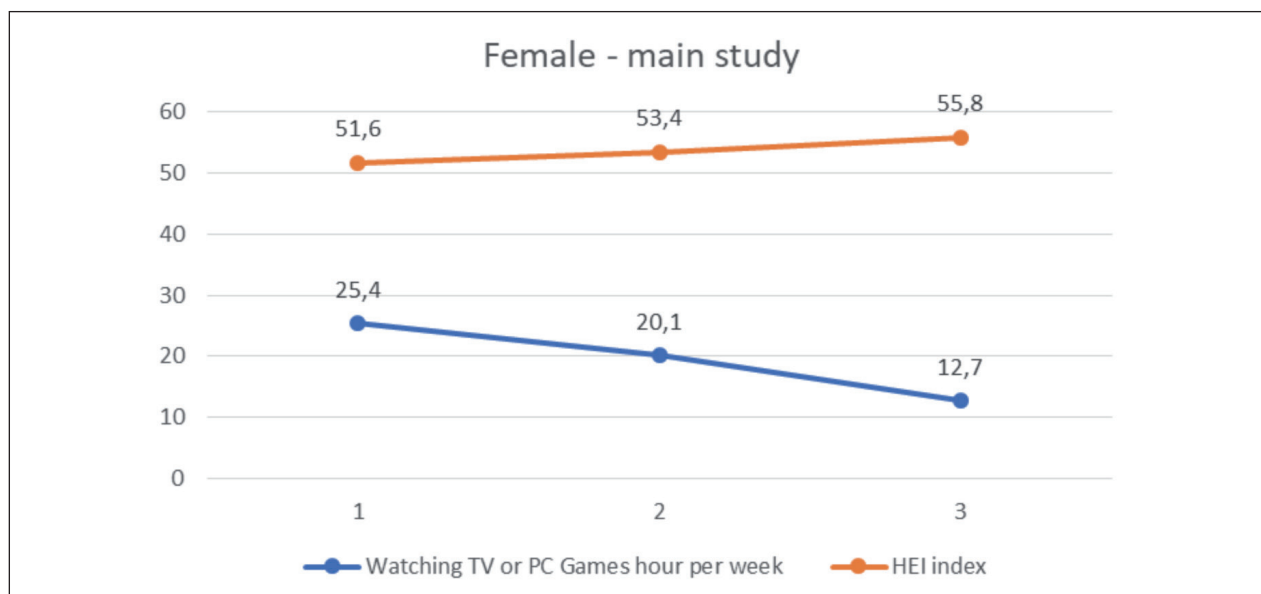**Figure 3**. Main study. Female students. Media usage and MET variation.

Figure 4. Main study. Female students. Media usage and HEI index variation.

lowing the decrease of the number of hours watched on media usage from 25.4 to 12.7 (Figure 6).

Similar results were also obtained by Kauer et al. 2003 (33) and Thomson et al. 2008 (34).

The conclusions of the Pearson correlation test were also maintained in the case of female students. The obtained values confirmed that there is a direct correlation between media usage and BMI (p = 0.038, r = 0.694).

