Body mass index and eating habits in young adults from Romania

Rada C.

"Francisc I. Rainer" Anthropological Institute of the Romanian Academy, Biomedical Compartment
Correspondence E-mail: corneliarada@yahoo.com

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ABSTRACT

This paper aims to investigate Body Mass Index, eating habits, knowledge and practices regarding this. Between 2013-2014 a self-administered questionnaire was used in sample of 1359 subject from urban area, aged 18-30 years. The subjects' weight and height were measured. SPSS statistical package and chi-square test were employed. Overweight status was diagnosed in 15.7%, obesity in 4% and underweight in 11.6%. Almost never controlled their weight: 25%. Over a quarter had not a correct perception of BMI category they belonged to. In comparison with females the proportion of obese and overweight in males was bigger and the proportion of the young male who checked often their weight and of correct weight self evaluation was lower (p<0.001). Up to half of respondents do not used to have breakfast every day, but consume sweets, chips, energy drinks, don't have three main meals, eat daily pastries, eat in front of the TV, the computer. Some statistically significant differences by gender and age groups have been observed (p<0.01). In generating health related programmes it is necessary to know those particular groups that hold a high risk for overweight, obesity, underweight and unhealthy eating habits so that education to focus mainly on these vulnerable segments.

Key words: body mass index, eating habits, young adults, healthy behaviour, Romania
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INTRODUCTION

Obesity is associated with a variety of adverse health outcomes. An important risk factor for cardiometabolic disorders, cardiovascular diseases and premature mortality is obesity.[1, 2]

There was evidence that suggest that diabetes, heart disease, osteoarthritis and high blood pressure may mediate the association between being overweight and health-related quality of life.[3] In the last 20 years obesity has increased in prevalence worldwide.[4]

The majority of studies focused on overweight, obesity and less on underweight. However, it is necessary to pay more attention to the negative effects that being too skinny have on health, being noted that the mortality risk is associated with underweight.[5]

A person may be underweight because of genetic or metabolic causes, lack of food, or diseases like hyperthyroidism, cancer, tuberculosis, gastrointestinal or liver problems etc.[6-8]

But a person can be underweight because he/she wants it, as a consequence of the emphasis society puts on "thinness" (*thinness*, „silhouette", the fact of not being fat). It can even lead to anorexia nervosa and bulimia nervosa. In case of anorexia nervosa, there is a loss of appetite, but sometimes the appetite stays while the patient refuses to eat and the body weight drastically drops. In case of bulimia nervosa, bouts of compulsive and fast

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hyperphagia of large quantities of food in a short period of time (eating binge) take place, followed by self-induced vomiting, laxatives or diuretics, by periods of feeding cease (*fasting*) or intense physical exercises in order to prevent weight gain (*binge and purge*, approx. "satiation and deprivation").[9]

Underweight individuals are prone to infections, osteoporosis. For women with severe underweight amenorrhea, infertility, complications during pregnancy, anemia, hair loss etc. can occur.[10]

Objectives
Taking into consideration the facts presented above, this study proposes to investigate knowledge and practices regarding the BMI and several eating habits that may influence the body weight and health. The impact of socio-demographic variables gender and age groups on these aspects in Romania will also be analyzed, and comparisons with other studies will be carried out.

MATERIALS AND METHODS

Design and sampling
This research was conducted using a quantitative cross-sectional study. Between 2013 and 2014 a questionnaire was administered in a sample of 1359 young people, aged between 18 and 30 years, randomly selected from urban environment covering the main universitary centers and Romanian, historical and geographical towns: Timişoara, Zalău, Baia Mare, Cluj, Târgu Mureş, Braşov, Sibiu, Piteşti, Craiova, Iaşi, Constanţa, Tulcea and Bucharest.

The sample structure included 533 (39.2%) men and 826 (60.8%) women, 80.9% unmarried and 74.6% being enrolled in educational institutions.

