A Cross Sectional Study to Determine the Prevalence of Obesity in a Rural Area of Goa

Peixoto C*, Shah H. K**,   Shiolkar S***

*Junior Consultant, NVBDCP Directorate of Health Services, Campal, Panaji, Goa **Professor (DACP) Member Secretary, Medical Education Cell, *** Junior Resident Department of P.S.M, Goa Medical College, Goa

Abstracts: Background: Nowadays, obesity has become a chronic disorder affecting the larger population than any other disease in the world. It mostly affects the adult population but children and adolescents are also prone to develop obesity. This study designed to determine the prevalence of obesity in both the sexes in person aged 25 years and above.[1] **Materials and Methods:** The present study had been undertaken in rural area of Goa (Mandur village), in which persons aged 25 years and above were interviewed. A house to house survey conducted. Systematic random sampling method was used for selection of houses. Predesigned structured questionnaire was used to record socio demographic profile. Anthropometric data regarding height, weight was also taken. The data was analyzed using SPSS 14 software. **Result:** The study showed that, 9.2% of the population was obese (6.04% in males and 11.93% in females.) 29.9% of the population had BMI >/= 25kg/m^2, 24.20% and 34.66% among male and females respectively. 22.72% of females and 18.12% males were pre-obese. **Conclusion:** BMI plays a crucial role in its early detection as it is simple to calculate and can even detect the pre-obesity stage in time. Obesity being a chronic illness, early detection of it can prevent various complications associated with it. [Shah H NJIRM 2015; 6(1):36-39]

Key Words: Body Mass Index, Obesity, Adult.

Author for correspondence: Dr. Christaline Peixoto , H.nu 1632,Agxem , Curtorim, Salcete Goa 403709 ,
 Email: christy_peixoto@yahoo.com

Introduction: In the 21st century, changes were noted not only in the science and technology but also in the life style of its inhabitants. Changes in the life style made life easier but marked the beginning of certain chronic ailments such as osteoarthritis, cardiovascular disorders, hypertension and obesity.[1]

Nowadays, obesity has become a chronic disorder affecting a population larger than any other disease in the world. It mostly affects the adult population but children and adolescents are also prone to develop obesity. According to the World Health Organization (WHO), nearly 20 to 40 % of adult population and 10 to 20% of children are affected by obesity.[2] Obesity, which made its presence felt first in the northern hemisphere, has now taken a pandemic look affecting practically almost all the countries of the globe.

Body Mass Index (BMI) has been one of the easiest ways to determine the transition of a person from normal weight to obesity. It is simple to calculate and it categorizes a person as underweight, normal, overweight and obese with its stages.[3] Thus, BMI not only identifies obesity but also persons in pre-obese stages. So a screening program based on BMI would be helpful not only in identifying obese but also pre-obese persons so

that timely measures could be taken for its correction, prevention and control persons and community as a whole.

Obesity is not just limited to urban and affluent society but is also seen to affect people in the rural places and persons belonging to the lower socio-economic strata, however these studies are lesser in number.

Hence, this study was designed with the following objectives to determine the prevalence of obesity in both the sexes in persons aged 25 years and above in a rural area.

Methods and Materials: This is a field community based cross sectional study carried out in the rural adult population [25 years and above] of Mandur village of Goa from January 2012 to June 2012, after institutional ethical clearance was obtained. Systematic Random Sampling method was used for the selection of houses. The house which did not have persons aged 25 years and above were excluded from the study and the next house was visited.

Data was collected using pre-designed structured proforma. Anthropometric measurements like height, weight, waist circumference and hip

circumference measurements were taken and recorded. Height was recorded using measuring tape to the nearest 0.1cm. A standardized portable weighing machine (bathroom scale) was used for recording the weight of the subjects and weight was recorded to nearest of 0.5 kg.

Body Mass Index (BMI): BMI was calculated using the following formula BMI = $\frac{weight\ (kg)}{height(m)^2}$ and the different classes of BMI were defined using WHO classification [4].

