



## RESEARCH ARTICLE

**Rising trends of obesity prevalence in urban areas:****A community based cross sectional study****Revathi Sathiyothan\*, Sathiyothan and Chellaiyan VG***Department of Community Medicine, Madha Medical College and Research Institute**Kundrathur, Chennai-600 069, India**\*Corresponding author: dr.revsathya@gmail.com; Phone: +91-9486118541***Abstract**

Around eighty percent of non-communicable diseases deaths have been reported in developing countries in 2008. Like many developing countries, India today faces the dual burden of the diseases caused by poverty as well as the diseases caused by affluence. Urbanization and the adaptation of the westernized lifestyle are among the reasons for the rapid epidemiological transition. Our present study is conducted in urban area with objectives to estimate the prevalence of obesity among adults in an urban and its association with diabetes mellitus. The Study was a cross sectional study carried out in the field practice area of Urban Health Training centre, Kancheepuram District, Tamil Nadu. The study was conducted among adults of age 35 to 74 yrs. The total study participants of 608 were chosen by multistage random sampling technique. Data collection was done by interview schedule. WHO Asia pacific classification is used for classifying individuals as normal and obese. The data was entered using epidata version 3.1 and analysis was done with SPSS version. Prevalence of overweight was 23.03%. Prevalence of obesity among males and females were 61.41 and 54.20 respectively. Prevalence of overweight (41.43%) and obesity (48.15%) were more common among the age group of 35 to 44 yrs Mean (SD) of Body Mass index was 25.5 ( $\pm 5.71$ ) ranging between 16.71 to 39.1%. Prevalence of obesity was found to be higher (67.95%) in participants with diabetes (Odds ratio 1.7 (1.160-2.627)). Higher prevalence of obesity and overweight was found in present study. Unhealthy dietary habits and physical inactivity with rapid urbanization in addition to other factors contributing to this higher prevalence is clearly evident. Also higher prevalence of obesity is seen among those who have self reported diabetes.

**Keywords:** obesity, overweight BMI, prevalence

---

*Received: 06<sup>th</sup> February 2015; Revised: 27<sup>th</sup> March; Accepted: 14<sup>th</sup> April; © IJCS New Liberty Group 2015***Introduction**

Non communicable diseases are among the leading cause of death worldwide. In 2008, eighty percent of non-communicable diseases deaths were in developing countries up from 40% in 1990. By 2030 low income countries will have eight times more deaths attributed to Non communicable diseases than high income countries (Nikolic et al., 2011). Like many developing countries, India today faces the dual burden of the diseases caused

by poverty as well as the diseases caused by affluence. Urbanization and the adaptation of the westernized lifestyle is one of the reasons for a rapid epidemiological transition. With the rapid urbanization in recent years, there has been a boom in the consumption of fast foods in India which are one of the important causes of obesity. The adverse effects of obesity to emerge in the population in transition are hypertension, hyperlipidemia and glucose intolerance, while coronary heart diseases

(Venkataramana et al., 2005). Hence, the present study has been conducted with objectives to estimate the prevalence of obesity among adults in an urban area of and to study the association between obesity and diabetes mellitus.

**Materials and Methods**

The present study is a community based cross sectional study and conducted in Maraimalai Nagar which is an urban area situated in Kancheepuram district of Tamil Nadu. Multi stage random sampling technique was used. Out of the three blocks, NH1 was selected by random sampling by lottery method. Three wards were selected out of five wards in each block. Among the three selected wards there were 77 streets. As the required sample size was 410, assuming that at least fifteen people will be covered from each street 30 streets was planned for this survey. Those 30 streets were selected by random

sampling by lottery method from 77 streets. Sample size of 608 was achieved by covering all the 30 streets.

*Sample size*

As the prevalence of obesity in Tamil Nadu is 19% (Manmohan Gupta et al., 2011) sample size was calculated using the formula  $n = z^2pq/l^2$  turned out to be 410. A total of 608 were surveyed in the study area.

*Study population*

Adults of aged 35 yrs and above who are permanent residents of Maraimalai Nagar (They should be residents of Maraimalai Nagar at least for past one year). Inclusion for the study are respondent adults (both males and females) aged 35 yrs and above and less than 75 yrs of age and people who gave written informed consent. Those who could not be contacted even after 2 visits were excluded from the study. The study was conducted for 1 yr from Aug'2012 to Jul' 2013.

