

Original article:

A study on health status of Medical students based on their BMI and abdominal circumference

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Abstract:

Introduction : Obesity is an important predisposing factor for many cardiac & hepatic ailments. In view of underlying risk associated, present study was undertaken to assess the incidence of obesity in the MBBS students so as to identify the susceptible population.

Material & Methods : Study consists of 52 adult Females and 31 adult males between the age group of 17- 25 years medical students. BMI was calculated from height & weight as per standard formula (BMI = weight in kg/ height in meter²). Abdominal circumference was measured at umbilicus region by measuring tape.

Results : BMI analysis of young medical students showed that 17.3 % of female students and 32.2 % of male students were found to have their BMI in the obesity range . Abdominal circumference (Abd Cmf) analysis of obese students showed that only 19.2 % Female & and 9.7% Male students carried both generalized obesity as well as central obesity.

Conclusion : There is a fairly high incidence of obesity among medical students. This is high time to emphasize upon medical students having raised BMI coupled with central obesity, to change their life style in order to prevent the development of metabolic syndrome/ its associated disorders in their future life.

Key words : BMI , abdominal circumference

Introduction:

Obesity is important health problem in India. It has been reported to set its foot from childhood itself. Moreover, the prevalence of overweight and central obesity has been correlated with metabolic syndrome associated disorders viz Hypertension, T2 DM, Dyslipidemia, CVD, & NAFLD. Indians with higher incidence of overweight and obesity are prone to develop these disorder in their future life.¹ However, There is a vast difference in obesity criteria laid down by WHO compared to our Indian (ICMR) standard. The present study was therefore undertaken to evaluate the health status of young medical

students, based on their body mass index (BMI) and abdominal circumference so as to identify the vulnerable population.

Material methods:

The study was undertaken through a voluntary projects assigned to the students. 83 students, who volunteered to participate in the project, constitute the subject matter of the present study.

Sex wise Distribution of cases : Male -31 , Female - 52

Age group - 17- 25 yrs.

BMI was calculated as weight in kg/ height in meter².

IJBAMR is now with IC Value 5.09

[Abdominal Circumference was measured at the level of umbilicus, in standing position at the end of expiration ²in the fasting state.]

Students were classified into four groups according to Indian BMI standard, as below-

Groups	Group A	Group B	Group C	Group D
BMI	18-22.9	<18	23-25	>25
(Range)	(Healthy Group)	(UnderWt Gr.)	(Pre-obese Gr)	(obese Gr.)

Abdominal Circumference

Subjects were classified into pre-obese & obese groups, on BMI pattern

Groups	Group A	Group B	Group C	Group D
Male	70.1 – 90 (Healthy Group)	<70 (Underweight gr.)	90.1 -95 (Pre-obese gr)	>95 (obese gr.)
Female	70.1 – 80 (Healthy Group)	<70 (Under weight gr.)	80.1- 85 (Pre-obese gr)	>85 (obese gr.)

RESULTS & OBSERVATION

Table-1 : Overall BMI & Abdominal Circumference(cm) in the Study subjects

		Male	Female	M&F Combined
BMI (kg/m ²)	(Mean ±SD)	22.8±3.34	22.0±3.46	22.3±3.11
Abdominal cmf(cms)	(Mean ±SD)	75.9±7.68	73.2±8.4	75.6±8.69

Table-2: Group Wise BMI analysis

		A Normal Gr.	B underweight	C Pre obese	D obese
Male	BMI (Mean ±SD)	20.74 ±1.25	15.34 ±0	24.04 ±0.8	26.28±1.38
Female	BMI (Mean ±SD)	20.9 ± 1.73	16.08±0.36	24.4 ± 0.23	27.6 ± 1.83

Table-3: Group Wise Abd Cmf analysis

		A Normal Gr.	B (underwt)	C Pre obese	D obese
Male	Abd Cmf (Mean ±SD)	79.68±5.5	68.5±1.79	91.4±0	96.5±0
Female	Abd Cmf (Mean ±SD)	73.9±2.6	65.05±3.15	82.1 ±1.3	93.02±4.8

Table-4: Distribution of students as per their BMI (kg/m²):- Figure 1- a & b

	A -Normal		B- UW		C- Pre-obese		D- obese	
BMI range	18-22.9		<18		23-25		>25	
	N	%	N	%	n	%	N	%
Female students	29	55.7	4	7.6	10	19.2	9	17.3

(n= 52)								
Male students (n= 31)	15	48.3	1	3.2	5	16.1	10	32.2
Total (M+F) (n=83)	44	53	5	6	15	18	19	23

[There is a High incidence of obesity among medical students. 41 % of Medical students fell in obese category - 18 % in the pre-obese & 23 % in the Obese category. 53 % of the students fell in the healthy category and 6 % students fell in the underweight category.]