Measurements, questionnaire design
An *Omnibus* type questionnaire with 60 items was used to collect socio-demographic data, relevant information about family and items to evaluate health risk behaviour: smoking, alcohol abuse, unprotected sex, sedentary lifestyle, *unhealthy eating* and violence. The subjects' weight and height were measured.

Subjects who were attending pre-university education classes completed the questionnaire during coordination hours, and those who were attending classes at an institution of higher education or postgraduate, completed the questionnaire during seminar classes (74.6%). The others completed the questionnaire at home.

In each locality, there were 2-3 people responsible with data organizing, collecting and verification. Verification of completing the questionnaires was done face- to- face with the respondent. Each responsible for checking the questionnaires had expertise in the fields of sociology, psychology and medicine. The response rate was 100%.

To ensure that the respondents felt at ease and to guarantee accurate answers, responsible for checking have the same gender and as far as possible closer age. Care and sensitivity were used at all times when dealing with the respondents.

The present study focuses on 10 items, namely:
- Do you personally control your weight? ; response options: 1. Almost not at all, 2. From time to time, 3. Often.
- Do you know what your weight is supposed to be, reported to your height? ; response options: 1. No,   2. Yes, how many? ....
- Do you consider yourself a person: 1.Underweight, 2. Normal weight, 3. Overweight.
- Given the type of activities undertaken throughout one week, how do you consider yourself? ; response options: 1. A sedentary person, 2. An active person, 3. An extremely active person.
- You eat breakfast every morning (until 10 am)? ; response options: 1.No,   2. Yes,   3. From time to time.
- How many main meals do you use to eat each day? ; response options: 1. One, 2. Two, 3. Three, 4. More than three, 5. Almost none, only small snacks.
- For you, a midday snack usually means: 1. An energy drink, 2. A coffee, 3. A chocolate bar, other sweets, 4. Chips, pretzels, 5. Fruits or vegetables.
- How often do you eat pastries, confectionery (pies, cookies, cakes, etc.)? ; response options: 1. Daily, 2. Weekly, 3. Monthly, 4. Only holidays, almost not at all.

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-   You eat watching TV, at the cinema, in front of computer? ; response options: 1. Almost not at all, 2. From time to time, 3. Often)
-   You think that your health is: 1. Good 2. Satisfactory 3. Not so good.

Data management and statistical analysis
The statistical programs SPSS, Version 15 and the Pearson chi-square tests were use. Demographic variables used in the statistical analyses were gender and age groups.

According to the values proposed by the World Health Organization the classification used regarding BMI was: Underweight-BMI<18.5, Normal weight-BMI: 18.5-24.9, Overweight-BMI: 25-29.9, Obese-BMI>=30. [11]

Ethical considerations
Informed written consent was obtained from each participant at the time of recruitment. The subjects were informed that they could withdraw from the study at any stage, and they were assured of confidentiality. The study was approved by the Ethics Commission of the "Francisc I. Rainer" Anthropology Institute of the Romanian Academy (Nr. 285/08-05-2013).

RESULTS

In the entire sample, an average height of 170.38 cm, a median of 170.00 with a minimum of 145 cm and a maximum of 200 cm (Std. Deviation: 9.028), an average weight of 65.36 kg, a median of 63.00, with a minimum of 39 kg and a maximum of 154 kg (Std. Deviation: 14.107) were registered. Thus, the sample was characterized by an average BMI of 22.37, a median BMI of 21.83, with a minimum of 14.11 and a maximum of 51.95 (Std. Deviation: 3.73493). Men had an average height and weight of 11.66 cm, respectively 17.33 kg higher than women, while women had a BMI average of 21.27, and men had a BMI of 24.06.

The observed distribution by BMI classification in the sample was: 68.7% normal, 15.7% overweight, 4% obese and 11.6% underweight.

