e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(3); 108-113

Original Research Article

Comparison of the Obesity Indices in Populations from Gaya, Bihar by Age Group and Gender

Anisha[1], Dipti Panwar[2]

[1]Tutor, Department of Physiology, Anugrah Narayan Magadh Medical College, Gaya, Bihar, India

[2]Tutor, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar, India

Received: 05-01-2023 / Revised: 03-02-2023 / Accepted: 25-02-2023

Corresponding author: Dipti Panwar

Conflict of interest: Nil

Abstract

Background: Obesity is understood to be a chronic condition that can lead to a number of metabolic, cardiovascular, and neurological issues. Obesity is becoming more common worldwide, especially in developing nations. All age groups and both sexes are affected. The existence and severity of comorbidities linked to obesity, as well as the body mass index (BMI), are used to distinguish the progressively worsening stages of obesity. In order to determine the burden of this lifestyle disorder across age groups and sexes, the current study aims to examine the prevalence of overweight, obesity (stage 0, 1, and 2), and morbid obesity in adult residents of Bihar (Gaya) state. This will allow for the development of a comprehensive action plan that will target the appropriate group with targeted preventive measures.

Method: Based on their BMI, the presence and severity of problems connected to obesity, and their BMI, 120 participants were surveyed and classified as non-obese, overweight, obese, or morbid obese. Point prevalence was calculated and compared across a range of age groups for both genders.

Result: The study participants made up of 41.4% non-obesity, 15.8% overweight, 29.3% obese, and 13.1% severely obese. In both sexes, the prevalence of all three conditions—overweight, obesity, and morbid obesity—rose with age. For "overweight" and "obesity," females across all age categories had a higher frequency than males. However, the gender gap shrank as the disease's severity increased, so that for morbid obesity, the ratio of men to women was reversed (by 2) moreover, ladies reached the peak prevalence of overweight and obesity a little later than males did. Yet, the same age group (41–50 years) in both genders exhibits the highest frequency of morbid obesity.

Conclusion: Females are more likely than males to be overweight or obese across all age categories, with peak prevalence occurring a little later in females than in boys. Nonetheless, there were more males than females who had morbid obesity. Gender disparities in prevalence diminished as severity increased.

Keywords: Complications, Body Mass Index Sever Obesity, Overweight, Maximum Prevalence.

Introduction

A common lifestyle disorder worldwide is obesity. According to its definition, it is "a condition of increasing body fat percentage to a degree that compromises health and well-being." In the year 2000, WHO recognized obesity as a "disease" and called the worrisome rise in incidence of it a "global epidemic" [1]. It is becoming more widely acknowledged as a "chronic condition" that is linked to a wide range of problems, including several malignant diseases that can shorten lifespan and diabetes mellitus, hypertension, stroke, osteoarthritis, gallstones, and sleep apnea [2].

Obesity is becoming more common worldwide, impacting people of all ages and genders. According to reports, emerging nations are experiencing a faster surge in prevalence than developed nations [3]. With 5% of the population being obese and the frequency continuing to rise quickly, especially among adults, obesity in India reaches epidemic proportions [4].

About 95% of the time, obesity is the result of a "energy imbalance" brought on by an excessive intake of foods high in energy and a sedentary lifestyle. In the remaining instances, it develops as a result of medications or illnesses (metabolic, endocrine, and genetic) [5]. Bihar is one of India's wealthier states, and its residents are known for their love of calorie-dense foods. This element, coupled with escalating urbanization, stress, sedentary lifestyle, availability, and affordability of junk food and energy-dense foods, likely increases the risk of obesity in this group.

"Body mass index" is the most widely used criterion to categories someone as overweight or having different degrees of obesity (BMI). It is calculated as the square of a person's height in meters divided by their weight in kilos. Thus, it is measured in kilograms per square meter (kg m-2). If there are no weight-related issues, a BMI of 18 to 24.9 is considered normal, 25 to 29.9 is considered overweight, and 30 to 39.9 is considered obese (stage 0). However, if difficulties are present, a BMI between 25 and 34.9 can indicate either stage 1 or stage 2 obesity, depending on how serious the complications are [6].

