

## Age group and gender-wise comparison of obesity indices in subjects of age group 18-25 years

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### Abstract

**Aim:** To assess age group and gender-wise comparison of obesity indices in subjects of age group 18-25 years. **Methodology:** A total of 250 subjects in age ranged 18-25 years of both genders were enrolled. A physical examination along with measurement of weight in kilograms and height in meters was recorded and BMI was calculated. **Results:** There were 65 males and 25 females in age group 18-20 years, 40 males and 45 females in age group 20-22 years and 45 males and 30 females in age group 23-25 years. There were 42.5% non-obese (males- 47.5%, females- 37.5%), 16% overweight (males- 13.5%, females- 18.5%), 28.5% obese (males- 25%, females- 32%) and 13% morbid obese (males- 14%, females- 12%). Maximum non-obese (60%) were seen in age group 18-20 years, overweight (20%) in age group 18-20 years, obese (38%) in age group 20-22 years and morbid obese (18%) in age group 23-25 years. A significant difference was observed in both genders ( $P < 0.05$ ). **Conclusion:** Obesity was most prevalent in females as compared to males. Age group 20-22 years had maximum obese subjects.

**Key words:** Obesity, Height, Weight, Gender

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### Introduction

Obesity is a lifestyle disorder prevalent worldwide. It is defined as “a condition of increased percentage body fat to an extent that impairs health and well-being”[1]. WHO has declared the alarming increase in prevalence of obesity as “global epidemic” and acknowledged its status as a ‘disease’ in the year 2000[2]. It is being increasingly recognized as a ‘chronic disease’ associated with large number of complications like diabetes mellitus, hypertension, stroke, osteoarthritis, gall stones, sleep apnoea and even some malignant diseases, which can reduce life span[3]. The prevalence of obesity is increasing throughout the world, affecting both sexes and all age groups[4]. The rate of rise of prevalence is reportedly higher in developing countries than in developed ones. In India, obesity has acquired epidemic proportions with 5% of country’s population being obese and the prevalence is further rising rapidly, especially in adult population[5].

The term overweight refers to excess body weight for a particular height whereas the term obesity is used to define excess body fat[6].

Overweight and obesity primarily happen either due to excess calorie intake or insufficient physical activity or both. Furthermore, various genetic, behavioural, and environmental factors play a role in its pathogenesis[7]. Childhood obesity is a forerunner of metabolic syndrome, poor physical health, mental disorders, respiratory problems and glucose intolerance, all of which can track into adulthood[8].

The most frequently used parameter to label someone as overweight or having varying grades of obesity is ‘Body mass index’ (BMI)[9]. It is the ratio of person’s weight in kilograms to square of his height in meters. Its unit is thus kilogram per square meter ( $\text{kg m}^2$ ). BMI of 18-24.9 is labelled as normal,  $\geq 25$ -29.9 overweight and 30-39.9 as obese (stage 0) if there are no weight related complications[10,11]. Considering this, the present study was attempted to assess age group and gender-wise comparison of obesity indices in subjects of age group 18-25 years.

### Methodology

A total of two hundred fifty adult subjects age ranged 18-25 years of both genders were enrolled after obtaining written consent. Institutional ethical and Review committee approval was taken before starting the study.

A case history performa was prepared and information such as name, age, sex, marital status, educational and economic status were recorded. Obesity related complications such as diabetes mellitus, hypertension and weight pattern were recorded. Weight in kilograms and height in meters was recorded and BMI was calculated. All underwent fasting blood sugar (FBS), lipid profile, liver function test (LFT), renal function test (RFT) and HbA1C estimation. Results of the present study after recording all relevant data were subjected for statistical inferences using chi-square test. The level of significance was significant if p value is below 0.05 and highly significant if it is less than 0.01.

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**Results****Table 1: Age and gender wise distribution**

Age group (Years)	Male	Female	Total
18-20	65	25	90
20-22	40	45	85
23-25	45	30	75
Total	150	100	250

