

# Prevalence and determinants of overweight and obesity among undergraduate medical students of Shyam Shah Medical College, Rewa

Anjana Niranjana, Manish Kumar, Paharam Adhikari, Manoj Saxena

Department of Community Medicine, Shyam Shah Medical College, Rewa, Madhya Pradesh, India.

Correspondence to: Anjana Niranjana, E-mail: dr.anju09@gmail.com

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## Abstract

**Background:** Obesity is a major global burden. Low levels of physical activities, watching TV, and dietary patterns are modifiable risk factors for overweight and obesity in adolescent.

**Aim and Objectives:** The main objective of the present study was to assess the prevalence of overweight and obesity and their determinants among undergraduate medical students.

**Materials and Methods:** The present study is a cross-sectional study conducted on undergraduate students of Shyam Shah Medical College, Rewa, Central India. All medical students were selected from 2nd prof to Internship, they were interviewed by predesigned questionnaire, between the time period of October 1, 2015 and November 30, 2015 and data were analyzed with the help of Epi-Cal info 2000. Indian guidelines were used to define normal weight, overweight, and obesity.

**Result:** Out of a total 280 medical students, 94 were girls and 186 were boys and it was found that in males 69.89% were normal weight, 21.50% were over-weight, and 8.60% were obese. Similarly, among females 56.38% were normal weight, 31.91% were over-weight, and 11.70% were obese. Stress and physical activities in medical profession and long course and over-expectation from themselves are important determinants in overweight and obesity among students.

**Conclusion:** Overweight and obesity are important emerging problems even in medical profession, it can lead to fatal outcome in later life. Hence, it is important to be notice early and try to control it by changing modifiable risk factor associated with it.

**KEY WORDS:** Medical student, normal weight, overweight, obesity

## Introduction

This is a great changing era, in the 21st century, changes occur in all things not only in science and technology, but also in the epidemiology of many diseases and events. Because of epidemiological transition the pattern of the diseases has shifted towards the beginning of certain chronic and life styles ailments such as cardiovascular disorders, COPD, cancer, hypertension, obesity, etc.<sup>[1]</sup>

In recent times, obesity has become one of the chronic disorders affecting the larger population than any other chronic diseases in the world. This mainly affects the adult population and the prevalence of children and adolescent obesity is also increasing. According to the World Health Organization (WHO) data, nearly 20–40% of adult population and 10–20% of children are affected by obesity.<sup>[2]</sup> In India, according to the findings from the 2007 National Family Health Survey,<sup>[3]</sup> the prevalence of overweight or obese is 12.1% males and 16% females, and in Madhya Pradesh its prevalence is 5.4% males and 6.7% females.

Obesity, which was first identified in the Northern Hemisphere and now it has become a pandemic health problem; affecting almost all the countries of the world. First obesity was identified as an affluent society health problem but now it is also affecting the rural places and persons belonging to the lower socioeconomic group. Various epidemiological determinants have been responsible for the development of obesity, notably among them are dietary patterns and dietary

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habits, physical inactivities, alcoholism, stress, and family history of any chronic health problem like obesity, diabetes, hypertension, etc.

Body Mass Index (BMI) has been one of the most common tools with the help of it one can determine the transition of a person from normal weight to obesity. It is simple to calculate and categorizes a person as underweight, normal, overweight, and obese.<sup>[2]</sup> Thus, BMI not only identifies obesity, but also provides us an opportunity to take timely measures in their pre-obese stages to prevent the progression of disease from pre-obese to obese. Overweight and obesity have reached a peak of epidemic in developed countries and now begins to decline but at present it is rapidly increasing in many middle-income and low income countries,<sup>[4]</sup> even at that time it was spread in those countries where the major nutritional disorder was malnutrition.<sup>[5]</sup> Hence the developing countries face the dual problem of newly increasing obesity and previously existing malnourishment. As the prevalence of obesity increases, the potential health problems associated with the obesity also increase correspondingly, like hypertension, coronary artery disease, diabetes mellitus, dyslipidemia, cholecystitis, pancreatitis, sleep apnea, and osteoarthritis.<sup>[6,7]</sup>