Among men, 3.8% were underweight, 26.5% were overweight, and 5.8% were obese. Among women, 16.7% were underweight, 8.8% were overweight, and 2.8% were obese. Between men and women and also on age groups, there were statistically significant differences regarding the BMI (p<0.0001). The share of overweight and obesity people was higher for males, and the share of underweight and normal weight share was higher for women. The underweight and normal weight share was higher for young people ages 18-23 years while the obese share was higher for young people age 24-30 years (Table 1).

Table: 1. Distribution of subjects according to BMI, gender and age groups

Classification according to the real BMI	Gender		Age groups	
	Male	Female	18-23	24-30
Underweight (<18.5)	12.7	87.3	79.7	20.3
Normal weight (18.5-24.9)	36.5	63.5	66.8	33.2
Overweight (25-29.9)	65.9	34.1	48.6	51.4
Obese (>=30)	57.4	42.6	46.3	53.7
Total	39.2	60.8	64.6	35.4

Regarding weight check habit 52.6% declared as a *From time to time* practice, 25% did almost never, and 22.4% often.

Concerning the personal control of their own body weight, statistically significant differences have been registered between men and women (p<0.0001) and between age groups (p <0.01). The share of those who reported that they control their weight *From time to time*, and *Often* was much higher for women (p<0.0001) and for young people aged 18-23 (p<0.01) (Table 2).

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Table: 2. Personal control of their body weight by gender and age groups

Personal control of body weight	Gender		Age groups	
	Male	Female	18-23	24-30
Almost not at all	56.2	43.8	57.9	42.1
From time to time	37.3	62.7	64.5	35,5
Often	24.7	75.3	72.4	27.6
Total	39.2	60.8	64.6	35.4

When asked to indicate the weight they suppose to have taking into account their height, 45.6% answered they do not know. Among the 739 subjects who indicated a weight, more than half indicated an unhealthy weight value. Only 39.6% of respondents indicated the healthy weight they suppose to have and had a correct perception of BMI category they belonged to.

As for the body weight they should have, according to their height, women had, to a greater extent, accurate assessments (p<0.0001) (Fig. 1).
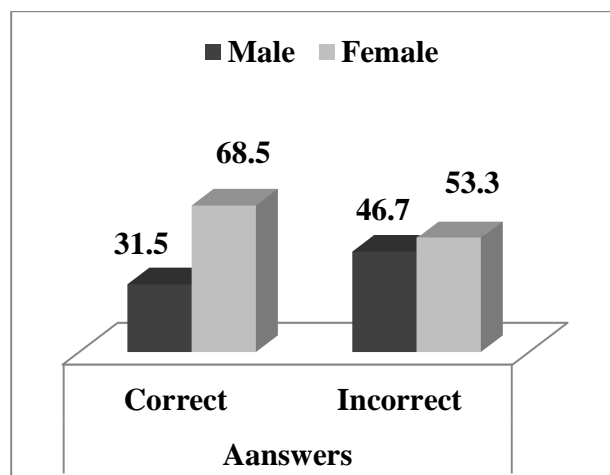

Fig. 1: Assessment of respondent on which normal weight should have by gender

With regard to the body weight that they should have, considering their height, young people aged 18-24 had, to a greater extent, accurate assessments (p<0.001) (Fig. 2).
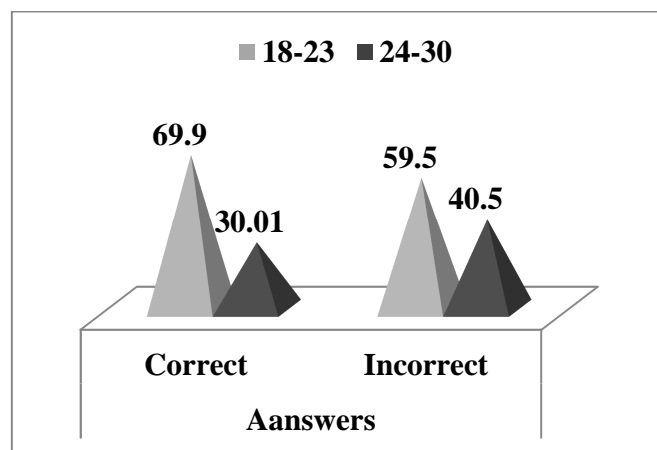

Fig. 2: Assessment of respondent on which normal weight should have by age groups

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Asked on how they assess themselves, regarding their own BMI (underweight, normal weight, overweight) 26.3% answered incorrectly.