BMI (kg/m^2)	Nutritional status
< 18.5	Underweight
18.5-24.99	Normal
25-29.99	Pre-obese
30-34.99	Obese class I
35-39.99	Obese class II
≥ 40	Obese class III

Waist circumference was measured as the smallest horizontal girth in-between the costal margin and the iliac crest, with the help of a measuring tape to the nearest of 0.1 cm. Hip circumference was taken as the greatest circumference at the level of greater trochanter on both the sides with the help of the measuring tape to the nearest of 0.1 cm.

Result: Out of the total 325 study subjects 149 (46%) were male and 176 (54%) were females. Majority of the subjects were from the age group 35-45 (25.5%) and minimum numbers of subjects were from the age group 75-85 .i.e. (3.4%).

Table 1: Socio Demographic Profile and General Characteristic of Study Population.

Parameter	Male (N=149)		Female (N=176)		Total (N=325)	
	No	%	No	%	No	%
Age						
25-35	34	43	45	57	79	24.3
35-45	39	47	44	53	83	25.5
45-55	26	43.3	34	56.7	60	18.5
55-65	23	43.4	30	56.6	53	16.3
65-75	19	48.7	20	51.3	39	12.0
75-85	08	72.7	03	27.3	11	3.4
Religion						
Hindu	75	47.5	83	52.5	158	48.6
Chris	74	44.3	93	55.7	167	51.4

tian						
Socioeconomic class (SEC)						
SEC : I	00	00	00	00	00	00
SEC: II	09	42.9	12	57.1	21	6.5
SEC: III	49	46.2	57	53.8	106	32.6
SEC: IV	75	46	88	54	163	50.2
SEC: V	16	45.7	19	54.3	35	10.8
Occupation						
Sedentary	85	85.86	14	14.14	99	30.46
Moderate	62	27.68	162	72.32	224	68.92
Heavy	02	100	00	00	02	0.62

In the present study 20.6% population were pre-obese. 9.2% (30) of the population were obese (BMI ≥ 30 kg/m2).Maximum numbers of obese subjects were in age group 75-85 years i.e. 36.4% in obese class I. This was followed by 35-45 years age group with 26% in obese class I and 3.6% in obese class II. 55-65 years age group also shows similar findings .i.e. 21.6% in obese class I and 1.9% in obese class II. The minimum percent (10.26%) of obesity was seen in 65-75 years age group. No subjects were seen in obese class III, with BMI value of ≥ 40 kg/m2. (Refer fig.1 and Table 2)

Out of the total population 29.9% of the subjects had BMI above 25 kg/m^2.

Figure 1:
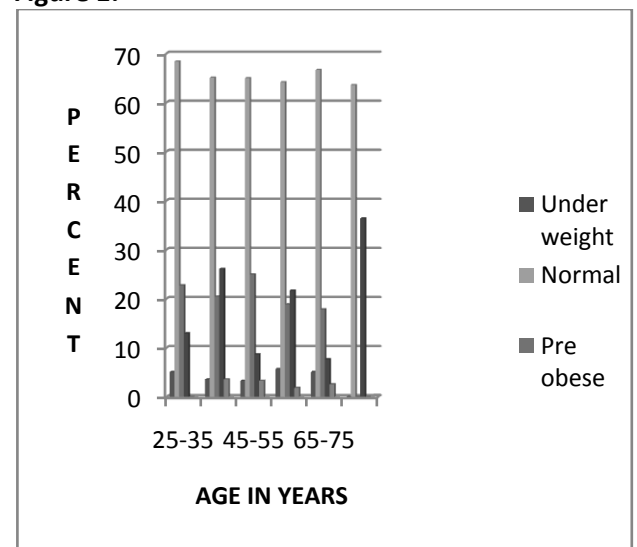
Total	149	100	176	100	325	100

Table 2: Distribution of BMI among Study Population According To Age Group

Age grp (yr)	U. Wt	Nor mal	Pre-Ob.	Obese Class			Tot al
				I	II	III	
	No. %	No. %	No. %	No. %	No. %	No %	No. %
25-35	04 5.1	54 68.4	18 22.8	03 13	00 00	00 00	79 24.3
35-45	3 3.6	54 65.1	17 20.5	06 26.1	0 3 3.6	00 00	83 25.5
45-55	02 3.3	39 65	15 25	02 8.7	02 3.3	00 00	60 18.5
55-65	03 5.7	34 64.2	10 18.9	05 21.7	01 1.9	00 00	53 16.3
65-75	02 5.1	26 66.7	07 17.9	03 7.7	01 2.6	0 (0)	39 12.0
75-85	00 00	07 63.6	00 00	04 36.4	00 00	00 00	11 3.4
Tot al	14 4.3	214 65.8	67 20.6	23 7.1	07 2.2	00 00	325 100

