

Prevalence of Obesity in Working Premenopausal and Postmenopausal Women of Jalandhar District, Punjab

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KEYWORDS Overweight. Obesity. Premenopausal Women. Postmenopausal Women

ABSTRACT For the present cross-sectional study, 595 women (330 premenopausal and 265 postmenopausal) subjects were selected by personal interview. A questionnaire was filled to know the required reproductive history of the subject. Obesity was assessed according to Body Mass Index, Waist-Circumference and Waist-Hip-Ratio. The prevalence of obesity was found more in postmenopausal women as compared to premenopausal women according to Body Mass Index, Waist Circumference as well as Waist- Hip Ratio. According to Body Mass Index, the prevalence was 70.30% and 75.09% in pre- and postmenopausal women, respectively. Similarly the prevalence of central obesity according to Waist Circumference was 75.15% and 89.05% in pre- and postmenopausal women, respectively where as according to Waist-Hip Ratio this prevalence was 74.54% in premenopausal women and 87.92% in postmenopausal women of Jalandhar District, Punjab.

INTRODUCTION

Obesity is the most prevalent nutritional disorder in which there is excessive storage of energy in the form of fat as per height, weight, race and gender (WHO 2005). Obesity is prevalent among all age groups and is on the rise among adults especially the women worldwide in both developed and developing countries (Wang and Hoy 2004; Flegal 2005).

Menopause is one of the critical periods of a women's life during which weight gain and onset or worsening of obesity are favoured. At this period the prevalence of obesity is the highest (de Paz et al. 2006; Sharma et al. 2008). The prevalence of overweight and obesity among postmenopausal women of United Kingdom has been reported as 41% (24/59) and 36% (21/59) respectively where as less than half of the premenopausal women (48.27% ,14/29) of U.K. were observed as overweight/ obese by Begum et al. (2009). This figure is higher than statistics released by WHO in 2006 (WHO global infobase) which stated that the prevalence of overweight and obesity among postmenopausal women of U.K. was 30-40% and 25-31%, respectively.

Rappelli (2002) has also reported that the prevalence of being overweight and obesity is higher in postmenopausal women. As we don't have such comparative statistics in Indian studies, so in the present study an attempt has been made to assess the prevalence of being overweight and obesity among working premenopausal and postmenopausal women of Jalandhar District using Body Mass Index (BMI), Waist Circumference (WC) and Waist-Hip-Ratio (WHR) as the measures of obesity.

MATERIALS AND METHODS

For the present cross-sectional study data has been collected from 595 women ranging in age from 30-60 years, working in various educational institutes of Jalandhar District, Punjab. A questionnaire was prepared to know the complete reproductive history of the subjects. First of all, the women were taken into confidence. Then the information regarding age, educational status, health status and continuation or cessation of menstruation was collected from each subject through interview schedule. Out of total 595 women, 265 (44.53%) were classified as postmenopausal; that is, those who had reached natural menopause and had their last menstrual bleeding at least one year previously (WHO 1996) and the remaining 330 (55.46%) were premenopausal i.e. those having regular menstrual bleeding. Perimenopausal women i.e. having irregular vaginal bleeding during the last 12 months, were

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excluded from the present study. Anthropometric measurements like, weight, height, waist and hip circumference were taken on each subject using standard methodology (Weiner and Lourie 1981). BMI and WHR were calculated and obesity was assessed.

The suggested critical limits of BMI by WHO (2000) were utilised for the assessment of obesity as given below.

Body Mass Index (BMI) kg/m ²	Classification
< 18.5	Underweight
18.5-22.9	Normal
23.0-24.9	Overweight
>25.0	Obese

As per Snehalatha et al. (2003) following cut off values of WC and WHR have been used for the assessment of central / abdominal obesity.

WC		WHR	
Normal	Abdominal obesity	Normal	Abdominal obesity
<80.0 cm	>80.0 cm	<0.81	>0.81

Data was managed on an excel spread sheet. Differences in baseline characteristics between the groups were examined by chi-square test. Differences were considered statistically significant with P values ranging from <0.001-0.05.

