



To study the obesity status among Rajput population of Mandi district in Himachal Pradesh in terms of Body mass index and waist hip ratio

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Abstract

Body mass index (BMI) and Waist hip ratio (WHR) are the two most commonly used anthropometric measurements to assess obesity. We measured height and weight to calculate BMI and, waist and hip circumference to calculate WHR. In the present study we have tried to understand the prevalence and the trend of obesity among 171 individuals among Rajput population of Himachal Pradesh, India. However, this study explains that WHR is better predictor obesity as mean BMI is found to be in the normal range for all the individuals.

Keywords: Obesity, Rajput population, BMI, WHR

Introduction

Obesity is rapidly growing health problem in both developed and developing countries. Visceral obesity is commonly seen among obese and overweight individuals. Body mass index (BMI) and Waist hip ratio (WHR) are easily assessable and commonly used measure of overweight and obesity. They are associated with an adverse metabolic profile as well as increased cardiovascular disease risk. The medical risks due to obesity have been shown to be linked more with the abdominal distribution of fat, as measured by the waist-to-hip ratio (WHR) and, more recently, by the waist circumference rather than BMI [1]. Waist circumference has been found to be a better

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predictor of visceral adipose tissue (VAT) than WHR [2]. This has also been confirmed by methods such as dual-energy X-ray absorptiometry.

The causes of the gender difference for BMI and WHR are unclear. Differences in anatomic, physiologic, metabolic and sex hormonal status between genders may provide certain explanations. The volume of visceral fat mass differs by sex. Men, on average, store 21% of total body fat in visceral region in comparison to 10% in women [3]. In addition, women have a wider hip circumference due to wider pelvis and larger gluteo-femoral muscle and fat depot. These anatomic distinctions result in different body fat distribution and cutoff points of WHR between genders.

The aim of the present study was to explain obesity status in terms of BMI and WHR among Rajputs of Mandi district in Himachal Pradesh. It also aims at understanding the gender and age wise differences with respect to the body mass index and waist hip ratio.

Method: A cross sectional study recruiting 171 individuals was carried out in Mandi district of Himachal Pradesh. Local colleges and villages were approached for data collection. Basic information about age, sex, caste and gotra were enquired from the subjects.

Anthropometric assessment: Height and weight were measured using standard anthropometer and weight scale, respectively, following the standard techniques. BMI was computed using the following standard equation: $BMI = \text{Weight (kg)} / \text{height}^2 \text{ (m}^2\text{)}$. According to world health organization (WHO) [4], BMI is classified into different ranges, viz, the individuals which have BMI < 18.50 are considered underweight, between 18.5-24.99 are normal category, 25-29.99 are overweight and >30 are obese. The waist circumference was measured at the umbilicus and hip circumference as the largest circumference between the waist and thighs, using measuring steel tape. WHR was calculated using the following equation: $WHR = \text{waist circumference (cm)} / \text{hip circumference (cm)}$. The normal range of WHR for females is ≤ 0.8 and males it is ≤ 0.9 .

Results and discussions: In the present study the mean BMI among males is found to be 20.24 and among females it is found to be 20.11 which lie in the normal range as defined by WHO. The t-test was calculated to compare the mean BMI among males and females which does not show significant difference (p value=0.7104). On classifying the same individuals into two groups viz, above 20 years and below 20 years of age the mean BMI value is found to be in the normal range. The mean WHR among males lie under the normal range but it is slightly higher among females. The t-test calculation among mean WHR of males and females gives significant difference (p value=0.022). Among the two age groups, the mean WHR for individuals below 20 years lie under the normal range and for individuals above 20 years of age lie above the normal range.

Table1: Distribution of various anthropometric variables in normal and abnormal ranges among Rajput population of Mandi district.