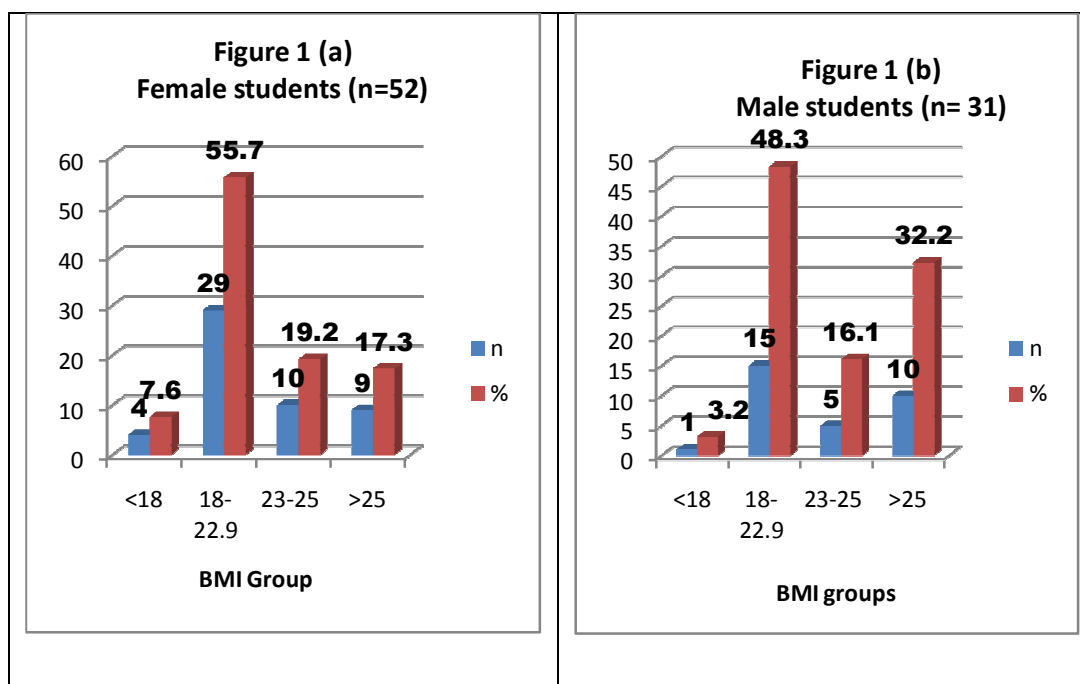


Table-5:- Distribution of students as per their abdominal circumference:-Figure 2- a & b

		A Normal .Gr	B (Subnormal)	C Pre obese	D obese
Male	Abd Cmf (cm)	70.1 - 90	<70	90.1 -95	>95
	n	24	04	02	01
	%	77.4	12.9	6.4	3.2
Female	Abd Cmf (cm)	70.1 - 80	<70	80.1 -85	>85
	n	24	18	06	04
	%	46.2	34.6	11.5	7.6