In the statistical analysis, the Levene test was also performed to verify whether the dispersions of the two samples were similar in choosing to perform the t-test for similar dispersions or the t-test for different dispersions.
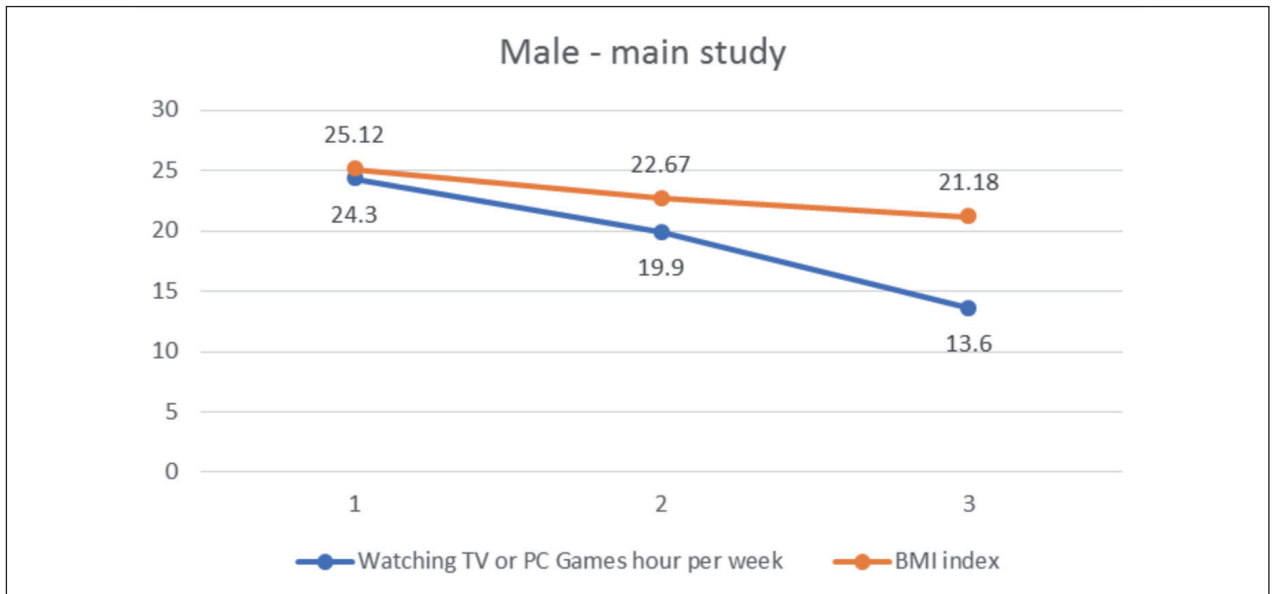
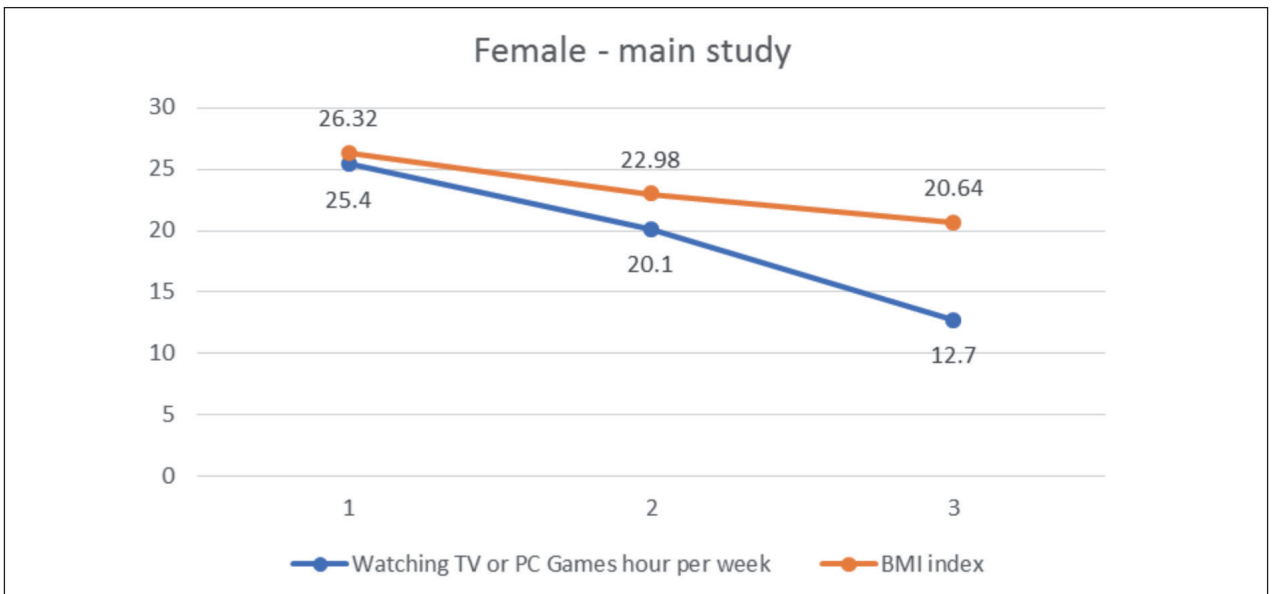**Figure 5**. Main study. Male students. Media usage and BMI variation.

Figure 6. Main study. Female students. Media usage and BMI variation.

Because $p > \alpha = 0.05$, the Levene test confirmed that the two groups had equal dispersions for all variables analyzed (HEI: $F = 0.380$, $p = 0.571$, media usage: $F = 0.078$, $p = 0.794$, BMI: $F = 0.335$, $p = 0.594$, MET: $F = 0.146$, $p = 0.722$).

Next, the t-test was performed for samples with equal dispersions to test the difference between the mean of the variables for the groups (male and female students).

Because $p > \alpha = 0.05$ (for all variables - Sig. Column (2-tailed) in the table 2) and, considering that the 95% confidence interval for the mean difference (95% CI for the mean difference) contains the zero value, it follows that there are no significant differences be-

tween BMI, MET, HEI, media usage between the male and female students in the main study (Table 2).