Globally, the transition pattern of health problems from communicable diseases to non-communicable diseases has also changed the priority of health policy makers all over the world including developed and developing countries. Among these obesity has become a major health problem and causes 2.6 million deaths every year worldwide.<sup>[8]</sup> Hence, it needs a serious public health concern. Of the factors contributing to obesity, like stress it seems to be an important determinants as stressful condition leads to irregularity in dietary patterns and addiction, each being considered independent factors leading to obesity.<sup>[9]</sup> As it is known that the medical education is stressful condition throughout the whole course of training from entrance examination to even whole life of practices. The long duration of course, pressure of examination, discrepancies between expectation and reality of life, and expectations of family and society all can lead to psychological stress.<sup>[10]</sup> Hence, by keeping all these things in mind this study was undertaken with the objective to find out the prevalence of overweight and obesity among undergraduate medical students and its associated epidemiological determinants.

## Material and Methods

The study was an observational cross-sectional study carried out among medical undergraduate students of Shyam Shah Medical College, Rewa, M.P., central India, between the time period of October 1, 2015 to November 30, 2015. All undergraduate medical students included in the study are from 2nd year to Internship who come in contact during the data collection at the time of their class conduction, after taking informed consent to participate in the study from all of them, only those student were excluded from the study who were not given consent to participate in the study and who are in 1st year M.B.B.S. so the total sample size obtained was 280.

The questionnaires contained the information regarding physical parameters like names, age, sex, year of admission, body weight, height, type of diet (vegetarian/non-vegetarian), dietary habit (regular/irregular), physical exercise (presents/absent) and any addiction (present/absent), any stress (present/absent), family history of obesity, diabetes, hypertension, etc.

For calculation of BMI by using the formula: weight (kg)/height<sup>2</sup> (m<sup>2</sup>), height and weight of each subject were recorded. According to WHO, BMI less than 25 was considered normal, 25–29.9 was overweight, and 30 or above obese. In 2012 the guidelines were released jointly by the Health Ministry, the Diabetes Foundation of India (DFI), the All-India Institute of Medical Science (AIIMS), Indian Council of Medical Research (ICMR), the National Institute of Nutrition (NIN), and 20 other health organizations.

But in India's new diagnostic cut-off for the BMI is 23 kg/m<sup>2</sup> was set up opposed to 25 kg/m<sup>2</sup> globally. A person with a body mass index of 23 kg/m<sup>2</sup> and above will now be considered overweight and below 23 kg/m<sup>2</sup> as normal BMI, and those with BMI of 25 kg/m<sup>2</sup> will be clinically termed obese, and those with BMI of 32.5 kg/m<sup>2</sup> will require bariatric surgery to eliminate excess flab. Result of the research conducted over several years has shown that the Indian bodies and genetics are different from their western counterparts as Indians suffer from abdominal obesity compared to people in the West whose bodies are uniformly obese.

## Data Analysis

The prevalence of overweight and obesity was calculated by using the formula as (Number of cases found to be overweight or obese/number of study population × 100). Significance of determinants influencing body weight such as type of diet, dietary habit, exercise or addiction and family history were performed by Chi-square test, with the help of Graph pad software.

## Results

In the present study, it was found that out of total 280 participants, 60.71% students were from 2nd prof and least (7.5%) was from internship. Out of total participants, the prevalence of obesity was 9.64% and over-weight was 25%, and 65.35% were with normal weight in which higher obese person was in final part-I followed by Internship, and least was in 2nd prof as shown in Table 1.

In the present study, it was found that most (85.71%) of the participants belong to age group of 21–25 years, least were in extreme age group like 15–20 years or > 30 year. In total participants 66.42% were males and 33.57% were females, in males 69.89% were normal weight, 21.50% were over-weight and 8.60% were obese. Similarly among females 56.38% were normal weight, 31.91% were over-weight, and 11.70% were obese. Hence, the prevalence of over-weight and obesity were found to be high in females as compared to males, as shown in Table 2.

