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BODY MASS INDEX ANALYSIS OF EDUCATIONAL SCIENCE FACULTY STUDENTS

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Abstract

The present study aims to evidence the Educational Science Faculty students body mass index (BMI). It is known that BMI is determined from a person's weight and its height, and it can categorise people in four major categories, such as: underweight, normalweight, overweight and obese, according to the scientific literature. The study revealed that out of 50 students, 16% were underweight, 50% were normalweight, 28% were overweight and 6% were obese, respectively.

Introduction

Body mass index (BMI) is a value that is drived from the persons mass/weight and its height. The BMI is defined as the body mass divided by the square of the body height and is expressed in units of kg/m², resulting from mass in kilograms and height in meters. The BMI may be determined using a table or a chart that displays BMI as a function of mass and height using contour lines or colours for different BMI categories as it is depicted in Figure 1[1].

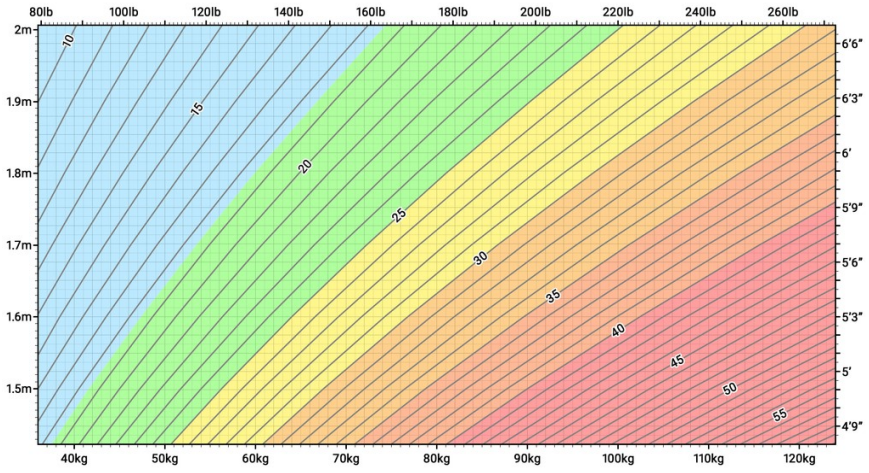

Fig. 1. Chart showing body mass index (BMI) for a range of heights and weights in both metric and imperial [1]

The BMI is a convenient method used to categorize a person as underweight, normal weight, overweight, or obese based on tissue mass (muscle, fat, bone) and height. Adult BMI classification are underweight (under 18.5 kg/m²), normalweight (from 18.5 to 24.9 kg/m²), overweight (25 to 29.9 kg/m²) and obese (30 or more kg/m²) [2].

BMIs under 20 and over 25 have been associated with higher all causes mortality, with the risk increasing with distance from 20 to 25 range [3].

The BMI is universally expressed in kg/ m², but if pounds and inches are used, a conversion factor of 703 (kg/m²)/(lb/in²) must be applied [1]. The following formula should be applied:

$$BMI = \frac{mass_{kg}}{height_{m^2}} = \frac{mass_{lb}}{height_{in^2}} \times 703 \quad (1)$$

The BMI is used to assess an individual's body weight and how far it departs from what is normal or desirable for its height. The weight excess may be accounted for by adipose tissue, although other factors such as muscularity can affest BMI significantly [4]. Lean male athletes often have a high muscle-to-fat ratio and therefore a BMI that is misleadingly high relative to their body-fat percentage [5]. The ranges of BMI values are only valid as statistical categories, as can be seen in Table 1.

Table 1. BMI, basic categories [1]

Category	BMI (kg/m²)	BMI Prime
Underweight (Severe thinness)	<16.0	<0.64
Underweight (Moderate thinness)	16.0 – 16.9	0.64 – 0.67
Underweight (Mild thinness)	17.0 – 18.4	0.68 – 0.73
Normal range	18.5 – 24.9	0.74 – 0.99
Overweight (Pre-obese)	25.0 – 29.9	1.00 – 1.19
Obese (class l)	30.0 – 34.9	1.20 – 1.39
Obese (class ll)	35.0 – 39.9	1.40 – 1.59
Obese (class lll)	≥ 40.0	≥ 1.60

The BMI ranges are based on the relationship between body height and disease and death [6]. Overweight and obese individuals are at high risk for the following diseases: coronary artery disease, dyslipidemia, type 2 diabetes, gallbladder disease, hypertension, osteoarthritis, sleep apnea, stroke, infertility, cancer (endometrial, breast, colon) epidural lipomatosis [7],[8],[9].

