

Practical-1

Body Mass Index: a measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters.

BMI is recommended as a practical approach for assessing body fat in the clinical setting. It provides a more accurate measure of total body fat compared with the assessment of body weight alone.¹⁸The typical body weight tables are based on mortality outcomes, and they do not necessarily predict morbidity. However, BMI has some limitations. For example, BMI over-estimates body fat in persons who are very muscular, and it can under-estimate body fat in persons who have lost muscle mass (e.g., many elderly). BMI is a direct calculation based on height and weight, regard-less of gender.

BMI, formerly called the Quetelet index, is a measure for indicating nutritional status in adults. It is defined as a

person's weight in kilograms divided by the square of the person's height in metres (kg/m²).

Aim: To measure the Body Mass Index with help of BMI Formula to identify the actual body weight status and desirable body weight status

Requirement: Weighing machine, Stadiometer, Subject, Paper, Pencil and Standardized

Norms. Procedure:

Demographic Details on Left Side

Name: Age: Class: Year: Body Weight

(Kg): Height (Meter): Training State:

Reading I	Body Weight (KG)	Height (Meter)
Reading II		
Reading III		
Average		

Procedure to measure the body weight of the individual:

1. Set the scale at zero reading
2. Ask the subject to remove any 'heavy' items from their pockets (key's, wallets etc.) and remove any heavy items of clothing or apparel (big jackets, shoes, woolen jerseys, cellphones, iPods) to extent possible etc.)

3. Have the student remove shoes.
4. Ensure you note the subject state and time of day for testing to ensure any subsequent tests can be taken under identical conditions (check state of hydration, food consumed recently etc.)
5. Ask subject to look straight ahead and stay still on the scales. Wait for the needle/digital screen to settle before recording the measurement
6. Read the weight value to the nearest $\frac{1}{4}$ pound or 0.1(1/10) kilogram
7. Measure the weight three times and take the average of all three measurement.
8. Record the weight value immediately on the student data record.

Procedure to measure the body height of the individual:

1. First, find a flat, uncarpeted section of floor and a flat section of wall.
2. Take off your shoes.
3. Remove braids, headbands, or anything else on your head that may get in the way of an accurate measurement.
4. Remove any bulky clothing that may make it difficult to stand flat against the wall.
5. Stand with your feet flat on the floor with your heels against the corner where the wall and floor meet. Make sure your head, shoulders, and buttocks are touching the wall.
6. Stand up straight with your eyes looking straight ahead. Your line of sight and chin should be parallel to the floor.
7. Have someone place a flat object (like a ruler or hardcover book) against the wall at a right angle. Then have them lower it until it rests gently on top of your head, keeping it at a right angle to the wall.
8. Lightly mark the wall with a pencil at the point where the ruler or book (or other flat object) meets your head.
9. Use a tape measure — ideally a metal one that will remain straight — to measure the distance from the floor to the mark on the wall.
10. Measure the height three times and take the average of three reading.
11. Take note of the measurement to the nearest $\frac{1}{8}$ th of an inch or 0.1 centimeter.

Procedure: BMI is calculated from [body mass](#) (M) and [height](#) (H). $BMI = M / (H \times H)$, where M = body mass in kilograms and H = height in meters. The higher the score usually indicating higher levels of body fat.

Scoring: Use the table below to determine your BMI rating. The table shows the World Health Organization BMI classification system. The rating scale is the same for males and females.

BMI	Nutritional status
Below 18.5	Underweight
18.5–24.9	Normal weight
25.0–29.9	Pre-obesity
30.0–34.9	Obesity class I
35.0–39.9	Obesity class II
Above 40	Obesity class III

Result: The subject belong from,

_____ **category**

y. References:

<http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>

Practical-2

Basal Metabolic Rate

Introduction: Basal metabolic rate (BMR) is the amount of energy required to maintain the body's normal metabolic activity, such as respiration, maintenance of body temperature (thermogenesis), and digestion. Specifically, it is the amount of energy required at rest with no additional activity. The energy consumed is sufficient only for the functioning of the vital organs such as the heart, lungs, nervous system, kidneys, liver, intestine, sex organs, muscles, and skin.

