



RESEARCH AND COMPARATIVE ANALYSIS OF DATA FOR INDICATORS OF BODY MASS OF MALE UNIVERSITY STUDENTS

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ABSTRACT

Aim of the conducted examination is to determine the indicators of body mass for male students at the Trakia university, city of Stara Zagora, and to compare the results to similar researches amongst other Bulgarian universities. Overview and analysis of the main theoretical statements and examinations of anthropometric indicators and the calculated on this basis index of body mass for male university students; researches of students according to morphological indicators; statistic processing and comparative analyses of the results. In the Trakia university the relative share of underweight people is 1.56%. The group of students with normal weight form 46.88%. The part of students, falling into the overweight category is 40.63%. The obesity rate among the examined resulted in 10.93%. This tendency is disturbing, if it is to be compared to previous researches at the same university - in 1918 students with overweight marked an increase in the relative portion - 51.56%, while students with normal weight were 46.88%. According to the conducted comparative analysis between the existing researches it can be found out that a lot of the students have normal weight and IBM, but there is a tendency of increasing underweight and even bigger rise of the overweight.

Key words: obesity, overweight, anthropometric indicators

INTRODUCTION

Globally, the incidence rate of overweight and obesity among students from colleges and universities is relatively well researched. Some authors such as Karen, K. S., S.C. Amy, H. Flora et al. (2009), draw the attention to the global proliferation, the risk of diseases of young people and the search for ways to fix the negative tendencies. Data from the American association of colleges in 2010, published by H. Jean, P. Lizzy, C. Beth et al., point out that overweight affects averagely 21% of the Bachelor students, and in 11.5% there is a tendency for increase of this matter until the end of the study. The scientific publications, which provide information in the form of comparative analysis of the body mass values and BMI of male students from different Bulgarian universities and

their tracking throughout the different years are not enough. The examination and reflection of the current indicators for physical development of the students would lead to scientifically grounded changes in the normative standards in the universities (3-8). This could support the sophistication and improvement of the efficiency of the system functionality for physical education in universities, as one of the ways to impact the already mentioned negative processes in the physical development of students (9-11). As the data from all researches is calculated by the SZO criteria from 1995, the comparative analysis is possible to be realized (12).

AIM of the conducted examination is to determine the indicators of body mass for male students at the Trakia university, city of Stara Zagora, and to compare the results to similar researches amongst other Bulgarian universities.

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TASKS

- Overview and analysis of the main theoretical statements and the available literature on examinations of anthropometric indicators (height and weight) and the calculated on this basis body mass index (BMI) for male university students aged 19-30 years old
- Fulfilling anthropometric researches among students according to morphological indicators - height, weight
- Statistic processing and comparative analyses of the results
- Comparative analysis

OBJECT of the examination are the anthropometric indicators (height and weight) and the body mass index (BMI).

SUBJECT of the examination are male students.

METHODOLOGY

the research is conducted during the winter semester of 2017/2018. The method used to register the data according to indicators ‘height’ and ‘weight’ of the examined personas is the method of *anthropometry*. The calculation of the body mass index (BMI) is based on the proportion height (cm) : weight (kg). The mathematical-statistical processing of the data is made by means of the program product IBM SPSS Statistics Subscription and includes *variational, comparative and graphical analyses*.

RESULTS AND ANALYSIS

The index of the body mass (BMI - body mass index) is one of the indicators for physical working capacity and normal health status of the students. The recommended values of this index with different height and weight, according to SZO (WHO, 1995) are shown in **Table 1**.

Table 1. Body mass index according to the World Health Organisation (WHO = SZO) 1995

Condition	BMI
Severe malnutrition	<16,0
Average malnutrition	16 - 16,99
Light malnutrition	17 - 18,49
Underweight	< 18,5
Normal weight	18,5 - 24,99
Overweight	≥ 25,0
Predisposition to obesity	25 - 29,99
Obesity	≥ 30,0
Obesity level I	30 - 34,99
Obesity level II	35 - 39,99
Obesity level III	≥ 40,0

Table 2 illustrates the values for body mass (kg) and BMI (kg/m²). The average values of the former are 78,10kg, the minimal are 50kg, and the maximum point 128,30kg. The averages of the BMI (25,43) show that part of the examined students fall into the group of overweight. The

minimum values (17,79) draw the attention, in that they mean underweight to a level ‘light malnutrition’ of a part of the students. The registered maximum values (41,89) give us a reason to be disturbed, since there are students with obesity at level I to III.