Among those who perceived themselves as underweight almost half were actually normal and among who perceived themselves overweight almost half were actually normal (p<0.0001) (Table 3).

**Table: 3. Assessment of the BMI category to which they belong depending on the actual BMI**

Respondents' assessment regarding the BMI category to which they belong	Classification according to the real BMI			Total
	Underweight	Normal	Overweigh	
Underweight	52.4	45.7	1.9	100
Normal weight	9.7	77.5	12.9	100
Overweigh	0	44.4	55.6	100
Total	12.1	71.5	16.4	100

In terms of the right assessment of the BMI category they belong to, women had, to a greater extent, right assessments (p <0.001) (Fig. 3).
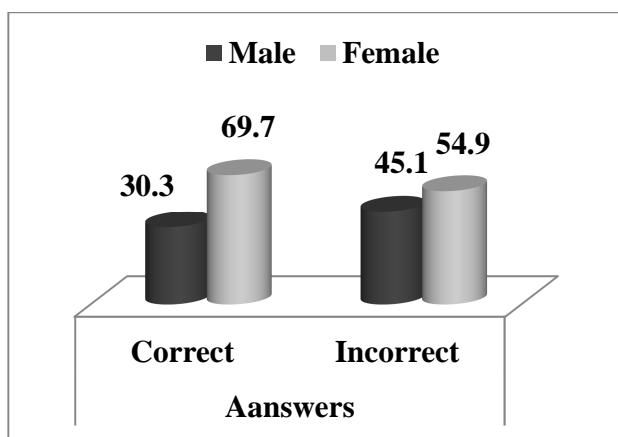
Fig. 3: Assessment of respondent on BMI category it belongs by gender

Regarding the right assessment of the BMI category they belong to, young people aged 18-24 had, to a greater extent, right assessments (p <0.001) (Fig. 4).
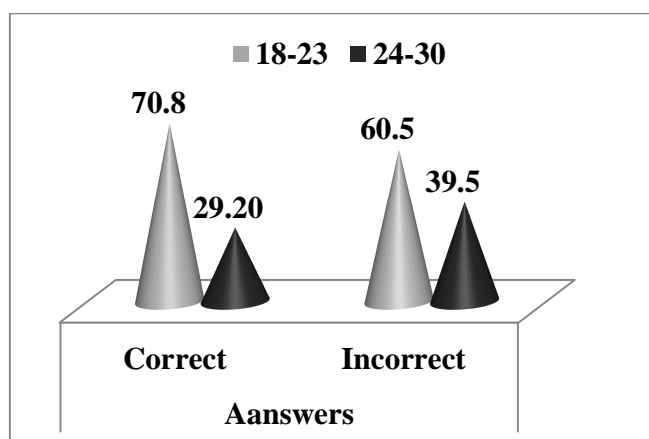
Fig. 4: Assessment of respondent on BMI category it belongs by age groups

Considering the types of activities they carry out throughout one week, subjects considered themselves *active* in proportion of 67.7%, 19.6% said they were *sedentary* and 12.7% thought they were *very active*. The share of obese

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people was higher among those who said they were sedentary (p<0.01). There were no significant differences by gender and age groups.

When asked about how they see their state of health, 56.9% considered that they are in good shape, 38% deemed it *satisfactory* and 5.1% *not so good*. Overweight and obese people tend to consider, to a greater extent, that their health condition is satisfactory or not so good (p <0.001).

