

Obesity and its causative factor among the urban community

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■ **ABSTRACT** : The study included 200 urban women from Sambalpur district, Odisha. Normal women and women with risk of obesity were recruited for conducting the study. Along with the demographic and anthropometric profile data on family history, food habits and causative factors of obesity were obtained by using the interview schedule. The finding revealed that about 48 per cent of obese women had maternal obesity, 14 per cent had paternal obesity and 33 per cent had obesity of both the parent. The difference in anthropometric measurements like height, weight, MUAC and waist circumference were found to be highly significant ($P < 0.05$) with prevalence of obesity on the basis of analysis of variance. There was no abnormality in lipid profile, though the subjects were obese, which indicate that there overweight is of recent origin

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Obesity may be defined as a condition in which excessive accumulation of fat in the adipose tissues has taken place. It arises when the intake of food is in excess of physiological needs. Obesity is the most common nutritional disorders in the western countries and among the high income groups in the developing countries (Swaminathan, 1998).

The obesity epidemic moves through a population in a reasonably consistent pattern over time and this is reflected in the different patterns in low and high income countries. In low income countries, obesity is more common in people of higher socio-economic status and in those living in urban communities. It is often first apparent among middle aged women. In more affluent countries, it is associated with lower socio-economic

status especially in women and rural communities. The sex differences are less marked in affluent countries and obesity is often common amongst adolescents and younger children. The standard definition of overweight ($BMI \geq 25 \text{ kg/m}^2$) and obesity ($BMI \geq 30 \text{ kg/m}^2$) have been mainly derived from populations of European descent. However in population with large body frames, such as Polynesians, higher cut-off points have been used. In populations with smaller body frames, such as Chinese populations, lower cut-off points have been proposed and studies are being undertaken to separate appropriate cut off points for a variety of Asian populations (Swinburn *et al.*, 2004).

Obesity is prevalent in several developing countries, affecting children, adolescents and adults

particularly in those countries experiencing rapid industrialization and urbanization, obesity is growing faster and coexists with under-nutrition and infectious diseases, becoming one of the greatest public health problems (Ribeiro *et al.*, 2003).

There is an association between obesity with food behaviour and some related factors like parity, duration of lactation, physical activity pattern and familial traits. Food behaviour denotes the different aspects of food consumption like selection and preparation, dietary intake, eating patterns, food likes, dislikes and habits and food intake in response to socio-cultural, environmental and physiological pressures (Dua and Seth, 1988).

Several authors have demonstrated a positive association between the time spent in watching TV, reduced physical activity, and obesity in children and adolescents. Time of TV viewing during childhoods is associated positively with obesity prevalence and incidence. Environmental factors represent important risk factors for overweight and obesity. At a given stage of development better socio-economic condition favour nutrition and health aspects and contribute to the rise of obesity in the population (Ribeiro *et al.*, 2003).

From National Family Health Survey (NFHS) it was found that Indian women are more obese than Indian men. Moreover, as per the NFHS data there is not a single state in India where more number of men are obese than women. Only Tripura is one state where this difference is small of 0.1 per cent (in Tripura number of obese male 5.2 % and number of obese female 5.3%), while in rest of state this difference is very significant. Whereas Punjab tops overall obese people chart with 30.3 per cent obese male and 37.5 per cent obese female. Overall, India results are 12.1 per cent obese male and 16 per cent obese female. From this data, we can clearly conclude that women are more obese than men in India. In recent years obesity has increased significantly in India and it looks that this trend has affected Indian women more than Indian men. It is difficult to define exact reason between these trends and why Indian women are more obese than Indian men, however, it looks that Indian women are enjoying life more comfortably than Indian men because comfortable life is mostly associated with obesity. Overall, this is not a good sign for health conscious women, because chances of numbers of health related problems increases

significantly (Garg *et al.*, 2009). Health care providers should encourage women to consume a diet high in fruits and vegetables and low in total and saturated fats (Morin, *et al.*, 2004).

According to the 2011 census, the state population is 41.9 million out of which 18.6 million are females. A review of literature reveals that no systematic study has been made on obesity and its causative factor among the urban women of Odisha. A humble attempt has been made in this paper to assess the causative factor of obesity among the urban community.

■ RESEARCH METHODS

According to the 2011 census the total population of Sambalpur district is 1,044, 410 out of which 529,424 are males and 514,986 are females. The urban women who were 25 years of age and above in different area of Sambalpur town *i.e.* Modipara, Cheruapara, Gopalmal, Housing Board Colony, Baraipali, Labour Colony, Station colony, constitute the universe of our study.