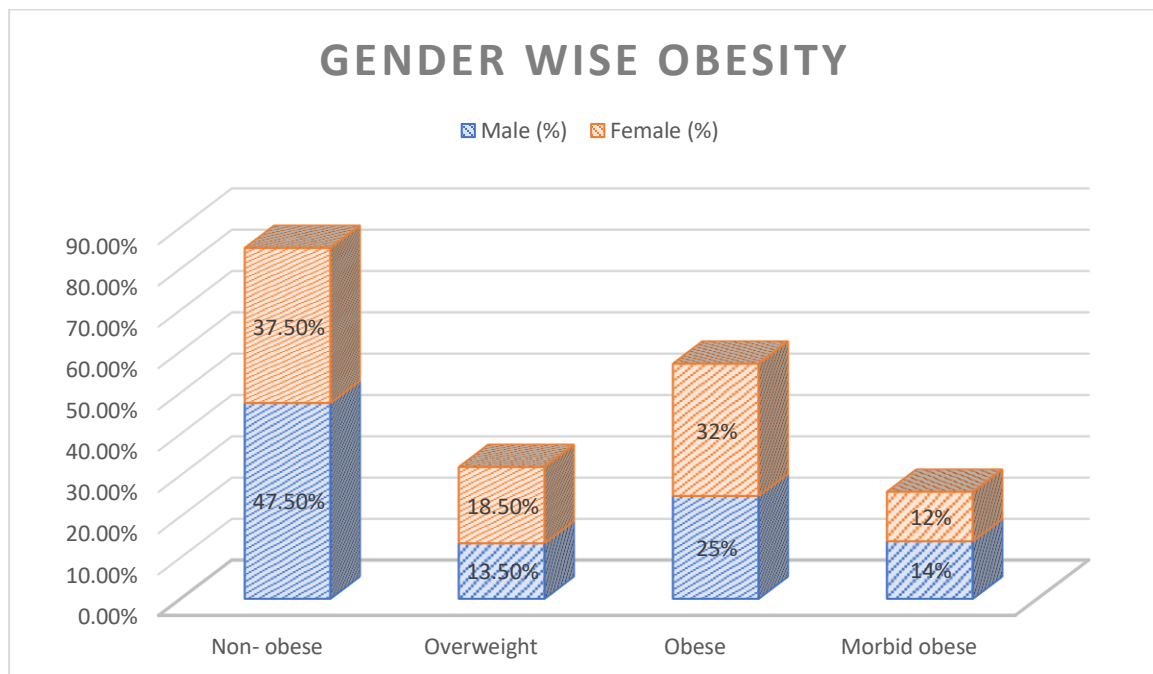
There were 65 males and 25 females in age group 18-20 years, 40 males and 45 females in age group 20-22 years and 45 males and 30 females in age group 23-25 years (Table 1).

**Table 2 Obesity based on gender**

Age group (Years)	Male (%)	Female (%)	Total	P value
Non- obese	47.5%	37.5%	42.5%	0.05
Overweight	13.5%	18.5%	16%	0.09
Obese	25%	32%	28.5%	0.05
Morbid obese	14%	12%	13%	0.08

Chi- square test, Significance  $P < 0.05$

There were 42.5% non- obese (males- 47.5%, females- 37.5%), 16% overweight (males- 13.5%, females- 18.5%), 28.5% obese (males- 25%, females- 32%) and 13% morbid obese (males- 14%, females- 12%). A significant difference was observed in both genders ( $P < 0.05$ ) (Table 2, graph 1).

**Fig 1:Genderwise obesity****Table 3: Obesity based on age group**

Age group (Years)	Non- obese	Overweight	Obese	Morbid obese
18-20	60%	20%	13%	7%
20-22	35%	13%	38%	14%
23-25	32.5%	15%	34.5%	18%
P value	0.04	0.05	0.04	0.03

Chi- square test, Significance  $P < 0.05$

Maximum non- obese (60%) were seen in age group 18-20 years, overweight (20%) in age group 18-20 years, obese (38%) in age group 20-22 years and morbid obese (18%) in age group 23-25 years. A significant difference was observed in both genders ( $P < 0.05$ ) (Table 3, graph 2).