Table 2. Anthropometric indicators of the examined male students from the Trakia university, Stara Zagora (2017/2018)

	N	Mean	Minimum	Maximum	Range	Std. deviation
Body mass (kg)	64	78,10	50	128,30	78,30	15,33
Height (cm)	64	174,98	160	192	32	7,581
BMI (kg/m ²)	64	25,43	17,79	41,89	24,09	4,33

On **Figure 1** it can clearly be seen that the relative portion of the underweight group is 1.56%. The one of the overweight group, obtained through the BMI is 46.88%. Troublesome is the share of students, falling into the overweight share (40.63%). The groups of students with obesity makes 10.93%, which tendency is disturbing, compared to the previous researches done in the same university. During 2006/2007 school year

G. Dyakova and A. Bozhkova conduct an examination also with male students (n=213) from the Trakia University, Stara Zagora. It is stated, that the relative portion of students with BMI under the norm is 1.95%, and the biggest one - 62.04% is of students with BMI which is in norm. What makes an impression is the part of the students already fallen in to the overweight and the obesity group (36.91%).

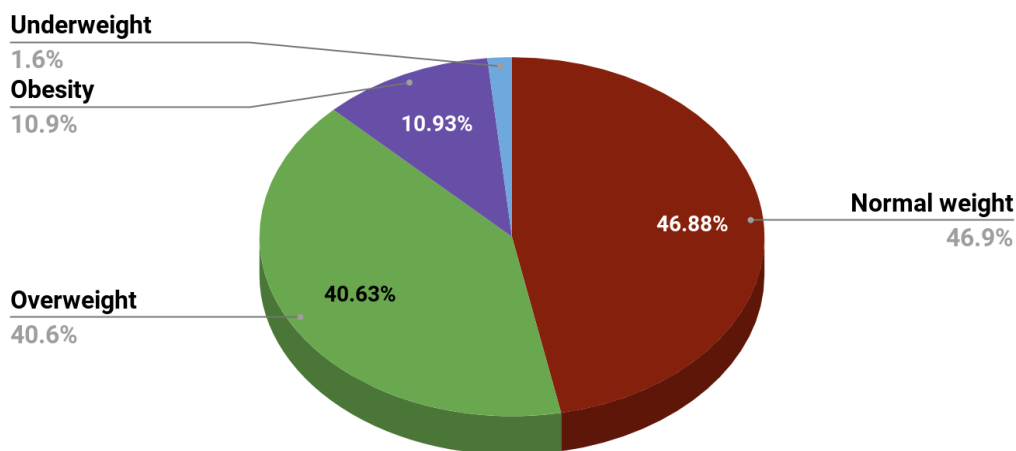


Figure 1. Distribution of the male students from Trakia University according to relative shares used on the anthropometric indicator BMI

The comparison of the two researches (**Figure 2**) depicts the ongoing changes for 11 years - the relative share of students with overweight has undergone a significant increase at the expense of the ones with normal weight.

In the national research of S. Petrova et al. on the nourishment and the nutritional status of the Bulgarian population, conducted in 2004, the group of men aged 18-29 (n=133) with

underweight (BMI<18.5) is 4.5%. Those with normal weight (BMI 18.5-24.99) were 66.2%, with overweight (BMI 25.00-29.99) - 23.3% and with obesity (BMI ≥ 30.00) were 6.0%.

In 2012 V. Birdanova et al. lead a research among students (n=209) male of middle age (21.6 ± 3.03), who study in the Medical University in Pleven. The established body mass (kg) is 76.5 ±

15.3. The average value for BMI (kg/m^2) of men students is 24.1 ± 4.2 . The relative share of normal weight of men is 61.2%, the incidence of

overweight - 25.4%, obesity - 8.6% and underweight - 4.8%.

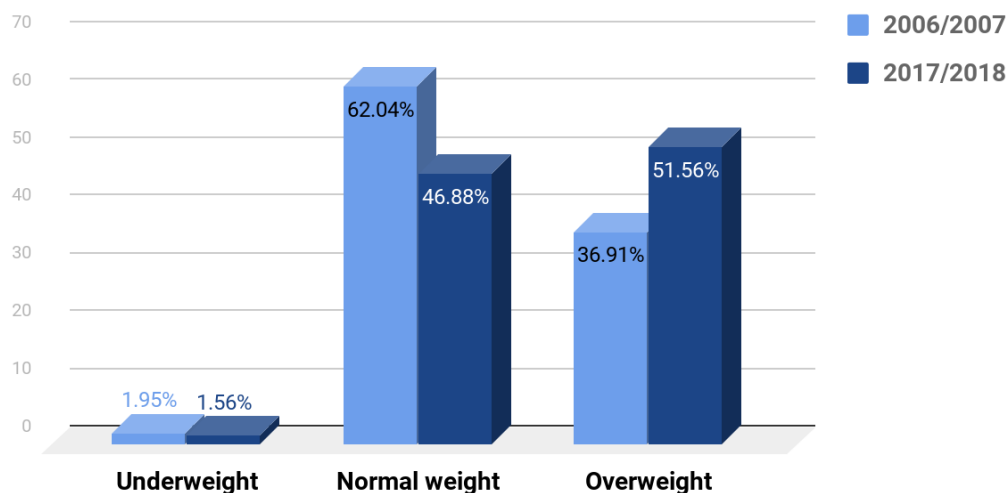


Figure 2. Comparison of BMI of Trakia University students in 2006/2007 and 2017/2018

