

GENERAL AND ABDOMINAL OBESITY AMONG THE ADULTS OF UDAIPUR DISTRICT, RAJASTHAN

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ABSTRACT

The present study aims to assess the frequency of general and abdominal obesity among individuals in Udaipur District of Rajasthan. A cross-sectional study was conducted among 100 male adults, who were selected randomly. Demographic and anthropometric data (age, height, weight, waist circumference and hip circumference) were obtained from each participant. Statistical analysis was performed using SPSS-20. The present study found highest prevalence of obese individuals (26%), followed by overweight (18%) and underweight (12%) individuals. Further, 33% of the participants were found to be having high waist circumference (WC). Similarly, 55% and 43% of the participants were found to be having high waist-hip ratio (WHR) and high waist-height ratio (WHtR), respectively. The study found that the prevalence of obesity was higher in the age group of 18-29 years. WC and WHtR were also found to be higher in the age group of 18-29 years. In conclusion, an alarming increasing trend by age was shown in the prevalence of overweight and obese among the younger male population. Therefore, proper awareness, management, and further research are need of the hour to reduce the burden of obesity and overweight in this population.

Keywords: General obesity, abdominal obesity, Udaipur District.

INTRODUCTION

Overweight and obesity are the major lifestyle related public health problems in developed and developing countries of the 21st Century (Chen *et al.*, 2019). The prevalence of obesity significantly varies across the world. According to global health estimation by World Health Organization, there were about 1.9 billion adults who were overweight and 650 million were obese (WHO, 2016). Several epidemiological studies have reported that prevalence of general and abdominal obesity is associated with common chronic diseases, including cardiovascular disease, type2 diabetes, hypertension, dyslipidemia and certain types of cancer, musculoskeletal disorder, and are considered as a risk factor for

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mortality globally (Tian, 2009). Therefore, WHO declared that obesity is a most recent and serious public health problem (Youngwah *et al.*, 2014). Some recent studies have reported that the prevalence of general and central obesity are very high in India (Undavalli *et al.*, 2018).

India is experiencing rapid epidemiological transition. Overall prevalence of obesity in India is 40.3%, constituting 44.17% in urban areas and 36.08% in rural areas (Venkatrao *et al.*, 2020). Considerable increase in obesity is associated with western lifestyles, intake of energy dense food items, decrease in physical activity, and going away from farm based labor work (Verma *et al.*, 2017).

The present study aims to assess the frequency of general and abdominal obesity of *Vaishnav* male adults in Udaipur District of Rajasthan, India.

MATERIALS AND METHODS

Study design and setting

This community based cross-sectional study was conducted in 6 villages of Udaipur District, of Rajasthan State. A total of 100 *Vaishnav* males, aged between 18 and 60 years, were recruited for the study by using simple random sampling method. This study was approved by the ethical committee, Department of Anthropology, University of Delhi. Prior written informed consent was obtained from all the participants.

Data collection and measurements

Anthropometric measurements (height, weight, waist circumferences and hip circumferences) were taken twice on each participant. Prior to taking the measurements, the protocols were explained to each of the participants. Sufficient time was given to relax their body from recent activities. Height and WC were measured to the nearest of 0.1 cm, respectively. Height was measured using anthropometer, and weight was recorded using standardized weighing machine. Waist circumference and hip circumference was measured using flexible steel tape over light clothing. The means of the replicates were used for final analysis.

Data analysis

BMI was categorized as normal ($BMI \geq 18.5 - \leq 22.5 \text{ kg/m}^2$), underweight ($< 18.0 \text{ kg/m}^2$), overweight ($\geq 23.0 - < 25.0 \text{ kg/m}^2$) and obese ($\geq 25.0 \text{ kg/m}^2$), following World Health Organization Asia Pacific Guidelines (WHO, 2004). Abdominal obesity was defined as $WC \geq 90 \text{ cm}$, $WHR \geq 0.90$ (WHO Expert Consultation, 2008) and $WHtR \geq 0.5$ for men (Ashwell *et al.*, 2016).

Statistical analysis was performed using SPSS v.20. Prevalence was reported as number with percentage. Chi-square test was used to perform test for difference in categorical variables. Correlation test was performed to find the

association of general and abdominal obesity. All the statistical analyses were set at a p-value of ≤ 0.05 as statistically significant.

RESULTS

In the present study, the mean age of participants was 31.0 years (± 11 years). The mean height, weight and BMI were 169.2 cm (± 6.7), 64.8 kg (± 13.3) and 22.55 (± 3.88), respectively. The mean of WC was found to be 82.98 (± 10.84). Hip circumference was found to be 89.6 (± 8.3). Further, the mean of WHR and WHtR were 0.92 (± 0.07) and 0.49 (± 0.06), respectively (Table-1).

Table 1: Distribution of somatometric variables among the participants

Variables	Mean \pm S.D.
Age (years)	31.0 \pm 11.0
Height (cm)	169.2 \pm 6.65
Weight (kg)	64.9 \pm 13.08
BMI	22.6 \pm 3.80
Waist Circumference (cm)	82.9 \pm 10.87
Hip Circumference (cm)	89.5 \pm 8.34
WHR	0.92 \pm 0.07
WHtR	0.49 \pm 0.06

By analyzing the categorical values of BMI, the prevalence of obese individuals (26%) was higher as compared to overweight (18%) and underweight (12%) persons. The study showed that 33 % individuals were found to be having high WC. Further, 55% of the study population was at risk with respect to WHR and similarly 43% of the respondents were found to be at risk on the basis of WHtR (Table-2).

