

# Prevalence of overweight and obesity in university students of the educational program of the degree in physical therapy 2014-2022

## Abstract

Within the framework of the research line of Healthy Lifestyles, of the Academic body of the Degree in Physical Therapy, it has been given the task of monitoring aspects related to health and Lifestyles, through BMI registration, which is a first level measure for detecting obesity, as a risk factor for different diseases. Detecting the prevalence of overweight and obesity offers information for preventive or corrective decision-making, since the Polytechnic University of Pachuca is part of the health-promoting Universities.

**Objective:** To determine the prevalence of overweight and obesity in students of the educational program of the Bachelor of Physical Therapy at the Polytechnic University of Pachuca, by measuring BMI.

**Methodology:** The present study is quantitative, ambispective, cross-sectional at the time of measurement of variables and longitudinal at the measurement of variables over a certain time, according to the analysis and scope of results: descriptive.

**Results:** Results are obtained regarding the prevalence of overweight and obesity in students of the educational program of the Bachelor of Physical Therapy at the Polytechnic University of Pachuca.

**Conclusion:** The students (male sample), were grade 1 and 2 overweight, during the periods of 2019 and 2022, while the women were grade 1 overweight in the 2019 period.

**Keywords:** body mass index BMI, obesity, overweight

Volume 7 Issue 1 - 2023

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**Received:** January 11, 2023 | **Published:** January 31, 2023

**Abbreviations:** BMI, body mass index; SI, international system of units; kg, kilogram; M, meter

## Introduction

Obesity is the main non-communicable chronic disease to which international organizations such as the World Health Organization (WHO) have paid attention. Let us not forget that obesity has a high prevalence and is associated with a significant number of other diseases.<sup>1</sup> Bad habits, changes in diet and little physical activity result in weight gain and obesity in the population, excess weight is related to the appearance of heart, metabolic, kidney diseases, sleep disorders, cancer and mental problems.<sup>1</sup> According to the Cardiovascular Risk Factor Multiple Evaluation in Latin America study, a study that evaluated the prevalence of cardiovascular risk factors in seven Latin

American cities, reported a prevalence of obesity of 18% to 31% of the population. Currently, countries like Mexico and Colombia have the highest prevalence of overweight and obesity (Mexico: Men 66.8% and Women 71.4%).<sup>1</sup> Among the main risk factors with a fundamental role in the development of chronic diseases, obesity is present.<sup>1</sup> The Body Mass Index (BMI) is accepted by most health organizations as a first-tier measure of body fat and as a screening tool for diagnosing obesity.<sup>2</sup> In the late 1990s, the World Health Organization (WHO) and a panel of experts from the American National Institute of Health (NIH) recommended the categorization of the Body Mass Index (BMI) as follows: 25 to 29.9 kg/m<sup>2</sup> as preobese or overweight and 30 kg/m<sup>2</sup> or more as obese, with the latter subdivided into 30 to 34.9 kg/m<sup>2</sup> (grade 1 obesity), 35 to 39.9 kg/m<sup>2</sup> (grade 1 obesity), grade 2) and 40 kg/m<sup>2</sup> or more (grade 3 obesity) Table 1.<sup>2</sup>

**Table 1** Classification of obesity according to BMI (KG/M<sup>2</sup>)

| OMS 2000                  | SEEDO 2007   | AHA 2009  |
|---------------------------|--|---|
| Under weight: <18.5       | Under weight: <18.5  | Under weight: <18.5   |
| Normal weight: 18.5-24.9  | Normal weight: 18.5-24.9   | Normal or acceptable weight: 18.5-24.9  |
| Overweight: 25-29.9       | Degree overweight 1: 25-26.9<br>Degree overweight 2: 27-29.9       | Overweight: 25-29.9   |
| Obesity degree 1: 30-34.9 | Obesity type 1: 30-34.9  | Obesity degree 1: 30-34.9   |
| Obesity degree 2: 35-39.9 | Obesity type 2: 35-39.9  | Obesity degree 2: 35-39.9   |
| Obesity degree 3: >40     | Morbid obesity or type 3: 40-49.9<br>Extreme obesity O type 4: ≥50 | Obesity degree 3: 40-49.9<br>Obesity degree 4: 50-59.9<br>Obesity degree 5: ≥60 |

OMS: Organización Mundial de la Salud; SEEDO: Sociedad Española para el Estudio de la Obesidad; AHA: Asociación Americana del Corazón

Surveillance of health risks in the population is essential for the allocation of resources and the planning of health services and preventive interventions.<sup>2</sup> Decades of epidemiological research have shown that BMI is associated with risk of death.<sup>2</sup> There are quite a few studies that evaluate the degree of classification in the diagnosis of obesity using the BMI in comparison with the percentage of body fat (BF), or other parameters, weighing up the cardiovascular and metabolic risk of the different measured subjects, sometimes finding elevated of cardiometabolic risk factors in non-obese individuals according to BMI.<sup>2</sup> The BMI does not discriminate between muscle mass and fat mass, assuming a handicap, since both factors can have an opposite impact on health<sup>14</sup>, and people with excess fat are not adequately identified, also knowing that obesity, far from being a protective factor for bone, is a condition with a deleterious impact on it and one more risk factor for osteoporosis.<sup>2</sup>

