

Consensus Statement versus WHO Criteria: A Study to Assess Obesity among Indian Medical Undergraduates

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Abstract

Introduction: Obesity is a global epidemic occurring in the world. Obesity is a common risk factor among all NCDs and its prevention thus can prevent NCDs. Doctors are the worst affected cadre among all healthcare professionals. Budding doctors need to be examined for tendency to become overweight and obese. It has been observed that WHO criteria underestimate occurrence of obesity among Indians as compared to Indian Consensus statement criteria. This study aimed to find out occurrence of obesity among medical undergraduates and compare the results of WHO criteria and the Indian consensus statement – 2011 criteria of obesity in the study population.

Materials and Methods: A cross-sectional study was conducted among medical undergraduates to compare the results of obesity between WHO and the Consensus statement. Anthropometric measurements were carried out as per the standard WHO guidelines. The results were compared with the chi-square test and Cohen's kappa.

Results: The BMI calculations indicated the occurrence of obesity among medical undergraduates based on WHO and Indian Consensus Statement – 2011 criteria as 2.4% and 15.66% respectively. The waist circumference calculations showed that the occurrence of obesity based on WHO and Indian Consensus Statement – 2011 criteria was 9.23% and 25.70% respectively.

Discussion: In comparison to WHO criteria, the Indian Consensus criteria showed an excess occurrence of 13.25% based on BMI calculations and a 16.46% excess occurrence of obesity based on waist circumference. The study had shown weak inter-rater reliability using Cohen's kappa (κ) between WHO and Consensus criteria for obesity.

Conclusion: Indian consensus statement provides us with a criterion that is more sensitive and specific for the Indian population than the WHO criterion.

Keywords: Obesity, Medical undergraduates, Indian consensus statement, WHO

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Introduction

In the 21st century, India is facing a double burden of malnutrition; a high prevalence of undernutrition coexists with a high prevalence of obesity. More educated and wealthy have been able to avoid undernutrition, but they have gotten obese. [1] Doctors are among the individuals who are more educated and wealthier as well. Recent literature indicates that doctors are the worst affected cadre among healthcare providers. [2] The roots of adulthood obesity lie in childhood, adolescence, and/or young age. Overweight, obese youth are at a greater risk of becoming obese in adulthood [3]. Hence, tracking obesity parameters in young medical undergraduate students is crucial for making them aware of the future possibilities of obesity when they become practicing doctors. Early changes in lifestyle at a younger age have long-term benefits as far as the complications of obesity are considered. Hence, we planned to screen the Indian medical undergraduates in a private medical college in eastern Gujarat for malnutrition with a special focus on overweight and obesity.

WHO defines overweight as a BMI of more than 25 kg/m², whereas obesity is defined as a BMI of more than 30 kg/m². [4] This BMI-based criterion for obesity has some limitations, viz., it does not consider body fat percentage, and it underestimates actual obesity prevalence among individuals. [5] Considering the disadvantages of underestimation of obesity based on BMI criteria, Institute for Clinical Systems Improvement (ICSI) suggested starting pharmacological intervention at a BMI of more than 27 kg/m² instead of a BMI of 30 kg/m². [6] WHO's BMI criteria are 'generalized' and are not suitable for all types of individuals on the earth, considering the variations in physical build, genetic, and metabolic differences, dietary patterns, etc.

Moreover, the impact of the 'distribution of

fat' irrespective of BMI on one's health needs to be addressed. Percentage body fat and morbidity data suggest that, for Asian Indians, the limits of normal BMI are narrower and lower in comparison to white Caucasians. To address these special needs, the leading metabolic disease experts from India brought a 'consensus statement' that proposed India-specific cut-offs for BMI and waist circumference to diagnose overweight and obesity. [7]

Accordingly, we planned to screen Indian Medical undergraduates for obesity to compare the cutoff criteria of WHO and 'The Indian Consensus Statement-2011'. The primary objective was to find out whether the WHO criteria significantly underestimate the proportion of overweight and obese in comparison to the 'Indian Consensus Statement-2011' standards.