Table 3A and B shows the distribution of males and females, respectively, with the factors influencing body weight.

**Table 1:** Distribution of the study population and prevalence of overweight and obesity

Attending Level of undergraduate	Normal weight (BMI <23)	Overweight (BMI >23 – <25)	Obese (BMI >25)	Total Participants
2 <sup>nd</sup> Prof	126	35	13	170
Final Part-I	24	14	7	42
Final Part-II	21	13	4	37
Internship	12	8	3	21
Total =	183	70	27	280

Chi-square = 10.815, *p* value = 0.094

**Table 2:** Show the distribution of participant according to age group and gender wise with their normal weight, overweight and obese

Age-Group (years)	Male			Female		
	Normal weight	Overweight	Obese	Normal weight	Overweight	Obese
15-20	2	00	00	1	1	00
21-25	112	34	12	51	22	9
26-30	15	5	3	2	6	2
>30	1	1	1	00	1	00
Total =	130 (69.89%)	40 (21.50%)	16 (8.60%)	53 (56.38%)	30 (31.91%)	11 (11.70%)

In male chi-square = 4.572, *p* value = 0.5997 and in females chi-square = 9.213 and *p* value = 0.1620

**Table 3A:** Distribution of Male subjects based on factors influencing body weight and their significance

Body weight influencing factors	Normal weight	Overweight	Obese	Significance
Diet type				<i>P</i> = 0.0452
Vegetarian	88	28	6	S
Non vegetarian	42	12	10	
Diet frequency				<i>P</i> = 0.1998
Regular	74	22	11	NS
Irregular	56	8	5	
Exercise				<i>P</i> = 0.1593
Present	38	6	3	NS
Absent	92	34	13	
Addiction				<i>P</i> = 0.1657
Present	42	8	7	NS
Absent	88	32	9	
Family history of obesity				<i>P</i> = 0.0001
Present	6	11	8	S
Absent	124	29	8	
Family history of Diabetes				<i>P</i> = 0.0052
Present	12	7	6	S
Absent	118	33	10	
High energy foods				<i>P</i> < 0.0001
Once a week	120	30	5	S
>3 Times a week	10	10	11	
TV/Computer watching per day in Hrs.				<i>P</i> < 0.0001
1-2	89	9	2	S
2-3	30	14	10	
>3	11	7	4	
Any professional stress present				<i>P</i> = 0.0248
Yes	32	18	7	NS
No	98	22	9	

**Table 3B:** Distribution of Female subjects based on factors influencing body weight and their significance

Body weight influencing factors	Normal weight	Overweight	Obese	Significance
Diet type				$P = 0.1388$
Vegetarian	48	23	8	NS
Non vegetarian	5	7	3	
Diet frequency				$P = 0.2236$
Regular	49	24	9	NS
Irregular	4	6	2	
Exercise				$P = 0.9373$
Present	12	7	2	NS
Absent	41	23	9	
Addiction				$P = 0.6764$
Present	1	00	00	NS
Absent	52	30	11	
Family history of obesity				$P = 0.0002$
Present	5	8	7	S
Absent	48	22	4	
Family history of Diabetes				$P = 0.0046$
Present	2	6	4	S
Absent	51	24	7	
High energy foods				$P = <0.0001$
Once a week	50	16	3	S
>3 Times a week	3	14	8	
TV/Computer watching per day in Hrs				$P = 0.0412$
1-2	28	12	2	S
2-3	22	13	5	
>3	3	5	4	
Any professional stress present				$P = 0.3715$
Yes	4	6	3	NS
No	49	34	8	

S = significant. NS = non-significant.

However, in males their dietary patterns, family history of obesity and diabetes, intake of high energy food, watching TV/ computer were significantly associated with their body weight. And in females except their dietary patterns all factors were same to show their significant association with body weight.

