Prevalence of Obesity in Adults of Urban and Rural Outskirts of Thiruvananthapuram District of Kerala

Dr Nithya VinayaKumar,
Research Associate, International Centre for Technological Innovations.

Abstract: Obesity is a major public health issue affecting both developed and developing societies. Residents in urbanareas have higher rates of chronic diseases compared to their rural counterparts, and obesity may be a major contributor to this disparity. The objective of this study is to analyse the prevalence of obesity in rural and urban adults using body mass index classification with measured height and weight and analyse the most important cause for obesity. In addition to this, demographic, gender, age and stress is taken into account. Proper measures are to be taken to tackle this issue.

Keywords: *Obesity, Body Mass Index (Bmi).*

I. INTRODUCTION

Obesity is a complex disease involving an excessive amount of fat. Obesity isn't just a cosmetic concern. It is a medical problem that increases the risk of other diseases and health problems, such as heart diseases, diabetes, high blood pressure and certain cancers (MFMER, n.d.). Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Once considered a problem only in high income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings (WHO, n.d.).

A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight. (WHO, n.d.)

Body mass index (BMI) is a ratio of weight in kilograms divided by height in meter squared (Kg/m^2). It is good a predictor for overall health and nutritional status. Obesity is one of the most neglected health problems which lead to the diabetes and cardiovascular diseases (National Institute of Health, 2000).

The World Health Organisation uses a classification system using the BMI todefine overweight and obesity (Prentice, 2006):

- A BMI of 25 to 29.9 is defined as a "pre-obese."
- A BMI of 30 to 34.99 is defined as "obese class I."
- A BMI of 35 to 39.99 is defined as "obese class II."
- A BMI of or greater than 40.00 is defined as "obese class III."

Classification of BMI by WHO (WHO, 2011)	BMI
Underweight	Upto 18.5
Normal weight	18.5- 25.0
Overweight (not obese)	25.0-29.9
Class 1 (low-risk) obesity	30.0-34.9
Class 2 (moderate-risk) obesity	35.0-39.9
Class 3 (high-risk) obesity	BMI is equal to or greater than 40.0

CAUSES: (Jerry R. Balentine, 2019)

Obesity is a major public health issue, affecting both developed and developing societies (Popkin, 2005). Living in closer proximity to public open space (POS) is associated with greater physical activity and improved health, for all age groups. For example, there is evidence that the distribution of urban green space and parks (Maes et.al, 1997).

Although genetic factors affect susceptibility to obesity (Popkin, 2012), they cannot account for the rapid increase in obesity in recent decades. Instead, changes in physical activity and diet are the focus in explaining this adverse trend (Rosenheck, 2008). Physical activity levels are declining,and sedentary behaviours increasing, not only in developed countries, such as the US, but also in low- and middle-income countries, such as China (Rural Health Information Hub, n.d.). Dietary changes, such as the growth in fast food consumption and the "nutrition transition" (Christie, Niaman &Michael, 2012) are also significant, and again affect both developed and less developed societies.

	CAUSES	
1.	Physical inactivity	Sedentary people burn fewer calories than people who are active.
2.	Overeating	Overeating leads to weight gain, especially if diet is rich in fats and sugar.
3.	Genetics	e.g. Leptin deficiency.
4.	A diet high in simple carbohydrates	Carbohydrates increase blood sugar levels, which in turn stimulate insulin release by the pancreas, and insulin promotes the growth of fat tissue and can cause weight gain.
5.	Frequency of eating	Though there is a controversy, it can lead to obesity in some cases.
6.	Medication	Anti-depressants, anti-convulsants, diabetic medications, oral contraceptives etc.
7.	Psychological factors	People eat excessively in response to emotions, stress and anger.
8.	Certain diseases	Hypothyroidism, insulin resistance, PCOD, Cushing's syndrome.
9.	Social issues	Lack of money to buy healthy food/lack of safe places to exercise.

A. Prevalence of Obesity

IN WORLD: Worldwide obesity has nearly tripled since 1975. In 2016, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 650 million were obese. 39% of adults aged 18 years and over were overweight in 2016, and 13% were obese. Most of the world's population live in countries where overweight and obesity kills more people than underweight. 41 million children under the age of 5 were overweight or obese in 2016. Over 340 million children and

adolescents aged 5-19 were overweight or obese in 2016 (WHO, 2018).

