

**KAGERA HEALTH AND DEVELOPMENT  
RESEARCH PROJECT**

**ANTHROPOMETRIC MEASUREMENT MANUAL**

**Anthropometric Measurements:**

These are physical measurement of individual parameters which could be used to ascertain or infer the levels of nutrition of an individual(s) or a community. Most common anthropometric measurements relate to:

- (a) Weight
- (b) Height
- (c) Length

Others are:

- Mid-upper arm circumference
- Thickness of adipose tissue
- Head circumference etc.

In this context we are concerned with measurement of weight, height and length. As an anthropometrist, you are required to measure all the members of the household as they are defined in the household questionnaire.

In most cases a household will be composed of adults and children of all ages.

Anthropometric measurements would in all cases be executed after the household questionnaire. It is hoped that the interviewer would have informed the household of your coming.

At the onset approach the household as described in the interviewers manual and remind them that you are part of the interviewers team but with the anthropometric measurement task. Politely ask for their consent and explain the procedures you are going to perform.

**Instruments provided:**

- (a) Adult weighing scale
- (b) Adult height measurement board.
- (c) Children weighing scale
- (d) Kitchen scale

The purpose of any measurement is to get the true value of what is being measured, in other circumstances you are required to measure the true difference between two measurable quantities.

There are several reason for measurements being measured not being the true values or differences. These reasons could be attributed to:

- (a) Measurer
- (b) Measuring instruments
- (c) The measured

In order to maximize the possibility of getting nearer true values. We need to adopt standard methods of conducting the measurement. As earlier stated, we are involved in the measurement of heights, weights and lengths, here follows summary procedures for anthropometric measurement of either for an adult or child.

### **Child Height Measurement Summary Procedure:**

1. **Anthropometrist:** Place the measuring board on a hard flat surface against a wall, table, tree, staircase, etc. Make sure the board is stable.

2. **Anthropometrist:** Ask the mother to remove the child's shoes and unbraid any hair that would interfere with the height measurement. Ask her to walk the child to the board and to kneel in front of the child.

**Mother:** request her to kneel with both knees on the right side of the child .

3. **Anthropometrist:** Kneel on your right knee only, for maximum mobility, on the child's left side.

4. **Anthropometrist And Mother:** Place the child's feet flat and together in the centre of and against the back and base of the board. Place your right hand just above the child's ankles on the shins, your left hand on the child's knees and push against the board. Make sure the child's legs are straight and the heels and calves are against the board. Once the child is in position ask the mother to assist in making sure the child maintains the position.

5. **Anthropometrist:** Tell the child to look straight ahead at the mother who should be in front of the child. Make sure the child's line of sight is level with the ground. Place your open left hand on the child's chin. Gradually close your hand. Do not cover the child's mouth or ears. Make sure the shoulders are level, the hands are at the child's side and the head, shoulder blades and buttocks are against the board. With your right hand, lower the headpiece on top of the child's head. Make sure you push through the child's hair.

6. **Anthropometrist And Mother:** Check the child's position. Repeat any steps as necessary.

7. **Anthropometrist:** When the child's position is correct, read and record the measurement to the nearest 0.1 cm. Remove the headpiece from the child's head, your left hand from the child's chin, ask the mother to support the child during the recording.

8. **Anthropometrist:** Check the measurement you recorded on the questionnaire for accuracy and legibility.

### **Child Weight Measurement Summary Procedure:**

1. **Anthropometrist:** Hang the scale from a tree branch, ceiling beam, tripod or pole held by two people. You may need a piece of rope to hang the scale at eye level. Ask the mother to undress the child.

2. **Anthropometrist:** Attach a pair of the empty weighing pants, infant sling or basket to the hook of the scale and adjust the scale to zero, then remove from the scale.

3. **Anthropometrist:** Have the mother hold the child. Put your arms through the leg holes of the pants. Grasp the child's feet and pull the legs through the leg holes. Make certain the strap of the pants is in front of the child.

4. **Anthropometrist:** Attach the strap of the pants to the hook of the scale. **DO NOT CARRY THE CHILD BY THE STRAP ONLY.** Gently lower the child and allow the child to hang freely.

5. **Anthropometrist And Mother:** Check the child's position. Make sure the child is hanging freely and not touching anything. Repeat any steps as necessary.