Your body converts what you eat and drink into energy. The calories in food and beverages are combined with oxygen to release the energy your body needs to perform your body's most basic (basal) function like breathing and cell production. Even when you are rest, your body needs energy for all of its hidden function such as breathing, circulating blood, adjusting hormone level, growing and repairing cells. The number of calories your body needs to carry out these basic function is known as your basal metabolic rate (BMR)

B.M.R. is the energy released when the subject is at complete mental and physical rest i.e. in a room with comfortable temperature and humidity, awake and sitting in a reclining position, 10-12hrs after the last meal. It is essentially the minimum energy required to maintain the heart-rate, respiration, kidney function etc.

Aim: To measure the Basal Metabolic Rate of the individual with the help of given formula

Requirement: Weight in Kg, Height in Centimeter, Paper, Pencil and Modified Harris Benedict Equation for calculation BMR.

Procedure:

Demographic Details on Left Side

Name: Age: Class: Year: Body Weight

(Kg): Height (Meter): Training State:

For men: **BMR** = 10 x weight (kg) + 6.25 x height (cm) – 5 x age (years) + 5.

For women: **BMR** = 10 x weight (kg) + 6.25 x height (cm) – 5 x age (years) – 161.

Lifestyle	Example	PAL	Calculation
Sedentary or light activity	Office worker getting little or no exercise	1.53	BMR x 1.53
Active or moderately active	Construction worker or person running one hour daily	1.76	BMR x 1.76
Vigorously active	Agricultural worker (non mechanized) or person swimming two hours daily	2.25	BMR x 2.25

To determine your total daily calorie needs, multiply your [BMR](#) by the appropriate activity factor, as follows:

1. If you are sedentary (little or no exercise) : Calorie-Calculation = BMR x 1.2

2. If you are lightly active (light exercise/sports 1-3 days/week) : Calorie-Calculation = BMR x 1.375
3. If you are moderately active (moderate exercise/sports 3-5 days/week) : Calorie-Calculation = BMR x 1.55
4. If you are very active (hard exercise/sports 6-7 days a week) : Calorie-Calculation = BMR x 1.725
5. If you are extra active (very hard exercise/sports & physical job or 2x training) : Calorie-Calculation = BMR x 1.9

Once you know the number of calories needed to maintain your weight, you can easily calculate the number of calories you need to eat in order to gain or lose weight.

Result: As per the calculation the Basal Metabolic Rate of the individual is _____ and to determine the total calories need as per lifestyle is _____.

References:

Mifflin MD, St Jeor ST, Hill LA, Scott BJ, Daugherty SA, Koh YO (1990). "[A new predictive equation for resting energy expenditure in healthy individuals](#)". *The American Journal of Clinical Nutrition*. **51** (2): 241–7. doi:10.1093/ajcn/51.2.241. PMID 2305711. From Wikipedia dated on 20.4.2020
https://en.wikipedia.org/wiki/Harris%E2%80%93Benedict_equation#cite_note-pmid2305711-4

<https://www.bmi-calculator.net/bmr-calculator/harris-benedict-equation/>

Practical-3

Aim: To measure the Waist Hip Ratio (WHR) of the individual with the help of given formula
Requirement: Inch tape, calculator, Subject, Paper, Pencil and Standardized norms
Demographic Details on Left Side

Name: Age: Class: Year : Body Weight (Kg):
Height (Meter): Training State:

Reading I	Waist (cm)	Hip (cm)
Reading II		
Reading III		
Average		

Formula for Waist Hip Ratio

Waist Circumference

Hip Circumference

According to the [World Health Organization](#) (WHO), a healthy WHR is: 0.9 or less in men

- 0.85 or less for women

In both men and women, a WHR of 1.0 or higher increases the risk for heart disease and other conditions that are linked to being overweight.