IN INDIA: More than 135 million individuals were affected by obesity in India. Prevalence of obesity in India is varying from rural to urban and state-wise (NFHS 3). As per NFHS 3 reports, Punjab, Kerala and Delhi are the states with the highest level of overweight and obesity. The percentage of women who are overweight or obese (BMI>_25) is highest in Punjab (30%), followed by Kerala (28%) and Delhi (26%). (NFHS 3).

In a study conducted by Susan Brink, 2019, it was found that global averages are creeping up for everyone – but faster for rural residents. The global average BMI for women rose in the past three decades by 2.09 in rural women compared to 1.35 in urban women; in that same period, it rose by 2.10 in rural men compared to 1.59 in urban men (NFHS 3, 2005). In another research led by Imperial College London and published in Nature, found that from 1985 to 2017, BMI rose by an average of 2.0 kg/m^2 in men globally, equivalent to each person becoming 5-6 kg heavier. More than half of the global rise over these 33 years was due to increases in BMI in rural areas. In some low- and middle- income countries, rural areas were responsible for over 80% of the increase. Average BMI in rural areas has increased by 2.1 kg/m^2 in both women and men. But in cities, the increase was 1.3 kg/m^2 and 1.6 kg/m^2 in women and men respectively. These trends have led to striking changes in the geography of BMI over the three decades. In 1985, urban men and women in over three quarters of the countries had a higher BMI than their rural counterparts. Over time, the gap between urban and rural BMI in many of these countries shrank or even reversed.

There is an important difference between high-, middle-, and low-income countries. In high-income countries, the study showed that BMI has been generally higher in rural areas since 1985, especially for women. The researchers suggest this is due to the disadvantages experienced by those living outside cities: lower income and education, limited availability and higher price of healthy foods, and fewer leisure and sports facilities.

Meanwhile, rural areas in low- and middle-income countries have seen shifts towards higher incomes, better infrastructure, more mechanised agriculture and increased car use, all of which bring numerous health benefits, but also lead to lower energy expenditure and to more spending on food, which can be processed and low-quality when sufficient regulations are not in pace. All these factors contribute to faster increase in BMI in rural areas.

II. RESEARCH METHODOLOGY

A retrospective cross sectional study was conducted at Government Homoeopathic Hospital, Thiruvananthapuram. This study is based on incidence of obesity cases during the fiscal year 2017-2018. The objective of this study is to analyse prevalence of obesity in rural and urban adults using the BMI(Body Mass Index) scores.A total of 54 cases were included after considering the exclusion and inclusion criteria. Ten were males, 44 females. 34 of them were urban residents and 20 from rural. Subjects were included, who consulted either for the treatment of obesity or for the complications of obesity due to lack of physical activity, overeating etc. A thorough check through the history of subjects was done for better understanding of the causes of obesity. Subjects were excluded if pregnant or lactating, those diagnosed with systemic illness and psychiatric illness.

III. RESULTS AND ANALYSIS

On analysing the data (BMI, diet, and physical activity), the following conclusions can be inferred from the bar graphs.

CHART 1: This simple bar graph is a comparative study of incidence of obesity based on gender. Female population are at a higher risk of obesity (overweight or obese) compared to male population. Central obesity was observed in these females.

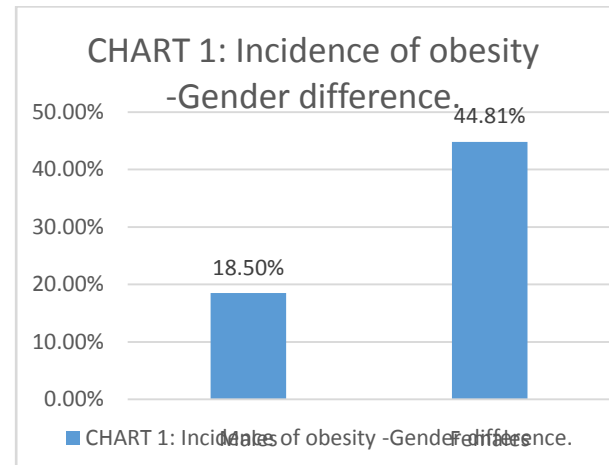

CHART 1: Incidence of obesity -Gender difference.

