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Research Article

EPIDEMIOLOGICAL STUDY OF OBESITY IN URBAN POPULATION BASED ON BODY MASS INDEX

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ABSTRACT
Obesity and the lifestyle characteristic of Indian society lead young people to conditions of potential cardiovascular risk. A recent meta-analysis reveals that prevalence of overweight and obesity was higher among boys than girls, and had increased among urban dwellers during the last decade. Present study is a cross sectional study to estimate the prevalence of obesity in different age group, sex and body mass index (BMI) of urban population. Study was conducted on 3993 urban population in and around Urban Health Training Centre of Department of Community Medicine, JNMC, AMU Aligarh, between age groups of 15-65 years. Data were analyzed statistically using Graph Pad Software Inc., [11452El Camino Real, # 215 San Digeo 92130, USA]. It was found that the overall prevalence of obesity in males and females was 6.8% and 12.8% respectively. The peak prevalence was 11.9% in males and 23.7% in females in age groups of 40-49 years and the lowest prevalence was 1.7% in males of age group of 20-29 years and 3.5% in females of age group 15-19 years. It is concluded that prevalence of obesity was more in females as compared to males. Peak prevalence was seen in middle age and lowest in early age group of both sexes.

Keywords*: Obesity; Urban Population; Body Mass Index (BMI) or Quetelets Index*

INTRODUCTION
Obesity is defined as excessive unhealthy accumulation of body fat. India has the third largest obese population in the world after United States of America and China (Mahawar, 2014). Obesity is an important public health concern, both in developed as well as developing countries. It remains largely an unsolved medical problem, and is a major contributor to the global burden of chronic disease and disability (World Health Organization, 2002).
Obesity and the lifestyle characteristic of Indian society lead young people to conditions of potential cardiovascular risk (Pengpid and Peltzer, 2014). A recent meta-analysis reveals that prevalence of overweight and obesity was higher among boys than girls, and had increased among urban dwellers during the last decade (Hoque *et al.,* 2014). Prasad *et al.,* had concluded in their population based survey that one-third of the urban populations are obese in Eastern India. Nevertheless, significant associations of the classical cardio metabolic risk factors with obesity were observed using the revised Asia–Pacific criteria clearly indicating a more aggressive cardiovascular prevention strategy for Asian Indians (Prasad *et al.,* 2013). BMI has strong association with TBF (Total body Fat) and PBF (percent of body weight as fat) and is a better criteria of measuring overweight and obesity (World Health Organization, 2002), as it obviates the need for weight and height charts and also it is not affected by type of body built (light, medium or heavy). Obesity is defined as a state of excess body fat (Mahajan and Gupta, 1991; Diet Nutrition and Prevention of Chronic Diseases Technical Report Series, 1990; Facility and Burgeres, 1993) and expressed as their weight in kilograms divided by the square of their height in meters (Department of health and the health and social care information centre (2004; North American Association for the study of obesity and the national heart, and blood institute). The key causes of this epidemic are the increase consumption of energy-dense, nutrient-poor foods that are high in saturated fats and sugars, and reduced physical activity (World Health Organization, 2002).

According to the World Health Organization, there are more than one billion overweight adults, of which at least 300 million are clinically obese, worldwide. Approximately two-thirds of the US adults are overweight or obese (World Health Organization, 2002). In the UK, between 1980 and 2000 the prevalence of obesity rose from 6% of men and 8% of women to 21% and 21.4%, respectively[6].

Obesity is complex condition associated with increase risk of numerous diseases, including type 2 diabetes, hypertension, stroke, cardiovascular disease, respiratory problems, gallbladder disease, osteoarthritis, sleep apnoea and certain cancer. Obesity also has serious social and psychological consequences, such as low self-esteem and clinical depression, and affects all ages and socioeconomic groups (Ajay, 1982).

With the exception of all but the most extreme of cases, the successful management of obesity is possible through lifestyle changes in diet and physical activity alone, although low compliance with such regimes has inevitably prompted interest in the development of effective therapies, including gastrointestinal surgery and pharmacological interventions.

MATERIALS AND METHODS

The present study was conducted in and around Urban Health Training Centre of Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, and Aligarh. The number of individuals in age group of 15-65 years was 4162 which constituted 58.15 percent of total population under study. Total number of individuals who were actually screened were 3993 (96%), 169 individuals (4%) could not be screened because of their non-availability, pregnancy, severe debilitating disease, having as cites and/or edema.

In 3993 individuals their weight without foot wears and minimum clothing was taken in kilograms to the nearest half of a kilogram, on a portable shelter type of weighing machine. Their height was increased to the nearest half of a centimeter without foot wears against a marked wall in erect position with heal touching the wall and to gaze at horizon.

Data was collected and recorded in a Performa and later tabulated, calculated by using BMI formula and analyzed. It was calculated by individual's body mass divided by the square of their height – with the value universally being given in units of kg/m2.

$$\mathrm{BMI} = \frac{\mathrm{mass(kg)}}{(\mathrm{height(m)})^2}$$

RESULTS AND DISSCUSON

Results

In present study population (3993), 2002 were males and 1991 were females. The maximum number of individuals in both sexes were in age group of 20-29 years (29.6% males and 28.5% females) and minimum number of individuals were in age group of 60-65 years (6% males and 6.6% females) as given in Table I.