6. **Anthropometrist:** Hold the scale and read the weight to the nearest 0.1 kg. Read out the measurement when the child is still and the scale needle is stationary. Even children who are very active, which causes the needle to wobble greatly, will become still long enough to take a reading. **Wait For The Needle To Stop Moving.**

7. **Anthropometrist:** Record the measurement, then hold the child in one arm and gently lift the child by the body. **Do Not Lift The Child By The Strap Of The Weighing Pants.** Release the strap from the hook of the scale with your free hand.

8. **Anthropometrist:** Check the recorded measurement on the questionnaire for accuracy and legibility.

### **Child Length Measurement Summary Procedure:**

1. **Anthropometrist:** Place the measuring board on a hard flat surface, i.e. ground, floor or steady table.

2. **Mother:** Advise the mother to kneel with both knees behind the base of the board, if it is on the ground or floor.

3. **Anthropometrist:** Kneel on the right side of the child so that you can hold the footpiece with your right hand.

4. **Anthropometrist And Mother:** With the mother's help, lay the child on the board by doing the following:

**Mother:** Support the back of the child's head with your hand and gradually lower the child onto the board.

**Anthropometrist:** Support the child at the trunk of the body.

5. **Anthropometrist:** Ask the mother to kneel on the opposite side of the board facing the measurer to help keep the child calm.

6. **Mother:** Cup your hands over the child's ears. With your arms comfortably straight, place the child's head against the base of the board so that the child is looking straight up. The child's line of sight should be perpendicular to the ground. Your head should be straight over the child's head. Look directly into the child's eyes.

7. **Anthropometrist:** Make sure the child is lying flat and in the centre of the board. Place your left hand on the child's shins (above the ankles) or on the knees. Press them firmly against the board. With your right hand, place the footpiece firmly against the child's heels.

8. **Anthropometrist:** Check the child's position.

9. **Anthropometrist:** When the child's position is correct, read and record out the measurement to the nearest 0.1 cm. Remove the footpiece, release your left hand from the child's shins or knees and ask the mother to support the child during while you record the length on the questionnaire.

10. **ANTHROPOMETRIST:** Check the recorded measurement on the questionnaire for accuracy and legibility.

### **Adult Height Measurement Summary Procedure:**

1. Place the height measuring on a hard flat surface against a wall table, tree, staircase, etc. Make sure that the board is stable.
2. Ask the person to take off his/her shoes, and, if necessary, unbraided any hair that would interfere with the height measurement.
3. Place the questionnaire and pencil on the **ground directly next** to you. Stand on the left side of the person. Make sure you are at eye-level with the reading area on the measuring board.
4. Ask the person to place his/her knees and feet together so they are against the base and back of the measuring board. Make sure the feet are flat on the board and touching both the base and the back of the board at the same time. Make sure that the heels and calves are against the board.
5. Tell the person to look straight ahead. Make sure that the person's line of sight is level with the ground. Place your open left hand on the person's chin. Gradually close your hand. Do not cover the person's mouth or ears. Make sure the shoulders are level, the hands are at the person's side, and the shoulder blades and buttocks are against the board. The head of an adult may not touch the back of the board.
6. With your right hand, lower the sliding headpiece on top of the person's head. Make sure that you push through the person's hair.
7. Check the person's position. Repeat any steps as necessary.
8. When the person is in the correct position, read and call out the measurement twice to the nearest 0.1 cm. Remove the sliding headpiece from the person's head and your left hand from the person's chin.
9. Immediately record the measurement on the questionnaire.
10. Check that the measurement you recorded on the questionnaire is correct and readable. If you have made an error, erase it completely and record the correct measurement.

**Adult Weight Measurement Summary Procedure:**

1. Place the scale on a hard, flat and level surface (you may have to use a plank of wood on which to place the scale). Adjust the scale to zero.
2. Place the questionnaire and pencil on the floor or ground near the scale.
3. Ask the person to take off his/her shoes and any heavy outer garments such as a coat, sweater, etc. Ask the person to stand on the scale. You may want to support him/her at the elbow as he/she steps on the scale. Make sure he/she is standing up straight and in the centre of the scale.
4. Kneel on the floor or ground next to the scale. Make sure not to touch the person being weighed.
5. Check the person's position. Repeat any steps as necessary.
6. Read and call out loud the measurement twice to the nearest 0.1 kg.
7. Immediately record the measurement on the questionnaire.

8. Check that the measurement you recorded on the questionnaire is correct and readable. If you have made an error, erase completely and record the correct measurement.

