A Study of Body Mass Index among Medical Students in a Tertiary Care Teaching Hospital

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Abstract:
Background: *In this 21ˢᵗ century over weight and obesity had become an epidemic due to sedentary lifestyle with less physical activity and more eating. Under weight is more common in certain poverty areas and in people with less eating and due to certain diseases.*
Aim: *This is to study the prevalence of obesity, overweight, normal weight and underweight by using **Body Mass Index** in medical students(third semester) of Sri Venkateswara Medical College, Tirupati. **Materials and methods:** In 200 medical students height and weight measurements were taken. Body mass index calculated and categorized into obese, overweight, normal weight and underweight*
Results: *In total students 11% come under obese category, 10% come under overweight category, 59% come under normal weight category and 20% come under under weight category.*
Conclusion: *Students should be aware of their weight and BMI category and they should adjust their category into normal weight by changing their food habits and physical activity (lifestyle)*
Keywords: *Height, weight, Body mass index, Obese, Overweight, Normal weight, Under weight*

I. Introduction

Now a days obesity and overweight became common in all age groups of society as a result of less physical activity, sedentary lifestyle and overeating. This lead to several health problems which are common causes of morbidity and mortality among people. On another side under weight is also another cause resulting in certain diseases like malnutrition, anemia, mortality and morbidity. So it is necessary to create awareness among students right from the student period. They should be aware of their weight and height and into which category they come i.e, obese, overweight, normal weight, under weight. According to their category they are instructed to change their lifestyle and habits so that they should be in normal weight category group. If they change their attitude towards bodyweight and maintain body weight properly it will be easy for them to maintain the same pattern in the future for effective and healthy living. Being medical students this responsibility is more as they have to guide the society in future as doctors including their families. It is their social responsibility. . BMI can be used as a simple method to assess the body Weight of an individual. BMI provides a reliable indicator of body fat percentage/body fatness for most people. obesity is increased in developed countries and prosperous societies. BMI is widely used for preliminary diagnosis[5] of obesity, waist circumference can also be taken for diagnosis[6) and (7)] BMI helps to understand and estimate the risk factors for health problems[8] BMI is a simple means of classifying physically inactive(sedentary) populations with an average body composition[9]

BMI Prime, a simple modification of the BMI system, is the ratio of actual BMI to upper limit BMI (currently defined at BMI 25). BMI Prime allows easy comparison between populations whose upper-limit BMI values differ.[12] BMI is compared against the percentile for children of the same gender and age,[13] instead of comparison against fixed thresholds for underweight and overweight. Recent studies in Britain have indicated that females between the ages 12 and 16 have a higher BMI than males of the same age by 1.0 kg/m^2 on average.[14] Breathing problems such as sleep apnoae & asthma, joint problem, musculoskeletol discomfort, fattyliver disease gallbladders stones, gastrooesophageal reflux(heart burn), obese children &obese adolescents have greater risk of social & psychological problems like discrimination & poor self-esteem which will continue into adulthood, obese children more likely become obese adults & obesity leads to serious conditions including heart diseases etc. If children are overweight, obesity in adulthood is more severe. obesity and overweight result from energy imbalanced, involves eating too many calories and not getting enough physical activity.The generation of cartilage and its underlying bones within the joints, gynaecological problems(abnormal menses, infertility).Economic consequences – Direct medical costs include preventive, diagnostic & treatment services related to obesity. Indirect costs relates to morbidity & mortality costs. Morbidity costs are defined as the the value of income lost from decreased productivity, restricted activity, absenteeism & bed days. mortality costs are the value of future income lost by premature death.Diseases and drugs –some illness may lead to obesity or Weight gain, cushings disease & polycystic ovary syndrome. Drugs such as steroids & some antidepressants

may also cause weight gain.Over weight and obesity result from energy imbalance, eating too many calories and not getting enough physical activity. Body weight is result of genes, metabolism, behavior, environment, culture and socio economic status.Obesity problem is a common and serious problem. It is necessary to change our communities into places that strongly support healthy eating and active living. Obesity causes problems during pregnancy or makes it more difficult for women to become pregnant. Obese persons required more costly medical care. This places a huge financial burden on our medical care system. Weight gain occurs when people eat too much food and get too little physical activity. Less access to fruits and vegetables is one cause. Restaurants & snacks shops provide food high in calories and fat. More sugar intake in diet is one cause. 6 out of 10 adults drink at least one sugary drink for day. It is often easier & cheaper to get less healthy foods and beverages. Foods in high in sugar, fat, salt are highly advertised & marketed. Life style became difficult to be physically active, access to parks became difficult, play not exist(in several schools there is no playground and teachers are not allowing the students to play. Teachers and parents together pressurizing the students and children to spend more time in reading and no time for play.) No safe route for walking in towns and cities.