Health risk	Women	Men
Low	0.80 or lower	0.95 or lower
Moderate	0.81–0.85	0.96–1.0
High	0.86 or higher	1.0 or higher

Procedure:

Waist-to-hip ratio chart

Waist measurement

- Check that the tape is not too tight or too loose
 - You should be able to place one finger between the tape and the subject's body
- Ask the participant to breath normally
- Read the waist circumference at the end of a light exhale



Waist measurement (at naval)

<https://www.youtube.com/watch?v=b-BXpE0itSY>

The waist measurement is taken at the narrowest waist level, or if this is not apparent, at the mid-point between the lowest rib and the top of the hip bone (iliac crest). If you are unsure if this measurement was taken at the narrowest level, take several measurements at different levels and take the lowest measurement. Some procedures measure abdominal circumference at the level of the umbilicus (belly-button). The waist circumference should be measured at the end of a normal expiration, as movement of the diaphragm may change the abdominal volume. The subjects should also be encouraged to have a relaxed posture, and changes in the tension of the abdominal muscles can also affect the measurement. When recording, you need to make sure the tape is not too tight or too loose, is lying flat on the skin, and is horizontal.

Step 1: Wear tight clothing, or roll your top up. If you're measuring your waist alone, stand in front of a mirror so you can position the measuring tape correctly. Your waist can be located between the top of your hipbones and the bottom of your ribs.

Step 2: Wrap a [cloth tape measure](#) around the narrowest part of your waist. If you don't have a cloth

measure, use a piece of string and measure the string afterward. Do not pull the tape measure so hard that it's compressing the skin; make sure the tape is only lying at the surface of your skin.

Hip measurement (at fullest point)

All of the protocols mentioned in Section 2.1.1 indicate that the hip circumference measurement should be taken around the widest portion of the buttocks



Step 1: Wear tight clothing, or roll your top up. If you're measuring your hips alone, stand in front of a mirror so you can position the measuring tape correctly. Your hips can be located at the widest part of your buttocks.

Step 2: Wrap a cloth tape measure around the widest part of your buttocks. Again, if you don't have a cloth tape measure, use a piece of string and measure the string afterward. Do not pull the tape measure so hard that it's compressing the skin; make sure the tape is only placed at the surface of your skin.

Step 3: Hold the beginning of the tape measure in place on the front side of your body with one hand. With the other hand, wrap the tape measure around your body until it overlaps with your starting point. Take note of your measurement, and measure once more for accuracy.

Result: As per the norms the subject belong from _____ category.

References:

https://apps.who.int/iris/bitstream/handle/10665/44583/9789241501491_eng.pdf;jsessionid=55E3C712199DB3EA4289E417B410A5EB?sequence=1

<https://www.youtube.com/watch?v=b-BXpE0itSY>

<https://www.youtube.com/watch?v=b-BXpE0itSY>

Practical-4

Body Composition

Introduction: Body composition, the body's relative amounts of fat and fat free mass, is an important component of fitness for health and wellness. People whose body composition is optimal tend to be healthier, to move more effectively and to feel better about themselves. They also have a lower risk of many chronic diseases. Many people, however, don't succeed in their efforts to obtain a fit and healthy body because they set unrealistic goals and emphasize short-term weight loss rather than permanent lifestyle changes that lead to fat loss and a healthy body composition. Successful management of body composition requires the long-term consistent coordination of many aspects of a wellness program. Even in the absence of changes in body composition an active lifestyle improves wellness and decrease the risk of disease and premature death.

The human body can be divided into fat-free mass and body fat. Fat free mass is composed of all the body's nonfat tissue eg bone, water, muscle, connective tissue, organ tissue and teeth. A certain amount of body fat is necessary for the body to function. Fat is incorporated into the nerves, brain, heart, lungs, liver, mammary glands and other body organs and tissue.