## **QUALITY CONTROL**

### **Reading Measurements**

1. The reading areas of the tape on the measuring board is in centimetres which are numbered.

Each centimetre is divided into ten gradations, i.e. small vertical lines, which at each 0.1 centimetre, or millimetre. The line at five millimetres is slightly longer. Large numbers appear every ten centimetres.

2. Similarly, there are numbers on the hanging scale at each kilogram, small lines at each 0.1 kg. and a slightly longer line at each 0.5 kg.

3. Be careful to read the scale on the measuring equipment properly. The tape on the measuring board should be read in an upward direction for height and left to right for length; and the hanging scale clockwise. Do not read the numbers in a backward direction.

4. Make sure to count the number of visible lines, i.e. millimetres, when you read the tape. The headpiece falls almost directly on the seventh line. Since it can be seen, it is counted towards the measurement.

5. If the dial of the hanging scale or the head piece fall directly on a line count that towards the measurements.

6. If the movable headpiece or footpiece or the dial of the scale fall between two lines, record the measurement of the LOWER number.

### **Reading And Recording System:**

1. Measurer checks to see if you wrote down the correct measurement e.g. t94.2> in the correct place on the questionnaire.

### **Checking Your Measurement Technique:**

1. All Measurements

a. Did you follow the procedures you were taught in training?

b. Were you firm yet gentle with the child? Did you control the child?

c. Were you at eye level with the site of each measurement, i.e. top of the head for height; bottom of the feet and heels for length ; face of the scale for weight?

d. Did you read and record carefully? Did you follow the Reading and Recording System?

e. Was the Questionnaire near when you recorded the measurement?

f. Did you record the measurements in the correct places on the questionnaire?

g. Did you check the equipment after each measurement? Were the board and scale working properly and positioned securely?

h. Did you double check to make certain you had not left any equipment behind in a household?

## 2. Height/Length

a. Did you determine if the child was less than, equal to, or greater than two years of age? If less than two, did you measure length? If two years of age or older, did you measure height?

b. Were the footwear and headgear removed? Was interfering hair untied before the measurement? If this was not possible because it was too cold or the child or mother were uncooperative, did you note this on questionnaire?

c. Was the child in the correct position, i.e. the head, body, knees and feet? Was the child's head level and child looking straight ahead for height? Was the child's head against the base of the board and eyes looking straight up for length?

d. Did the mother support the child during the recording?

## 3. Weight

a. Write all numbers clearly and legibly.

b. Was the scale hung correctly and from a strong place?

c. Was the scale zeroed with empty measuring pants, infant sling or basket?

d. Was the child undressed? If not, did you note this on the questionnaire?

e. If the scale needle wobbled, did you wait until the child was still before taking a reading?

f. Was the strap of the weighing pants in front of the child?

g. Was the child hanging freely during the measurement?

## 4. Numbers

a. Were you careful to make all the numbers as instructed?

b. Did you place the numbers in the boundaries of the bores on the questionnaire?

c. Did you record the measurements in the appropriate places on the questionnaire?

## **Equipment Standardization**

Weighing and measuring equipment must be regularly checked during data collection, approximately twice a month, since weather changes, humidity and continued use may affect measurement reliability. Anthropometrist/interviewer should be able to check their own equipment while collecting data.

## A. Measuring Board

1. For each measuring board, measure an object of known height such as a pole, twice for each board.
2. If the Board is in two sections, measure two different poles. The first pole should be less than the height of the lower section of the board. The second pole should be less than the total height of the board when both sections are together. Measure each pole twice for each board.
3. If there is 0.3 cm. or more difference between the known height of the pole and its height when measured on the board, then check the measuring tapes and the boards in question.
4. Check each board for the following:
  - a. Loose screws
  - b. Broken or loose parts
  - c. Rough edges that may need sanding
  - d. Sliding headpiece/footpiece: (1) Less than 0.2 cm. lateral wobble, i.e. that it is not too loose to fit when on the board.

## B. Scale

1. For each scale, weigh three objects of different known weights. Repeat this procedure a second time. A large plastic bottle with different marks on the outside of the bottle can be used for this purpose. Weight the bottle after filling it to each line with water and record the weights.
2. If there is a 0.1 kg. or more difference between repeated weights on the same scale or between weights on different scales, check that the scale was zeroed, and reweigh each of the weights.
3. Check the scale for the following:
  - a. Scale 'zeros' properly.
  - b. Stitching of weighing pants and infants slings to make sure they are not torn.
  - c. Outside scale case for any breakage.
  - d. Missing scale hooks.
  - e. Dial of the scale is straight.