In [10], the authors highlights the proportion of the overweight or obese population in European Union (EU) aged 18 and over in 2019 as is represented in Figure 2.

It is shown that Romania had a percentage of 59 overweigt and obese adult population. According to [11], in 2008 51.0% of the adult population (≥ 20 years old) in Romania were overweight and 19.1% were obese. The prevalence of overweight was higher among men (53.1%) than women (49.1%). The proportion of men versus women that were obese was 16.9% and 21.2%. Adulthood obesity prevalence forecast predict that by 2023 15% of men and 10% of women will be obese [12].

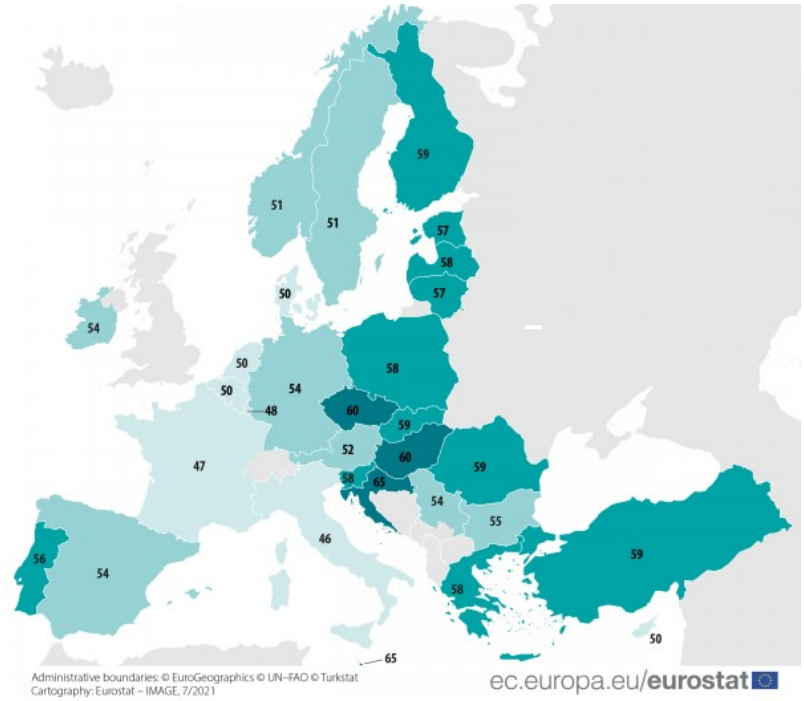

Fig. 2. Overweight population (BMI≥25) %of adult population in 2019 [12]

Material-method

This paper aims to analyse the BMI of 50 students, all women, aged between 19 to 39 years-old, from Educational Science Faculty, second year of study. The experminet was conducted in 2020. All students delivered a signed consent form and agreed for the data to be published. Experimental, analysis and statistical methods were used to perform this study. Two measurements were performed on the subjects, weight, and height. We were able to collect data during the first Physical Education and Sport (PES) class. It is important to mention that those students study PES only one hour per week during the fist semester.

Results

In Table 2 are presented the average results of the two measurements that were performed in the current study: body weight and height.

Table 2. BMI, basic categories

Category	kilograms/meter
Weight (average)	69.8 ± 0.4
Height (average)	1.68 ± 0.2

Calculating the BMI from the above data it can be concluded that Educational Science Faculty students have an average BMI of 24.75. Comparing the result with BMI basic category it can be observed that students are normalweighted. Analysing the BMI of each student we can identify wich category they represent. According to Table 3 16% of the students are underweight, 50% are normalweight, 28% are overweight and 6% are obese. It is important to mention that the 3 students that represent 6% from the obese category were all diagnosed with methabolic disease. They were recomanded to perform low to moderate physical exercises.

