

Growing Obese in Manipur: Relationship between Age and Obesity among the Meitei Males of Manipur, India

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KEYWORDS Adolescent. BMI. Imphal. Lifestyle. Urban

ABSTRACT The present study was conducted to find the prevalence of obesity with advancing age among the Meitei adult males aged 14-60 years of age. A cross-sectional data was collected from 606 participants following a house-to-house visit. The prevalence of overweight and obesity were evaluated by using both WHO standard values and Asian cut-off points. Out of 606 participants, 10.89 per cent was found to be overweight and 1.65 per cent obese when the assessment was done using WHO standard. Using Asian cut-off point, the prevalence of overweight and obesity were found to be 16.83 per cent and 5.12 per cent respectively. The study also showed that prevalence of overweight and obesity increases along with advancing of age. Sedentary lifestyles and inactive physical activities could be the main reasons for the higher prevalence of overweight and obesity in the older age groups.

INTRODUCTION

Obesity is a condition that develops from a chronic quantitative imbalance between energy intake and energy expenditure leading, in turn, to an excessive accumulation of adipose tissue within the body (Bray and Bellanger 2006). The increasing patterns of obesity is differed by age and sex (Matijasevich et al. 2009). Obesity is more common in middle-aged group, people of higher socio-economic status and those living in urban areas. The prevalence of obesity is increasing in all age groups and reaches its peak at around 55-64 years and decreases thereafter.

The number and proportion of older people who are obese have risen notably in recent decades. An estimate of 300 million adults is reported to be overweight worldwide in 2000 (Finer 2003). By 2010, the prevalence of overweight adults was more than 1.4 billion while more than 400 million adults are reportedly obese (WHO 2011). While once considered a problem related to affluence, obesity is now increasing rapidly in many developing countries as well as within poor neighbourhoods of developed countries (WHO 2003). Even in places like India and Africa, which are usually associated with under nutrition, the prevalence of obesity is increasing (Berman 2009;

Brewis 2011). Therefore, the present study has been conducted in Manipur to determine the prevalence of overweight and obesity in different age groups among the adult male populations.

Objective

The primary purpose of the study is to determine the prevalence of obesity in relation to age among Meitei males of Manipur.

MATERIAL AND METHODS

The present study was conducted on the urban living males of Imphal, the capital of Manipur. A cross-sectional data on 606 males aged 14 to 60 years were collected following house-to-house visit. Most of the subjects for the present study belonged to lower income family groups (41.75%) followed by middle income groups (33.83%) and high income groups (24.42%). Anthropometric measurements were taken on those participants who volunteered to participate in the study. The participants were divided into five different age groups viz., 14-19 years, 20-29 years, 30-39 years, 40-49 years and 50-60 years. Data on anthropometric measurements such as height and body weight were collected using anthropometer and weighing machine. Height (cm) was measured with an anthropometric rod with a precision of 1mm. Weight was recorded to the nearest 0.1 kilogram by weighing machine. The participants were putting on light apparel when weighed. Body Mass Index (BMI) was calculated using the formula weight in kilograms / (height in meter)². The prev-

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alence of overweight and obesity were evaluated by both WHO International standard (overweight- BMI ≥ 25 ; obese- BMI ≥ 30) and Asian cut-off points (overweight-BMI ≥ 23 ; obese-BMI ≥ 27.5) (WHO 2000). In order to test the level of significance, both t-test and chi-square test have been used. Both $p < 0.01$ and $p < 0.05$ were considered as statistically significant. All the analysis was carried out in MS-excel software (Microsoft company, 2007 version).

RESULTS

The basic data height and weight of Meitei males of Manipur in five different age groups are given in Table 1. The mean value for height was found to be highest in 20-29 years age group and lowest among 14-19 years of age group. The difference in mean height was only statistically significant between 14-19 years and 20-29 years

age groups. Body weight was found to be the lowest among 14-19 years age group and highest among 50-60 years age group signifying that body weight increased along with the advancement of age. The differences were found to be statistically significant in all the age groups, except for 30-39 and 40-49 years age groups. Age group wise distribution of mean, standard deviation, standard error of mean, t-values with level of significance between five different age groups for BMI are shown in Table 2. BMI was found to be the lowest in 14-19 years age group and it increased gradually with advancing age. The differences in mean BMI were statistically non-significant between 30-39 years and 40-49 years age groups, whereas the differences among the rest of the groups were found to be statistically significant. Table 3 showed the distribution of subjects on the basis of body mass index as assessed from WHO International value and Asian

Table 1: Basic data on height and weight of the Meitei adult (male) of Manipur

Age group	N	Height (cm)					Weight (kg)				
		Mean	$\pm$ SD	$\pm$ SE	t-test	Significant	Mean	$\pm$ SD	$\pm$ SE	t-test	Significant
14-19	256	161.32	7.33	0.46	-	-	53.85	6.59	0.41	-	-
20-29	102	165.27	5.44	0.54	5.59	$p < 0.01$	59.89	7.33	0.72	7.23	$p < 0.01$
30-39	86	165.22	5.31	0.57	0.06	ns	62.34	8.60	0.93	2.08	$p < 0.05$
40-49	80	164.79	4.99	0.56	0.53	ns	63.70	9.93	1.11	0.93	ns
50-60	82	165.08	5.54	0.61	0.35	ns	66.90	9.37	1.04	2.10	$p < 0.05$