Eating habits
Every morning 40.3% have breakfast, 36% do so occasionally and 23.8% do not eat breakfast.

Usually 40.7% of the respondents eat two main dishes, 37.6 eat three main meals, 10.7% eat more than three, 9.4% eat one, while 1.6% eat almost none, mainly just snacks. It has been noted that mostly girls are the ones that only eat snacks, with no meal.

The snack during the day is usually a bar of chocolate or other sweets for 28.6%, fruits or vegetables for 27.9%, one coffee for 22.3%, chips, pretzels for 15.5%, an energy drink for 5.5% and 0.1% do not take snacks. The snack during the day tends to be, to a greater extent, fruits and vegetables, a coffee, a chocolate bar for girls and one energy drink for boys. The midday snack tends to be, to a greater extent, a chocolate bar for those aged 18-23 (p <0.001) (Table 4).

Table: 4. The typical midday snack by gender and age groups

The typical midday snack	Gender		Age groups	
	Male	Female	18-23	24-30
One energy drink	69.7	30.3	53.9	46.1
One coffee	38.6	61.4	50.8	49.2
A bar of chocolate, other sweets	35.8	64.2	72.9	27.1
Chips, pretzels	47.4	52.6	67.3	32.7
Fruits or vegetables	32.5	67.5	67.8	32.2
No snack	50.0	50.0	50.0	50.0
Total	39.2	60.8	64.6	35.4

In the sample 51% of the respondents eat pastries, confectionery (pies, cookies, cakes) on a weekly basis, 24.2% do it monthly, 11% daily, while 13.8% do so only during the holidays or not at all.

The percentage of people that *often* eat in front of the TV, computer, at the movies stands at 27.8%, 54.5% do so *From time to time* and 17.7% *almost never*. The share of young people who *often* eat in front of the TV, the computer, or at the cinema is higher for young people aged 18-23 (p<0.001). For the other dietary habits, no statistically significant differences by gender and age groups have been recorded.

DISCUSSION

In a Brazilian study conducted between 2008-2009 on 3404 men and women with an average age of 39.7 years, 44% of individuals were overweight. Regarding the BMI, significant differences were observed in sex, age distribution, marital status and education.[12]

In a Turkish study over 2000 respondents, aged 15 years or older, proportions over double for overweight, over six times for obesity and under half for underweight were reported.[13]

In the present study, the share of overweigh and obese subjects was much lower, but we must take into consideration that the average age was 22.67. However, the BMI increase by age was observed.

However, throughout the European Union countries, for both women and men aged 18 years and over, the lowest proportions of the population considered to be obese in 2008 were observed in Romania (8.0 % for women and 7.6 % for men).[14]

In a Finnish study on more than 4,500 twins aged between 22-28 years, at the time of data collection from 2000 to 2002, the BMI average in men was 23.9 and in women 22.2. In the present study, the BMI average was slightly

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higher in males and slightly lower in women. In both studies the obesity was relatively rare 4%, and overweight was slightly higher in the Finnish study.[15]

A study from Karachi on undergraduate university students between the ages of 15-24 identified a marked discrepancy between the calculated BMI and the self-perceived weight.[16] The current study also showed, to a large extent, a reduced knowledge of the weight which they should have, according with their height.

The same with other studies [17, 18] the current study identified a higher proportion of overweight and obese men. Physical inactivity is increasing among children and adolescents and may be contributing to the increasing prevalence of overweight and obesity.[19,20] In this study as well, the physical inactivity was associated with obesity. Although studies reveal that men are becoming more concerned with body image [21], in this study, the percentage of women who control their weight more frequently is twice as high.

For people who want to lose weight in order to reach the ideal weight, it is important to monitor their weight through a weekly weighing. Since throughout a day the weight fluctuates, the weighing needs to take place in the same day of the week, at the same time, completely naked or dressed with the same clothes.