Materials and Methodology:

For this cross-sectional study, undergraduate medical students from a private medical college in the eastern part of Gujarat were selected as a base population. After getting an ethical

committee's approval, the study was conducted between September 2021 and December 2021. All the undergraduate medical students willing to participate in the study were included and due consent for participation was taken. The students not willing to participate in the study were excluded from the study. Out of the 550 undergraduate students, 249 students were included in the study. 159 males and 90 females participated.

Height was measured using a height meter, whereas weight was measured using a standardized weighing scale. Body mass index (BMI) (Kg/m²) was calculated for each student. Waist circumference (WC) was measured as per the WHO STEPS protocol. [8] WC was measured just above the iliac crest, at the end of normal expiration, in the fasting state, with the

subject standing erect and looking straight forward.

BMI cutoff for obesity:

1. Based on World Health Organization criteria
 - 18.5 - 24.9 kg/m² for normal,
 - 25.0 - 29.9 for overweight and
 - ≥ 30 kg/m² for obesity
2. Based on the Indian Consensus Statement:
 - Normal BMI: 18.0-22.9 kg/m²
 - Overweight: 23.0-24.9 kg/m²
 - Obesity: ≥ 25 kg/m²

Waist Circumference cutoff for obesity:

1. Based on World Health Organization criteria, Men: 102 cm, women: 88 cm.
2. Based on the Indian Consensus Statement, Action level 1: Men: 78 cm, women: 72 cm. Action level 2: Men: 90 cm, women: 80 cm.

The action level 2 cutoffs are used to define obesity.

Statistical Analysis:

The data was processed in MS Excel and was analyzed in IBM SPSS version 26. Shapiro-Wilk test and Kolmogorov Smirnov test were carried out for normality testing of the collected data about BMI and WC. Normality tests showed BMI and WC data to be non-parametric ($p < 0.05$). So, a chi-square test was carried out to check whether there is a significant difference between the two criteria. Cohen's kappa or Kappa statistic (κ) was utilized here to determine the agreement or inter-rater reliability between the two diagnostic criteria. (9)

Results:

A total of 249 medical undergraduates

participated in the study with 159 (63.85%) males and 90(36.41%) females. The sample population shows a mean BMI of 21.08 ± 3.97 kg/m² and a mean waist circumference of 79.73 ± 10.83 cms. On gender-wise analysis, mean BMI was found to be higher in males (21.30) as compared to females (20.71), and mean waist circumference was also found to be higher in males (80.67 cms) as compared to females (80.67 cms).

Based on the BMI cut-off, the prevalence rates of obesity according to WHO criteria and consensus criteria were 2.4% ($n = 6$) and 15.66% ($n = 39$) respectively (Table 1). There were 13.25% or 33 obese individuals who are diagnosed by the consensus criteria but missed by the WHO criteria based on BMI. There were 14.48% of males and 11.1% of females that were missed by WHO criteria. The agreement between both criteria was weak ($\kappa = 0.54$). With regards to gender, the prevalence rates of obesity based on BMI cut-off were significantly higher (p -value < 0.05) in males in both WHO (2.5% versus 2.2%) and consensus criteria (16.98% versus 13.3%) respectively.