It is the main source of stored energy in the body: it also cushions body organs and help regulate body temperature. This essential fat makes up about 3-5% of total body weight in men and about 8-12% in women. The percentage is higher in women due to fat deposit in the breast, uterus, lower extremity and specific sites. Most of the fat in the body is stored in fat cells or adipose tissue located under the skin (subcutaneous fat) and around major organs (visceral or intra-abdominal fat). People have a genetically determined number of fat cells, but these cells can increase or decrease in size depending on how fat is being stored.

The amount of stored fat depends on several factor including age, sex, metabolism, diet and activity level.

The primary source of excess body fat is excess calories consumed in the diet-that is, calories consumed in excess of calories expended in metabolism, physical activity and exercise. A pound of body fat is equal to 3500 calories so an intake of just 100 calories a day in excess of calories expended will result in a 10 pounds weight gain over the course of a year. Excess stored body fat is associated with increased risk of chronic diseases like diabetes and cardiovascular diseases etc.

Physical activity and exercise do improve body composition (meaning less fat and lean muscle mass). Evidence supports a dose-response relation between exercise and fat loss-that is the more you exercise, the more fat you will loss. This include both total body fat and abdominal fat. Additionally, the more body fat a person has the greater is the loss of abdominal fat with exercise. Studies show that even without calories reduction walking 150 minutes per week at a pace of 4 miles per hour or jogging 75 minutes a week at 6 miles per hour produces a decrease in total fat and abdominal fat that is associated with improved metabolic health.

Studies also show, however that combining exercise with an appropriate reduction in calories is an even better way to reduce levels of body fat and increase lean muscle mass. The result of combining exercises and calories reduction may not show up as expected on the scale, because the weight of body fat lost is partially offset by the weight of muscle mass gained. Still, your body composition, physical fitness and overall health have improved.

Aim: To measure the Body Composition, body fat and lean body mass with the help of skinfold caliper Requirement: Skinfold Caliper, Subject, Paper, Pencil and Standardized Norms.

Demographic Details on Left Side

Name: Age: Class: Year: Body Weight

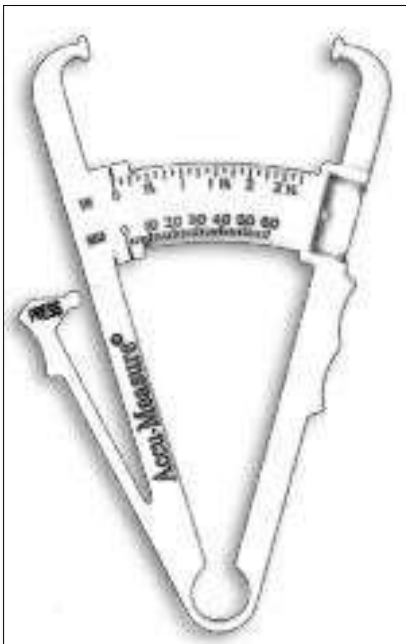
(Kg): Height (Meter): Training State:

Time of day of measurement _____

Men	Reading mm	Women	Reading mm
Chest		Triceps	
Abdomen		Suprailium	
Thigh		Thigh	
Sum		Sum	

Procedure:

