

# Measure, Calculate and Interpret Body Mass Index

A guide for teachers and school club leaders

## INTRODUCTION

This section defines BMI, summarizes its importance and gives guidance on how to take measures, and calculate and interpret Body Mass Index (BMI) results using the Z-score chart. The guide has been developed to overcome the gap identified during the midterm assessment. The primary audiences for the guide will be teachers and health extension workers/professionals who are involved in measuring, calculating and interpreting adolescent girls' BMI.

Application of COVID-19 pandemic measures is very critical

## Activity 1: Measure, Calculate and Interpret Body Mass Index

This section summarizes the relationship between BMI and nutrition in applying question and answer methodology.

### Activity 1: Getting informed about Body Mass Index and its importance

#### What is Body Mass Index?

- Body mass index (BMI) is a measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in meters ( $\text{kg}/\text{m}^2$ ).
- Body Mass Index (BMI) is a measurement of a person's weight with respect to his or her height.
- It is a way for us to see if our weight and height are in a healthy proportion

#### What is the relationship between body mass index and nutrition?

- Healthy nutrition is characterized by the consumption of a balanced diet.
- Balanced diet means getting the right types and amounts of foods and drinks to supply adequate nutrient and energy for supporting normal growth and development.
- Healthy food is a food that is highly beneficial to health that nourishes the human body with essential nutrients, namely, vitamins, minerals, trace minerals, protein, carbohydrates, fats and enzymes. These nutrients are necessary for life. And the food should be free of microorganisms that damage the health of human beings.
- A good and healthy diet helps us to maintain a healthy weight. In order to know if we are getting a balanced diet, we must know our Body Mass Index (BMI).
- A well-nourished person has a body weight proportional to his or her height.
- BMI provides a reliable indicator of body thin-ness and fatness for most people and is used to screen for weight categories that may lead to health problems.
- The identification of BMI helps people in choosing the healthy food to be taken.

#### Why body mass index for adolescent girls?

- Nutrition influences growth and development throughout infancy, childhood and adolescence. However, nutrient needs are high during adolescence
- The primary objective of BMI measurement is to motivate the girls and their parents to adopt healthy diets
- It is an inexpensive and easy-to-perform method of screening for weight categories that may lead to health problems.
- BMI measurement helps to trace a high amount of body fat that can lead to weight-related diseases and other health issues. Being underweight can also put one at risk for infections and health issues.
- Body mass index (BMI) has been recommended for use as a screening tool for overweight, obesity and thinness in adults and adolescents.

#### What key points must be considered by service providers?

- Let the girl know her weight and height as well as her BMI Z-Score result
- Explain carefully if BMI is too low (thin) or too high (overweight)
- Whatever the result, provide counseling for adolescent girls to practice or continue practicing healthy diet
- Make sure parents of adolescent girls are informed about the BMI status of their daughters and encourage them to adopt key adolescent nutrition behaviors

# Activity 2: Measuring and interpretation of BMI

This section will enable the participant to practice measurement and interpretation of BMI.

## REQUIRED MATERIALS

- Weight scale
- Calibrator
- Standing/ dropdown height measurement
- BMI register
- BMI Z-Score for 5-19 year-old girls

### 2.1: How to measure body weight

Material needed: Functional weight measurement

#### Precondition to measure body weight:

- Calibrate the weight scale after every 10 measurements.
- Ask the adolescent girl to remove heavy materials – jacket, shoes.
- Assign a recorder who registers each result on BMI register.

#### Steps in measuring body weight and recording accurate weight:

Be sure that the scale is placed on a flat, hard, even surface. It should not be placed on a loose carpet or rug, but a firm carpet that is glued down is acceptable.

- Turn on the scale. When the number 0.0 appears, the scale is ready to use.
- Check to see that the girl has removed her shoes and over coats & jacket.
- Ask the adolescent girl to stand in the middle of the scale, feet slightly apart (on the footprints, if marked), and remain still. The girl's clothing must not cover the display panel.
- Carefully read the numbers in the correct order.
- Immediately note down the numbers next to the ID number or name, make sure the date is noted.

### 2.2: How to measure height

#### Taking height measurements

Ideally height measurements will be taken using a 'drop down' tape measure fixed at about 2 meters on a wall or a specific piece of measuring equipment as shown adjacent. A reliable measurement could be taken without this equipment by marking a point (top of girl's head) against a wall and measuring up to it.

#### Steps to be followed while measuring height

##### When taking measurements of height:

- Ask the girl to stand with her back touching the wall and look directly forward.
- Ask the girl to stand and her back should touch the wall and look directly forward.
- The back of their feet, calves, buttock, upper back and the back of their head should all be in contact with the wall. They should be positioned directly underneath the drop-down measuring device.
- Lower the measuring device until it rests gently on the top of the adolescent girl's head and read the measurement.
- Record the measurement immediately next to the ID number or name, make sure the date is noted.

## 2.3: Calculating Body Mass Index (BMI)

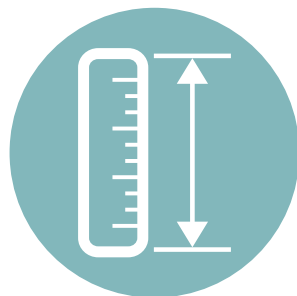
Body Mass Index (BMI) is calculated a person's weight in kilograms divided by the square of height in meters.

The equation for BMI is:

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m)}^2$$

### Steps in measurement and interpreting BMI

1. Obtain accurate weight and height measurements.
2. Select the appropriate growth chart (based on the age and sex of the child being weighed and measured).
3. Calculate BMI.
4. Plot measurements (BMI result in BMI Z-Score chart).
5. Interpret the plotted measurements.
6. Record the data and let the girl know her measurements (Height, Weight & BMI Z-Score).
7. Provide counseling based on the BMI Z-Score result, encourage healthy food choices and a diverse diet in adequate amounts.



## 2.3: Interpreting BMI using Z-Score for age chart

- In adolescent, BMI is calculated as for adults and then compared with Z-scores or percentiles.
- BMI is interpreted differently for children and teens, even though it is calculated using the same formula as adult BMI.
- Children and teen's BMI need to be age and sex-specific because the amount of body fat changes with age and the amount of body fat differs between girls and boys.
- For those aged 5–19 years,
  - Overweight is defined as a BMI-for-age value over +1 SD and
  - Obesity as a BMI-for-age value over +2 SD.
  - Normal -2 to+1 SD.
  - Thinness <-2 to -3 SD.
  - Severe thinness <= -3 SD.

### How is BMI interpreted for adolescent girls 10-19 years old?

- After BMI is calculated for adolescent girls, it is expressed as a BMI -Z score obtained from a graph. Weight and height can change during growth and development, as does their relation to body fatness and thin-ness. Consequently, a child's BMI must be interpreted relative to other children of the same sex and age.
- To plot and interpret
  - X axis reads the age of the adolescent girl.
  - Y-axis marked with BMI- the calculated result.
  - Plot the calculated BMI result.

### Interpretation of cut-offs

There are five BMI weight categories; **underweight (thinness & severe thinness), normal, overweight and obese.**

Severe thinness	Thinness	Normal	Overweight
<=-3	<-2 up to -3sd>	-2 to +1	>+1SD

### Key message for actors

1. Make sure each student knows their BMI status (BMI-Z Score) and encourage them to talk with their parents.
2. Whatever the status of the BMI result (BMI-Z Score), make sure all adolescent girls whose BMI is measured should get counseling on healthy food choices, diverse diet and adequate amounts.
3. Make sure to arrange a separate counseling session for parents of adolescents whose BMI -Z Score is very low.