In the present study, it was found that the BMI has shown a significant association with family history of both diabetes and obesity, but when compared the family history of obesity had more significant association than that of family history of diabetes.

## Discussion

The present study was conducted among the medical students of Shyam Shah Medical College, Rewa Central India, the total participants were 280, among them most (60.71%) were from 2nd prof and least (7.5%) were from internship, as 100 students took up admission in the beginning of the year 2013 and before that only 60 students had got admission in each batch. Out of the total participants the prevalence of obesity was 9.64% and over-weight was 25% while 65.35% were with normal weight in which higher number of obese

students were in the final part-I followed by Internship, and least were in 2nd prof, however this distribution was not significant as  $p$ -value observed was not more than 0.04 ( $p$ -value = 0.094), higher prevalence of over-weight and obese were found as Indian cut-off value of BMI was used for defining normal weight, over-weight, and obesity.

In the present study, it was found that most (85.71%) of the participants belong to the age group of 21–25 years, least were in extreme age group like 15–20 year or > 30 year. This was because most of the participants were from second prof and they were mostly in age group of 21–25 years, however there was no significance difference in their body weight according to age in both males and females as  $p$ -value observed was not more than 0.04 (in male,  $p = 0.5997$  and in females  $p = 0.1620$ ). In total participants 66.42% were males and 33.57% was females and male/female ratio was 1.97:1, in males 21.50% were over-weight and 8.60% were obese and in females 31.91% were over-weight and 11.70% were obese. Hence, the prevalence of over-weight and obesity was high in females than males. The differences observed in the prevalence of obesity and overweight between males and females may be because of higher physical activity level found among males as compared to females.

The finding of the present study however shows that in males their dietary pattern, family history of obesity and diabetes, intake of high-energy food, and watching TV/computer were only significantly associated with their body weight. And in females except their dietary pattern all factors were same to show their significant association with body weight.

Similarly, a study conducted by Shukla et al<sup>[11]</sup> found that the rate of obesity in male was 19% and in female it was 30%. Similarly a study by Zargar et al<sup>[12]</sup> has also reported the rate of obesity in male as 7.01% and in female as 23.69%. All these above studies support the findings of the present study.

But contrast to this, a study conducted by Gupta et al<sup>[13]</sup> found that the obesity was higher among males as compared to females. Out of 114 total students, 70 were male and 44 were female (M:F = 1.6:1). Out of 70 male students, 11 were overweight and 4 were obese whereas out of 44 female students, 9 were found to be overweight and none were obese. An overall prevalence of overweight and obesity was found to be 17.5%, and 3.4%, respectively.

Similarly a study conducted by Chhabra et al<sup>[14]</sup> found that the prevalence of overweight and obesity among medical students of Delhi were 11.7% and 2%, respectively. And a study conducted by Goyal et al<sup>[15]</sup> has reported that the overall prevalence of obesity and overweight were 6.55% and 13.9%, respectively. The prevalence of obesity and overweight were, respectively, 6.7% and 15.1% in boys and 6.4% and 13.35% in girls. A study conducted by Tiwari et al<sup>[16]</sup> has found that the 34.4% of males and 31.3% females were obese according to the WHO classification of BMI, the difference in prevalence of obesity may be due to that study was conducted on older group and may be also because of the increase in the BMI in the older group, i.e., after the age of 30 year.

In all the above study the prevalence of obesity and overweight were more in boys compared to girls but in present study prevalence of over-weight and obesity were more in girls than boys.

Similar to the finding of present study, a study conducted by Baker et al<sup>[17]</sup> has reported that the most important factors responsible for obesity were, long time spent on computer, eating more during time of stress, and eating snacks between meals. Similarly, Goyal et al<sup>[15]</sup> found that the important influencing factors for overweight and obesity were low levels of physical activity, watching television or playing computer games, and consuming junk foods, snacks, carbonated drinks, etc. Similarly a study conducted by Amin et al<sup>[18]</sup> has found that the less educated and working mothers' children were overweight and obese. This may be because they were missing or giving infrequent meals to their children on their demands without any rule and knowledge, like missing and or infrequent intake of breakfast at home, frequent consumption of fast foods, low servings per day of fruits, vegetables, milk and dairy products, with frequent consumption of sweets/candy and carbonated drinks which are all predictors of obesity and overweight among the children, all these above studies support the finding of the present study.