II.   Materials And Methods

This is a prospective cross sectional study conducted by department of Pharmacology, Sri Venkateswara Medical College, Tirupati, 200 medical students of 3rd semester between the age group of 18 to 20 years were selected randomly. The participants were informed about the aim of the study and their verbal consent was taken. The study was done over 2 weeks. The general distribution was taken, heights and weights were taken & body mass index calculated using the formula- mass(weight) in kgs/height^2 in meters. The Body mass Index (BMI)[4] or Quetelet index [2]is a measure of relative size based on the mass and height of an individual. Adolphe Quetelet[2] defined BMI for a person as their body mass divided by the square of their Height . BMI value is given in units of Kg/m^2. It is ratio of Weight to squared Height. Students were categorized according to BMI into underweight, normal weight, over weight and obese. BMI is calculated quickly & without expensive equipment. But BMI categories do not take in to account some factors like frame size and muscularity [16]

The BMI ranges are based on the relationship between body weight and disease and death.[3] Overweight and obese individuals are at an increased risk for many diseases and health conditions, including the following:[10]

- Hypertension
- Dyslipidemia (for example, high LDL cholesterol, low HDL cholesterol, or high levels of triglycerides)
- Type 2 diabetes
- Coronary heart disease
- Stroke
- Gallbladder disease
- Osteoarthritis
- Sleep apnea and respiratory problems
- At least 10 cancers (including endometrial, breast, and colon).[11]

Gender and age distribution of the given data was assessed. Students were enquired about their food habits, physical activity like, walking, running and playing etc by giving certain questionnaire.

BMI Categories[1]
Underweight = <18.5
Normal weight = 18.5–24.9
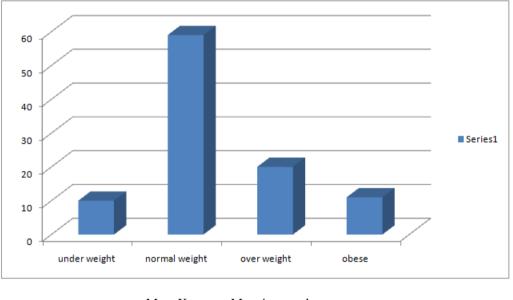Overweight = 25–29.9
Obesity = BMI of 30 or greater

International variations: These recommended distinctions along the linear scale may vary from time to time and country to country, making global, longitudinal surveys problematic.

For example Japan: Japan Society for the Study of Obesity (2000):[15]

Category	BMI range – kg/m^2
Low-	18.5 and below
Normal-	from 18.5 to 25.0 (Standard weight is 22)
Obese (Level 1)	from 25.0 to 30.0
Obese (Level 2)	from 30.0 to 35.0
Obese (Level 3)	from 35.0 to 40.0
Obese (Level 4)	40.0 and above

III. Results

(1)

AGE	MALE	FEMALE	UNDERWEIGHT
18 – 20	18	22	40

(2)

AGE	MALE	FEMALE	NORMAL WEIGHT
18 – 20	58	60	118

(3)

AGE	MALE	FEMALE	OVERWEIGHT
18 – 20	10	10	20

(4)

AGE	MALE	FEMALE	OBESITY
18 – 20	10	12	22

Fig: 1 showing percentage distributions of four categories of BMI (under weight, normal weight, over weight and obesity)

The formula for BMI is $$\frac{Mass\ Kg}{Height^2} = \frac{Mass\ in\ pounds}{Height^2\ in\ inches} \times 703$$

IV. Discussion

In our study number of females - 104 and number of males - 96. All come into the age group of 18 – 20. In table (1), 18 number of males and 22 number of females come into underweight group and their total percentage is 20%. In table (2), 58 number of males and 60 number of females come into normal weight group and their total percentage is 59%. In table (3), 10 number of males and 10 number of females come into over weight group and their total percentage is 10%. In table (4), 10 number of males and 12 number of females come into obese group and their total percentage is 11%.

Among normal weight medical students 50% of students are engaged in physical activities like playing, walking, jogging, physical exercises and yoga. All of the students among over weight and obesity category are not having any physical activity. They are awaking by 7.30 AM, refreshing, taking breakfast and going to hospital to attend clinical posting by 9.00 AM. After coming to hostel they are spending their time in watching TV, movies, computer and internet. while watching they are eating snacks and there is no physical activity. So these are at the risk of complications of obesity and overweight like Diabetes Mellitus, Hypertension, Osteoarthritis, Coronary Artery disorders etc in future if they won't change their lifestyle. They were warned and educated about these things, so that they rectify themselves and guide the people in the society as it is an important responsibility of doctor, (whatever may be the specialty like ENT and Ophthalmology etc, selected by them in their future) and underweight students are instructed to improve diet as malnutrition may lead to many complications like hypoglycemia, giddiness, drowsiness, sometimes irritability and loss of memory . They

may not be able to concentrate in the classroom and may not read properly. Finally they may suffer from hypoproteinemia and anemia and other problems like anxiety, depression if they won't improve their quality and quantity of dietary intake and this indicates some eating disorders like anorexia nervosa. This category(under weight) is associated with incorrect weight perception among young females. 25% of students are spending more time in reading with no time for any physical activity.

V.   Conclusion

According to the proverb **prevention is better than cure**, it is better to rectify the weight abnormalities rather than to treat the complications and resulting diseases of overweight, obesity and underweight, so that the medical students first make themselves physically fit with good dietary habits and life style and serve the society around them.

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