**Table 1.** Distribution of Body Mass Index among Study Population

BMI	Category	Age in years (%)				Gender (%)		Frequency	%
		35-44	45-54	55-64	65-74	Male	Female		
<18.5	Under weight	5(38.46)	3(23.07)	2(15.38)	3(23.07)	7(2.34)	6(1.93)	13	2.14
18.5-22.99	Normal	45(43.27)	23(22.12)	24(23.07)	12(11.54)	41(13.76)	63(20.32)	104	17.1
23.0-24.99	Over weight	58(41.43)	31(22.14)	34(24.28)	17(12.15)	67(22.49)	73(23.55)	140	23.03
≥25	Obese	169(48.15)	93(26.50)	57(16.24)	32(9.11)	183(61.41)	168(54.20)	351	57.73
Total		277	150	117	64	298	310	608	100

*Data collection*

Pilot study was conducted during September 2012 and feasibility was checked. Questionnaire was modified further after pilot study. As per the sampling technique 30 streets were needed to be covered. Door to door survey was conducted for all the streets. The streets had a total of three hundred and twenty seven households. Excluding the houses which were locked at the survey timing and those who did not give consent, 304

households were surveyed which included 608 study participants. Maximum of two persons that is, one male and one female were included in each household. Timings on the survey days were chosen in such a way to have the representation of working people. Survey was conducted both during morning and evening to cover most of the working population. People were asked if they have disease of sugar or diabetes. Those who said yes to the question status were confirmed by reports of

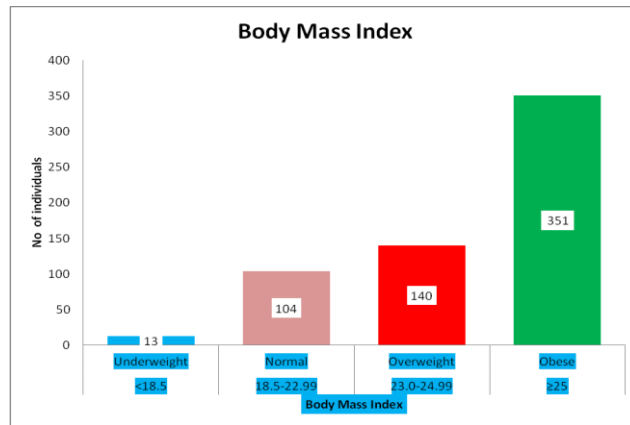
diagnosis or treatment. Height of the participant was measured using portable stadiometer. Weight was measured by using electronic weighing machine with person standing erect and looking straight ahead. It was

recorded in kilograms. Every day the calibration was checked properly. Body Mass Index was calculated using the formula weight in kg/height in m<sup>2</sup> (Quetlet's index).

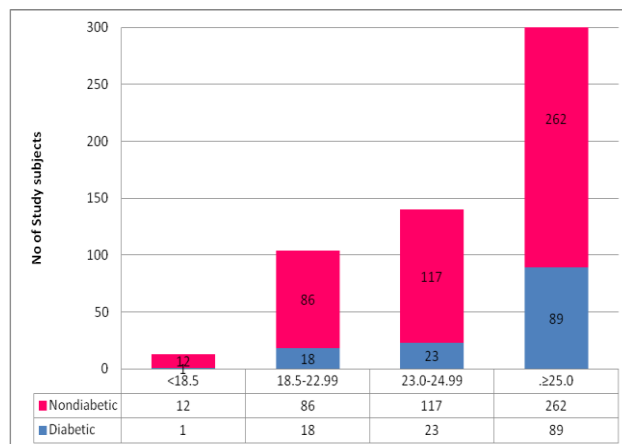
**Table 2.** Relationship between Body Mass Index and Diabetes Mellitus

BMI status	Diabetic	Non-diabetic	Total	Odds ratio	95% C.I	P value
Obese(≥25)	89 (67.95%)	262 (54.93%)	351 (57.24%)	1.746	1.160-2.627	0.07
Non obese (<25)	42 (32.05%)	215 (45.07%)	257 (42.76%)			
Total	131	477	608			