## Conclusion

The findings of the present study concluded that regular exercise avoiding high-energy food and taking care of factors which cause stress could help in improving the health of the medical students, and regular screening for student who have family history of diabetes and hypertension and obesity is a must because these factors were found to be highly significantly associated with their body weight.

## References

- Harrison. *Harrison's Text Book of Internal Medicine*, 16th edn. McGraw Hill, pp. 422–9.
- Park K. *Textbook of Preventive and Social Medicine*, 18th edn. Jabalpur: M/s Bananridas Bhanot, 2005. pp. 316–9.
- National Family Health Survey, 2005–06. Mumbai: International Institute for Population Sciences, 2007.
- Chopra M, Galbraith S, Darnton-Hill I. A global response to a global problem: the epidemic of over nutrition. *Bull World Health Organ* 2002; 80: 952–8.
- Dennis M, Styne MD. Childhood and adolescent obesity prevalence and significance. *Pediatr Clin North Am* 2001;48: 823–54.
- Must A, Jacques PH, Dallal GE, Bafema CJ, Dietz WH. Long term morbidity and mortality of overweight adolescents: A follow up of Harvard growth study of 1922–1935. *N Engl J Med* 1992; 327: 1350–5.
- Hill JO, Trowbridge FL. Symposium on the causes and health consequence of obesity in children and adolescents. *Pediatrics* 1998;101:S497–574
- World Health Organization. 1. *Preventing Chronic Diseases: A Vital Investment. World Global Report*. Geneva: World Health Organization, 2005.
- Kumar S, Mahabalaraju KD, Anuroopa MS. Prevalence of obesity and its influencing factor among affluent school children of Devanagere city. *Indian J Community Med* 2007;32:15–7.
- Srinivasan K, Vaz M, Sucharita S. A Study of stress and autonomic nervous function in first year undergraduate medical students *Indian J Physiol Pharmacol* 2006;50:257–64.
- Shukla HC, Gupta PC, Mehta HC, Herbert JR. Descriptive epidemiology of body mass index of an urban adult population in western India. *J Epidemiol Community Health* 2002;56: 876–80.
- Zargar AH, Masoodi SR, Laway BA, Khan AK, Wani AI, Bashir MI, et al. Prevalence of obesity in adults – An epidemiological study from Kashmir Valley of Indian Subcontinent. *J Assoc Physicians India* 2000;48:1170–4.
- Gupta S, Ray TG. Overweight, obesity and influence of stress on body weight among undergraduate medical students. *Indian J Community Med* 2009;34(3).
- Chhabra P, Grover VL, Aggarwal K, Kanan AT. Nutritional status and blood pressure of medical students in Delhi. *Indian J Community Med* 2006;31:248–51.
- Tiwari R, Srivastava D, Gour N. A cross-sectional study to determine prevalence of obesity in high income group colonies of Gwalior City. *Indian J Community Med* 2009;34(3).
- Goyal JP, Kumar N. Determinants of overweight and obesity in affluent adolescent in Surat City, South Gujarat region, India. *Indian J Community Med* 2011;36(4).

17. Baker EM, Ismail NA, Mahaba HM. Impact of lifestyle on the nutritional status of medical students at Ain Shams University. *J Egypt Public Health Assoc* 2002;77:29–49.
18. Tarek Tawfi K Amin, Ali Ibrahim Al-Sultan, Ayub Ali. Overweight and obesity and their association with dietary habits, and socio-demographic characteristics among male primary school children in Al-Hassa, Kingdom of Saudi Arabia. *Indian J Community Med* 2008;33(3).

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