CHART 2: The pie chart depicts the association of obesity and demography. Urban residents are highly affected than their rural counterparts. This may be due to the lack of health awareness, accessibility to public open spaces and health clubs in urban areas of Thiruvananthapuram. Whereas in rural, facilities are easily available.

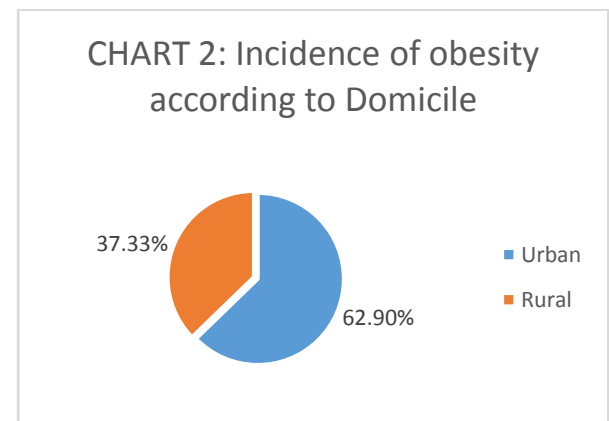CHART 2: Incidence of obesity according to Domicile

CHART 3: This bar graph details data on the interdependence of obesity and socio-economic factors. There are previous researches which shows that obesity prevalence increases as income decreases, especially in women. This is evident from the graph. Women who are house wives are the most affected community in the population.

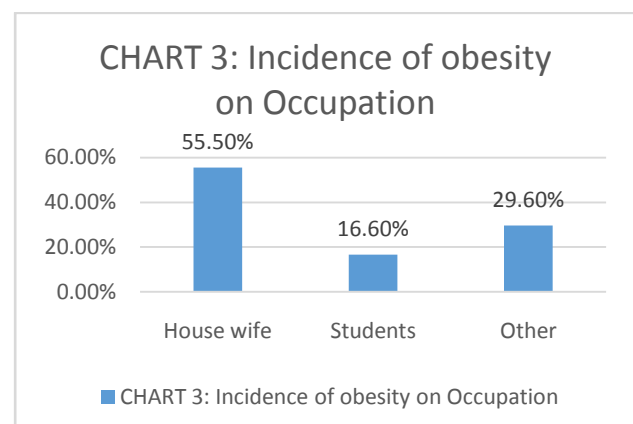CHART 3: Incidence of obesity on Occupation

CHART 4: This graph gives information regarding the level of obesity on the selected population. Though there is only a less percentage of morbidly obese people in the population, high level of class I obesity shows, they are at a high risk of developing morbidities in the later stages of life.
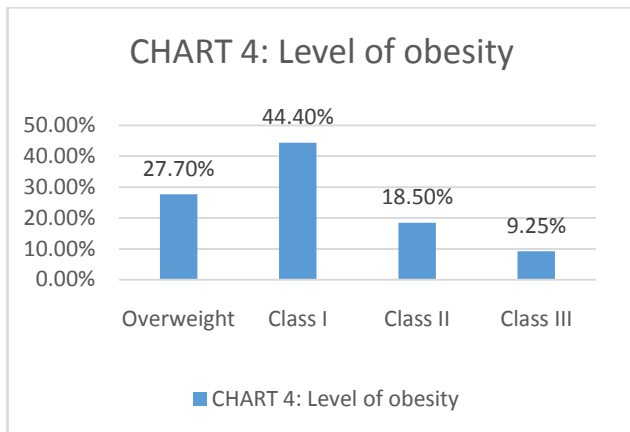