**Fig. 1.** Distribution of Body Mass Index among Study Population



**Fig. 2.** Relationship between Body Mass Index and Diabetes Mellitus



## Results

In the present study, conducted among 608 study participants majority of study participants belonged to age group 35 to 44 yrs. Mean (SD) age in years was 48.2 ±10.2. Males (47.8%) and females (52.3%) were almost equal in distribution. The study population constituted 89.5% Hindus, 9.5% Christians and 1% Muslims. About 65.46% of study population were literates. About 93.91% of study participants were from nuclear family. And 6.09% of study participants were from joint family. Based on WHO Asia pacific perspective the prevalence of obesity and overweight was 57.73% and 23.03% respectively. Prevalence of obesity among males and females were 61.41 and 54.20 respectively. Prevalence of overweight (41.43%) and obesity (48.15%) were more common among the age group of 35 to 44 yrs. Mean (SD) Body Mass index among study population was 25.5 (5.71). Body mass index among study population ranges from 16.71% to 39.1%. Higher prevalence of obesity (67.95%) is seen in participants with Diabetics having odds ratio 1.746 (1.160-2.627) (Table 2).

## Discussion

Higher prevalence of Obesity and overweight in the present study shows features of rapid urbanization with unhealthy lifestyle practices irrespective of literacy status of the population. Similar prevalence was found in study done by Manmohan Gupta et al. (2012) with 44.9% respondents were found to be pre-obese and 19.0% were obese. Also, the prevalence of overweight was 22.3% among the males and 35.4% among the females. Lower prevalence of overweight and obesity are also seen in some other studies with Anuradha et al. (2011) which showed 7 and 19.8% respectively. Nevertheless, the age group included in the study were 20 yrs and above. Study

done by sidhu among urban population in Amritsar has shown the prevalence of Obesity as 46.1%. The study done by Jidendra has revealed that more than 23% of women in the urban area are either overweight or obese compared to only 7% of women in rural areas

## Limitations

The study did not include age group 30-34 yrs which could have influenced the prevalence of overweight and obese. Only self reported diabetics were included in the study and this has some influence on the association of diabetes and obesity.

## Conclusion

Higher prevalence of obesity and overweight was found in present study. This is a clear-cut evidence of rapid urbanization with unhealthy dietary habits, and physical inactivity in addition to the influence of other factors. Also, higher prevalence of obesity was found among study participants with diabetes.

## References

- Anuradha Ravivarman G, Timsi Jain (2011). The prevalence of Overweight and obesity among women in an Urban slum of Chennai, India 5(5): 66-71.
- Concept of health and disease (2011). Chapter 2. Park textbook of Preventive and Social Medicine, 21<sup>st</sup> Edition published by M/s Banarsidas Bhanot.
- Jitendra Gouda, Ranjan Kumar Prusty (2014). Overweight and Obesity among Women by Economic Stratum in Urban India. J Health Popul Nutr 32(1): 79-88.
- Manmohan Gupta, Rajkumar Patil, Mohd.Iqbal Khan, Sanjeev Kumar Gupta (2011). The Prevalence of Obesity and Hypertension in Urban Tamil Nadu. JCDR 5(3): 586-88.

- Nikolic IA, Stanciole AE, Zaydmana M (2011). The Mounting challenge of NCDs. Chronic Emergency: Why NCDs Matter. July 4. Available at <http://siteresources.worldbank.org/healthnutritionandpopulation/resources/281627-1095698140167/chronicemergencywhyncdsmatter.pdf> [accessed on, Oct 6<sup>th</sup> 2012.]
- Sidhu S, Kumari K (2006). Incidence of Overweight and Obesity among Urban and Rural Males of Amritsar. *Journal of Exercise Science and Physiotherapy* 2: 79-83.
- Sundar Rao J, Richard L (2009). Introduction to Biostatistics and Research methods, 4<sup>th</sup> edition published by Asoke K Gosh, India.
- Venkatramana P, Chandrasekhar Rao P, Annaiah P, Madhavi P, Chengal Reddy (2005). Prevalence of Overweight and Obesity Among the Rural Populations of Andhra Pradesh *Human Ecology Special* 913: 111-114.
- WHO (2010). Burden: Mortality, morbidity and risk factors. Global status report on non communicable diseases. 9. Available at [http://www.who.int/nmh/publications/ncd\\_report\\_full\\_en.pdf](http://www.who.int/nmh/publications/ncd_report_full_en.pdf) (accessed on July 21st 2010)
- World Health Organization (WHO), International Association for the Study of Obesity (IASO), and International Obesity Task Force (IOTF) (2000). *The Asia-Pacific Perspective: Redefining Obesity and Its Treatment*. Geneva, Switzerland: World Health Organization pp 378-420.