RESULTS

Body Mass Index provides the most useful albeit crude population level measure of obesity and it can be used to estimate the prevalence of obesity within a population (WHO 1998). Therefore in present study, the prevalence of malnutrition was calculated according to the critical limits of BMI as recommended by WHO and IOTF (2000). Table 1 presents the distribution of all subjects according to BMI classification.

The frequencies of being underweight, normal, overweight / obese and overweight and obesity taken separately were 1.81%, 15.75%, 82.42%, 12.12%, 70.30% among premenopausal women and 1.13%, 9.05%, 89.81%, 14.72%, 75.09% among postmenopausal women, respectively. The overall prevalence of overweight and obesity in the working women of Jalandhar was found to be 13.94% and 72.43%, respectively.

Waist Circumference (WC) and Waist-Hip Ratio (WHR) are important parameters for the assessment of abdominal adiposity. Table 2 reveals the percentage prevalence of central / abdominal obesity among pre- and postmenopausal women according to WC and WHR. Prevalence of normal and abdominally obese women were found to be 24.84% and 75.15% among premenopausal women and 10.94% and 89.05% among postmenopausal women, respectively according to WC where as according to WHR these prevalences were 25.45% and 74.54% among premenopausal women and 12.07% and 87.92% among postmenopausal women respectively. The overall prevalence of abdominal obesity according to WC was observed as 81.34% and according to WHR, it was found to be 80.50%.

DISCUSSION

The present study reveals higher rate of overweight and obesity among postmenopausal women as compared to premenopausal women according to BMI, WC and WHR. On the other hand percent prevalence of underweight is quite less i.e. 1.81% and 1.13% in pre- and postmenopausal women respectively as compared to the prevalence of overweight and obesity in both the groups. On using the WHO (2000) criteria of BMI for Asians (Table 1), the combined prevalence of overweight and obesity among working premenopausal and postmenopausal women is 82.42% and 89.81%, respectively and the diff-

Table 1: Number and percentage prevalence of working women of Jalandhar District Punjab in various body mass index groups (WHO, 2000)

Category	Number of subjects	Underweight		Normal		Overweight & Obese		Overweight		Obese	
		No.	%	No.	%	No.	%	No.	%	No.	%
Pre-M	330	6	1.81	52	15.75	272	82.42	40	12.12	232	70.30
Post-M	265	3	1.13	24	9.05	238	89.81	39	14.72	199	75.09
Total	595	9	1.51	76	12.77	510	85.71	79	13.94	431	72.43

(Pre-M= Premenopausal women, Post-M= Postmenopausal women)

erences between both the groups are statistically significant ($\chi^2=6.54$, $df=1$ and $p<0.05$). Not much work has been done to study the prevalence of obesity among premenopausal and postmenopausal women separately at national and international level although studies are there which show the relationship between increase in obesity at menopause and occurrence of obesity related morbidities like diabetes, hypertension, dyslipidemia and certain types of cancer (Chang et al. 2000 and Begum et al. 2009). According to Skafar et al. (1997), fall in level of estrogen at menopause leads to lack of protection against cardiovascular diseases in postmenopausal women.

When compared to other studies, the prevalence of obesity in the present study (72.43%) is much higher than all other Indian studies (Asthana et al. 1998; Gopalan 1998; Zargar et al. 2000; Misra et al. 2001; Reddy et al. 2002; Gupta et al. 2004; Bhadra et al. 2005; Mungreiphy and Kapoor 2008). Even when compared to Punjabi population, it is much higher than the studies available so far (Sidhu and Tatla 2002; Sidhu and Prabhjot 2004; Sidhu et al. 2005; NFHS-3 2007). Although it is nearly equal to the obesity observed by Das and Bose (2006) in women of West Bengal (Table 3).