Gender differences were also seen in the distribution of BMI in the present study. Obesity i.e. BMI more than 30kg/m^2 were present in 6.04% of male and 11.93% of females. 22.72% of females and 18.12% males were pre obese. 24.16% of men and 34.66% of women had BMI of more than 25kg/m2.

Table 3: Distribution of BMI in A Study Population According To Gender

BMI Class		Male		Female		Total	
		No.	%	No.	%	No.	%
Underwt		10	6.7	04	2.3	14	4.3
Normal		103	69.1	111	63.1	214	65.8
Pre-obese		27	18.1	40	22.7	67	20.6
Obese class	I	08	5.4	15	8.5	23	7.1
	II	01	0.7	06	3.4	07	2.2
	III	00	00	00	00	00	00

Discussion and Conclusion: The present study had found that the prevalence of increase in BMI is quite prevalent among adult population aged 25 years and above.

The study has found that males were taller with average height of 1.58 m then females who had average height of 1.53. The average weight in males was 58.53 kg and females were 56.88 kg. The average BMI in both males and females was 23.53kg/m^2 and 24.31 kg/m^2 respectively. Shukla et al, Das et al also reported similar findings in their studies. The average BMI of both males and females participants was 23.10 kg/m^2 and 23.70 kg/m^2 respectively.[5,6]

This present study revealed that 29.9% of the subjects had BMI above 25kg/m2 with 24.20% of men and 34.60% of women. Similar findings were seen in study conducted by Tiwari et al; 34.4% of males and 31.3% of females had BMI >/=25kg/m2[7]. The rates are similar to rates reported by Shukla et al, males 19% and females 30%; but higher than rates quoted by Zargar et al-male 7% and females 23.69% [8].

Asthana et al; and Meetu et al. who also screened the prevalence of obesity in affluent female population found the prevalence of increased BMI in their study populations which was 30.24% and 17.45% respectively [9,10].

The present study revealed 9.2% of the population were obese (BMI>/=30kg/m^2).Maximum number of obese subjects were in age group 75-85 years i.e 36.4%, followed by 26.1 % in 35 -45 age group and 21.7% in 55-65 years age group. Silmilar findings were found in study conducted by Haung K C et al (2002) in Taiwan[11]. The prevalence of obesity according to BMI >/=25kg/m^2 among age group 20-39 years was 27% in men and 9.3% in females. In 40-64 years age it was 34.8% in men and 26.8% in women. In the age group above 65 years it was 29% and 30% in males and females respectively. Study by Taiwan et.al also revealed that as the age advances there is a slight increase in BMI with maximum prevalence among person of age groups

50-60 years in males and in females more than 70 years.

Deshmuk et al (2006) carried out a study in subjects above 18 years in rural Wardha wherein the total prevalence of obesity (BMI ≥ 25kg/m2) was 5.15% (males: 5.1% and female 5.2%) [12]. In the present study the prevalence of obesity (BMI ≥ 30 kg/m2) is similar to above studies .i.e. 6.04 % in males and 11.93 % in females. But compared to the above studies the percent of population with BMI ≥ 25 kg/m2 in present study Is more, as discussed above. The reason may be the acceptance of western/urban lifestyle by people of this rural area as this area is fast developing due to its closeness to urban town.

Conclusion: It can be concluded from the present study that obesity and overweight are quite prevalent among adult population especially 25 years and above in both the sexes. BMI is a simple and effective way to screen obese and overweight persons so that timely measures could be taken to prevent their progression and complications associated with it.

Measures to increase physical exercises both at home and at workplace could be undertaken using the behavior change communication strategy. Persons with BMI greater than 24.99 kg/m^2 should be motivated to undergo regular screening of their BP.

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