BODY MASS INDEX EVOLUTION BEFORE AND DURING THE COVID PANDEMIC IN A SAMPLE OF UNIVERSITY STUDENTS

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Abstract

One of the schools and universities closure numerous effects is the decrease in exposer to physical education. The research purpose is related to the decreased physical activity of university students due to the closure of sport facilities in universities, and public fitness centers during the coronavirus pandemic restrictions. Those sanitary restriction, combined with e-learning and passive leisure time may have an impact on the young people weight. This longitudinal research intends to assess changes and trends in university students BMI before and after remote learning due to sanitary restrictions. Men gained 0,5 kg/m2 in BMI from 22.8 to 23.3, and more important the percentage of overweight and obese persons increased from 14% to 30.4%, more than double. The percentage of normal weight and underweight categories decreased proportionally. In women sample the trend is contrary; BMI values are lower than in 2017, the difference being of -0.45 kg/m2. Lower percentage are observed in three categories: underweight, overweight, and obese, whilst the healthy weight category displays the most important increase with 7.3 %.

Keywords: *Physical activity, weight, lifestyle, modifiable behaviours*

JEL Classification: I10, I19, I20

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1. Introduction

Since 11-th March 2020 when COVID-19 was declared pandemic, it continues to impact all aspects of our lives, like few crises before it. In education at least 1.5 billion students worldwide were out of school at the peak of the pandemic, causing losses in learning [1] and significantly interrupting students daily routine. One of the schools and universities closure numerous effects is the decrease in exposer to physical education and restricted access to recreational facilities. This obesogenic environment in convergence with Covid-19 pandemic place students at risk of weight gain [2]. Body Mass Index (BMI) is the most used equation for approximate the body fat, defining overweight, obesity and one's health state.

BMI was originally proposed in 1832 by Lambert Adolphe Jacques Quetelet (1796–1874), a Belgian astronomer, sociologist, and statistician known for his application of statistics and probability theory to social phenomena. In

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developing his index, Quetelet had no interest in obesity. His main goal was defining the characteristics of 'normal man' and fitting the distribution around the norm. In Quelelet's essay Sur l'homme et le développement de ses facultés, ou essai de physique sociale (1835); (A Treatise on Man and the Development of His Faculties), he presented his conception of the average man as the central value about which measurements of a human trait are grouped according to the normal distribution [3].

In the middle of the nineteenth century, when BMI was developed, society admired overweight, as a sign of prosperity and success. Ordinary people, who represented the largest share in the statistical average of the population, would not be overweight due to long hours of physical work, lack of quantity or/and quality of food, and walking as their primary form of transportation. Men of robust proportions were often thought to be correspondingly wealthy and having a higher social status, while in women case an extra weight was connected to successful motherhood [4].

The formula derived from large-scale population studies and the validity of the Quetelet Index was confirmed in 1972, since when it has been named the Body Mass Index. However, a WHO report (1995) warned that row BMI data might create confusion between muscularity and overweight [5]. After year 2000 researchers suggested that BMI reliability is questionable and recommended direct measurement of body fat for an accurate diagnosis of overweight and obesity. However, BMI measurement is still an inexpensive, easy to apply and prompt assessment mean that should be used as the initial screening of overweight and obesity risk in adults.

Therefore, measuring BMI in a young adult population was considered an appropriate method for this study and easy to use in different conditions. The research purpose is related to the decreased physical activity of university students due to the closure of sport facilities in schools, universities, and public fitness centers during the coronavirus pandemic restrictions. Those sanitary restriction, combined with e-learning and passive leisure time (tv, gaming) in same seating position may have an impact on the young people weight and consequently on their BMI.

2. Results

This longitudinal research intends to assess changes and trends in university students BMI before and after remote learning due to sanitary restrictions. The first data set was collected in 2017, when students attended physical education lessons regularly, at least once a week. Those data were compared with another data set collected in November 2020 on a sample of students who had remote physical education almost eight months. Physical education classes in high schools and universities were suspended in face-to-face

scenario in March 2020 and hopefully will be expected to restart in the beginning of the next school and academic year: September / October 2021.

The sample studied in this research comprised 510 students, divided in two successive groups: in 2020 sample were 292 students:170 women and 122 men; and in 2017 sample were 218 students: 90 male and 128 females, with an average 19.7 years of age. In 2017 group the measurement of weight and high were performed with the same devices and the same person, while the 2020 group self-reported their anthropometric data. The results are displayed in the following table:

Anthropometric data

Table 1

	Gender	Weight	Hight	BMI	Δ BMI
2017	Women	58 kg	1.65 m	21.05 kg/m^2	
	Men	74.56 kg	1.79 m	22.8 kg/m^2	
2020	Women	56.2 kg	1.65 m	20.6 kg/m^2	-0.45 kg/m^2
	Men	75.75 kg	1.80 m	23.3 kg/m^2	+0.5 kg/m^2

In the next stage subjects were divided in 4 categories on BMI criteria: underweight (BMI >18.5), normal or healthy weight (18.5 – 24.9), overweight (25 - 29.9 kg/m^2) and obese BMI < 30. Further the percentage of each category was calculated, and samples were compared aiming to observe the evolution over time and in different circumstances. The results are graphically displayed in fig. 1 for men and in fig. 2 for women.