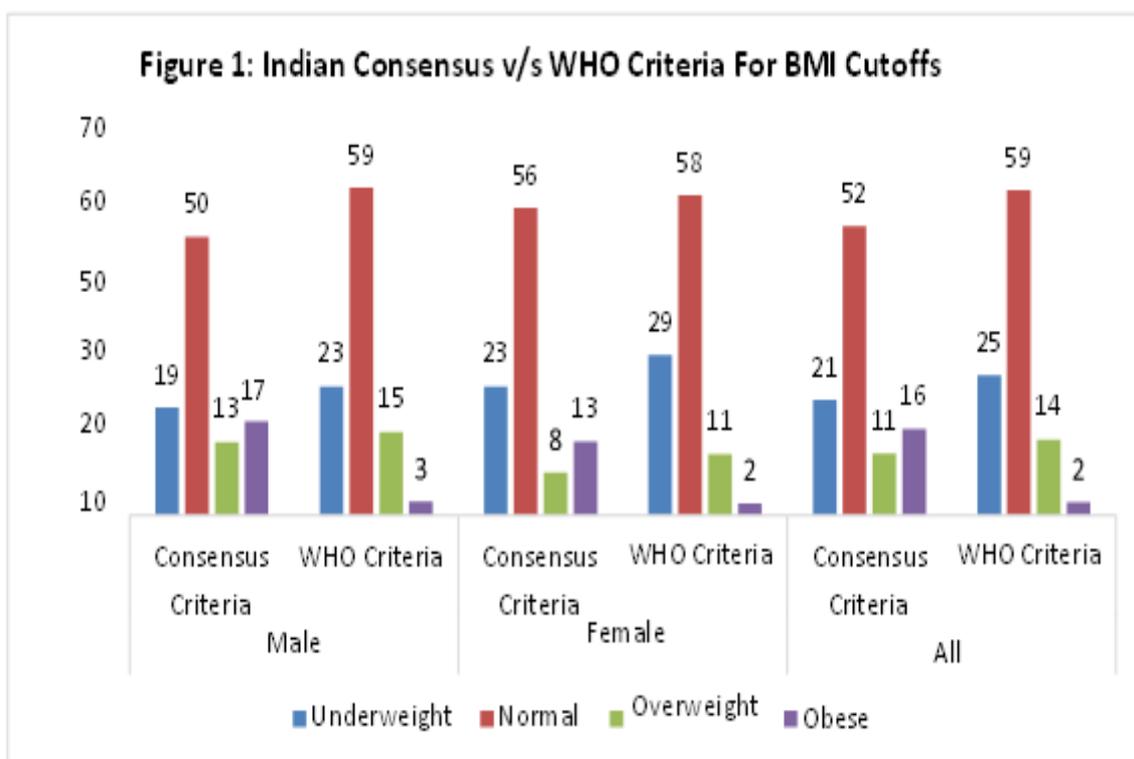
Based on the WC cut-off, the prevalence rates of obesity according to WHO criteria and consensus criteria were 9.23% ($n = 23$) and 25.70% ($n = 64$) respectively (Table 2). There were 16.46% or 41 obese individuals who are diagnosed by the consensus criteria but missed by the WHO criteria. There were 9.84% of males and 15.43% of females that were missed by WHO criteria. The agreement between both criteria was weak ($\kappa = 0.45$). With regards to gender, the prevalence rates of obesity based on WC cut-off were significantly higher (p -value < 0.05) in females in both WHO (15.55% versus 5.66%) and consensus criteria (20.12% versus 35.55%) respectively.

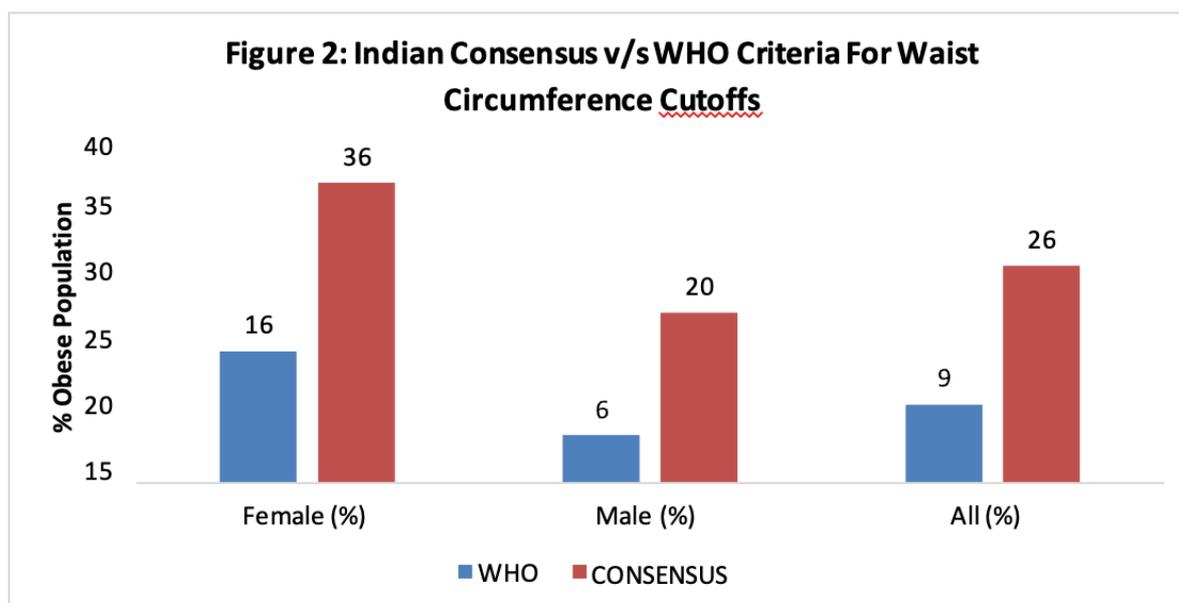
Table 1: Comparison of WHO and consensus criteria for BMI cutoffs for nutrition status of undergraduate students

