



Study of Sex Wise Prevalence of Obesity in Urban and Rural Population



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Abstract

Aim: Rural residents have higher rates of chronic diseases compared to their urban counterparts; however, its reasons are unknown. We hypothesize that obesity may be one of the main contributors of increased illness, to this disparity one of the reasons can be change in lifestyle. This study analyses obesity prevalence in rural and urban adults using body mass index classification with measured height and weight that correlates amount of obesity across rural and urban residence are examined. This was so done to analyse and study the emergence and prevalence of Obesity in different age groups.

Method: The present study was to investigate the Obesity level among population of Ahmadabad and Villages. Name of Zone in Ahmadabad city: Vejalpur, Navrangpura and that of Villages: Hasanpura, Gangad, Zanzaraka. The data obtained randomly from 300 individual from Urban and Rural area to get a clear data of common people who don't have routine check-up. Analysis was done using Omron HBF-375 body composition monitor.

Result: BMI, BMR, TSF, body age, body fat % was observed significantly high in urban population whereas muscle mass was seen more in rural population.

Conclusion: The rise in obesity and its complications threatens to bankrupt the healthcare system. Early treatment and prevention offer multiple long term health benefits, and they are the only way towards a sustainable health service.

Keywords: Obesity, Urban, Rural, Male, Female, BMI, BMR, TSF, Body Age, Body Fat, Lifestyle, Surrounding Environment

Abbreviations: BMI: Body Mass Index, BMR: Basal Metabolic Rate, TSF: Triceps Skin Fold, NCD: Non-Communicable Diseases, CURES: Chennai Urban Rural Epidemiology Study

Introduction

Obesity is considered as 'global epidemic' and one of the most important and neglected public health problems [1,2]. Obesity is a multi-factorial and challenging problem that is increasing at an alarming rate across the globe without any biases in age group [3]. Obesity can be seen as the first wave of a defined cluster of most non transmittable diseases called New World Syndrome creating great socioeconomic and public health burden in underdeveloped and developing countries [1]. Obesity is simply defined as accumulation excess of body fat that leads to adverse health effects. This excessive fat builds up results from an imbalance between calories consumed on one hand and calories expended on the other hand [4]. Overweight and obesity are key risk factors for many chronic diseases, including diabetes, cardiovascular diseases, and cancer. Obesity is attributed to around 44% diabetes, 23% of the ischemic heart diseases, 7%- 41% of few cancers and other diseases like type 2 diabetes mellitus, osteoarthritis [5-7].

Studies say that India will become the global diabetes capital by 2050 if the abdominal and lower limb obesity and metabolic syndrome are not arrested. Obesity and overweight are linked with deaths worldwide. Around 3.4 million adults die each year due to overweight. There is a vast difference in the quality of life in urban population resulting in substantial increase in obesity in the urban population [8]. Obesity is also on the rise with excessive consumption of processed foods, high fat diets and acquiring sedentary lifestyle [9]. Malnutrition and Underweight is high in rural, urban slums and tribal areas of India and it is growing issue [1].

Method

The present study was to investigate the Obesity level among the population of Ahmadabad and Villages. Name of Zone in Ahmadabad city: Vejalpur, Navrangpura and that of Villages: Hasanpura, Gangad, Zanzaraka. The study protocol was approved

by Gujarat University Institutional Ethical Clearance [GUJ-IEC-09-2015]. The data obtained randomly from 300 patients from each Urban and Rural area to get a clear data of common people who don't have routine check-up. also categorized in six groups (18-20, 21-30, 31-40, 41-50, 51-60, >60). Analysis was done using Omron HBF-375 body composition monitor.

Exclusion Criteria

Pregnant women were not taken as a part of study. People such as body builders were not taken as a part of study. Infants and children's were not taken in to an account. Aged people above 80 were also excluded.

Inclusion Criteria

Adults of age above 18 years and below 80 years of age were considered.