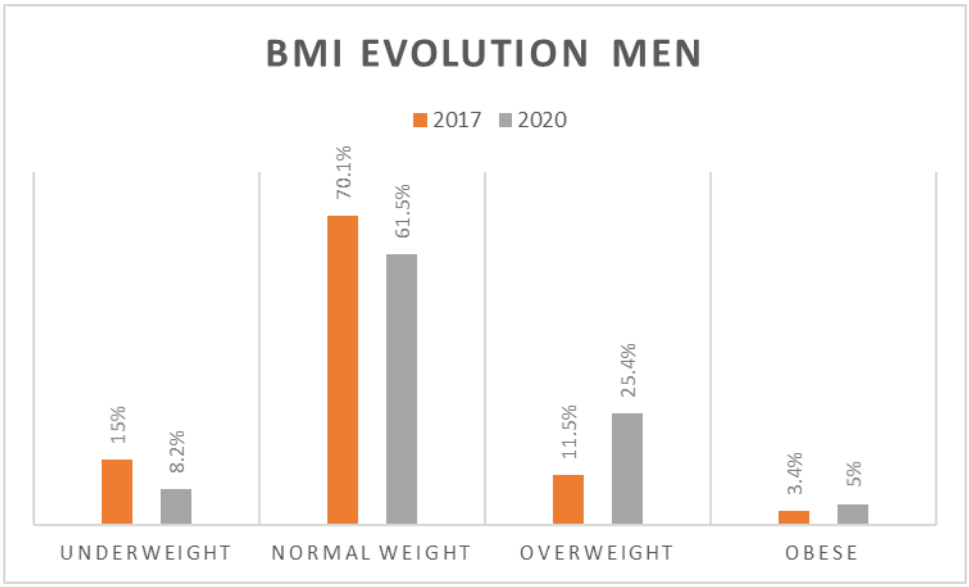

Figure 1

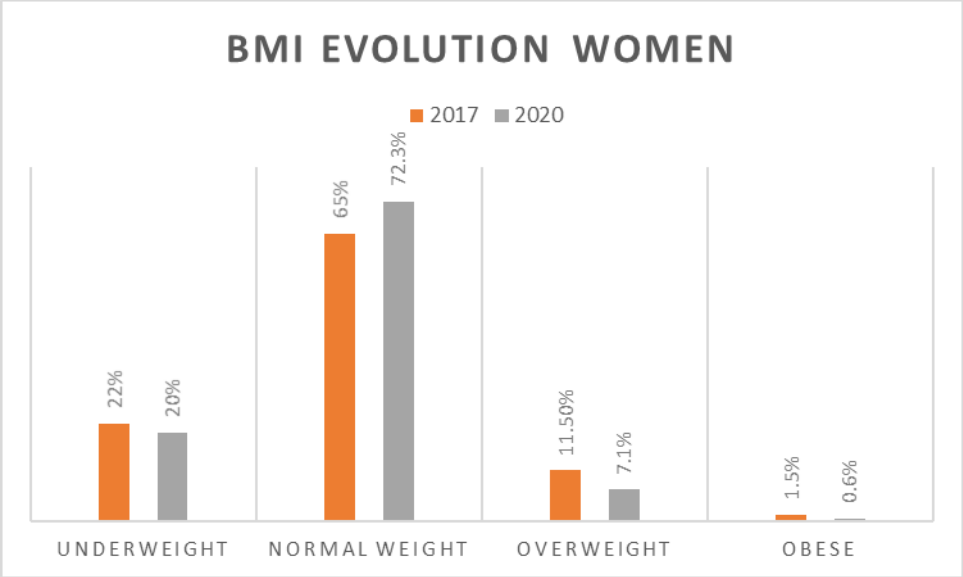

Figure 2

3. Discussion

A survey from 2016 [6] revealed that less than half of Romanian adults have a normal weight, the majority adult population being overweight (46%) and obese (9,3%).

Population	Normal Weight	Overweight	Obese
Men	36,9%	54,1%	9%
Women	51,3%	39%	9,7%
Adults	44,7%	46%	9,3%

Comparing these data with the present study results an important difference can be observed. The percentage of persons with healthy weight in our sample is higher (67,25%) primarily because the study sample comprised young adults around 20 years of age. It is known that weight due to body fat deposits is increasing with age.