For any given BMI, Indians tend to have increased waist circumference. Hence abdominal adiposity assessed using waist circumference is considered to be more appropriate to predict metabolic disorders than generalized adiposity assessed by BMI (Ramachandran et al. 1997). WHR is an accepted clinical, though, indirect method to identify subjects with abdominal fat accumulation. Prevalence of abdominal adiposity according to WC and WHR has also been found more in postmenopausal women as compared to premenopausal women (Table 2) and the differences are statistically significant w.r.t. both

methods ($\chi^2=18.70$, $df=1$ and $p<0.001$ in case of WC and $\chi^2=16.75$, $df=1$ and $p<0.001$ in case of WHR). The differences in prevalence of adiposity w.r.t. BMI, WC and WHR has been found significant in premenopausal ($\chi^2=8.06$, $df=2$ and $p<0.05$) but insignificant in case of postmenopausal women. When compared with other such studies conducted among Indian women, the prevalence of abdominal obesity in the present study according to WC has been observed as the highest (81.34%) among the working women of Jalandhar, where as the according to WHR, the prevalence of abdominal obesity (80.50%) is nearly equal to the obesity observed by Gupta et al. (2004) in Punjabi Bhatia family, Jaipur (Table 4).

Thus it is apparent from the present study that the prevalence of abdominal adiposity according to WC and WHR is significantly more than the generalised obesity (BMI). So it becomes clear that abdominal adiposity does not always go hand in hand with general obesity. Bhadra et al. (2005) has also reported the prevalence of central obesity measured as waist circumference (55.15%) and waist-hip ratio (42.39%) being significantly higher than generalised obesity measured as BMI (17.45%). This implied that the existence of central obesity is considerably higher as compared to generalised obesity among educated women of Jalandhar (Punjab). As it has been found in the present study that the prevalence rates of overweight and obesity are different with three different variables (BMI, WC and WHR) and the same has been observed in other studies also (Misra et al. 2001; Reddy et al. 2002; Gupta et al. 2004; Bhadra et al. 2005; Das and Bose 2006). So it is recommended that some crude parameter should be developed to assess the obesity in the Indian population.

While comparing the present data with other parts of India (Tables 3 and 4), it is apparent that prevalence rate of being overweight and obesity

Table 2: Prevalence of abdominal / central adiposity according to WC and WHR criteria given by Snehalatha et al. (2003) among working women of Jalandhar.

Category	Total No. of subjects (595)		Pre-M (330)		Post-M (265)	
	No.	%	No.	%	No.	%
WC						
Normal women	111	18.65	82	24.84	29	10.94
Abdominal adiposity	484	81.34	248	75.15	236	89.05
WHR						
Normal women	116	19.49	84	25.45	32	12.07
Abdominal adiposity	479	80.50	246	74.54	233	87.92

(Pre-M= Premenopausal women, Post-M= postmenopausal women)

Table 3: Percent prevalence of overweight and obesity among women in various Indian populations according to BMI

City/Centre	No. of subjects	Year of study	Age group (Yrs.)	Cri-teria	Prevalence (%)	Investigator
Varanasi females	625	-	>15	≥30	30.24	Asthana et al. (1998)
Middle class	443	-	20-65	≥25	H.M.C-50.00	Gopalan (1998)
New Delhi					M.M.C-30.00	(NFI report)
					L.M.C-28.00	
					Slum-4.00	
Kashmir	2587	-	>40	≥25	23.70	Zargar et al. (2000)
Urban Slum	362	1998-99	>30	≥25	15.60	Misra et al. (2001)
population, Delhi						
New Delhi	U-1456	-	35-64	≥25	U-48.00	Reddy et al. (2002)
	R-1070				R-40.00	
Punjabi Bhatia	232	2003	44.7±	≥25	69.40	Gupta et al. (2004)
family, Jaipur	232	2003	15.3	≥30	32.30	
Bengalee Hindu	854	2001-3	20-50	≥30	17.45	Bhadra et al. (2005)
women				25-29.9	37.24	
West Bengal Marwaris	110	2001-2	>20	≥25	71.80	Das and Bose (2006)
Tangkhu Naga	346	2005-6	20-70	≥30	27.10	Mungreiphy and Kapoor (2008)
Tribal Women						
<i>In Punjab</i>						
Adult Punjabi	1000	1998-99	>20	25-29.9	20.00	Sidhu and Tatla (2002)
females				≥30	25.30	
College girls	500	2001	≥18	25-29.9	28.20	Sidhu and Prabhjot (2004)
Amritsar				≥30	15.00	
Punjabi Urban	900	1998-99	>20	25-29.9	22.77	Sidhu et al. (2005)
females				≥30	21.11	
Punjabi Rural	800			25-29.9	12.00	
females				≥30	10.25	
Punjabi Families	3681	2005-6	15-49	≥30	38.00	NFHS-3, 2007
Jalandhar women						
Premenopausal	330	2007-8	>30	≥25	70.30	Present study
Post-menopausal	265	2007-8	>30	≥25	75.09	
Pre- and	595	2007-8	>30	≥25	72.43	
Post-menopausal woman						