Secondary interventions are needed to manage ongoing weight increase and stop the onset of consequences in people with BMIs above the normal range who have not yet experienced obesity-related comorbidities. However, since they are already feeling the negative effects of increasing body weight, people with higher grades of obesity should receive more severe tertiary interventions. The goals of tertiary interventions are to address the problems and stop them from getting worse. If demographic groups with a higher risk of becoming obese are identified, obesity control techniques can be used to their fullest potential in a nation like India with a rapidly growing population and little access to health care. When appropriate for primary, secondary, or tertiary preventive measures, they ought to be identified. As a result, the patient outcomes will be maximized, and the intervention's cost effectiveness and benefit-risk ratio will both be improved [7].

In order to ascertain the prevalence of overweight, obesity, and morbid obesity in Bihar citizens of both genders and various age groups, this study was designed (Gaya).

The following objectives were set:

- To determine the prevalence of overweight, obesity (stages 0, 1, and 2), and morbid obesity;
- To analyses the distribution of these conditions by age and gender among Bihar residents;
- To determine the prevalence of each condition (Gaya).

Method

Study participants

The study comprised adult patients who checked in at the "sample collection center" from various outpatient departments (OPDs) of Anugrah Narayan Magadh Medical College, Gaya. Those who were extremely muscular, edematous, elderly, sarcopenic, or pregnant were excluded from the trial.

Method

The study was carried out on 260 adult patients after receiving approval from the IEC and given written consent. Using a self-structured, pre-validated proforma, the patient's name, age, sex, religion, marital status, level of education, and economic situation were entered. Certain eating practices and exercise routines were recorded.

Diabetes mellitus, hypertension, gallstones, stress incontinence, snoring, and weight history during the past several years were all associated with obesity-related problems. During the physical examination, the patient's height in meters and weight in kilograms were noted. The BMI was then computed using the provided formula.

Height / Weight (Kg) = BMI (m^2) Kg/m^2 per unit

To identify the presence of any issues associated to obesity, a general physical and systemic examination of the joints, abdomen, cardiovascular system, and respiratory system was conducted. Each patients underwent the necessary tests, including Fasting Blood Sugar (FBS), Lipid Profile, Liver Function Test (LFT), Renal Function Test (RFT), and HbAIC. Data were entered into MS Excel and analyzed to determine the prevalence of overweight, obesity, and morbid obesity in males and females of various age categories, including those under 31, between 31 and 40, between 41 and 50, and over 51.

Results

Data from 292 patients were collected and analyzed in total. 32 proformas with insufficient data were not included in the analysis. Ages ranged from 17 to 76. So, a total of 260 patients were included in this research.

60.1% of the participants in this study were women, and the remaining participants were men. Since the study participants were chosen at random, there were more females (167) than males (93). Only 41.4% of the 260 total individuals had a BMI that was considered normal or non-obese. 15.8% of people were obese. The research population's total obesity prevalence was found to be disturbingly high (29.3%). Morbid obesity, a more severe form of obesity, was also prevalent in high levels (13.1%).

In the study population, the point prevalence of "overweight" and "morbid obesity" was highest in the age group of 41–50 years, and that of "obesity" was highest in people who were 51 years or older [Table 1].

Table 1: Point prevalence of obesity, including severe obesity, throughout all age groups.

Age group	Percentage of Non-obese	Percentage of Overweight	Percentage of Obese	Percentage of Morbid obese
<31	62.8%	14.4%	17.1%	5.3%
31-40	39.0%	19.7%	28.7%	12.2%
41-50	25.6%	20.0%	35.1%	18.8%
>51	31.1%	11.6%	38.0%	18.2%
Total	41.4%	15.8%	29.3%	13.1%

Females are more likely than males to be overweight or obese at the gender-specific point. Yet, as seen in Table 2, "morbid obesity" is observed to be slightly more common among males. As

the severity rises, the female-to-male prevalence ratio falls until it is 2 for morbid obesity (0.91:1).

Table 2: Male to female point predominance

Severity	Percentage of Male	Percentage of Female	The ratio of female to the male population
Non-obese	48.4%	36.8%	-
Overweight	12.8%	17.7%	1.37:1
Obese	24.6%	32.5%	1.31:1
Morbid Obesity	13.8%	12.6%	0.91:1

The prevalence of obesity and morbid obesity peaks in the age categories of 41 to 50, while that of overweight does so in the age groups of 31 to 40. The prevalence among males rises as they become older.