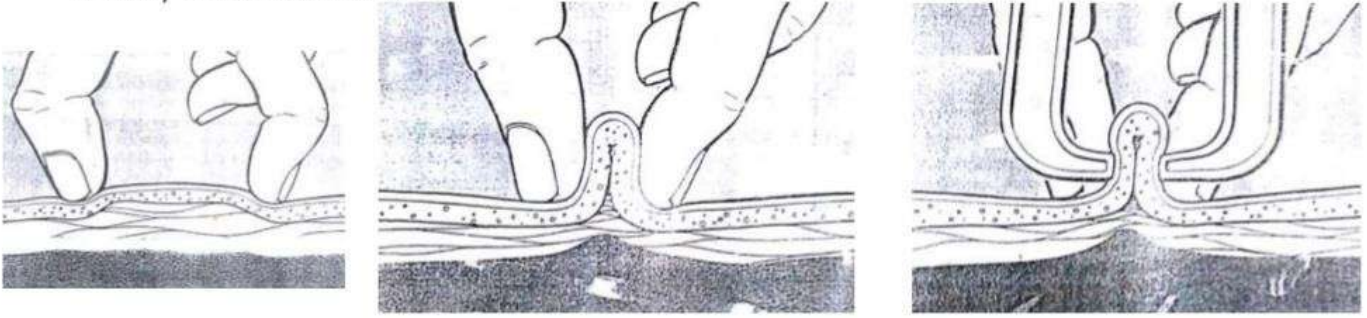
Skinfold Measurement



Skinfold measurement is a simple, inexpensive and practical way to assess body composition. Skinfold measurement can be used to assess body composition because equation can link the thickness of skinfold at various sites to percent body fat calculation from more precise laboratory techniques. Skinfold assessment typically involves measuring the thickness of skinfold at several different sites on the body. You can sum up the skinfold values as an indirect measure of body fatness. For example if you plan to create fitness program to improve body composition, you can compare the sum of skinfold values over time as indicator of your program’s progress and of improvements in body composition. You can also plug your skinfold values into equation. When using these equation, however, it is important to remember that they have a fairly substantial margin of error ($\pm 4\%$ if performed by a skilled technician) –So don’t focus too much on specific values. The sum represents only a relative measure of body fatness. Skinfold are measured with a device called “Caliper”, which is a part of spring

–loaded, calibrated jaws. High-quality caliper are made of metal and have parallel jaw surface and constant spring tension. Inexpensive plastic calipers are also available; to ensure accuracy, plastic calipers should be spring-loaded and have metal jaws. Taking accurate measurement with calipers requires patience, experience and considerable practice. It’s best to take several measurement at each site (or have several different people to take each measurement) to help ensure accuracy. Be sure to take the measurement in the exact location called for in the procedure. Because the amount of water in your body changes during the day, skinfold measurement taken in the morning and evening often differ. If you repeat the measurement in the future to track changes in your body composition, measure skinfold at approximately the same time of day.

- Then holding the caliper in your right hand place the jaws of the caliper about 1/4" from fingers of your left hand which continues to hold the fold of skin.
- Completely release the trigger of the caliper so the entire force of the jaws is on the skin fold.
- Do not release the fold of skin held in your left hand while taking the reading.
- Best to take all 4 reading & add together & with the aid of charts.
- % body fat is calculated.



- i. **Chest**
- ii. **Abdomen**
- iii. **Thigh**
- iv. **Triceps**
- v. **Suprailium**

Select and locate the correct sites for measurement. All measurement should be taken on the right side of the body with the subject standing. Skinfold are normally measured on the natural fold line of the skin, either vertically or at a slight angle.

The skinfold measurement sites for males are chest, abdomen and thigh and for female, triceps, suprailium and thigh. If the person taking skinfold measurement is inexperienced, it may be helpful to mark the correct sites with a marking pen.

Measurement the appropriate skinfold. Pinch a fold of skin between your thumb and forefinger. Pull the fold up so that no muscular tissue is included; don't pinch the skinfold too hard. Hold the caliper perpendicular to the fold and measure the skinfold about 0.25 inch away from your fingers. Allow the tips of the caliper to close on the skinfold and let the reading settle before marking it down. Take reading to the nearest half-millimeter. Continue to repeat the measurement until two consecutive measurement match, release and re-pinching the skinfold between each measurement. Make a note of the final measurement for each sit.

Assessing Body Fat Using the Skinfold Method

1. Instruct the client to wear either shorts, pants, or skirt and a loose fitting shirt to facilitate the ease of measurement.
2. standing at the client's right side, locate the sites to be measured.

Anatomical sites for women:-

1. **Triceps skinfold:** vertical fold on the back of the arm, halfway between the shoulder and the elbow, with the arm held vertically. (Figure 1)
2. **Suprailium skinfold:** diagonal fold taken 1 cm above the anterior superioriliac crest (Figure 2).-
3. **Thigh skinfold:** vertical fold halfway between the hip and knee, measured on the front of the thigh (see Figure 3).