H.M.C.- High middle class, M.M.C.-Mid middle class, L.M.C.- Low middle class, U- Urban, R-Rural

in the present study is quite high than what has been reported in various other Indian studies but it is in line with women of West Bengal (Das and Bose 2006). Similarly the prevalence of central obesity in the present study is in line with the Punjabi Bhatia women of Jaipur (Gupta et al. 2004). However, the extent of overweight and obesity reported in these studies is not strictly comparable because of the variation in the criteria of BMI cut- off points used and variation in age and socio-economic status of the subjects. It is discernible from table (I) that the prevalence rates of overweight and obesity in working premenopausal and postmenopausal women of Jalandhar District (Punjab) are higher than those observed in other parts of India. This comparable profile of prevalence of overweight and obesity indicates that working women of Jalandhar are at an increased risk of malnutrition in the form of overweight and obesity.

CONCLUSION

The prevalence of obesity in the present study has been found to be 70.30% among premenopausal women and 75.09% among postmenopausal women. The overall prevalence of obesity has been observed as 72.43%. Similarly the incidence of abdominal adiposity according to WC among pre- and postmenopausal women has been found to be 75.15% and 89.05% where as according to WHR, this occurrence is 74.54% and 87.92% respectively. The overall adiposity prevalence has been observed as 81.34% and 80.50% respectively according to WC and WHR. The obesity trend has been found to be higher in women of Jalandhar District (Punjab) as compared to other Indian women populations studied so far except the women population of West Bengal (Das and Bose 2006) and the Punjabi Bhatia women of Jaipur (Gupta et al. 2004).

Table 4: Percent prevalence of central / abdominal obesity among women in various Indian populations according to WC & WHR

City/Centre	No. of subjects	Year of study	Age group (Yrs.)	Cri-teria	Prevalence (%)	Investigator
WC						
Urban Indian population, Jaipur	573	2002	20	70-80	68.40	Gupta et al. (2002)
Punjabi Bhatia family, Jaipur	232	2003	20-60	≥88.0	55.60	Gupta et al. (2004)
Bengalee women	854	2001-3	20-50	≥72.0	55.15	Bhadra et al. (2005)
Working women of Jalandhar	595	2007-8	≥30	≥80.0	81.34	Present study
WHR						
New Delhi, middle class	443	-	20-65	≥0.85	H.M.C-50.00 M.M.C-49.00 L.M.C-50.00	Gopalan (1998)
Urban slum population in Northern India	362	1998-99	>18	≥0.80	51.10	Misra et al. (2001)
New Delhi	U-1456 R-1070	-	35-64	≥0.80	U-40.00 R-36.00	Reddy et al. (2002)
Punjabi Bhatia Marwaris of Howra, Jaipur	232	2003	20-60	≥0.80	80.20	Gupta et al. (2004)
Bengalee Women	854	2001-3	20-50	>0.85	42.39	Bhadra et al. (2005)
West Bengal	110	2001-2	>20	>0.80	41.80	Das and Bose (2006)
Women of Jalandhar	595	2007-8	≥30	>0.81	80.50	Present Study

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