Category	Range	Above 20 yrs		Below 20 yrs	
		Males	Females	Males	Females
BMI Range	<18.5	3(7.50%)	14(23.73)	13(28.26%)	8(30.77%)
	18.5-24.99	35(87.5%)	42(71.19%)	33(71.74%)	18(69.23%)
	25-29.99	2(5%)	3(5.08)	0	0
	Total	40	59	46	26
WC Range	Normal	38(95%)	38(64.4%)	46(100%)	20(76.92%)
	Abnormal	2(5%)	21(35.59%)	0	6(23.07%)
	Total	40	59	46	26
WHR Range	Normal	16(40%)	6(10.17%)	30(65.22%)	7(26.92%)
	Abnormal	24(60%)	53(89.83%)	16(34.78%)	19(73.08%)
	Total	40	59	46	26

In the present study, in the age group above 20 years of age maximum number of males (87.5%) and females (71.19%) are found in normal range of BMI. Though 60% males found to be in the abnormal range of WHR but in case of waist circumference 95% lie under the normal range. Similar trend is seen among females above 20 years of age.

In the age group below 20, maximum number of males and females are found in the normal category of BMI. 100% males in the age group below 20 are found in the normal range of waist circumference and 65.22% males are found in the normal range that is below 0.9. Among females below 20 years of age, results show that though maximum number of females (76.92%) lie in the normal range of waist circumference but 73.08% females lie in the abnormal range of WHR.

Table2: Mean values of different anthropometric variables among Rajput population of Mandi District

	Above 20 yrs			Below 20 yrs		
	Females(59)	Males(40)	p-value	Females(26)	Males(46)	p-value
WC(cm)	78.49±7.12	80.85±7.13	0.97	75.87±7.068	75.92±7.11	0.11
BMI	20.33±2.5	21.00±2.5	0.19	19.61±1.81	19.58±1.80	0.94
WHR	0.92±0.09	0.911±0.09,40	0.625	0.88±0.09	0.88±0.09	1

In this study the mean BMI was found to be normal among males (21.00) and females (20.33) in the age group above 20 years. The t-test was calculated between them did not give significant difference (p value=0.19). The same trend was seen in the age group below 20 years of age with no significant difference (p value=0.94). The mean WHR shows a different pattern altogether, with high mean value among females in both the age groups. The difference in the mean WHR with respect to males and females was not found to be statistically significant in both the age groups (p value=0.625 and p value =1 ,respectively). The t-test among mean waist circumference between males and females in both the age groups does not give significant difference, (p value=0.97 and p value=0.11 respectively).

Childhood obesity is an important predictor of adult obesity [5]. Metabolic and cardiovascular risk profiles tend to track from childhood into adult life, resulting in an elevated risk of ill health and premature mortality [6]. There is a drastic change in physical activity, food intake and meal patterns which contribute to the obesity. Therefore, we have tried to segregate our data in two age groups, below and above 20 years.

Vikram et al [7] reported 34 % (WHR: male->0.95, female->0.8) prevalence among urban slum dwellers in Delhi during 2000. In Chennai, Mohan et al [8] demonstrated the prevalence of high waist hip ratio (criteria: WHR: M->0.9, F->0.85) higher among middle income groups (29%) compared to low income group (23%). It also showed that the prevalence of overweight-obesity to be almost twice among males compared to females in low-income groups whereas in middle-income groups it was almost the same among males and females. Recent studies done in Delhi during 2002, among adolescents show a high rate of overweight-obesity (19%) using the criteria (WHR: male->=0.87, female->=0.85) [9].

Among Asian Indians abdominal obesity and excess fat is frequently observed even though they don't have a high BMI [10]. The present population is healthy in terms of BMI, but the average WHR in this population shows a different pattern altogether. In the present study, though it's a cross-sectional study, BMI cannot be the indicator of obesity because it is found to be normal whereas it can be explained in the terms of WC and WHR. If we see the pattern of obesity in terms of WHR, we can find a similar trend of obesity among females belonging to both the age groups.

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