

## **NUTRITIONAL STATUS OF MACEDONIAN HIGH SCHOOL STUDENTS AND RELATION TO LEVEL OF EDUCATION AND EMPLOYMENTS STATUS OF THEIR PARENTS**

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### **Abstract**

The aim of this study was to evaluate the nutritional status in Macedonian high school students and relation with the level of education and employments status of their parents.

In this study 1207 adolescent students (616 males and 591 females) at age of 11 to 14 years were included. We measured weight and height using standard procedures while body mass index was calculated and these values were used to assess nutritional status. The examinees fill the questionnaire with the data for parent's education and employment.

We found significant difference between male students who were with risk of obesity and overweight, with high percentage of students with employed mother, contrary to those students with unemployed mother. According to the level of education in father, there was significant difference in the group of underweight females with the higher percentage being underweight with father with lower education, primary school, and only 1,4% were underweight with father with university education.

Our data suggest that parental level of education and employment status are in relation with the nutritional status of Macedonian adolescents.

**Key words:** Adolescent, underweight, nutritional anthropometry, obesity

### **Introduction**

Obesity as well as malnutrition is both problems in this modern world, so researchers are trying to early detect factors of healthy risk in child and adolescent population. Beside genetic factors which are predictors for physical constitution, other factors that influence dynamic of physical growth and development and biologic characteristics of child organism are: food, socio cultural or environmental factors and physical activity [1-6]. Studies suggests that socioeconomic status and parental level of education and employment status are one of the factors that are related with food intake in puberty and adolescent period and are associated with children health [6-9]. Connection between SES and eating habits exist, especially in developed country where nutritional stress is major factor, and influence of medium and advertisement of eating habits among adolescents is much bigger than in developing countries [9-12].

In this study we focused on anthropometrically assessed nutritional status in Macedonian high school students and relation to the level of education and employments status of their parents.

### **Subjects and methods**

In this study 1207 adolescent students (616 males and 591 females) at age of 11 to 14 years were included, from selected schools and classes, which gave their permission to be part of a research. To be avoiding mistake in selection of sample, voluntary students were not included. Subjects were grouped according to sex and age. Anthropometric measurements were taken with optimal organization, without disturbing classes. Body height was measured with Martin stadiometer. Standing height is the measurement the maximum distance from the floor to the highest point on the head, when the subject is facing directly ahead. Shoes should be off, feet together, and arms by the sides. Heels, buttocks and upper back should also be in contact with the wall when the measurement is made. Height measurement can vary throughout the day, usually being higher in the morning, so to ensure reliability height should be

measured at the same time of day. We measured body mass with scale, the person stand with minimal movement with hands by their side. Shoes and excess clothing were removed. Body mass index, BMI (weight (kg) / height (sm<sup>2</sup>) was calculated. These values were used to assess nutritional status.

The cut-off points suggested by WHO were used (WHO, 1995). Subject having BMI less than 18,5 kg/m<sup>2</sup> were categorized as underweight, BMI form 18,5-24,9 normal weight, BMI from 25,0 - 29,9 overweight and BMI more than 30,0 as obese. Every adolescent has their own anthropometric file with the data as: date of birth, date of examination and sex. The examinees fill the questionnaire with the data for parent’s education and employment status. The University Ethical Committee on human research approved the experimental protocols.

The data were analyzed with descriptive statistics represented by measures of central tendency and its deviation (arithmetic mean value and standard deviation). The significant differences between groups, formed by a different level of factors were evaluate through LSD test by ANOVA, on significance level p <0.05.

### Results

Out of 1207 high school students 616 were males and 591 were females at the age of 11 to 14 years. Values for nutritional status, assessed by BMI classification for males and females are presented in table 1.

<b>Male 11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>
(n=167)	5.38%	79.64%	10.77%	4.19%
(n=150)	3.33%	80.66%	11.25%	4.66%
(n=140)	4.28%	79.28%	10.71%	5.71%
(n=159)	4.40%	80.50%	10.06%	5.03%
<b>Female 11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>
(n=148)	5.40%	78.37%	10.81%	5.40%
(n=151)	3.97%	80.79%	9.93%	5.29%
(n=146)	5.47%	79.45%	9.58%	5.47%
(n=146)	2.05%	91.78%	4.79%	1.36%

**Table1.** Nutritional status of adolescents, BMI classification

BMI classification: <5<sup>th</sup> percentile - underweight, ≥5<sup>th</sup> to 85<sup>th</sup> percentile –normal weight, ≥85<sup>th</sup> to 95<sup>th</sup> percentile-risk of obesity, ≥95<sup>th</sup> percentile- overweight (Kuczmarski and al. 2000).