Statistical Analysis

The differences between rural residents and urban residents were evaluated by Graph Pad Prism 7 with column analyses by t-test.

Result

The result shows that the basal metabolic rate (BMR), was significantly high in urban (1550 ±16.20) as compared to

village population and was more prevalent in males. Urban male (1626±20.24), rural male (1425±20.2) then in females (urban female=1441 ±23.33), rural female (1185±24.22). Body age: body age was observed significantly high in urban (52.58±0.86) then in rural area (37.68±1.24) and was observed slightly more in urban females and rural females (urban-55.32±1.316, rural-33.99±1.927) then in urban males and rural males (urban males-51.19±12.7,rural-36.57±1.625).Body fat %: it was observed high in urban area (32.71±0.44) then in rural area (30.73±1.29). Body fat % was observed slightly more in age group above 60 and was observed more in females (urban females-37.1±0.53, rural females-33.87±0.82 then in males (urban males-29.55±0.53, rural males-28.02±2.27). Muscle mass: Muscles mass was observed significantly high in rural (29.58±1.17) then in urban area (26.09±0.37). Triceps skin fold: TSF is observed more in urban (32.29±0.47) then in rural (20.79±0.58). Moreover, TSF is observed more in females (urban-29.12±0.62, rural 24.30±0.68) then in females (20.21±0.49 and rural male 17.47±0.79). Visceral fat was observed high in urban area (12.28±0.40) and that in rural area was observed 8.28±0.46. BMI was observed more in urban (28.00±0.34) and that in rural (24.19±0.43). Moreover, BMI was observed more in females (urban 28.84±0.57 and rural females 26.42±0.41) Then that in males (urban27.37±0.42 and in rural 23.60±0.58) (Table 1-4).

Table 1: BMI of Urban and Rural males, females.

	BMI	
	Mean ± SEM	P. value
Urban (males+females)	28.00 ± 0.3470,	< 0.0001,0.9288
Rural (males+females)	24.19 ± 0.4380,	
Urban males	27.37 ± 0.4210,	< 0.0001,0.4230
Rural males	23.60 ± 0.5822,	
Urban females	28.84 ± 0.5762,	0.0005,0.1528
Rural females	24.41 ± 0.4137,	

Values mean ±S. E M

Table 2: Percentage of normal, underweight, overweight, and obese people according to BMI in males, females.

Parameters	Normal (%)	Underweight (%)	Overweight (%)	Obese (%)	Total (%)
Males	35.3	11.38	28.58	19.1125	23.59313
Females	37.36	5.36	29.86	28.205	25.19625
Total	36.33	8.37	29.22	23.65875	

Values mean ±S. E M

Table 3: BMR in Urban and Rural males, females.

	BMR	
	Mean ± SEM	P. value
Urban (males+females)	1550 ± 16.20,	< 0.0001,0.0778
Rural (males+females)	1319 ± 17.86,	
Urban males	1626 ± 20.24,	< 0.0001,0.0078
Rural males	1425 ± 20.21,	

urban females	1441 ± 23.33,	< 0.0001,0.1634
Rural females	1185 ± 24.22,	

Values are mean ±S. E M

Table 4: Body age in Urban and Rural males, females.

	Mean ± SEM	P. value
Urban (males+females)	52.85 ± 0.8640,	< 0.0001,0.0196
Rural (males+females)	37.68 ± 1.247,	
urban males	51.19 ± 1.127,	< 0.0001,0.23290
rural males	36.57 ± 1.625,	
Urban females	55.32 ± 1.316,	< 0.0001,0.0203
Rural females	38.99 ± 1.927,	