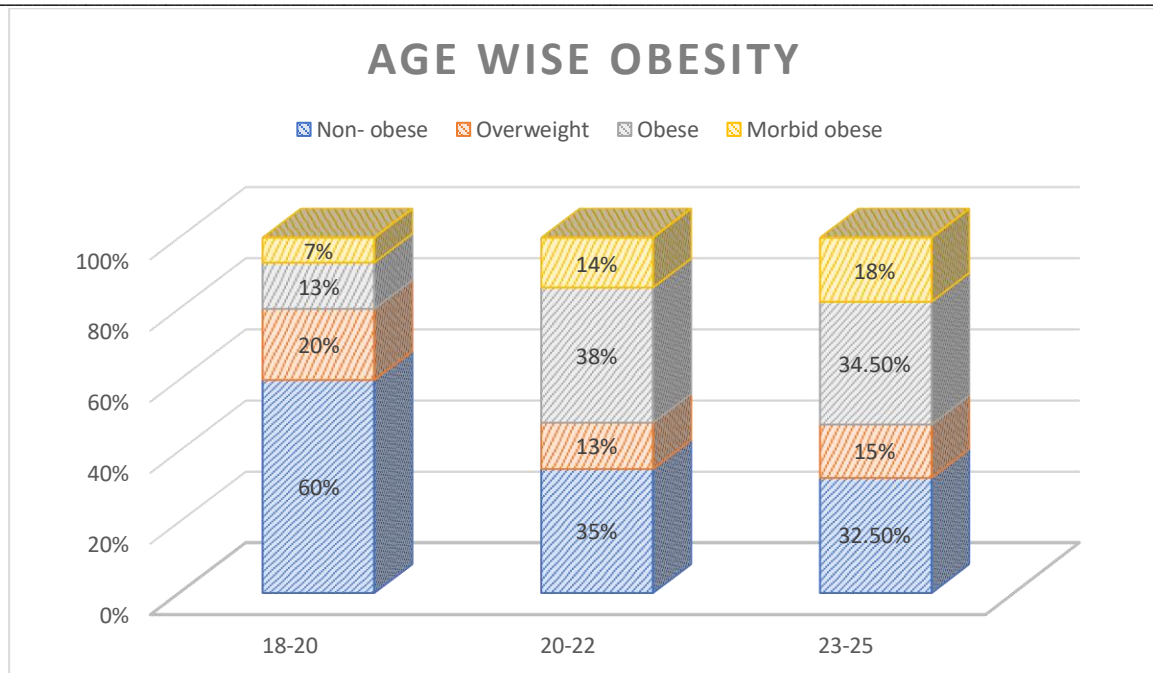


Fig 2:Agewise obesity

### Discussion

In this study assessed age group and gender-wise comparison of obesity indices in subjects of age group 18-25 years. We recruited 250 subjects in age group 18-25 years. There were 65 males and 25 females in age group 18-20 years, 40 males and 45 females in age group 20-22 years and 45 males and 30 females in age group 23-25 years. Globally, the prevalence of obesity has risen in recent years[12]. The International Association for the Study of Obesity (IASO) and International Obesity Task Force (IOTF) estimate that 200 million school children are either overweight or obese[13]. It is difficult to compare prevalence rates of childhood obesity in different countries due to several limitations: lack of nationally representative surveys of school children and paucity of serial measurements over time[14]. Lower BMI (body mass index) cut-offs of 23 and 25 kg/m<sup>2</sup> have been suggested by the World Health Organization (WHO) and IOTF for Asian Indian adults for overweight and obesity, respectively but these are not applicable for children and adolescents[15].

Our study revealed that there were 42.5% non- obese (males- 47.5%, females- 37.5%), 16% overweight (males- 13.5%, females- 18.5%), 28.5% obese (males- 25%, females- 32%) and 13% morbid obese) males- 14%, females- 12%). Singh et al[16] studied prevalence of overweight, obesity (stage 0,1,2) and morbid obesity in adult to determine burden of this lifestyle disorder in different age groups and sexes among 1000 subjects. In study population 41.5% subjects were non-obese, 15.9% were overweight, 29.4% were obese and 13.2% were morbidly obese. The prevalence of all the 3 conditions (overweight, obesity and morbid obesity) increased with increasing age in both sexes. The prevalence was more among females of all age groups than males for 'overweight' and 'obesity'. But gender- based difference narrowed down with increasing severity of disease, such that female to male ratio reversed.

Our results showed that maximum non- obese (60%) were seen in age group 18-20 years, overweight (20%) in age group 18-20 years, obese (38%) in age group 20-22 years and morbid obese (18%) in age group 23-25 years. Rohila et al[17] determined the prevalence of overweight and obesity and the associated risk factors in 1900 adolescents in the age group of 10-19 years. International Obesity Task Force (IOTF) classification was used for the estimation of being overweight and obese. The mean age of the study subjects was 14.84 years (SD =

2.81). Mean weight increased from 34.7 to 55.09 kg from the age group 10-13 to 17-19 years. Mean height also increased from 1.34 to 1.57 m from the age group 10-13 to 17-19 years. Similarly, the mean body mass index was 19.23 at 10-13 years, followed by 21.11 at 14-16 years and 22.46 at 17-19 years. On binary logistic regression analysis, female gender, bus as a mode of transport, not playing games, and single sibling were found to have independent association with prevalence of being overweight.

Goyal et al[18] reported that outdoor games on weekly basis had an odds ratio of 1.75 for obesity and overweight in comparison to no outdoor games having odds ratio 2.23. The prevalence of overweight and obesity among subjects using bus as mode of transport was found as 20.4% and 8.7% compared to subjects using cycle as a mode of transport in which it was 7.2% and 4.4%, respectively. Logistic regression analysis revealed that bus as a mode of transport is a strong predictor of overweight and obesity. Going to school by bus/auto was associated with 2.14 times risk of developing obesity. Ranjani et al<sup>19</sup> in their study prevalence data from 52 studies conducted in 16 of the 28 States in India were included. The median value for the combined prevalence of childhood and adolescent obesity showed that it was higher in north, compared to south India. The pooled data after 2010 estimated a combined prevalence of 19.3 per cent of childhood overweight and obesity which was a significant increase from the earlier prevalence of 16.3 per cent reported in 2001-2005.

### Conclusion

Obesity was most prevalent in females as compared to males. Age group 20-22 years had maximum obese subjects.

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