The available data from the researches in the different universities on a national scale gives the opportunity for the dynamics of the processes of BMI changes throughout the given years to be

tracked and compared (Figure 3). In 2018 it can be seen that there was an increase of the overweight students, reaching 51.56%, while the ones with normal weight decreased to 46.88%.

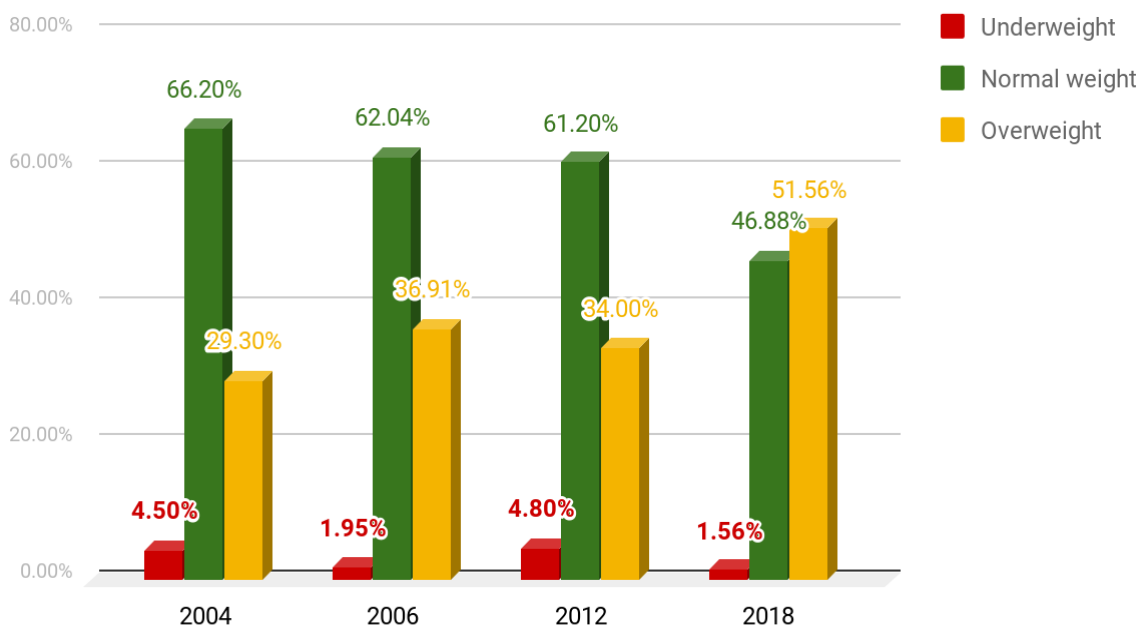


Figure 3. Comparison of BMI

E. Yordanov (2012) publishes data from examinations of weight and BMI among 50 male students. The pointed average value for weight is 71.38kg, and for BMI it is 22.03. The minimum

weight is 51.00kg, and the maximum - 90.00kg. The minimum BMI is 17.82, and the maximum - 27.77. This established value points to the assumption that there is a group of students,

threatened by obesity. The same author (2012) does a comparative analysis of the obtained results from examination of the weight of students from: Sofia University (2006) - 73.1kg, Sofia University (2012) - 71.38kg, the University of Architecture, Civil Engineering and Geodesy (UACEG) - 72.15kg, NI (1970) - 69kg, NI (1980) - 68.9kg. In his own research, this author presents the data of the body mass index of men students (n=35). The ones with weight under the norm are 61.90%, with normal nutrition - 19%, with overnutrition - 14.3%, and 4.80 with obesity.

V. Boycheva (2015) claims, that the body mass index is a reliable indicator for evaluation of overweight and obesity at the age of 19-30 years. In the Medical University of Pleven in 2013 it has been established among male students (n=196), that the average body weight (kg) is 76.5kg, and BMI (kg/m²) is 24.1. The averages of the latter respond to the range which matches the recommended body mass, but there is no concrete information about the relative shares of the examined students.