CHART 4: Level of obesity

CHART 5: This chart is a comparative study between obesity and the comorbidities associated with it. Though PCOD and diabetes are closely related to obesity, factors such as physical inactivity, stress and over eating also gains importance here.
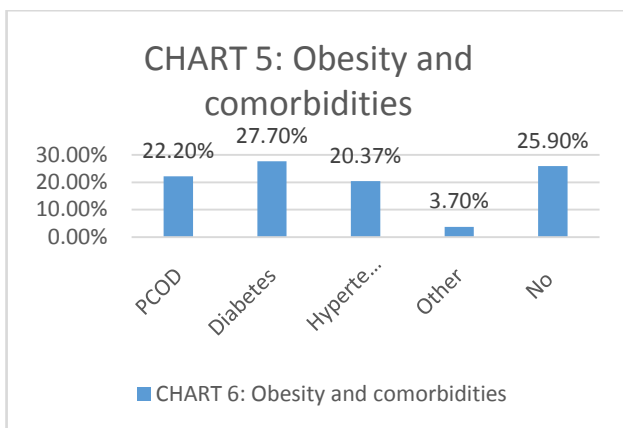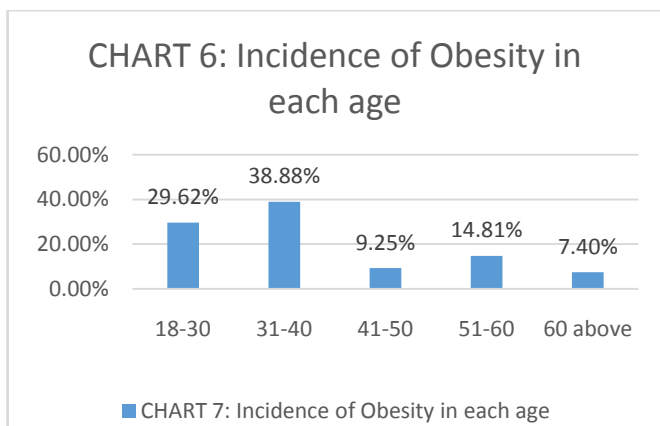

CHART 5: Obesity and comorbidities

CHART 6: A cursory glance at the bar graph reveals the high risk age group of obesity. Adults between the ages 18-40 is suffering from overweight and class I obesity, while the age group above 60 is related to aging and degeneration.

CHART 6: Incidence of Obesity in each age

CONCLUSION AND RECOMMENDATIONS

The results of this study shows that urban residents experience higher rates of obesity and overweight than their rural counterparts. Of the selected study group, 44.81% were females, who are at high risk for obesity than males. Taking socio-economic factors into concern, the unemployed community of the population, i.e. house wives are the most affected. The age group 31-40 shows an increased incidence of

obesity/overweight (38.88%) and is associated with comorbidities like PCOD, diabetes, hypertension etc. From the thorough history taking, it was evident that all the people who were found to be obese, were suffering from overweight since 10 years. Thus it can be concluded that overweight or even a small increase in BMI can lead to various stages of obesity over time.

The rural outskirts are peaceful, nice and a fun place to be in. The advantages of rural areas is that a lot of open spaces are available. Unlike the urban settings, homes in rural areas have a lot more land area to access. Moreover, most of the rural population depend on agriculture, for their food and wages. Thozhilurappu, National Rural Employment Generation Scheme, launched by Government of India in 2006, is a scheme for providing 100 days guaranteed wage employment for all the employment seekers above 18 years of age. House wives in rural areas, who are employed through this scheme, gets a benefit of physical work, which in turn reduces obesity in rural outskirts of Thiruvananthapuram. Additionally, there are PHCs in every panchayat working towards elimination of obesity and enhance health by providing yoga classes and treatments, free of cost, especially for women.

Though the urban settings are well equipped with health clubs, gymnastics, sports clubs, public open spaces (POS) like parks, are often accessible to males. Young girls get a chance to make use of these facilities. But in the case of females, especially house wives, these health clubs are still a dream to be accomplished. In addition to this, the considerable rise in urbanization has led to multiple health challenges on the fronts of sanitation, communicable and non-communicable diseases. Further, public health network in urban areas is inadequate and functions sub-optimally with lack of man power, equipment and inadequate attention to public health. Sedentary lifestyle and increased consumption of fast foods adds on to this issue. National Urban Health Mission, launched by Government of India in 2013, which aims to address the health concerns of urban poor, still has to travel long to deepen its roots in urban Kerala.

The findings of this study reveals that urban outskirts of Thiruvananthapuram is stricken with the obesity and its comorbidities. Female population, especially house wives are the most affected. Unemployment decreases their quality of life. Their mental state get affected, gradually affecting their physical health. A sense of loneliness adds on to this problem.

It is necessary to provide health services at the rural areas. Along with primary health care, it is mandatory to have open spaces which can be accessed by women also.

Dietary changes are the primary solution to obesity and its complications. Some of the do's and don'ts are mentioned below.

