DESCRIPTION

Definition

To be considered clinically obese, an individual must have a Body Mass Index (BMI) value ^{TM} 30 kg/m^2. A BMI between 25 and 29.9 is considered overweight, but not obese[2]. Normal weight BMI ranges from 18.5 – 24.9 and underweight is 18.5[2]. Obesity has been further divided into three classes[2]. Class I: BMI 30.0 – 34.9, class II: BMI 35.0 – 39.9, and class III: BMI ^{TM} 40.0.

Does having a BMI of over 30 always mean you are obese?

Not necessarily. An individual can have a BMI ^{TM} 30 and not be obese.

How is this explained?

Body mass index indicates overweight for height, but does not differentiate between fat mass and fat-free mass[41]. For this reason, BMI may not be an accurate measure of obesity. Essentially, BMI is a calculation that examines whether an individual is weight-height proportionate. This in itself has sparked debate on whether classifying people as weight-height proportionate or non-weight height proportionate is meaningful or appropriate. Individuals that are relatively muscular may score overweight on a BMI despite having low body fat and being and/or appearing healthy.

Why is BMI used?

Body mass index is commonly used in obesity research to examine obesity[41]. The reason for this could be that determining BMI involves a quick and simple equation using weight and height while other methods tend to be more time consuming, may require special equipment, and are typically more invasive. Also, there does not appear to be a clear agreement in the literature on how to classify obesity by other methods, i.e. – what does an individual have to measure to score on an alternative test to be considered obese?

Limitations of BMI

Body mass index is not an accurate measure of obesity across all populations. As previously mentioned, this can include individuals that have relatively large amounts of muscle mass. Also, individuals that are considered underweight by BMI (˜18.5) may have a relatively large amount of body fat. In effect, BMI does not discriminate between fat mass and fat-free body mass[41]. In studies where BMI has been used in an attempt to estimate body fat, the standard of error is high[44].

Body Composition Tests, an alternative to BMI

Body composition assesses the relative percentage of body weight that is fat and fat-free tissue[1]. In this regard, body composition tests are able to estimate the actual percentage as well as amount of body fat in an individual.

Body Composition Assessments

Body composition can be estimated by a variety of techniques. These include densitometry methods such as hydrostatic (underwater) weighing, and plethysmography (air displacement), and anthropometric methods such as skinfold measurement[1]. Other methods include bioelectrical impedance analysis (BIA), dual energy X-ray absorptiometry (DXA), and near-infrared interactance (NIR)[1].

Skinfold measurement must involve a skilled technician to be as accurate as possible. In this technique, the technician takes skinfolds with a caliper device at standardized cites on the subject that is being tested. The caliper device measures the different skinfold sites in millimeters. The sum of folds is put into a regression equation to estimate body fat percentage[1]. Skinfold measurement offers a quick, non-expensive method for body composition assessment.

Hydrostatic weighing estimates body composition based on Archimedes' principle, stating that a body immersed in water is buoyed by a counterforce equal to the weight of water displaced. In other words, the closer an individual weight while immersed in water is to their dry weight (weight on land), the higher their percentage of fat-free mass. An individual with more fat free mass for the same dry body weight weighs more in water, therefore has higher body density and lower percentage body fat[1].

For an overview of plethysmography, BIA, DXA, and NIR as well as other assessments such as waist-to-hip circumference, please see Heyward's *Applied Body Composition Assessment.*

Additional Information

For additional information on BMI and body composition, please see the cited references from this section of the website.

Resources for Body Composition Assessment (Local)

Bellingham, Washington:

Exercise Physiology Laboratory
Western Washington University
Bellingham, WA 98225-9076
Phone: (360) 650-2851

Calculating BMI

To calculate your BMI, take your weight in kilograms and divide it by your height in meters squared:

(BMI = $kg_{weight} / m^2_{height}$)

Alternatively, BMI can be calculated in standard units by taking weight in pounds multiplied by 705 and dividing the resultant number by height in inches squared:

(BMI = $lb_{weight} * 705 / inches^2_{height}$)

Don't want to do the math? Check out the BMI chart below or the online BMI Calculator

WEIGHT	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250
HEIGHT																															
5'0"	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
5'1"	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	43	44	45	46	47
5'2"	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	36	37	37	38	39	40	41	42	43	44	45	46
5'3"	18	19	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	43	43	44
5'4"	17	18	19	20	21	21	22	23	24	25	26	27	27	28	29	30	31	32	33	33	34	35	36	37	38	39	39	40	41	42	43
5'5"	17	17	18	19	20	21	22	22	23	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	37	38	39	40	41	42
5'6"	16	17	18	19	19	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	35	36	36	37	38	39	40	40
5'7"	16	16	17	18	19	20	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	34	35	36	37	38	38	39
5'8"	15	16	17	17	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	33	34	35	36	36	37	38
5'9"	15	16	16	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	32	33	34	35	35	36	37
5'10"	14	15	16	17	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	29	30	31	32	32	33	34	34	35	36
5'11"	14	15	15	16	17	17	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	29	29	30	31	31	32	33	33	34	35
6'0"	14	14	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	31	31	32	33	33	34
6'1"	13	14	15	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32	33
6'2"	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	31	32
6'3"	12	13	14	14	15	16	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31
6'4"	12	13	13	14	15	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	24	25	26	26	27	27	28	29	29	30	30