Table 1: Distribution of the Study Population According to Age and Sex

Age in Years	Male Number (%)	Female Number (%)
15 - 19	420 (21.0)	315 (15.8)
20 - 29	594 (29.6)	567 (28.5)
30 - 39	372 (18.6)	407 (20.4)
40 – 49	244 (12.2)	384 (19.3)
50 - 59	252 (12.6)	187 (9.4)
60 - 65	120 (6.0)	131 (6.6)
Total	2002 (100%)	1991 (100%)

The overall prevalence of obesity (BMI> 30) in males and females was 6.8% and 12.8% respectively. The peak prevalence of obesity was in age group of 40-49 years (11.9% males and 23.7% females) where as the lowest prevalence of obesity in males was observed in age group of 20-29 years (1.7%) and in female in age group of 15-19 years (3.5%) as per Table II and Table III.

Table 2: Distribution of Male Population Based on Body Mass Index (BMI)

Age in Years	**Body Mass Index**				
(No. of Patients)	**< 20**	**20 – 24.9**	**25 – 29.9**	**30 – 40**	**> 40**
15 – 19	318	82	8	12	0
(n= 420)	(75.7)	(19.5)	(1.9)	(2.9)	(0)
20 – 29	207	288	89	10	0
(n= 594)	(34.8)	(48.5)	(15.0)	(1.7)	(0)
30 – 39	52	182	107	32	0
(n= 372)	(14.0)	(48.9)	(28.8)	(8.6)	(0)
40 – 49	51	89	74	29	1
(n= 244)	(21.0)	(36.5)	(30.3)	(11.9)	(0.4)
50 – 59	56	100	69	27	0
(n= 252)	(22.2)	(39.7)	(27.4)	(10.7)	(0)
60 – 65	34	45	14	27	0
(n= 120)	(28.3)	(37.5)	(11.7)	(22.5)	(0)
Total	718	786	361	137	1
(n= 2002)	(35.9)	(39.3)	(18.0)	(6.8)	(0.04)

Figure in bracket indicates the percentage of the value above it.

Table 3: Distribution of Female Population Based on Body Mass Index (BMI)

Age in Years	**Body Mass Index**				
(No. of Patients)	**< 20**	**20 – 24.9**	**25 – 29.9**	**30 – 40**	**> 40**
15 – 19	201	96	7	11	0
(n= 315)	(63.8)	(30.5)	(2.2)	(3.5)	(0)
20 – 29	262	230	53	22	0
(n= 567)	(46.2)	(40.5)	(9.3)	(3.9)	(0)
30 – 39	63	193	92	59	0
(n= 407)	(15.5)	(47.4)	(22.6)	(14.5)	(0)
40 – 49	24	125	142	91	2
(n= 384)	(6.2)	(32.6)	(37.0)	(23.7)	(0.5)
50 – 59	7	75	65	40	0
(n= 187)	(3.7)	(40.1)	(34.8)	(21.4)	(0)
60 – 65	16	41	43	31	0
(n= 131)	(12.2)	(31.3)	(32.8)	(23.7)	(0)
Total	573	760	402	254	2
(n= 1991)	(28.8)	(38.1)	(20.2)	(12.8)	(0.1)

Figure in bracket indicates the percentage of the value above it.

Discussion

The observation in present study was similar as compared to Sood (Ajay, 1982) where he observed maximum population in age group 20-29 years (29.5% males and 28.0% females) and minimum population in age group of 60-65 years (6% males and 7% females). The prevalence of obesity in males and females in present study is low as compared to Sood (Ajay, 1982) and Gupta (Gupta, 1989). Who

reported the prevalence of 8.4% and 9.8% in males and 15.1 % and 18.8% in females respectively? This difference is due to the fact that the upper cut off limit used for estimation obesity in present study was higher (BMI>30) as compared to Sood (BMI>27) and Gupta (BMI>25). Furthermore, sidhu and kumari had conducted a study on obesity on urban and rural males of Amritsar and they concluded that the overall prevalence of overweight and obesity among Punjabi adult men, according to WHO (1998) classification, is 24.7%. The high prevalence is supposed to be due to selection of Punjabi population with higher socioeconomic status. The diet pattern of Punjabis is also different from others (Sidhu and Kumari, 2006).

Kalra *et al.,* has reported the highest prevalence of obesity (7.8%) and overweight (36.9%) among subjects aged 35-44 years in both sexes. The slight variation with our finding was seems to be due to higher number of sample size taken from different regions of India (Kalra and Unnikrishnan, 2012). Our result was in agreement with many studies that prevalence of obesity was more in female as compared to male group. Seiga *et al.,* had reported that the age range of 25–44 years is the time when women tend to gain the greatest amount of weight. Among women of childbearing age, one potential pathway for the development of obesity has been through the retention of gestational weight gain (Siega *et al.,* 2004).

Conclusion

So it can be concluded from the present study that prevalence of obesity was more in female as compared to male group and the peak prevalence of obesity in both sexes was in middle age group. The lowest prevalence was found in early age group in both sexes.

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