Comparing the results obtained in 2017 with those from 2020 a few differences are notable:

- Men gained 0,5 kg/m^2 in BMI from 22.8 to 23.3, and more important the percentage of overweight and obese persons increased from 14% to 30.4%, more than double. The percentage of normal weight and underweight categories decreased proportionally.
- In women sample the trend is contrary; BMI values are lower than in 2017, the difference being of -0.45 kg/m^2. Lower percentages are observed

in three categories: underweight, overweight, and obese, whilst the healthy weight category displays the most important increase with 7.3 %.

The BMI percentage differences between samples before and during the Covid pandemic are presented in the following graph.

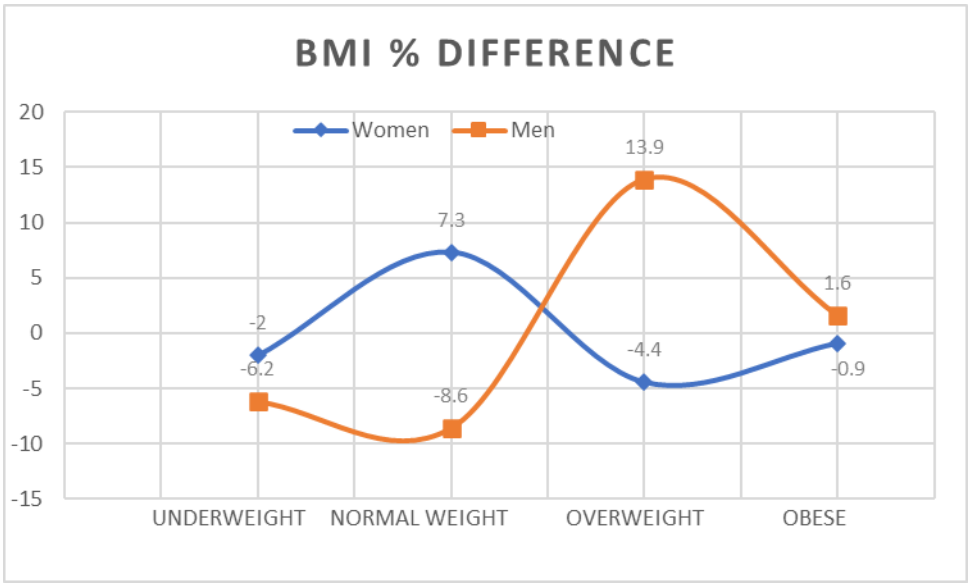

Figure 3. BMI percentage differences

In a systematic review and a meta-analysis of the difference between self-reported and directly measured weight among women [6] was found that women below and over 19 years of age underestimated their weight by 0.95 kg. It could be the case also in our sample, as time studies demonstrated young women dissatisfaction with their physical appearance [7] and a strong correlation between BMI and body image acceptance. A pro aspect of decreasing the women BMI may be the home-made meals in family and less high calories and fast-food consumption with friends and colleagues.

Female and especially young women are usually more involved in healthier nutrition and diets, while men are less interested in keeping the balance between energy intake and calories expenditure [8]. Most young men probably think they get all the exercise they need and the energy expenditure just doing normal, daily activities.

Studies on university students sample shown that even in normal circumstances, just 33.76% have a correct body posture, and the remaining 66.23% have at least one poor attitude parameter [9]. In my opinion after a year without organized physical activity and online learning implying many hours spent in a relaxed seating position, the bad body posture percentage will increase even more.

The effect of a bad posture and extra weight gain in early adulthood are in most of the cases for life span.

Diet and a sum of lifestyle components like 150 minutes per week of moderate physical activity, 6-8 hours of sleep, limited sedentary and screen time, and stress control could have synergic and cumulative effects on obtaining and maintaining a healthy body weight in adulthood.

4. Conclusion

The insufficiency of physical activities in university students, due pandemics restriction of mobility and human interaction, has multiple effects on their weight gain, fitness level and physical and psychological health status. The study results showed an important increase of men's BMI in a short period of time, values reached in decades under normal circumstances. It can be assumed that this situation is caused by lifestyle change due to a deficit of physical activity and subsequently the predominance of sedentary behaviour, amplified by on-line learning, closing of school and universities gyms, sport facilities, fitness centers and mobility restrictions. It can also be assumed that the pandemic effects on lifestyle changes on children and adolescents are similar and over the life course consequences. Even the women reported a lower BMI than we measured before pandemic, there are pros and cons in accepting those values.

Public health providers, overwhelmed during the pandemic, will face the comorbidities associated with excessive body weight in the years to come. Public health services should observe beside BMI other factors as fat distribution, age, gender, fitness level, population subgroups, or body fat percentage aiming to predict and prevent overweight, obesity and their consequent morbidity.

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