Figure 1 Triceps Skinfold



Figure 2 Suprailiac



Figure 3 Thigh Skinfold

Anatomical sites for men:-

1. **Chest skinfold:** diagonal fold halfway between the front crease of the axilla and the nipple, measured on the lateral aspect of the chest along an imaginary line between the shoulder and opposite hip (see Figure4).-
2. **Abdominal skinfold:** vertical fold, taken 2 cm to the right of the umbilicus (see Figure 5).-
3. **Thigh skinfold:** vertical fold halfway between the hip and knee, measured on the front of the thigh (see Figure 6).



Figure 4 Chest Skinfold



Figure 5 Abdomen



Figure 6 Thigh Skinfold

Determining percent body fat

Add the measurement of your three skinfold. Use this sum as a point of comparison for future assessment and/or to find the percent body fat that corresponds to your total in the appropriate table. For example a 20 year old female with measurement of 17 mm, 21 mm and 22 mm of respective sites would have a skinfold sum of 60 mm; according to the following table her percent body fat is 23.5

Sum of three skinfold _____ mm

Percent body fat _____

_____ mm

Prediction of Fat Percentage in Female from the Sum of three Skinfold									
Sum of Skinfolds (mm)	Age (Years)								
	20	25	30	35	40	45	50	55	60 & over
20	9.3	9.6	9.9	10.2	10.5	10.8	11.1	11.4	11.7
25	11.2	11.5	11.8	12.1	12.4	12.7	13.0	13.3	13.6
30	13.1	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5
35	14.9	15.2	15.5	15.8	16.1	16.4	16.7	17.0	17.3
40	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1
45	18.4	18.8	19.1	19.4	19.7	20.0	20.3	20.6	20.9
50	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.4	22.7
55	21.9	22.2	22.5	22.8	23.1	23.4	23.7	24.1	24.4
60	23.5	23.8	24.1	24.4	24.8	25.1	25.4	25.7	26.0

65	25.1	25.4	25.7	26.1	26.4	26.7	27.0	27.3	27.7
70	26.7	27.0	27.3	27.6	27.9	28.3	28.6	28.9	29.2

75	28.2	28.5	28.8	29.1	29.5	29.8	30.1	30.4	30.8
80	29.7	30.0	30.3	30.6	31.0	31.3	31.6	31.9	32.3
85	31.1	31.4	31.7	32.1	32.4	32.7	33.0	33.4	33.7
90	32.5	32.8	33.1	33.5	33.8	34.1	34.4	34.8	35.1
95	33.8	34.1	34.5	34.8	35.1	35.5	35.8	36.1	36.5
100	35.1	35.4	35.8	36.1	36.4	36.8	37.1	37.4	37.8
105	36.3	36.7	37.0	37.3	37.7	38.0	38.3	38.7	39.0
110	37.5	37.9	38.2	38.5	38.9	39.2	39.5	39.9	40.2
115	38.7	39.0	39.3	39.7	40.0	40.4	40.7	41.0	41.4
120	39.8	40.1	40.4	40.8	41.1	41.5	41.8	42.1	42.5
125	40.8	41.2	41.5	41.8	42.2	42.5	42.9	43.2	43.5
130	41.8	42.1	42.5	42.8	43.2	43.5	43.9	44.2	44.5
135	42.7	43.1	43.4	43.8	44.1	44.5	44.8	45.1	45.5

Source: Table generated from equations in Jackson, A. S., and M. L. Pollock. 1978. Generalized equations for predicting body density in men, *British Journal of Nutrition* 40:497-504; Jackson, A. S., M. L. Pollock and A. Ward. 1980. Generalized equation for predicting body density in women, *medicine and science in Sports and Exercise* 12:175-182; Siri, W.E. 1956. Gross composition of the body. In J.H. Lawrence and C.A. Tobias. (eds.), *Advances in Biological and Medical Physics*, IV. New York: Academic Press