The mechanisms that govern the accumulation of body fat are complex and remain unclear, although we know that age, gender, hormonal and genetic factors have shown a significant impact on the distribution of body fat.<sup>2</sup> Current evidence indicates that morbidity and mortality ratios increase proportionally with the degree of obesity, both in men and women.<sup>2</sup> The BMI has been a simple and useful measure to document the growth in the prevalence of overweight worldwide.<sup>2</sup> In addition, it must be understood as a condition subject to temporality as healthy, being considered more as a transition towards disease, such as metabolic syndrome and/or Body mass index: advantages and disadvantages of its use in obesity. Relationship with strength and physical activity cardiovascular disease<sup>56</sup>, obesity being a much broader chronic disease in its deleterious effects at all levels.<sup>2</sup> Quality of life is as broad a term as you like, with philosophical and practical implications that vary from one person to another and that is related to daily life, culture, economic and social well-being, and health. Hence, health-related quality of life (HRQoL) refers to that part of the quality of life that is altered when we contract a disease or improves when it disappears, affecting aspects of life that, although they may seem insignificant, prevent us from living it as desired.<sup>3</sup> HRQoL is related to the degree of obesity and the distribution of fat.<sup>3</sup>

This epidemic represents a great challenge for the prevention of chronic noncommunicable diseases, in developed and developing countries.<sup>4</sup> Obesity is an important public health problem with a high prevalence in developed countries (4), in the State of Mexico, the increase occurs in all population groups, with 47.7% in men and 42.6% in women. Obesity increases mortality and decreases life expectancy and quality, especially in young adults. Being overweight or obese has become very prevalent throughout the world in the 21<sup>st</sup> century. This epidemic represents a great challenge for the prevention of chronic noncommunicable diseases, in developed and developing countries.<sup>4</sup> And it has even been associated with low academic performance. "Prevalence studies in different strata and locations in Latin American countries range from 22-26% in Brazil, 21% in Mexico, 10% in Ecuador, 3-22% in Peru, 22-35% in Paraguay and 24 – 27% in Argentina".<sup>5</sup> It is estimated that by 2015, the prevalence of malnutrition due to excess reaches 39% of the total population over 20 years of age.<sup>5</sup>

## Development includes: material and methods; results and discussion

The study methodology was quantitative, ambispective, depending on the period and sequence of the study: cross-sectional due to the cutoff moment for the measurement of variables and longitudinal due to the measurement of variables over a certain period of time, according to the analysis and scope of results: descriptive.

**Study area:** The study was carried out at the facilities of the Polytechnic University of Pachuca, located in ExHacienda de Santa Bárbara, Zempoala Hidalgo, which corresponds to the metropolitan area of Mexico. The University community is made up of 5,000 students from different engineering and undergraduate degrees, including physical therapy, as well as 450 teachers and administrators. The Universe was made up of all the people belonging to the Polytechnic University of Pachuca, the sample was made up of 396 students with an average age of 21 years, from the seventh quarter during the years 2014 to 2022 Figure 1-4.

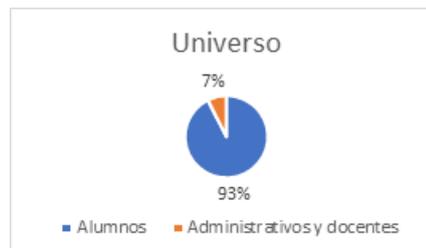


Figure 1 Distribution of the Universe of the Educational Community of the Polytechnic University of Pachuca. Own authorship.

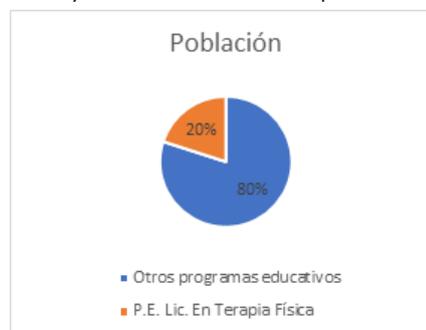


Figure 2 Population selected for the sample. Own authorship.



Figure 3 Sample. Own authorship.

Distribución de la muestra alumnos de 7mo cuatrimestre



Figure 4 Distribution of the Sample in Seventh semester students. Own authorship.

**The population:** PE students Lic. In Physical Therapy. The sample was made up of 75% of students in the seventh quarter, from various educational periods: 2014, 2015, 2016, 2017, 2019 and 2022. The study sample consisted of 396 people made up of students from the Educational Program of the Bachelor's Degree in Physical Therapy of the Polytechnic University of Pachuca.

### Sample 2014-2017

There were 174 participants with a frequency of 31% the age in men of 21.5 years of age, with a frequency of 39% the age in women is 20 years of age, the weight with a frequency of 31% was 63 kg in men, while, in a frequency of 23%, the weight in women was 53kg.