Table 3. BMI of selected students

Category	BMI (kg/m²)	Subject %	Number
Underweight	<16.0	16%	8
Normalweight	18.5 – 24.9	50%	25
Overweight	25.0 – 29.9	28%	14
Obese	≥ 30.0	6%	3

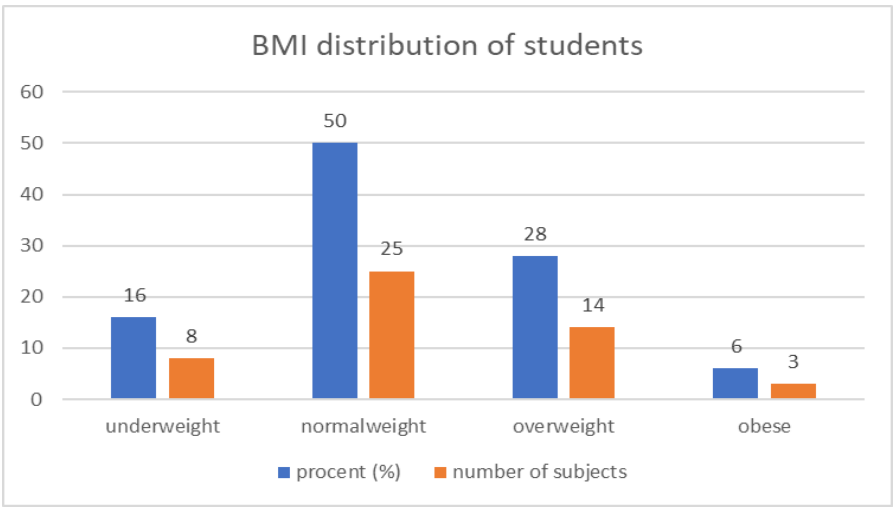

Fig. 3. Chart showing body mass index (BMI) of Educational Science Faculty students

Conclusions

We can conclude that half of the students were normalweighted, the other half were included in the under- or overweight category. As the above analysis

show, 16% of the students are underweight, 50% are normalweight, 28% are overweight and 6% are obese. It is important to mention that student's physical activity during the PES classes is unrelevant due to low number of classes weekly.

References

[1]. https://en.wikipedia.org/wiki/Body_mass_index#Children_(aged_2_to_20) (accesed 12.01.2022)

[2]. The SuRF Report 2 (PDF). The Surveillance of Risk Factors Report Series (SuRF). World Health Organization. 2005. p. 22.

[3]. Di Angelantonio E, Bhupathiraju ShN, Wormser D, Gao P, Kaptoge S, Berrington de Gonzalez A, et all. Body-mass index and all-cause mortality: individual-participant-data meta-analysis of 239 prospective studies in four continents. Lancet. 2016 Aug 20;388(10046):776-86. doi: 10.1016/S0140-6736(16)30175-1. Epub 2016 Jul 13. PMID: 27423262; PMCID: PMC4995441.

[4]. https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html (accesed 10.01.2022)

[5]. https://www.nhs.uk/conditions/obesity/ (accesed 14.01.2022)

[6]. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. World Health Organ Tech Rep Ser. 1995;854:1-452. PMID: 8594834

[7]. "Executive Summary". Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report. National Heart, Lung, and Blood Institute. September 1998. xi–xxx

[8]. Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon DA, Smeeth L. Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5·24 million UK adults. Lancet. 2014 Aug 30;384(9945):755-65. doi: 10.1016/S0140-6736(14)60892-8. Epub 2014 Aug 13. PMID: 25129328; PMCID: PMC4151483.

[9]. Jaimes R 3rd, Rocco AG. Multiple epidural steroid injections and body mass index linked with occurrence of epidural lipomatosis: a case series. BMC Anesthesiol. 2014 Aug 15;14:70. doi: 10.1186/1471-2253-14-70. PMID: 25183952; PMCID: PMC4145583.

[10]. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics (accesed 14.01.2022)

[11]. https://www.euro.who.int/__data/assets/pdf_file/0014/243320/Romania-WHO-Country-Profile.pdf (accesed 16.01.2022)

[12]. WHO Global Health Observatory Data Repository (online database). Geneva. World Health Organisation, 2013 (http:/apps.who.int/gho/data/view.main) (accesed 16.01.2022)