N= number of subjects; SD= standard deviation; SE= standard error

Table 2: Distribution of BMI among the Meitei adult (male) of Manipur

Age group	N	Mean	$\pm$ SD	$\pm$ SE	t-test	Level of significant
14-19	256	20.67	1.96	0.12	-	
20-29	102	21.91	2.31	0.22	4.77	$p < 0.05$
30-39	86	22.80	2.74	0.29	2.38	$p < 0.05$
40-49	80	23.42	3.15	0.35	1.33	ns
50-60	82	24.51	3.08	0.34	2.23	$p < 0.05$

N= number of subjects; SD= standard deviation; SE= standard error

Table 3: Age group wise prevalence of overweight and obese among the Meitei adult (male)

Age group	N	WHO international value		Asian cut-off point	
		Overweight (BMI ≥ 25)	Obese (BMI ≥ 30)	Overweight (BMI ≥ 23)	Obese (BMI ≥ 27.5)
14-19	256	8 (3.12%)	-	14 (5.47%)	3 (1.17%)
20-29	102	9 (8.82%)	1 (0.98%)	17 (16.67%)	3 (2.94%)
30-39	86	12 (13.95%)	1 (1.16%)	22 (25.58%)	4 (4.65%)
40-49	80	15 (18.75%)	3 (3.75%)	21 (26.25%)	6 (7.50%)
50-60	82	22 (26.83%)	5 (6.09%)	28 (34.15%)	15 (18.29%)
Total	606	66 (10.89%)	10 (1.65%)	102 (16.83%)	31 (5.12%)

$\chi^2 = 2.51$, df= 4, $p > 0.05$

$\chi^2 = 5.23$, df= 4, $p > 0.05$

cut-off points. Out of 606 males, 10.89 per cent were found to be overweight and 1.65 percent obese when the assessment was done using WHO International value. When BMI was assessed using Asian cut-off point, the prevalence of overweight and obesity were found to be 16.83 per cent and 5.12 per cent respectively. The result also showed that the prevalence of overweight and obesity increased gradually along with the age when assessed according to both WHO International standard and Asian cut-off points.

DISCUSSION

The results showed that the height increased till 20-29 years of age group and decreased gradually with the increase in age and although there was some fluctuation in height in older age group. Overall improvement in economic conditions and better nutrition in the past few decades could be the reason for the increase in height in younger generation as observed in the present study. The gradual decrease in height with the advancement of age was also reported by other studies (Kapoor and Tyagi 2002; Bhardwaj and Kapoor 2007). Body weight was found to be the lowest in younger age group and highest in the older age group showing gradual trend of increase in weight with the advancement of age. Similarly, mean BMI value also increases along with the advancing of age. An understanding of the causes of increase in body weight and mean BMI in older people could be the change body composition that occurs with ageing. The others study also reported that ageing process increases the level of centrally distributed body fat (Ross et al. 1994).

The increase in body fat with ageing is multifactorial in origin; decreased physical activity might be a major cause. With increase in age there is a progressive increase in fat and decrease in fat-free mass, that is, due to loss of skeletal muscle (Molarius et al. 2000). Consequently, at any given weight, older people, on average, have substantially more body fat than younger ones. An increase accumulation of visceral fat in older people has been confirmed in a number of studies, and it relates to risk of diabetes and cardiovascular disease (Goodpaster et al. 2005).

The present study showed an increase in the prevalence of overweight and obesity along

with the advancement of age. The positive relationship between age and obesity was also observed in earlier study (Balarajan and Villamor 2009). The main possible reasons could be the physical inactivity and the sedentary lifestyle adopted by the adult populations. Lesser involvement in exercise and the use of automobiles are certain kind of lifestyles adopted by the adult populations. Such kind of lifestyles can cause less energy expenditure from the body and increase accumulation of fat leading to the increase in body weight. The sharp increase in obesity is due to a confluence of factors, including technological advances that have lowered the costs of food, more sedentary forms of employment, and a decline in the amount of leisure time adults spend engaging in physical activity (for example, walking, biking, swimming) (David et al. 2003). The other reason could be the nutrition transition due to the effect of globalization. This has brought tremendous changes in food and eating patterns. The introduction of western food in great quantities may also alter the traditional way of food and eating habits. The changes in the food environment can be observed from the increasing number of road side vendors in Manipur especially in the Imphal area (Dkhar and Singh 2012). Further, the increase consumption of energy rich fast food could also be another possible reason for the increase in the prevalence of overweight and obesity among the Meitei males from the present study.

LIMITATIONS

The study has certain limitations that need to be acknowledged and addressed. The lack of data on physical activities and food habits are the main limitations of the study. Despite these limitations, large sample size is one of the strength of this study.

CONCLUSION

The present study highlights the increasing prevalence of overweight and obesity among the Meitei male population. If the present trend in the prevalence of overweight and obesity is not checked on time, it could lead to development of chronic morbidities associated with overweight and obesity in the adult populations. Therefore, Societies need to educate the consequences of risks factors and economic costs associated with overweight and obesity.

RECOMMENDATIONS

Health education programs and effective policies are urgently required to check the increasing problems of obesity and its health consequences. Prevention should begin early in life, in childhood and adolescence. For adult, regular monitoring of BMI and fat distribution would be useful to control even modest weight gain with ageing.

ACKNOWLEDGEMENTS

The authors are very thankful to all the subjects for their cooperation and patience during the time of fieldwork. M.S.Singh is grateful to University Grant Commission for providing financial assistant through UGC-JRF Fellowship.

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