The statistical analysis was applied also for the whole group of students participating in the main study. In this case, the same conclusions were obtained as the conclusions obtained separately for male and female students.

Thus, between the variables media usage and MET and between the media usage and HEI, there is a strong negative correlation (media usage - MET: $p = 0.001$, $r = -0.731$, media usage - HEI: $p = 0.002$, $r = -0.711$), which indicated that the values of these variables were inversely proportional. There was a strong positive correlation between media usage and BMI ($p = 0.001$, $r = 0.698$).

Ancillary study

The group of students interviewed in the ancillary study showed the same tendencies as the students interviewed in the main study, using self-report questionnaires.

For male students, the Pearson test indicated a strong negative correlation, resulting that the values of the variables were inversely proportional to the media usage and MET, but also to the media usage and HEI. (media usage - MET: $p = 0.005$, $r = -0.793$, media usage - HEI: $p = 0.04$, $r = -0.716$). Because $p = 0.044 < \alpha = 0.05$ found that the variables media usage and BMI were correlated. It was also observed that the value $r = 0.685$ indicated a strongly positive correlation. For female students, the Pearson test indicated an inverse correlation between media usage and MET ($p = 0.014$, $r = -0.721$) and between media usage and HEI ($p = 0.02$, $r = -0.706$) and the same direct correlation between media usage and BMI. ($p = 0.045$, $r = 0.710$).

Conclusions and Recommendations

This study aimed to underline the unbalances present in the students' daily life, associated with the reduction of the PA, during this important period for forming

Table 2. Independent Samples t-Test for the main study.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		f	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
HEI index	Equal variances assumed	0.380	0.571	0.017	4	0.988	0.03333	2.01108	-5.55032	5.61699
	Equal variances not assumed			0.017	3.732	0.988	0.03333	2.01108	-5.71226	5.77893
Media usage hours per week	Equal variances assumed	0.078	0.794	-0.028	4	0.979	-0.13333	4.81710	-13.50774	13.24108
	Equal variances not assumed			-0.028	3.889	0.979	-0.13333	4.81710	-13.65980	13.39313
BMI index	Equal variances assumed	0.335	0.594	-0.161	4	0.880	-0.32333	2.00887	-5.90084	5.25417
	Equal variances not assumed			-0.161	3.572	0.881	-0.32333	2.00887	-6.17462	5.52796
MET (minutes per week/100)	Equal variances assumed	0.146	0.722	0.154	4	0.885	2.91000	18.91357	-49.60248	55.42248
	Equal variances not assumed			0.154	3.874	0.885	2.91000	18.91357	-50.28177	56.10177

Table 3. Ancillary study. Male and female students. MET, BMI, HEI index, and media usage variations.

Sport activity(PA)	Low		Moderate		Intense	
Gender	Male	Female	Male	Female	Male	Female
MET (minutes per week/100)	3.86	3.46	23.61	22.44	52.74	44.71
MET (minutes per week)	386.52(14.7)	345.76(16.2)	2361.49(25.8)	2244.38(19.5)	5273.87(23.9)	4471.48(23.7)
BMI index	25.12	51.6	22.67	21.98	21.18	20.64
HEI index	50.8	51.6	52.9	53.6	56.7	55.8
Media Usage hour per week	23.7(3.5)	25.8(3.6)	19.3(3.3)	21.2(3.1)	13.2(3.5)	12.3(2.9)

future adults. The attitude towards alimentation and the PA are factors connected to the lifestyle and nutritional behavior, having an important role in the etiology and prophylaxis of numerous chronic diseases.

In the main study, the decrease of the number of hours allocated to the average use from 24.3 h/week to 13.6 h/week was associated with an increase of the PA of the male students from 386 MET to 5347 MET, and in the case of the sex students female increase in PA from 346 MET to 4525 MET.

From the point of view of nutritional habits, there was an increase in the HEI index from 51.3 to 56.7 in the case of male students and from 51.6 to 55.8 in the case of female students. These results were corroborated by a decrease in the weekly time spent on media usage from 24.3 h/week to 13.6 h/week.

In terms of BMI, there was a decrease from 25.12 to 21.18 in the case of male students and from 26.32 to 20.64 in the case of female students, together with the decrease in the number of hours spent on media usage from 24.3 to 13.6 h/week.

The results of the present study confirmed that the time allocated for the media usage decreased while the time allocated to physical activities increased and by this, there was also a higher possibility for the students to be predisposed to an unhealthy diet represented by a lower HEI index.

The reduction of HEI index and MET were also confirmed by the increase revealed in BMI. These trends were observed for both female and male students, at the main study and ancillary study. Also, the student's involvement in PA was associated with better eating habits and lower BMI index.