The idea of silhouette has changed in the last 50 years. The most sensitive to this change are teenagers and especially girls. They go through all kinds of diets in order to reach their ideal, usually that of being very thin.[22] Among the underweight subjects in this study, women represent a significant 6 times higher share and younger subjects represent an almost 4 times higher share.

The study shows that subjects were aware that overweight and obesity are not associated with a good health condition, which is a positive fact.

The fact that usually, over ½ are not used to have breakfast every day and consume less healthy foods (sweets, chips, pretzels, energy drinks) as a midday snack, that over 60% don't have three main meals, that 11% eat daily pastries and confectionery, and more than ¼ often eat in front of the TV, the computer, at the cinema, requires a more consistent education, in order to acquire healthy eating behaviors.

A high quality of sleep, a good morning-type diurnal rhythm, and indirectly good mental health was associated with eating breakfast. The mechanism involves metabolism of tryptophan in the morning to serotonin. [23]

The prevalence of skipping breakfast in Romanian sample is similar to that of a study conducted in 2010-2011 among Inner Mongolia Medical students in China.[24]

The prevalence of regular breakfast consumption is less than twice than in a study made in 1999 on French children, adolescents and adults.[25] This may indicate a change related to age, to socio-cultural norms and values, to passing of time.

Not all students have the possibility to cook in their dorm room and therefore they may have to eat mainly fast food, pastries, pretzels, fried potatoes, which are found almost everywhere. There is also the group or peer pressure regarding choosing what you eat and where you eat. Eating habits are learned in the family but with the transition from middle school to high school and especially college they can compete with what the peer group tends to practice.

A good habit in some university campuses, which could be also promoted in the universities throughout Romania, is that during the exams, free fruit will be available in the study room, which could lead to a consumption increase for these.[26]

The transition from primary to secondary education, as well as from lyceum education to university education comes with changes in terms of schedule, status, with much more independence and therefore with changes in eating habits. For instance, if coming to school with a sandwich during the elementary education can be very common, when you're in high school and especially as a college student, the package brought from home to eat during the school, college break, becomes an impediment when socializing with colleagues. For this reason, students prefer to

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buy snack food from a buffet. At the buffet, apart from healthy foods, there are many unhealthier ones, very attractive, that you can hardly resist.

The study conducted on a sample of 237 adolescents from tenth grade of Dimitrie Cantemir High School from Iasi, Romania, accomplish in 2010 and 2012 showed that, basically, in over 70% of cases fruit consumption is very good. The study claims that there is no need for national programs oriented toward public education of fruit consumption because only about 6% of teenagers rarely or never consume fruits in a usual week. At the same time, a far too low consumption of milk and eggs was found, reason why authors recommended that the national program for nutrition education to focus rather on highlighting the protein's role within the diet, especially because teenagers need protein in order to ensure normal growth. [27]

During the food education programs, a thing to be considered are the different eating habits by gender and age groups such as the boys' higher vulnerability for energy drinks and that of the girls for sweets. However, it appears that, with the increasing age, the preference for snacks changes in regards of a lower consumption of chocolate, sweets, chips, pretzels, but unfortunately the consumption of fruits and vegetables also decreases.

Several studies are needed to clarify if the change is due to the influence of marital and professional status. Throughout this study, the influence of these two demographic variables was not clear.

CONCLUSION

We can say that overweight, obesity are not a characteristic in the analysed sample, which is a positive situation. However about 40% of respondents do not have correct knowledge regarding BMI and are unaware of their body weight status that requires educative actions, especially among young males. Also, it is alarming that up to half of respondents have unhealthy eating habits such as frequent consumption of sweets, pastries, that they do not eat three main meals and don't eat breakfast in the morning.

There are never enough money to cover the entire population in research and education for a healthy lifestyle. Therefore in generating health related programmes it is necessary to know those particular groups that hold a high risk for overweight, obesity and underweight and unhealthy eating habits so that education to focus mainly on these vulnerable segments.

The results have not been published previously and are not under submission elsewhere.

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