A study of female prevalence by age shows a similar tendency of rising prevalence with ageing, with minor variations (Table 3). Female prevalence peaks a little later than male prevalence does.

Table 3: Female prevalence overages.

Age groups	Overweight		Obesity		Morbidity Obesity	
	N	Percentage	N	Percentage	N	Percentage
<31 Years	15	12%	16	13.7%	9	8.0%
31-40	11	16.1%	17	24.2%	7	10.7%
41-50	7	12.6%	20	33.2%	11	19.03%
>51 Years	13	10.8%	41	30.0%	22	18.5%

While the prevalence of "overweight" and "morbid obesity" is highest in the 41–50 age group, the prevalence of "obesity" is highest in females 51 years and older. As a result, this study reveals that obesity and overweight are more common in women than in men, with males reaching their peak prevalence earlier than females.

Discussion

A worldwide health concern is obesity. It is the precursor to a wide range of metabolic, cardiovascular, mental, and even malignant disorders that harm health, degrade life expectancy, and worsen quality of life. In addition to being a significant preventable cause of death, obesity is also the one that receives the least attention globally [1, 8]. Consequently, monitoring systems that identify demographic groups more likely to experience obesity and its comorbidities can make the best use of the limited health resources that are available. In the current study, more than half of the population (58.4%) had a body mass index (BMI) that was higher above the range (17-24.8).

In Chennai, Deepa M et al. observed a frequency of 45.9%, and Bhardwaj et al. reported a prevalence of 50.1 in North India [9,10]. Comparing these numbers reveals a clear increase trend in the prevalence of obesity over time. Our findings, however, differ from those of Shirazi et al., who indicated that the prevalence of obesity in the Kashmiri population in 2014 was just 7.05% [11]. Around the same proportion (7-8%) had also been found by Abbas et al. and Khan et al. in 2003, ten years earlier [12,13].

In 2015, residents of Tamil Nadu and Chandigarh, respectively, reported a somewhat lower frequency of 24.6% and 31.3%, according to the ICMR INDIAB survey [14].

According to this study, the prevalence of obesity rises with age in both genders. For males, the peak prevalence of obesity is seen between the ages of 41 and 50, and for females, it peaks at or beyond the age of 51. In rural Andhra Pradesh in 2018, Uddevalla et al. similarly found a greater prevalence of

obesity among women and people aged 41 to 50 [15]. It has been found that women are more likely than men to be overweight or obese. Many research carried out in various parts of the world have found such gender-based disparities in the prevalence of obesity. According to India's National Family Health Survey 3 [16], women are more likely than males to be obese. In all age groups, girls were more likely than males to be obese, according to studies by Pandey et al. and Al Mahroos et al. [17,18]. Serena et al. noted that, particularly in developing nations, more women than men were obese. [19]. In this study, the prevalence ratios for overweight, obesity, and morbid obesity are 1.37:1, 1.32:1, and 0.91:1, respectively, among women. Female to male obesity prevalence ratio was likewise reported to be 1.26:1 in a study by Shirazi et al. [10]. Similar results were also revealed by a 1999 study carried out by Singapore's health ministry [20].

According to a 2017 WHO data release, prevalence of BMI 30 was found to be 5.1% for men and 2.7% for women [21]. In American Indians, the prevalence of class II (BMI 35–39.9) and class III obesity (BMI 40+) was higher in women than in men from 1995 to 2004 and was rising every year in both sexes, according to Charlton W et al. Nonetheless, the percentage prevalence increase was noticeably higher for men than for women. As a result, the gender gap in severe obesity was getting smaller every year [22]. With increasing severity, the ratio for men decreases and then reverses (becomes 2) for morbid obesity. Contrary to our findings, Odegan et al. had come to the conclusion that women, regardless of age, race, or ethnicity, are disproportionately harmed by extreme obesity than men [23,24].

Conclusion:

In all age categories, females are more likely than males to be overweight or obese, with peak prevalence occurring a little later in girls than in boys. Yet, when severity rose, gender-based disparities in prevalence lessened, and males were more likely than females to suffer from morbid obesity.

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