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Research Article

Obesity among adult population of a rural coastal area in South India

Ramesh Chand Chauhan[1]*, Neelima Singh Chauhan[2], Manikandan[1], Anil Jacob Purty[1], Amit Kumar Mishra[1], Zile Singh[1]

[1]Department of Community Medicine, Pondicherry Institute of Medical Sciences, Puducherry-605014, India
[2]Department of Obstetrics & Gynaecology, Pondicherry Institute of Medical Sciences, Puducherry-605014

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***Correspondence:**
Dr. Ramesh Chand Chauhan
E-mail: rcchauhan21@gmail.com

ABSTRACT

Background: Obesity is associated with cardiovascular diseases and has become the main public health issue in India. However, the prevalence of obesity in India varies widely. The aim of this study was to assess the prevalence of overweight and obesity among rural adults in a coastal area of South India.
Methods: The prevalence of overweight and obesity was assessed among individuals of 15 years and above living in a rural coastal area of Tamil Nadu in India.
Results: Among 207 adult participants, 69.1% were female. About one-fourth (23.7%) of the participants were in age group of 15-24 years and 67.2% participants were literate. About one-third (30%) of the adults were overweight. Obesity was present in 14% of the study participants (26% by using the Asian cut-offs). Using waist circumference and waist-hip ratio cut-offs, abdominal obesity was observed among 55% and 57% of the participants. Among females the central obesity was more common than males.
Conclusions: The prevalence of obesity in rural areas was high. There is need to implement community based programs to tackle the increasing obesity.

Keywords: Obesity, Abdominal obesity, BMI, Rural India

INTRODUCTION

Many low- and middle-income countries are now facing a "double burden" of diseases. While they continue to deal with the problems of infectious disease and under-nutrition, they are experiencing a rapid upsurge in non-communicable disease risk factors such as overweight and obesity. Overweight and obesity are linked to more deaths worldwide than underweight. In 2014, more than 1.9 billion adults of 18 years and older were overweight. Among these, over 600 million were obese. Also, around 3.4 million adults die each year as a result of being overweight or obese.[1]

Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Around 44% of the diabetes, 23% of the ischemic heart disease and 7%-41% of certain cancer burdens are attributable to overweight and obesity.[1] Once considered a problem only in high income countries,[2,3] overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings. In India; Punjab, Kerala, and Delhi are the states with the highest level of overweight and obesity but the prevalence is increasing in states of South India.[4]

As the prevalence of overweight varies with the populations, and overweight including obesity, as well as their related non-communicable diseases are largely preventable, this study was done to assess the prevalence of overweight in a rural community of coastal area of Tamilnadu. The findings of this study would be helpful in

developing strategies for healthier lifestyle and tracking the burden of overweight and obesity.

METHODS

This community based observational study was conducted in a rural coastal area of Villupuram district of Tamil Nadu state in India. The study area is the field practice area of Department of Community Medicine, Pondicherry Institute of Medical Sciences. From the list of villages in the study area, a village was randomly selected and all the individuals of 15 years and above were included in the study.

A pre-tested semi-structured questionnaire was used to collect data. Questionnaire contains detail of demographic characteristics, employment, education level, income etc. Height, weight, waist and hip circumference were measured using standard anthropometric methodology. Weight was recorded to the nearest 0.1 kg using digital weighing scale and height was measured to the nearest 0.1 cm by using stadiometer. Waist and hip circumference were measured by using a flexible non-stretchable measuring tape. WC was measured to the nearest 0.1 cm at the narrowest point between the lower end of the rib cage and iliac crest with the subjects standing. Hip measurement was taken as the largest circumference around the buttocks. Body Mass Index (BMI) was calculated by dividing observed weight in kilograms by height in meter square (kg/m^2).

For assessment of obesity, both World Health Organization (WHO) definition (BMI ≥25 as overweight and BMI ≥30 as obesity) and Asian criteria (BMI ≥23.5 as overweight and BMI ≥28 as obesity) were used.[5] Waist circumference and waist-hip ratio were measured to assess the central obesity. The International Diabetes Federation (IDF) cut off values for waist circumference ≥80 cm among female and ≥90 cm among male and WHO cut-off values for WHR ≥0.8 and ≥0.9 among women and men were used to define the increased health risk due to overweight.[6,7]

Data collection**:** A house to house survey was done during June-August 2014 and trained interviewers visited all selected households. If any of the household were found locked then they were visited again. Two return visits were made to households where eligible members were not available for interview during the first visit. Informed written consent and/or assent were taken from all the participants/guardians before the initiation of interview. All available adult members in the household were interviewed and anthropometric measurements done.