BMI Cut-off	Category	Male	Female	Total	Total in %
WHO Criteria	Underweight	37	26	63	25.30%
	Normal	94	52	146	58.63%
	Overweight	24	10	34	13.65%
	Obese	4	2	6	2.41%
	TOTAL	159	90	249	
Consensus Criteria	Underweight	31	21	52	20.88%
	Normal	80	50	130	52.21%
	Overweight	21	7	28	11.24%
	Obese	27	12	39	15.66%
	TOTAL	159	90	249	

Table 2: Comparison of WHO and consensus criteria for WC cut offs for nutrition status of undergraduate students

WC Cut-off	Category	Female	Male	Total	Total in %
WHO criteria	Obese	14	9	23	9.24%
	Normal	76	150	226	90.76%
	TOTAL	90	159	249	
Consensus criteria	Obese	32	32	64	25.70%
	Normal	58	127	185	74.30%
	TOTAL	90	159	249	





Discussion:

Indian Consensus Statement 2011 presented us with the revised guidelines for the diagnosis and treatment of obesity and metabolic syndrome in Asian Indians. Asian Indians are having clustering of cardiovascular risk factors and T2 diabetes mellitus (DM) at lower levels of obesity; thus, the diagnosis of obesity should be made at lower levels of weight for height than in non-Asians. It is estimated that by application of these guidelines, an additional 10- 15% of the Indian population would be labeled as obese or overweight[7].

A study by S. Sharma et al. (2013) showed an increase of 14.53% of students classified as obese and 5.93% of students as overweight using the guidelines of the consensus statement[10].

Similar results are observed in this study. The consensus criteria for BMI showed an increase of 13.25% than WHO criteria for BMI while the Consensus criteria for WC showed an increase of 16.46% for BMI. The study had shown weak inter-rater reliability using Cohen's kappa (κ) between WHO and Consensus criteria for both BMI and WC. Hence, the Indian Consensus Statement – 2011 is more reliable than the WHO criterion in the Indian scenario for

diagnosing and management of obesity. The lower cut-offs will lead to early interventions like lifestyle modifications, dietary pattern changes, exercise etc. This will ensure that the course of obesity is delayed and possibly aborted at the earlier stages[11].

Limitations of the study:

1. The sample size of the study was small as it was conducted at a single center.
2. The study sample did not have equal participation from both genders.
3. The study sample included participants from a narrow age group (17-25 years).

The data collected and analyzed was non-parametric.

Hence, it is difficult to extrapolate the study findings to the general population. But the study has fulfilled its aim to find out whether the WHO criteria significantly underestimate the proportion of overweight and obese in comparison to the 'Indian Consensus Statement-2011' criteria.

Conclusion:

The pandemic of non-communicable diseases is at the doorstep of India. Preventing obesity among the Indian population should be on a priority of all the stakeholders, including policy makers. To plan the prevention, we need a criterion that

is more sensitive and appropriate to the Indian population. Indian consensus statement provides us with a criterion that is more sensitive and specific to the Indian population than the WHO criterion. A multi-center study with a larger sample size and participation of Indian population from a variety of geographical terrains and broader ethnic and genetic pool shall be planned to establish the utility of the 'Indian Consensus Statement – 2011' criteria to diagnose obesity in Indians.

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