The study was conducted by interviewing 200 urban women of Sambalpur district of western Odisha selected by purposive sampling technique. A personal interview schedule was designed, pre-tested, and refined for the collection of information on demography and other socio economic condition of family. Information on family history, food habits, causative factors were obtained by using detailed interview schedule. Anthropometric measurements of the subjects recorded were height, weight, waist and hip circumferences. Body mass index was calculated by using formula $BMI = \text{Weight (kg)} / \text{Height (mtr}^2\text{)}$. According to Jelliff and Jelliff (1991) to determine whether an individual is obese or not, his body mass index is compared with a reference standard. The serum lipid profile is useful in determining the amount of different lipids in the blood in order to assess the risk levels of obesity.

■ RESEARCH FINDINGS AND DISCUSSION

Table 1 presents the prevalence of obesity among the urban women on the basis of BMI level. It was observed that out of total 200 data, about 21.5 per cent were normal women having BMI level 18.5-24.9. About 50 per cent were pre-obese women having BMI level ranging from 25.0-29.9. 24.5 per cent belonged to obese class I type where the BMI level is 30.0-34.9. None of them belong to obese class II category. Only 4 per cent

of women belonged to obese class III category where BMI level is 40 or higher.

Family history of obesity :

Table 2 shows the family history of obesity among the obese and non obese urban women (divided to obese and non obese according to BMI level of the individuals). Among the total 200 urban women about 40 per cent had reported the family history of maternal obesity, 24 per cent had reported the family history of both paternal and maternal obesity while 13 per cent had reported the history of paternal obesity. Johnson observed that obesity has a strong genetic component. If one or both parents are obese, obesity risk for children is raised because genes determine one’s body shape and to some extent weight.

Causes of obesity as believed by women:

The causes for obesity as expressed by the urban women, who are divided to obese and non-obese category according to BMI level of the individual was

presented in Table 3. Ten per cent of the urban women expressed eating more fried foods/high fat foods as the reasons for their obesity. Seventeen per cent expressed nibbling between foods, thirty four per cent expressed sedentary activity, eight per cent expressed child birth and another seventeen per cent expressed the habits of consuming left over foods as the reasons for their obesity.

Occasion for consuming high fat/energy food :

Table 4 revealed the different occasions in which the women consumed more of energy and fat rich foods. Twenty two per cent of the urban women expressed the consumption of more energy rich foods during get together; another 22 per cent expressed the consumption during holidays. 21 per cent reported consumption during family functions, 14 per cent during formal parties, 13 per cent during festivals and 8 per cent reported the consumption of high energy and fat rich foods during informal parties. All of them admitted that they are unable to resist the temptation to eat good quality food served during such occasions.

Table 1 : Prevalence of obesity and BMI [wt/(ht)²]

Weight status	Number of subjects	Percentage	BMI range
Normal	43	21.5	18.5-24.9
Pre-obese	100	50	25.0-29.9
Obese-I	49	24.5	30.0-34.9
Obese-II	-	-	35.0-39.9
Obese-III	8	4	40 or higher

Table 2 : Family history of obesity

Family history of obesity	Obese		Non-obese		Total	
	N	Per cent	N	Per cent	N	Per cent
Paternal	8	14	18	13	26	13
Maternal	27	48	53	37	80	40
Both parents	19	33	29	20	48	24
None of the parents	3	5	43	30	46	23
Total	57	100	143	100	200	100

Table 3 : Causes of obesity as was believed by women

Causes of obesity	Obese		Non-obese		Total	
	N	Per cent	N	Per cent	N	Per cent
Hormonal imbalance	--	--	27	19	27	14
Sedentary activity	17	30	51	36	68	34
Habit of consuming leftover food	15	26	19	13	34	17
Nibbling between foods	11	19	23	16	34	17
Eating more fried foods/high fat foods	10	18	11	08	21	10
Child birth	04	07	12	08	16	08
Total	57	100	143	100	200	100

Frequency of consumption of high energy/fat food:

Table 5 shows the frequency of consumption of high energy / fat foods by the urban women. Regarding the consumption of sweets, out of total 57 obese women 30 per cent consumed daily, 63 per cent consumed weekly, 7 per cent consumed occasionally. Among 143 non-obese women, 29 per cent consumed daily, 58 per cent consumed weekly and 13 per cent consumed occasionally. Regarding chocolate consumption, among obese women, 89 per cent consumed occasionally and 11 per cent never consumed chocolate. Among non-obese, 6 per cent consumed weekly, 84 per cent consumed occasionally and 10 per cent never consumed chocolate. Regarding bakery consumption among obese women, 7 per cent consumed weekly, 88 per cent consumed occasionally and 5 per cent of them never consumed bakery items. Again out of 143 non-obese, 11 per cent consumed weekly, 86 per cent consumed occasionally and 3 per cent never consumed bakery items. Regarding ice cream, out of 57 obese women 86