The most of the male students (79,64%) and female students (78,37%) were with normal weight. In females at the age of 14 years there are great percent of underweight students than in the early age, and there was less percent of underweight female (2,05%) compared to males at the same age (4.40%). The similar results we got at the age of 14 years in overweight students, where 1,36 % of females were overweight contrary to 5,03% of males. Males in all age groups were with higher percents with the risk of obesity compared to females.

Correlation of level of parental education and employment with nutritional status in male adolescents aged 11 to 14 years is showed in Table 2. The high percent of male students with the risk of obesity 14,9%, were with mother with university level of education compared with those whose mother had only primary school educational level (6,7%). The similar results were for overweight students, with 5% being overweight with the mother with university level of education compared with those whose

mother had only primary school educational level (2,9%). For underweight students results were opposite and 6,7% of underweighted students had mother with primary school education level, and only 2,7% of students who were underweight had mother with university level of education. 5,6% of underweight male students were with mother who was unemployed, and 3,8% were with employed mothers and there was significant difference. Also we found significant difference between male students who were with risk of obesity, with high percent of students (12,3%) with employed mother, contrary to those students with unemployed mother (7,6%). There was significant difference between students who were overweight, 6,3% had employed mother, and only 1,5 % had uneployed mother. The results for relation of education and employment of fathers of male students were similar, with the exception of male students who were overweight and had mothers who were employed, compared to fathers those students who were more overweight (7,4%) had fathers who were unemployed and 4,5% were with fathers who were employed. Although there were no significant differences between the groups, there were more underweight students (8,8%) with the father unemployed comapred to those with employed father 3,6%.

Correlation of level of parental education and employment with nutritional status in female adolescents aged 11 to 14 years is showed in Table 2. There were significant differences in females who were underweight, with higher percentage of females (9,4%) with mother with primary school and only 1,4% with mother with university level od education. There was also significant difference between overweighted students with higher percent 5,6% overweight females with mother with university and 2% with mother with primary school educational level. In the group of females with the risk of obesity the higher percent 12,8% was in those with mother with high school education, and 5,6% in those with mother with university education. Significant differences were found in underweight females with unemployed m,other (7,4%), and only 2,4% were underweight with mother employed. According to the level of education in father, there was significant difference in the group of underweight females with the higher percent (7,8%) being underweight with father with lower education, primary school, and only 1,3% were underweight with father with university education. The percent of those who were with the risk of obesity was higher when father had high school education (11,7%) and was employed (9,6%). Those female students with father unemployed were more overweight (8,1%) than their peers with father employed (3,2%).

<b>Education level of mother</b>	<b>11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>	<b>p</b>
Primary school	(n=104)	6.7%	83.7%	6.7%	2.9%	0.058
High school	(n=247)	5.3%	81.4%	8.1%	5.3%	
University	(n=262)	2.7%	77.5%	14.9%	5.0%	
<b>Employment</b>						
Employed	(n=416)	3.8%	77.6%	12.3%*	6.3%*	0.012
Unemployed	(n=197)	5.6%*	85.3%	7.6%	1.5%	
<b>Education level of father</b>	<b>11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>	<b>p</b>
Primary school	(n=66)	6.1%	81.8%	4.5%	7.6%	0.606
High school	(n=283)	4.2%	79.9%	11.7%	4.2%	
University	(n=258)	3.9%	80.2%	11.2%	4.7%	
<b>Employment</b>						
Employed	(n=535)	3.6%	81.3%	10.7%	4.5%	0.122
Unemployed	(n=68)	8.8%	72.1%	11.8%	7.4%	

**Table 2.** Correlation of level of parental education and employment with nutritional status in male adolescents aged 11 to 14 years