Prediction of Fat Percentage in Male from the Sum of three Skinfold									
Sum of Skinfolds (mm)	Age (Years)								
	20	25	30	35	40	45	50	55	60 & over
10	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	5.9
15	3.2	3.8	4.3	4.8	5.4	5.9	6.4	7.0	7.5
20	4.8	5.4	5.9	6.4	7.0	7.5	8.1	8.6	9.2
25	6.4	6.9	7.5	8.0	8.6	9.1	9.7	10.2	10.8
30	8.0	8.5	9.1	9.6	10.2	10.7	11.3	11.8	12.4
35	9.5	10.0	10.0	11.2	11.7	12.3	12.8	13.4	13.9
40	11.0	11.6	12.1	12.7	13.2	13.8	14.4	14.9	15.5
45	12.5	13.1	13.6	14.2	14.7	15.3	15.9	16.4	17.0
50	14.0	14.5	15.1	15.6	16.2	16.8	17.3	17.9	18.5
55	15.4	16.0	16.5	17.1	17.7	18.2	18.8	19.4	19.9
60	16.8	17.4	17.9	18.5	19.1	19.7	20.2	20.8	21.4
65	18.2	18.8	19.3	19.9	20.5	21.1	21.6	22.2	22.8
70	19.5	20.1	20.7	21.3	21.9	22.4	23.0	23.6	24.2
75	20.9	21.5	22.0	22.6	23.2	23.8	24.4	24.9	25.5
80	22.2	22.8	23.3	23.9	24.5	25.1	25.7	26.3	26.9

85	23.4	24.0	24.6	25.2	25.8	26.4	27.0	27.6	28.2
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90	24.7	25.3	25.9	26.5	27.0	27.6	28.2	28.8	29.4
95	25.9	26.5	27.1	27.7	28.3	28.9	29.5	30.1	30.7
100	27.1	27.7	28.3	28.9	29.5	30.1	30.7	31.3	31.9
105	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.0
110	29.3	29.9	30.5	31.1	31.7	32.4	33.0	33.6	34.2
115	30.4	31.0	31.6	32.2	32.8	33.5	34.1	34.7	35.3
120	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7	36.4
125	32.5	33.1	33.7	34.3	34.9	35.6	36.2	36.8	37.4

Source: Table generated from equations in Jackson, A. S., and M. L. Pollock. 1978. Generalized equations for predicting body density in men, *British Journal of Nutrition* 40:497-504; Jackson, A. S., M. L. Pollock and A. Ward. 1980. Generalized equation for predicting body density in women, *medicine and science in Sports and Exercise* 12:175-182; Siri, W.E. 1956. Gross composition of the body. In

J.H. Lawrence and C.A. Tobias. (eds.), *Advances in Biological and Medical Physics*, IV. New York: Academic Press

Rating your body composition

Refer to the chart to rate your percent body fat.

Percent Body Fat Classification

Gender	Percent Body Fat (%)			Gender	Percent Body Fat (%)		
Women	20-39 years	40-59 years	60-79 years	Men	20-39 years	40-59 years	60-79 years
Essential	8-12 %	8-12%	8-12%	Essential	3-5%	3-5%	3-5%
Low/Athletics	13-20%	13-22%	13-23%	Low/Athletics	6-7%	6-10%	6-12%
Recommended	21-32%	23-33%	24-35%	Recommended	8-19%	11-21%	13-24%
Over fat	33-38%	34-39%	36-41%	Over fat	20-24%	22-27%	25-29%
Obese	≥39	≥40	≥42	Obese	≥25	≥28	≥30

Source: Gallagher, D., et al. 2009. Healthy percentage body fat ranges: An approach for developing guidelines based on body mass index. *American journal of clinical Nutrition* 72:694-701. American College of Sports Medicine. 2009. ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription, 6th ed. Philadelphia: Lippincott Williams and Wilkins.

Result: As per the norms the subject belong from _____ category.

References

- Thomas D. Fahey, Paul M. Insel and Walton T. Roth (2011), "Fit and well" core concepts and labs in *Physical Fitness and Wellness*, Page no. 181-185