### Sample 2019

The subjects participating in this study were 123 students, with an average BMI of 25.3466, of them, 84.21% women, with a BMI of 25.0923 and 15.79% men, with a BMI of 26.7027, with a minimum age of 20 years and a maximum age of 32 years of age, average age of 21.38.

### Sample 2022

In this sample there were 87 participants, the body mass index of 27.51, in the group of women it was 23.05, it is worth mentioning that, in the present sample, there were mild post-Covid 19 patients, with Omicron variants. The present investigation was carried out from January 2014 to August 2022, the techniques of scientific, exploratory and critical observation were used as a method. The analysis of the data was done through the quantitative method, formulas, analysis of information, both statistical and documentary, were applied. Statistical data processing: Tabulations and Analysis of results, gathering of empirical information, direct approach in the place of field research and provision of information from bibliographic sources. As instruments, for the measurement of anthropometric characteristics, a Huawei AH100 version smart scale and a scale with a height rod for adults were used. The data obtained in the sample were obtained with the subjects wearing light clothing, without shoes or objects that could alter the results, such as cell phones, purses or wallets. For its simplicity, an indicator known as Body Mass Index (IMC) or BMI (for its acronym in English) was taken for the calculation. The BMI was calculated by dividing the weight for the squared height ( $BMI = \text{weight [kg]/height [m]}^2$ ) and the following general criteria were used to classify the population according to their weight status: normal weight (NP): BMI.

### Participants with the following criteria of inclusion

Students in active status of the educational program of the Degree in Physical Therapy from 20 to 32 years of age, corresponding to the seventh quarter, during the period from January 2014 to April 2022. The research is part of the field of Health research, an approach will be assumed: quantitative. The main methods that will be applied in the investigation of the theoretical level are: modeling, based on the principle of the ascent from the concrete to the abstract; the systemic-structural and functional approach, which will allow establishing the structure, contents and methodology of the proposed program. Likewise, through the logical processes of thought, analysis-synthesis, inductive-deductive, hypothetical-deductive, generalization, among others, it will be possible to analyze and synthesize the conceptions related to the object of study and scientific questions that will be derived from the study. of cases to carry out and formulate conclusions after the experimental verification of the proposal. The statistics by

level that will be used are listed below: Ordinal (mean). Quantitative data refers to numerical information about variables whose values have already been determined in the introduction. The statistical technique, already mentioned above: Deductive. This development part also includes the Results and Discussion section, which can come in a single section or separate as appropriate to the authors.

The results of this study are shown below, starting with the Universe Figure 1. The population, which corresponds to the students, is shown below Figure 2. The sample with respect to other educational levels of the same Degree in Physical Therapy is shown below Figure 3. The corresponding percentage of students who entered and did not enter this study is shown below. Figure 4. Below is the distribution of sex, corresponding to the records from 2014 to 2022 Figure 5. Below is the gender distribution, corresponding to the 2014-2017 registration Figure 6. The record corresponding to the distribution by sex of the 2019 sample is shown below Figure 7. The distribution by sex corresponding to 2022 is shown below Figure 8. Below are the results in the prevalence of obesity and overweight in students of the educational program of the Lic. In Physical Therapy Figure 9.



Figure 5 Distribution by sex of the sample. Own authorship.



Figure 6 Distribution by sex in the 2014-2017 sample. Own authorship.



Figure 7 Distribution by sex in the 2019 sample. Own authorship.

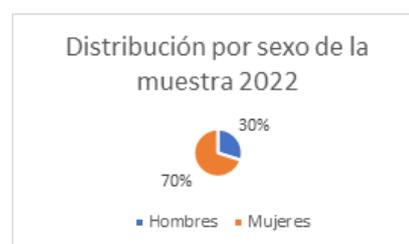


Figure 8 Distribution by sex of the 2022 Sample.



**Figure 9** Prevalence of BMI in students of PE Lic. In Physical Therapy. Own authorship.

### Equations

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)} \times \text{height (m)}}$$

### Units

According to the International System of Units SI, the standard measurement is used, that is what the gram is, however, in the present investigation, the Kilogram (Kg) is taken into account. According to the definition of the base units adopted by the General Conference of weights and measures are the following: The meter (m) is defined as the length of the path traveled by light in a vacuum in a period of  $1/299792458$  of a second.

### Conclusion

The prevalence of grade one and two overweight occurred in men, in the period: 2019-2022, while, in women, grade 1 overweight only occurred in 2019. Although the 2022 sample was subjected to the pandemic, we observed that it had a negative impact on the male population, the authors deduce that due to the roles played in the quarantine. It is suggested to take this research into account to monitor healthy lifestyles in the university population.

### Acknowledgments

The authors thank Dr. Rosa María Chío Austria. Director of the Division of Professional Health Studies, of the Polytechnic University of Pachuca, for the facilities to carry out this research.

### Conflicts of interest

The autor delares there is no conflict of interest.

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