The study had its limitations. The survey was limited to samples of 19- to 25-year-old Romanian students. It is known that the habits of childhood and youth greatly influence the health of future adults (23). .Larger samples in each age and country group are essential for establishing age and sex-specific indexes and correlations. The authors of this study intend to continue the research started by two other studies, one with children between the ages of 10 and 17, and the other with the target group of adults between 35 and 45 years.

The authors recommended accordingly with previous researches (20-23) the following guidelines: limit students total media usage, to no more than 1 to 2 hours per day, remove television sets from student's bedrooms and encourage alternative entertainment for students, including PA like, biking, hiking, and dancing, together to limit snacking and eat traditional (slow food) meals with more fruit and vegetables. These results of this study can be taken into consideration while designing educational programs and interventions. In general, it was appreciated that there was a possibility to improve the nutritional approach for the students of both sexes, correlating it with more PA and fewer media usage.

In order to win the battle against degenerative chronic diseases, there has to be a balance between the daily tasks of using media, PA, and how a person can approach a better diet while doing this tasks, in the context of avoiding sedentariness, namely of adopting an active life regime from a physical point of view (28).

Most probably for the future, especially for countries like Romania and with the data of many studies

like this one, there will be changes in order to have a decreased level for demographical, morbidity and mortality ratios similar to other western countries that have better prophylactic and more effective health policies, especially for the young generation. The future training in the faculties must have a decisive role in this direction and have to involve not only academic staff but also medical staff, families and most importantly, to motivate students to carry on their daily tasks being more health aware of their daily routines. The nutritional approach and the PA vs media usage may influence therefore the students' process of growth and development, as well as their health condition as associated factors, but also as separate factors, their effect being of accumulation.

Acknowledgments

Authors' contributions

All authors contributed equally to this manuscript. All authors read and approved the final manuscript.

References

1. Warren T. Y., Barry V., Hooker S. P., Sui X., Church T. S., Blair S. N., Sedentary behaviors increase risk of cardiovascular disease mortality in men. Med Sci Sports Exerc. 2010, 42(5):879–885. DOI:10.1249/MSS.0b013e3181c3aa7e.

2. Aadahl M., Kjaer M., Jorgensen T., Influence of time spent on TV viewing and vigorous-intensity physical activity on cardiovascular biomarkers. The Inter 99 study. Eur J Cardiovasc Prev Rehabil., 2007, 14(5):660–5.

3. Haapanen-Niemi N., Miilunpalo S., Pasanen M., Vuori I., Oja P., Malmberg J., Body mass index, physical inactivity and low level of physical fitness as determinants of all-cause and cardiovascular disease mortality-16 y follow-up of middle-aged and elderly men and women. Int J Obes Relat Metab Disord., 2000, 24(11):1465–74.

4. Hu F. B., Li T. Y., Colditz G. A., Willett W. C., Manson J. E. Television watching and other sedentary behaviors in relation to risk of obesity and type 2 diabetes mellitus in women. Jama 2003, 289(14):1785–91.

5. Hu F. B., Leitzmann M. F., Stampfer M. J., Colditz G. A., Willett W. C., Rimm E.B., Physical activity and television watching in relation to risk for type 2 diabetes mellitus in men. Arch Intern Med., 2001, 161(12):1542–8.

6. Leitzmann M. F., Park Y., Blair A., Ballard-Barbash R., Mouw T., Hollenbeck A. R., et al., Physical Activity recommendations and decreased risk of mortality. Arch Intern Med., 2007, 167(22):2453–60.

7. Kesaniemi Y. K., Danforth E. Jr. Jensen M. D., Kopelman P. G., Lefebvre P., Reeder B. A., Dose-response issues concerning physical activity and health: an evidence-based symposium. Med Sci Sports Exerc., 2001, 33(6): S351–8.

8. Kirsten K. D., Simon J. M., Leann L. B., Cross-sectional and longitudinal associations between TV viewing and girls' body mass index, overweight status, and percentage of body fat, The Journal of Pediatrics, 2006, 149 (1):32–37.

9. Pate R. R., O'Neill J. R., Lobelo F. The evolving definition of "sedentary". Exerc Sport Sci Rev 2008, 36:173–178.

10. Healy G. N., Dunstan D. W., Salmon J., Shaw J. E., Zimmet P. Z., Owen N., Television time and continuous metabolic risk in physically active adults. Med Sci Sports Exerc. 2008, 40(4):639–45.

11. Hamilton M. T., Hamilton D. G., Zderic T. W., Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes, and cardiovascular disease. Diabetes. 2007, 56(11):2655–67.