Statistical analysis: All the data were captured in the Microsoft excel spreadsheet and the analysis was done in SPSS version 17. Means and proportions were calculated for continuous and categorical variables respectively.

RESULTS

Among 207 adult participants, 69.1% were female. About one-fourth (23.7%) of the participants were in age group of 15-24 years and 67.2% participants were literate. Majority (66.2%) of the participants were having monthly income of <2000 INR/month (Table 1).

Table 1: Socio-demographic characteristics of study participants (n=207).

	N	%
Sex		
Female	143	69.1
Male	64	30.9
Age-group (years)		
15-24	49	23.7
25-34	58	28.0
35-44	43	20.8
45-54	34	16.4
55-64	13	6.3
≥65	10	4.8
Education		
Graduate and above	19	9.2
Higher secondary	23	11.1
High school	40	19.3
Middle school	21	10.2
Primary	36	17.4
Illiterate	68	32.8
Occupation		
Farmer	33	15.9
Fisherman	12	5.8
Homemaker	82	39.6
Others	52	25.2
Unemployed	28	13.5
Income per month (INR)		
<2000	137	66.2
2000-4999	43	20.8
5000 and above	27	13.0
Alcohol consumption		
Yes	45	21.8
No	162	78.2
Tobacco usage		
Yes	16	7.7
No	191	92.3

INR - Indian rupees

The mean BMI of the participants was 24.5 kg/m^2. About one-third (30%) of the adults were overweight. Overweight was common among females as compared to males. According to Asian cut-off values also, almost one-third (30%) participants were overweight but overweight was common among male (32.8% as compared to 28.7%).

Obesity was present in 14% of the study participants (26% by using the Asian cut-offs). Male were having more obesity as compared to female. Waist circumference and waist-hip ratio cut-offs, abdominal obesity was observed among 55% and 57% of the participants. Almost two-third (65.7%) of the females were having more waist circumference as compared to one third males (31.3%). More waist-hip ratio was observed among 60.1% females as compared to 50.0% male. Overall, central obesity was more common among females (Table 2).

Table 2: Prevalence of overweight, obesity and central obesity among study participants.

	Female	Male	Total
	n (%)	n (%)	n (%)
Overweight*			
WHO criteria	45 (31.5)	18 (28.1)	63 (30.4)
Asian	41 (28.7)	21 (32.8)	62 (30.0)
Obesity**			
WHO criteria	18 (12.6)	11 (17.7)	29 (14.0)
Asian	34 (23.8)	20 (31.3)	54 (26.1)
Abdominal obesity			
Waist circumference	94 (65.7)	20 (31.3)	114 (55.1)
Waist-hip ratio	86 (60.1)	32 (50.0)	118 (57.0)

*Overweight is defined as BMI ≥25 (WHO) or BMI ≥23.5 (Asian)

**Obesity is defined as BMI ≥30 (WHO) or BMI ≥28 (Asian)

DISCUSSION

BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. Using WHO BMI criteria for obesity, in the present study, 44% of the female and 46% of the male participants were either overweight or obese. According to global health observatory data, worldwide, 39% of adults aged 18 years and over were overweight and 13% were obese.[8] In the present study, the prevalence of overweight was 30%. This is similar to the prevalence of overweight observed in other parts of country.[4]

As excess abdominal fat, regardless of overall body fat, will predispose you to obesity-related disease, measurement of WC and WHR are important.[9]

In the present study, more WC was observed among 55% of the participants. A similarly study done in rural south India found 45.3% adults with high WC and among them about 51% of women and 35% of men had high WC.[10]

Similar study done in an urban area found a higher prevalence of overweight (36.0%), obesity (21.3%) and abdominal obesity (63.3).[11]

The prevalence of overweight is increasing in adult population including in rural areas. This should be dealt as priority by intervening at community level.

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