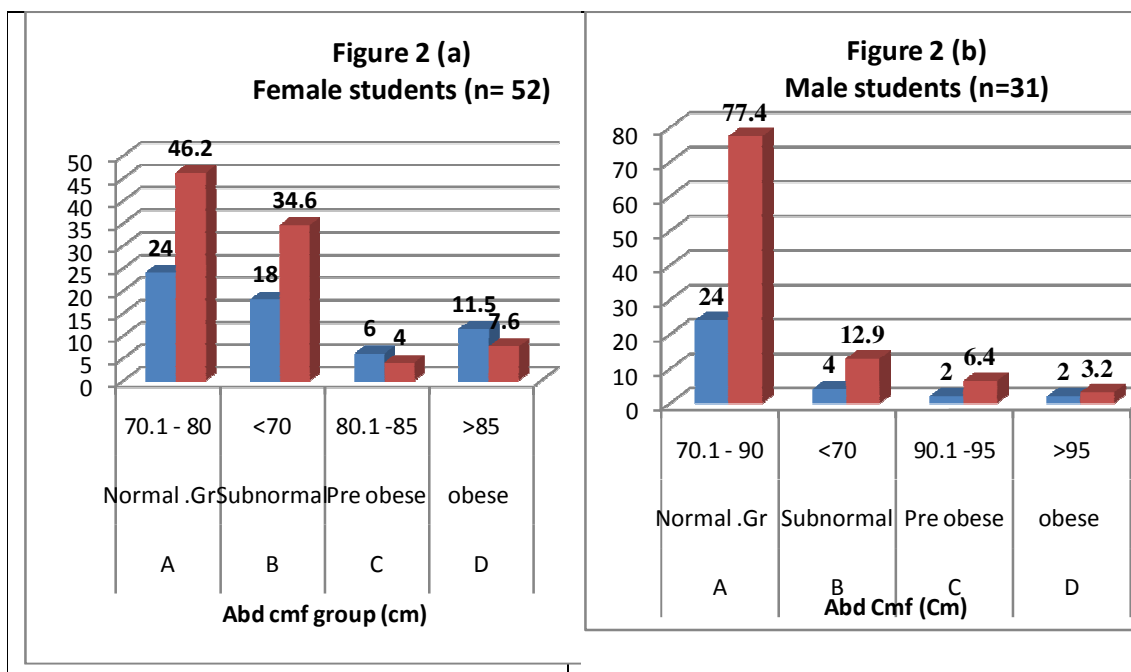


Table 6 - Correlation between BMI & Corresponding Abdominal circumferences

		A Normal	B (underweight)	C Pre obese	D obese
Male	n	15	1	5	10
	BMI (Mean±SD)	20.74 ±1.3	15.34 ±0	24.04 ± 0.8	26.28±1.4
	P Value (Vs A)	<0.05			
	Abd Cmf(Mean ±SD)	72.2 ±10.7	68.58 ±0	81.28±11.7	85.08±4.0
	P Value (Vs A)	<0.05			
Female	n	29	4	10	9
	BMI (Mean ±SD)	20.9± 1.7	16.08 ±0.36	24.4 ±0.23	27.6± 1.8
	P Value (Vs A)	< 0.05			
	Abd Cmf (Mean ±SD)	71.4 ±9.9	68.7±15.7	80.5 ± 8.1	81.1 ± 9.5
	P Value (Vs A)	<0.05			

Table7- Correlation between Abd Cmf & Corresponding BMI

		A Normal .Gr	B (Underwt.)	C Pre obese	D obese
Male	n	24	04	02	01
	Abd Cmf (Mean ±SD)	79.68±5.5	68.5±1.79	91.4±0	96.5±0
	P Value (Vs A)	<0.01			
	BMI (Mean ±SD)	25.2±2.74	19.49±2.8	26.4±0	22.9±0

	P Value (Vs A) <0.001				
Female	n	24	18	06	04
	Abd Cmf (Mean ±SD)	73.9±2.6	65.05±3.15	82.1 ±1.3	93.02±4.8
	P Value (Vs A) <0.001				
	BMI (Mean ±SD)	22.2±2.43	19.7±2.72	24.4±2.15	25.6±4.7
	P Value (Vs A) <0.05				

[Statistical analysis was performed by using unpaired 't' Test.

The value of p = <0.05, <0.01, and <0.001 were taken as significant.]

Discussion:

[Corresponding abdominal circumference mean value was 75.9 ± 7.7 for male and 73.2± 8.4 in female students. Health Status Breakup- Based on body mass index (BMI) (kg/m²)]

WHO CLASSIFICATION ⁴		INDIAN CLASSIFICATION ⁵	PRESENT DATA
Classification	BMI Range	BMI Range (kg/m ²)	
Underweight	<18.50	<18.0	15.34
Normal range	18.50-24.99	18.50-22.99	20.7±1.25
Overwt / Pre-obese	25.00-29.99	23 -25	24 ±0.8
Obese	>30.00	>25.00	26.2 ±1.4

BMI vs central obesity (Abd Cmf):-

	A Abd Cmf		B. BMI		A vs B (M)	A vsB (F)
	M (%)	F (%)	M (%)	F (%)		
Pre- obese	6.4	11.5	16.1	19.2		
Obese	3.2	7.6	32.2	17.3		
Total	9.6	19.1	48.3	36.5	38.7 %	17.4 %

[It is evident that 9.6 % male and 19.1 % Females students carried both central obesity as well as raised BMI. This group's make the most vulnerable population, prone to develop obesity related metabolic disorders.

Thus, BMI and waist circumference should be used in conjunction for discrimination of health risk.⁶ Abdominal circumference is considered a better indicator for health risk than BMI alone, particularly for individual in the BMI range of 25 -34.⁷

The role of BMI is restricted by increase muscles mass.]

Conclusion:

Overall incidence of obesity among medical students at the time of their entry was found to be 41% (Pre-Obese 18% , obese 23 %). 6% students fell in underweight category. 9.6 % male and 19.1 % Females students carried both central obesity as well as raised BMI. There is a fairly high incidence of obesity among medical students. This is the high time for the medical students having raised BMI coupled with central obesity to change their life style in order to prevent the development of metabolic syndrome associated disorders in their future life.

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