\*p<0,05

<b>Education level of mother</b>	<b>11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>	<b>p</b>
Primary school	(n=149)	9.4%*	81.2%	7.4%	2.0%	0.000
High school	(n=226)	3.5%	78.8%	12.8%*	4.9%	
University	(n=213)	1.4%	87.3%	5.6%	5.6%*	
<b>Employment</b>						
Employed	(n=370)	2.4%	84.1%	9.2%	4.3%	0.038
Unemployed	(n=217)	7.4%*	80.2%	7.8%	4.6%	
<b>Education level of father</b>	<b>11 to 14 years</b>	<b>Underweight</b>	<b>Normal weight</b>	<b>Risk of obesity</b>	<b>Overweight</b>	<b>p</b>
Primary school	(n=90)	7.8%*	80.0%	8.9%	3.3%	0.014
High school	(n=264)	5.7%	78.8%	11.7%*	3.8%	
University	(n=227)	1.3%	89.0%	5.3%	4.4%	
<b>Employment</b>						
Employed	(n=501)	4.2%	83.0%	9.6%*	3.2%	0.050
Unemployed	(n=74)	5.4%	83.8%	2.7%	8.1%*	

**Table 3.** Correlation of level of education and employment status with nutritional status in female adolescents aged 11 to 14 years \*p<0,05

### Discussion

In this study we made evaluation of nutritional status (according to BMI percentile values), in high school students from selected schools and classes in three urban cities in North Macedonia. They were at the age of 11 to 14 years, and our aim was to find relation of level of education and employment status of adolescent parents with their nutritional status. It is very important to evaluate nutritional status in adolescents in this period and make important points to them about the meaning of eating healthy food. As they grow and develop, it's normal for them to feel hungrier and start to eat more. Their body is going through a major growth spurt and extra food gives them extra energy and nutrients to support this growth. Not always the parents have influence on their children habit of eating but there are studies that suggest that there is relation between parents and childhood overweight [1,13]. According to our results for nutritional status in Macedonian adolescents at age of 11 to 14 years, the most of them normal weight, although there were about 10 % in both males and females with the risk of obesity, and lower percents of those who were underweight and overweight.

The influence of socioeconomic statuses of adolescents and the level of education and employment of their parents has definitely influence on the morphological characteristics of adolescent body and is different among different populations. According to Turkish scientists Can Pelin et al. who made a research with healthy adolescents at age of 19, there was positive correlation between education level of their parents and BMI [14]. HBSC study (Health Behaviour in School-aged Children) found positive relation between socioeconomic circumstances and helath in adolescents. Low income in families limits the opportunities of healthy eating habits in children and adolescents, like eating more fruit and vegetables. Also young people that live in low socioeconomic environment are more stressful, which has influence on their health [15]. Acording to Prista A. and al. the period of adolescent is most critical for obesity as well as malnutrition. In this period the most of the eating habits are developing and the weight is easily changed [16]. Although parents are not directly connected with their children eating habits they could provide healthy environment by educating them about healthy habits, like eating healthy food, or

more physical activity. Eiben OG and al. in their study of 39,035 children and adolescents at the age of three to eighteen from urban cities and small villages in Hungary, found that the profession of mother is connected with small number of body variables and has not at all relation with body variables in males. Profession of father had influence only in females on their body weight. The level of education of parents had influence on body variables but not significantly [17]. From our findings is obvious that level of education and employments status of parents are in relation with the nutritional status in adolescents. Since the adolescents were underweight with the significant difference in both males and females, had unemployed mother and father we could assume that they lived in low socioeconomic circumstances so the parents could not provide proper food intake to their children. According to education in both males and females the higher percentage were underweight when parents had only primary school.

### Conclusion

The present study showed that Macedonian adolescents had most of them normal weight both male and female. We found significant differences between those groups of males and females who were underweighted and had unemployed parents, and in groups of males and females with the risk of obesity or overweight and had parents who were employed and with high school level of education. According to our opinion in our country Macedonia which is a country in transition, is very important in present educational programs in primary and secondary school to emphasize the importance of negativity of sedentary style of live and eating fast food and presentation of benefits of more physical activity and its healthy eating habits not only of children and adolescents but also to their parents.

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