Values are mean ±S. E M

Discussion

There was a great change in the health status in the world impelled by technological and socio-economic changes which greatly brought changes in life expectancy and ways of living. Unrestrained behaviour, lifestyle changes, and Dietary deficits that has accompanied with industrialization, and urbanization along with economic development which has made a significant contribution to the most globally persistent change of the rising burden of obesity and non-communicable diseases (NCDs). Obesity was labelled as a disease thirty six years ago when the WHO listed obesity as a disease state in its International Classification of Diseases in 1979. Prevalence of mortality trends is large relation to NCDs in developing countries (e.g., China, India, and Brazil) [10]. The Chennai Urban Rural Epidemiology Study (CURES) conducted in Chennai city in Tamil Nadu reported occurrence of obesity to be 45.9% [11]. Similar study conducted in urban north India [New Delhi], the overall prevalence of obesity was 50.1% [Bhardwaj et al, 2006]. Obesity in our study was found to be higher in females (urban females 36.6% and

that of rural is 19.7%) rather than in males (urban males 24.6% and that in rural males is 13.54). Several studies in India have reported predominance of obesity among women [12-16]. The prevalence of obesity among Indian women has increased from 10.6% (NFHS2 in 1998-1999) to 12.6% (NFHS3 in 2005-2006) i.e., an increase by 24.52 per cent in a 7-year period [17]. In our study Obesity in females was observed more, significantly in urban females. It was observed more in age group of 18-20 [66.66%] whereas in rural females' obesity was observed high in age group of above 60 (71.42). BMI was observed more in urban (28.00±0.34) and that in rural (24.19±0.43). Moreover, BMI was observed more in females (urban 28.84±0.57 and rural females 26.42±0.41) Then that in males (urban 27.37±0.42 and in rural 23.60±0.58). Studies indicate that central obesity, characterized by increased waist circumference is associated with an increased risk for a few diseases including cardiovascular diseases, non-insulin dependent diabetes mellitus, high blood pressure, gall bladder disease, stroke, and certain cancers in patients with a BMI in the range between 25 and 34.9 and is associated with overall mortality, independent of BMI [18] (Table 5-8).

Table 5: Body fat in Urban and Rural males, females.

	Mean ± SEM	P. value
Urban (males+females)	32.71 ± 0.4422,	< 0.0001,0.0918,
Rural (males+females)	30.73 ± 1.296,	
Urban males	29.55 ± 0.5326	< 0.0001, 0.4152
Rural males	28.02 ± 2.277	
Urban females	37.10 ± 0.5338	<0.05, 0.0091
Rural females	33.87 ± 0.8270	

Values are mean ±S. E M

Table 6: Muscle mass in Urban and Rural males, females.

	Mean ± SEM	P. value
Urban (males+females)	26.09 ± 0.3197,	< 0.0001, 0.0007
Rural (males+females)	29.58 ± 1.170,	

Urban males	28.46 ± 0.4099,	<0.0001,0.1747
Rural males	30.76 ± 0.4680,	
Urban females	22.64 ± 0.2855,	< 0.0001,0.0114
Rural females	28.11 ± 2.435,	

Values are mean ±S. E M

Table 7: TSF in Urban and Rural males, females.

	Mean ± SEM	P. value
Urban (males+females)	23.29 ± 0.4782,	0.0010,0.7614
Rural (males+females)	20.79 ± 0.5892,	
Urban males	20.21 ± 0.4971,	0.0024,0.0525
Rural males	17.47 ± 0.7985,	
Urban females	29.12 ± 0.6220	< 0.0001,0.6982
Rural females	24.30 ± 0.6846	

Values are mean ±S. E M

Table 8: VISCERAL FAT in Urban and Rural males, females.