Do's	Don'ts
Vegetable salad.	Avoid fried chicken.
One cup of rice.	Avoid grilled chicken.
Include more wheat.	Reduce pickles.
Chicken curry once in a month.	Avoid fried and bakery items.
One cup of tea per day	Avoid coffee
Fish curry prepared using Garcinia Cambogia.	Avoid sweetening agents

Some of the Ayurvedic herbals which can be used for treatment of obesity are:

- Commiphora mukul (Guggulu)
- Triphala (Phyllanthus emblica, Terminalia chebula, Terminalia bellirica).
- Cuminum cyminum (Jeera).

Limitations of this study is that direct interview with the selected sample were not possible. Stress core was not mentioned in the medical-records.

References

[1] Mayo Foundation for Medical Education and Research n.d., viewed on 21st October 2019, Available from https://www.mayoclinic.org/diseases-conditions/obesity/symptoms-causes/syc-20375742

[2] World Health Organisation, n.d, viewed on 21st October 2019, Available from https://www.who.int/topics/obesity/en/

[3] National Institutes of Health, 2000, North American Association for the Study of ObesityThe Practical guide: identification, evaluation, and treatment of overweight and obesity in adults, NIH Publication Number 00-4084, viewed on 21stOctober 2019, Available from http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf

[4] World Health Organization, 2011,Waist circumference and waist-hip ratio: report of a WHO expert consultation, Geneva, 8-11 December 2008, viewed on 21stOctober 2019, Available from https://apps.who.int/iris/handle/10665/44583

[5] World Health Organisation, 2014, Global status report on non-communicable diseases 2014 pdf. Available online: http://www.who.int/nmh/publications/ncd-status-report-2014/en/ (accessed on 21/10/2019).

[6] Prentice AM, 2006, The emerging epidemic of obesity in developing countries, International Journal of Epidemiology. 2006 Feb; 35(1):93-9.

[7] Jerry R. Balentine, 2019, accessed on 21st October 2019, Available from https://www.medicinenet.com/obesity_weight_loss/article.htm

[8] Popkin BM, 2005, Using research on the obesity pandemic as a guide to a unified vision of nutrition, Public Health Nutrition, 2005 Sep; 8(6A):724-9.

[9] Maes HH, Neale MC, Eaves LJ &Behav Genet. 1997,Genetic and environmental factors in relative body weight and human adiposity, PubMed, NCBI, 27(4):325-51.

[10] Popkin BM, 2012,Time use and physical activity: a shift away from movement across the globe, PubMed, NCBI, 13(8):659-80.

[11] Rosenheck R, 2008, Nov Fast food consumption and increased caloric intake: a systematic review of a trajectory towards weight gain and obesity risk; PubMed, NCBI, 9(6):535-47.

[12] Rural Health Information Hub, n,d, accessed on 21st October 2019, Available from https://www.ruralhealthinfo.org/topics/obesity-and-weight-control

[13] Christie A Befort, Niaman Nazir, Michael G Perri, 2012, Prevalence of Obesity among adults from rural and urban areas of the United States Findings from NHANES 2005-2008, The Journalof Rural health, available from https://www.researchgate.net/publication/232527126_Prevalence_of_Obesity_Among_Adults_From_Rural_and_Urban_Areas_of_the_United_States_Findings_From_NHANES_2005-2008

[14] World Health Organisation, 2018, Accessed on 21st October 2019, Available from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

[15] National Family Health Survey, India, Key findings(2015-16)Available online:http://rchiips.org/NFHS/factsheet_NFHS-4.shtml, Accessed 21st October 2019Google Scholar

[16] NFHS 3, Accessed on 21stOctober 2019, Available from http://rchiips.org/nfhs/NFHS-3%20Data/ke_state_report_for_website.pdf

[17] Susan Brink, 2019, Accessed on 21st October 2019, Available from https://www.npr.org/sections/goatsandsoda/2019/05/08/721373756/study-shatters-preconceived-notions-about-urban-vs-rural-obesity

[18] NFHS (2005) Key Findings Report, National Family Health Survey (NFHS-3). Ministry of Health and Family Welfare, Government of India. Available: http://www.nfhsindia.org/nfhs3.html. Accessed on 21-10-2019

[19] Anil Bindhu , Thankam.K , Regi Jose, Benny PV, Nazeema Beevi, Jeesha C.Haran, 2014, Prevalence of Obesity and Overweight Among Adults In a Rural Area in Trivandrum – A Cross Sectional Study, *International Journal of Preventive and Therapeutic Medicine.*