M. Dontcheva, Y. Dobreva (2013) conduct a research of students men (n=43), through which they find out a BMI equal to 22.2, which means normal weight of the examined people. The given minimal values of BMI are 18.4, and the maximum are 36.4, which leads to conclusion that there are students with obesity.

M. Grigorova and T. Todorov (2014) examine 44 male students from the 'Angel Kanchev' University of Ruse. From the published results it can clearly be seen that the average BMI value is 23.40, the minimum and the maximum range from 18 to 31, which means that a process of gaining overweight has begun.

INFERENCE

- There is a relative difference between the different researches on the base of the established weight and body mass indexes of male students.
- The examination of male students from the Trakia University of Stara Zagora found out that the relative share of the registered with overweight are almost an equal amount to the

ones with normal weight. For 11 years the relative portion of overweight students have significantly risen at the expense of students with normal weight.

- On the base of the fulfilled comparative analysis between the previous and the current researches determines a big proportional share of normal weighed students, but a tendency of increasing incidence rate of underweight and mostly overweight is also established.

CONCLUSION

Despite the contradictory data for the frequency of under- and overweight, their distribution is a matter of fact. This represents a medical-social problem, which needs to be a permanent object of thorough research with purpose prophylaxis and overcoming.

REFERENCES

1. Karen, K.S., S. C. Amy, H. Flora et al., The contributions of weight problem perception, BMI, gender, mood and smoking status to binge eating among college students. - *Eating Behaviours*, №10, 1-9, 2009
2. Jean H., P. Lizzy, C. Beth et al. Undergrad and Overweight: An Online 12. Behavioral Weight Management Program for College Students. - *J Nutr Educ Behav*, №44, 604-608, 2012
3. Dyakova G., A. Bozhkova - Comparative analysis of the self-assessment of motor mode of overweight students. *Magazine 'Sport and Science'*, ed.3, p.90-93, ISSN 1310-3393, S., 2011
4. Dyakova, G., Study of body weight of students from Thrakian University, *Sports and science*, ISSN 1310-3303, C., бр. 2, c. 110-114., 2007
5. Dyakova, G., Distribution of body weight outside the norm in female students - condition and trends, *Personality. Motivation. Sports.*, Volume 13, ISBN 978-954-718-229-5, c. 243-249, 2008
6. Dyakova, G., Regulation of body weight in female students. Monograph, ISBN 978-954-338-036-7, pp. 140, 2012
7. Dyakova, G., Study of the frequency of overweight in students. *Mr. Sports and Science*, ISSN 1310-3303, Assoc. no. 1, S., pp. 153-160, 2010

8. P. Angelova, Physical development analysis according to anthropometric indicators of male students in the Trakia University, *Trakia Journal of Sciences*, Vol. 17, Suppl. 1, pp 638-642, 2019
9. Plamen Petkov Petya Angelova, Study of students' physiometric indicators, 57 та Годишна конференция на Русенския университет, 2018
10. Peeva, D., Nedkova, M., „Longitudinal research of body mass index of newly accepted female students at CT „Todor Kableshkov”, 17th Symposium on sport and physical education of youth, Activities in physical education and sport, *International Journal of Scientific and Professional Issues in Physical Education and Sport*. APES, Vol. 4, 1/ 2014, Ohrid, Republic of Macedonia.
11. Peeva, D., Petkov, K., „BMI of female students newly enrolled at „Todor Kableshkov” university of transport”, „*Montenegrin journal of sports science and medicine*”, 5/ 2014.
12. WHO Expert Committee/ Physical Status: Use and Interpretation of Anthropometry. WHO TRS 854. WHO, Geneva, 1995
13. Yordanov E. - Research of model for mastering the tennis education of students from the Sofia University ‘Kliment Ohridski’, Sofia, 2012
14. Petrova S., V. Duleva, L. Rangelova and other - Monitoring of the nutritional status of the Bulgarian population. Incidence rate of obesity and underweight. - *Dietetics Science*, №2, 18-29 Arbilis, 2012
15. Dontsheva M., Y. Dobрева - Examination of physical capability indicator condition according to students of the Technical University of Varna anthropometrics; *Scientific works of the University of Ruse*, vol.52, ser.8.2, 2013
16. Atanasova V. - Research on nourishment and nutritional status of students studying medicine. Author Abstract. Sofia, 2015
17. Birdanova V., A. Penkov, M. Stoynovska, K. Petkov, N. Statev - Research of anthropometric indicators for evaluation of nutritional status of students studying medical specialty, *Dietetics Science* 1-2/2013
18. Grigorova M., T. Todorov - Characteristics of students from the ‘Public Health and Health Care’ faculty - *SCIENTIFIC WORKS OF THE UNIVERSITY OF RUSE* - 2014. Volume 53, series 8.2