	Mean ± SEM	P. value
Urban (males+females)	12.28 ± 0.4053	< 0.0001,0.2609
Rural (males+females)	8.285 ± 0.4692	
Urban males	12.71 ± 0.5101,	< 0.0001,0.2743
Rural males	7.722 ± 0.5932,	
Urban females	11.71 ± 0.4352	< 0.0001,0.2329
Rural females	8.952 ± 0.3904	

Values are mean ±S. E M

A study conducted in Delhi and rural Ballabgarh (Haryana State), revealed that overweight was widely prevalent in the urban population (men: 35.1%, women: 47.6%) compared to the rural population (men: 7.7%, women: 11.3%) [19]. Similar result was observed in our study where overweight was observed high in urban area than in rural area. Contradicting results were found to that of Reddy et al when the data was analysed in genders of different age group and on the other hand underweight was observed significantly high. In rural area and (in all age group) underweight was observed more in age group of 18-20 in urban area. This depicts the scenario of difference in quality of life in rural and urban region.

Asian Indians have a greater predisposition to abdominal obesity and accumulation of visceral fat, and this has been termed as "Asian Indian phenotype [12,20]. The increased waist circumference is unlikely to be due to visceral adipose tissue alone; it probably reflects both visceral and subcutaneous fat and hence total fatness. In contrast the body mass index measures the sum of fat mass and fat free mass, and it is impossible to know the relative contributions of each [21]. Our result depicts, visceral fat was observed high in urban area (12.28±0.40) and that in rural area was observed (8.28±0.46) even TSF is observed more in urban (32.29±0.47) then in rural (20.79±0.58). This reveals the unhealthy dietary habit and sedentary lifestyle which

in urban area which has resulted high BMI, VF and TSF value in urban than that in rural area. On the other hand, muscles mass was observed significantly high in rural (29.58±1.17) then in urban area (26.09±0.37) and underweight also observed more in rural population that depicts that, yet the amount of calorie burnt due work done is more still under nourished and underweight is observed more one of the reasons may be due to prevalence of poverty and laborious work done by them. This scenario shows the ill management in health care. In countries like India, the rise in obesity prevalence could be attributed to the increasing urbanization, increasing availability of processed and fast foods, use of mechanized transport, adoption of less physically active lifestyles, increased television viewing, and consumption of more "energy dense, nutrient poor" diets [4,18,22]. Socioeconomic status is another factor which has been linked to problem of overweight and obesity in many other studies [23,24]. Traditional diet has been replaced by the 'Western diet' and major declines in all phases of activity and increased sedentary activity as the main reasons explaining the rapid increase in overweight and obesity, bring major economic and health costs. [25-28].

Conclusion

Today India is confronted with a great nutritional puzzle because on one hand India's rich and urban population is facing

an epidemic of obesity which acts as a host to welcome other problems such as cardiovascular diseases, hypertension, metabolic syndrome, and is being projected to be the diabetic capital of the world resulting in increased morbidity and mortality from life style and non-communicable diseases and on the other hand India is home to largest number of malnourished population in the world especially the rural confronting malnutrition, sanitation related, communicable, water born and poverty diseases. In India there is a tremendous 'Urban (Rich)/Rural (Poor)' biasness and is further increasing in present era of globalisation and is contributing higher prevalence of obesity in the urban rich than in rural areas and poor communities. India is on its way ahead in increasing epidemic of lifestyle disorders associated with adult as well as childhood obesity. Few of the key reason of the epidemic in India can be unhealthy eating patterns, reduced physical activity, increased sedentary pursuits and possibly 'constitutional predispositions'/early origins. Prevention must begin early in the form of a public health campaign directed towards lifestyle changes of the family/society. The campaign requires strong social and political will. Health professionals must think 'prevention of obesity' at all visits, monitor BMI and ensure that 'nutrition messages are not conflicting and confusing. Standard treatment approaches for overweight and obesity must be tailored to the needs of various patients or patient groups.

Large individual variation exists within any social or cultural group; furthermore, substantial overlap occurs among subcultures within the larger society. Obesity affects almost every phase of life. The rise in obesity and its complications threatens to bankrupt the healthcare system. Early treatment and prevention offer multiple long term health benefits, and they are the only way towards a sustainable health service. A good system of specialties can contribute to manage the great Indian nutritional puzzle of epidemic of obesity on one hand and grave danger from under nutrition on the other.

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