per cent consumed occasionally and 14 per cent of them never consumed ice-cream. Similarly out of 143 non obese women 86 per cent consumed occasionally, and another 14 per cent never consumed ice cream. Regarding fleshy foods, consumption among obese 2 per cent consumed daily, 46 per cent consumed weekly, 2 per cent consumed occasionally and 50 per cent never consumed fleshy foods. Similarly among non-obese 1 per cent consumed daily, 48 per cent consumed weekly, 7 per cent consumed occasionally and 44 per cent never consumed fleshy foods. Regarding synthetic soft drinks consumption among obese 93 per cent consumed occasionally and 7 per cent never consumed soft drinks. Similarly among non-obese 85 per cent consumed occasionally and 15 per cent never consumed. Regarding the consumption of ghee among obese women 74 per cent consumed daily, 24 per cent consumed weekly, 2 per cent consumed occasionally. Similarly among 143 non-obese women 54 per cent consumed daily, 43 per cent consumed weekly and 3 per cent consumed

Table 4 : Occasions during which fat/high energy food was consumed

Occasions leading to consumption of high fat/energy	Obese		Non-obese		Total	
	N	Per cent	N	Per cent	N	Per cent
Family function	09	16	32	22	41	21
Get together	14	25	33	23	47	22
Formal parties	06	10	21	15	27	14
Informal parties	04	7	12	08	16	8
Holidays	17	30	27	19	44	22
Festivals	07	12	18	13	25	13
Total	57	100	143	100	200	100

Table 5 : Frequency of consumption of high energy / fat food

High energy items	Category of women	Number	Per cent of women taking the food			
			Daily	Weekly	Occasionally	Never
Sweets	Obese	57	30.0	63.0	7.0	--
	Non-obese	143	29.0	58.0	13.0	--
Chocolate	Obese	57	--	--	89.0	11.0
	Non-obese	143	--	6.0	84.0	10.0
Bakery items	Obese	57	--	7.0	88.0	5.0
	Non-obese	143	--	11.0	86.0	3.0
Ice cream	Obese	57	--	--	86.0	14.0
	Non-obese	143	--	--	86.0	14.0
Fleshy foods	Obese	57	2.0	46.0	2.0	50.0
	Non-obese	143	1.0	48.0	7.0	44.0
Synthetic soft drinks	Obese	57	--	--	93.0	7.0
	Non-obese	143	--	--	85.0	15.0
Ghee	Obese	57	74.0	24.0	2.0	--
	Non-Obese	143	54.0	43.0	3.0	--

occasionally.

Obesity and anthropometric measurement:

The Table 6 presents the relation of obesity with the five anthropometric measurements of women of. In case of obese women weight, waist circumference and MUAC are higher than the non-obese in the present study. The difference in anthropometric measurements like height, weight, MUAC, waist circumference were found to be highly significant, ($P < 0.05$) with prevalence of obesity on the basis of analysis variance.

Lipid profile of selected obese women :

Table 7 presents lipid profile of the selected obese women. Out of 30 obese women, about 11 (36.7%) have

total cholesterol value < 220 mg/dl. It means for them treatment is not necessary. About 12 (40%) women have total cholesterol value in between suspect range (220-260) mg/dl. For 7 (23.3%) women treatment is necessary because they have cholesterol value > 260 mg/dl. For 30 urban women the mean value of total cholesterol was 231.50 mg/dl.

The HDL cholesterol level was > 55 mg/dl in 3 (10%) women, which means for them treatment is not necessary. In 23 (76.7%) women the HDL cholesterol level was within suspect range (35-45) mg/dl. The level was < 35 in 4 (13.3%) women, where treatment is necessary. For 30 obese women the mean value of HDL cholesterol was 40.83 mg/dl.

The LDL cholesterol level was < 150 mg/dl in 11

Category	Height	Weight	Waist	Hip	MUAC
Non-obese	143	143	143	143	143
	156.81 \pm 4.39	64.57 \pm 6.66	81.53 \pm 5.12	101.75 \pm 3.76	33.51 \pm 3.44
Obese	57	57	57	57	57
	152.66 \pm 5.12	75.12 \pm 4.48	87.64 \pm 1.93	101.91 \pm 2.01	38.28 \pm 2.71
Total	200	200	200	200	200
	155.63 \pm 4.97	67.58 \pm 7.75	83.27 \pm 5.24	101.80 \pm 3.35	34.87 \pm 3.89
F	14.643	99.404	62.542	0.106	72.177
Sig	0.000	0.000	0.000	0.745	0.000