12. French S. A., Story M., Jeffery R. W., Environmental influences on eating and physical activity. Annu Rev Public Health, 2001(22), 309–335.

13. Salmon J. A., Bauman D., Crawford A. T., and Owen N. The association between television viewing and overweight among Australian adults participating in varying levels of leisure-time physical activity. Int. J. Obes. Relat. Metab. Disord., 2000, (24):600–606.

14. Hicks R. A., Mc Tighe S., Juarez M. Sleep duration and eating behaviors in college students. Percept Mot Skills. 1986, 62(1):25–26.

15. Oliver G., Wardle J. Perceived effects of stress on food choice. Physiol Behav. 1999, 66(3): 511–515.

16. Dietz W., Gortmaker S. Do we fatten our children at the TV set? Obesity and television viewing in children and adolescents. Paediatrics 1985, (75): 807–812.

17. Department of Health. At least five a week. Evidence on the impact of physical activity and its relationship to health. A report from the chief medical officer. London: Department of Health 2004.

18. Canadian Society for Exercise and Physiology. Canadian Physical Activity Guidelines, 2011. Available at http://www.csep.ca/english/View.asp?x¼587.

19. Jordan A., Emily K. G. and Victor C. S. "Does adolescent media use cause obesity and eating disorders?" Adolescent medicine: state of the art reviews, 2008, (19) 3: 431–49.

20. Hagstromer M., Oja P., Sjostrom M. The International Physical Activity Questionnaire (IPAQ): a study of concurrent and construct validity. Public Health Nutr., 2006, 9(6):755–62.

21. National Cancer Institute, Division of Cancer Control and Population Sciences. Comparing the HEI-2015, HEI-2010, and HEI-2005. Available via https://epi.grants.cancer.gov/hei/comparing.html.

22. The Diet History Questionnaire III. Available via https:/

www.dhq3.org/study/study_id=101/view-questionnaire/.

23. Pinto B. M., Marcus B. H. A. Stages of change approach to understanding college students' physical activity. J Am Coll. Health, 1995, 44(1):27–31.

24. Keim N. L., Blanton C. A., Kretsch M. J. America's obesity epidemic: Measuring physical activity to promote an active lifestyle. Journal of the American Dietetic Association, 2004, 104–9.

25. Nelson T. F., Gortmaker S. L., Subramanian, S. V., Cheung L., and Wechsler H. Disparities in overweight and obesity among US college students. American Journal of Health Behavior, 2007, 31, 363–373.

26. Harrison, K. and Cantor, J., The relationship between media consumption and eating disorders. Journal of Communication, 1997, 47: 40–67.

27. Pyle R. L., Neuman P. A., Halvorson P. A., Mitchell J. E. An ongoing cross-sectional study of the prevalence of eating disorders in freshman college students. International Journal of Eating Disorders, 1990, 10(6), 667–677.

28. Gore S. A., Foster J. A., DiLillo V. G., Kirk K., and West D. S., Television viewing and snacking. Eating Behaviors, 2003, 4, 399–40.

29. Harrison K. S. The relationship between media consumption and eating disorder symptomatology. Master's thesis, University of Wisconsin–Madison, 1994.

30. Bowman S.A. Television-viewing characteristics of adults: correlations to eating practices and overweight and health status. Prev Chronic Dis 2006, 3(2):A38.

31. Oppert, J. M., Kettaneh A., Borys J. M., Basdevant A., Ducimetiere P., and Charles M. A., The relationships between indicators of physical activity, indicators of sedentary behavior and adiposity in French adults: The FLVS II study. Journal of Public Health, 2005, (14), 87–93.

32. Ballard M, Gray M., Reilly J., Noggle M., Correlates of video game screen time among males: body mass, physical activity, and other media use, Eat. Behav., 2009, (10) 161–167.

33. Kauer H., Choi W. S., Mayo M. S., Harris K. J. Duration of television watching is associated with increased body mass index. J Pediatr 2003, 143:506–11.

34. Thomson, M., Spence, J. C., Raine, K., Laing, L. The association of television viewing with snacking behavior and body weight of young adults. American Journal of Health Promotion, 2008, (22), 329–335.

35. Loud K. J., Hergenroeder A. C., Guidelines for Physical Activity and Sports Participation, In Neinstein, L.S., ed. Adolescent Health Care: A Practical Guide, Philadelphia PA: Wolters Kluwer/Lippincott Williams & Wilkins, 2008, 264–296.

———

Correspondence:
Octavian Barna
Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Galati, Romania,
E-mail: octavian.barna@yahoo.com