Table 2: Distribution of general and abdominal obesity among participants

Variables		N (%)
BMI	Normal	44(44.0)
	Underweight	12(12.0)
	Overweight	18(18.0)
	Obese	26(26.0)
WC	Normal	67(67.0)
	At risk	33(33.0)
WHR	Normal	45(45.0)
	At risk	55(55.0)
WHtR	Normal	57(57.0)
	At risk	43(43.0)

Table-3 depicts the categorical values of somatometric variables (BMI, WC, WHR and WHtR) in terms of age groups, i.e., 18 to 29 years, 30 to 39 years, and 40 years and above. The study showed that the prevalence of obese subjects was the highest in 18-29 years age group (34%) as compared to other age groups.

WC at risk was found to be significantly higher in the age group of 18-29 years (42.6%) as compared with other age groups. Participants in the age group of 40 years and above had high prevalence of WHR (66.7%) as compared to others age groups. The distribution of WHR with respect to the age groups was not differing significantly ($p=0.360$). The highest risk of WHtR was found in the age group of 18-29 years (48.9%) followed by 40+ years group (48.1%) and 30-39 years age groups (26.9%) ($p=0.156$).

Table 3: Age-wise categorical distribution of somatometric variables among participants

Variables		Age			p-value
		18-29 years	30-39 years	40 years and above	
		N (%)	N %	N %	
BMI	Normal	16(34)	16(61.5)	12(44.4)	0.129
	Underweight	5(10.6)	5(19.2)	2(7.4)	
	Overweight	10(21.3)	2(7.7)	6(22.2)	
	Obese	16(34)	3(11.5)	7(25.9)	
WC	Normal	27(57.4)	23(88.5)	17(63)	0.023*
	At risk	20(42.6)	3(11.5)	10(37)	
WHR	Normal	23(48.9)	13(50)	9(33.3)	0.360
	At risk	24(51.1)	13(50)	18(66.7)	
WHtR	Normal	24(51.1)	19(73.1)	14(51.9)	0.156
	At risk	23(48.9)	7(26.9)	13(48.1)	

* Significant at $p<0.05$.

Table-4 shows the correlation among BMI, WC, WHR and WHtR. A significantly strong positive correlation was found between WC and BMI ($r=0.749$, $p<0.01$). Further, BMI was also found to have a significantly strong positive correlation with WHR and WHtR ($r=0.448$, $p<0.01$ and $r=0.749$, $p<0.01$). Also, WC had strong significant positive correlation ($r=0.576$, $p<0.01$) ($r=0.808$, $p<0.01$) with WHR and WHtR, respectively.

Table 4: Correlation between age, BMI, WC, WHR and WHtR among participants

Variables	BMI	WC	WHR
BMI			
WC	0.749**		
WHR	0.448**	0.576**	
WHtR	0.749**	0.808**	0.656**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

DISCUSSION

The present study aims to assess the general and central obesity among the *Vishnav* males, aged between 18 and 60 years in Udaipur District of Rajasthan. In this study, the prevalence of obesity and overweight were found to be 26%

and 18%, respectively.

This study showed that the prevalence of general and abdominal obesity was significantly high in the age group of 18-29 years. High WC is linked to potential development of non-communicable disease (Darsini *et al.*, 2020). This increasing trend may be due to the nutritional transition, changing life style pattern, urbanization and decline in farm-based labor work, shift in nature of occupation, carbohydrate rich diet, less physical activity and rise in socio-economic status may be responsible in fat deposition (Farhad *et al.*, 2009). This age is the onset age of other obesity related to health complications such as diabetes, hypertension and cardiovascular diseases (Kumar *et al.*, 2020).

Our results are in concordance with several studies, in which changing patterns of general and abdominal obesity were investigated. For instance, an earlier study (Mithun *et al.*, 2014) conducted among Rajput men of Rajasthan reported that 14.83% males were found to be having general obesity and 23.63% males were found to be with central obesity. Further, a study conducted by Indian Council for Medical Research (ICMR) found that the prevalence rate of obesity and central obesity were ranging from 11.8% to 31.3% and 16.9% - 36.3%, respectively (ICMR, 2015).

A worldwide study indicated similar result, in which the rise in BMI was observed in 20-29 years age group (Farhad *et al.*, 2009). Further, men showed a greater change in prevalence of overweight, obesity and abdominal obesity, particularly in the youngest age group (20-29 years) (Farhad *et al.*, 2009), which was also found in the present study.

In contrast, a study conducted among Varanasi adult population reported that BMI and WC and fat percentage in age group of 18-29 were lower as compared to the other age groups, and also this group was found to be more concerned and aware about the body fitness (Kumar *et al.*, 2020).

In conclusion, an alarming increasing trend was shown in the prevalence of overweight and obese individuals among the young male population. This study might help in identification of the age of progression of obesity, and for planning of further research. This study would be of use for implementation of governmental health programs in aiming to administer lifestyle modifications in obesity and help the health policy makers to identify groups were more towards the risk of being overweight and obese.

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