Lipid profile (mg/dl)	Number	Per cent
Total cholesterol		
Treatment not necessary < 220	11	36.7
Suspect range 220-260	12	40.0
Treatment necessary > 260	7	23.3
HDL cholesterol		
Treatment not necessary > 55	3	10.0
Suspect range 35-45	23	76.7
Treatment necessary < 35	4	13.3
LDL cholesterol		
Treatment not necessary < 150	11	36.7
Suspect range 150-190	17	56.6
Treatment necessary > 190	2	6.7
VLDL cholesterol		
Treatment not necessary < 30	5	16.7
Suspect range 30-40	25	83.3
Serum triglyceride		
Treatment not necessary < 150	8	26.7
Suspect range 150-200	6	20.0
Treatment necessary > 200	16	53.3

Table 8 : Comparison of mean lipid profile of the selected obese subjects with other similar studies

Lipid fractions (mg/dl)	Obese subjects of Coimbatore 1(1989)	Obese women Coimbatore 2(2002)	Obese subject of Coimbatore 3(2003)	Obese group of Coimbatore 4(2003)	Present study of urban women 5 (2011)
Total cholesterol	215.3	277.0	187.92	220.4	231.50
HDL-cholesterol	51.5	41.0	42.83	46.3	40.83
LDL- Cholesterol	150.2	158.0	110.3	121.1	154.73
VLDL- Cholesterol	33.9	29.0	26.8	42.4	38.0
Triglycerides	169.73	144.0	134.3	212.9	195.23

1= Abraham and Jagannathan (1989), 2= Thilakavathi and Purushothaman (2002), 3= Vijayalakshmi and Anitha (2003)

4= Vijayalakshmi *et al.* (2003)

(36.7%) women, which mean for them treatment is not necessary. In 17 (56.7%) women the LDL cholesterol level was within suspect range (150-190) mg/dl. Only in 2 (6.7%) women the level was > 190 mg/dl, where treatment is necessary. The mean value of LDL cholesterol for 30 obese women was 154.73 mg/dl. The VLDL cholesterol level was <30 mg/dl in 5 (16.7%) women which means for them treatment is not necessary. In 25 (83.3%) women VLDL cholesterol level was within suspect range. For 30 obese women the mean value of VLDL cholesterol was 38 mg/dl.

Out of 30, about 8 (26.7%) women have serum triglyceride value < 150 mg/dl, where treatment is not necessary. 6 (20%) women have triglyceride value within suspect range (150-200) mg/dl. The serum triglyceride value was > 200 mg/dl in 16 (53.3%) women, where treatment is necessary. The mean value of serum triglyceride level for 30 obese women was 195.23 mg/dl.

Among the 30 obese women the mean lipid fractions were 231.50 mg/dl total cholesterol, 40.83 mg/dl HDL cholesterol, 154.73 mg/dl LDL- cholesterol and 195.23 mg/dl triglycerides. The lipid profile of the selected obese women revealed that there was no abnormality in mean fractions though the subjects were obese.

Comparison of mean lipid profile with other similar studies :

The mean lipid profiles of the urban women were compared with all other similar studies (Table 8). It was observed that the mean total cholesterol level was higher (277.0 mg/dl) in the study done by Thilakavathi, and Purushothaman, (2002). In the present study the mean value of total cholesterol was 231.50 mg/dl. Mean total cholesterol level was lower (187.92 mg/dl) in study done by Vijayalakshmi and Anitha (2003).

The mean HDL- cholesterol level was lower (40.83 mg/dl) in the present study when compared with other related studies. Mean HDL- cholesterol level was higher (51.5 mg/dl) in Abraham and Jagannathan study done in 1989. The mean LDL cholesterol level was 154.73 mg/dl in the present study. It was higher (158mg/dl) in Thilakavathi and Purushothaman study (2002). The mean value of VLDL- cholesterol was 38.0 mg/dl in the present study. The mean value of both VLDL – cholesterol level and serum triglycerides value were higher (42.4 mg/dl and 212.9 mg/dl) in the study conducted by Vijayalakshmi *et al.* (2003). In the present study the mean value of serum triglycerides level is 195.23 mg/dl. Similar work related to the present investigation was also carried out by Nalawade and Prabhu (2012); Dixit and Mathur (2013); Yadav and Singh (2010) and Barooah *et al.* (2014).

Conclusion:

Obesity is the most common nutritional disorder in different societies. Its significance requires constant emphasis because it is associated with increase mortality and morbidity due to the development of various chronic disorders. About 200 urban women were chosen by purposive sampling method of which 48 per cent of obese women had maternal obesity, 14 per cent had paternal obesity and 33 per cent had obesity of both the parents. In case of obese women weight, waist circumference and MUAC are higher than the non-obese in the present study. The difference in anthropometric measurements like height, weight, MUAC and waist circumference were found to be highly significant ($P < 0.05$) with prevalence of obesity on the basis of analysis of variance. There was no abnormality in lipid profile, though the subjects were obese, which indicate that there overweight is of recent origin.

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