MEASUREMENT OF WEIGHT USING DIGITAL BALANCES

TESTING ACCURACY OF DIGITAL BALANCES

Weight and body mass index (BMI) are two important parameters used for assessment of nutritional status in all age groups

With the advent of battery operated digital balances accurate measurement of weight of different age groups in community or hospital setting has become easier

However as accuracy of balances is an essential prerequisite for accurate measurement of weight.

It is imperative that accuracy of balances are tested

- using standard weights certified by the Deptt of Weights and Measures and checking the weight recorded by the balance

- by weighing persons of varying weights five times in the test balances and comparing it with the weight of the same person weighed using the standard balance

TESTING ACCURACY AND SENSITIVITY OF DIGITAL BALANCES

DIGITAL BALANCE

Numerous digital weighing machines are available

For surveys it is preferable to use lithium battery operated machines which can weigh persons with weight ranging from 5- 150 kg and have the accuracy of 100g

Accuracy and sensitivity of digital balances are to be tested against the standard weights and weights of persons and compared with the standard digital weighing machine

TESTING ACCURACY OF BALANCE USING STANDARD WEIGHTS

TESTING ACCURACY OF BALANCE USING STANDARD WEIGHTS

Deptt of Weights and Measures certified Standard weights of 5,2,1,0.5,0.2 and 0.1 kg are used

Weigh first 5 kg and then 7,8,8.5, 8.7 and 8.8 kg as shown in the figures .

The balance should record weights with accuracy of $\pm$0.1 kg

Weigh five adults five times in each test balance

Weigh the same five adults once in the standard balance

The difference between weight measured by test balance & standard balance should not be> 0.1 kg

		P	R	V	K	S
TEST BALANCE	1	70.3	80.9	83.7	78.3	49.9
	2	70.3	81.0	83.7	78.3	49.9
	3	70.3	81.0	83.6	78.3	49.9
	4	70.3	81.0	83.7	78.3	49.9
	5	70.3	81.0	83.7	78.3	49.9
STANDARD BALANCE		70.3	81.0	83.7	78.3	49.9

For testing accuracy , five adults were weighed five times in test balance and once in standard balance

Four individuals' weight was the same both in test and standard balance (table above)

In two individuals there was one reading each which was lower by 100grams

This balance is accurate as only two of the 25 readings showed difference of 100 grams as compared to the standard balance

TESTING SENSITIVITY OF ELECTRONIC BALANCES

In both hospital and community settings the same balance is used to weigh all persons from neonate to elderly

Infants and young children do not like to be separated from the mother and weighed . Use of 100g sensitive digital makes it possible to accurately measure weight of infants and young children carried by the mother or care giver

As first step the mother carrying the infant is weighed

Then the infant is taken by others and the mother or care giver alone is weighed

The weight of the baby is computed by subtracting mother's weight from the total weight of mother carrying the baby

Accurate measurement of weight of the infant within 100 grams is essential for assessing weight for age and BMI for age

Some balances which are accurate while weighing standard weights or weighing adults may not be sensitive upto 100grams when the mother is carrying the baby

It is therefore essential to test the sensitivity of the balance by weighing adults carrying standard weights

TESTING SENSITIVITY OF ELECTRONIC BALANCES

In CAB component of AHS the same balance is used to weigh al persons from neonate to elderly

Infants and young children who cannot stand by themselves are carried by the mother or care giver

Mother or care giver carrying the baby is weighed first

Then the infant is taken by others and the mother or care giver alone is weighed

The weight of the baby is computed by subtracting mother's weight from the total weight of mother and the baby

Accurate measurement of weight of the infant within 100 grams is essential for assessing weight for age and BMI for age

Some balances which are accurate while weighing standard weights or weighing adults may not be sensitive upto 100grams when the mother is carrying the baby

It is therefore essential to test the sensitivity of the balance by making adults carry standard weights

TESTING SENSITIVITY OF BALANCES (ADULT + STANDARD WT)




Weigh the adult

Weigh the adult carrying 5 kg, 7 kg, and 8 kg

The combined of adult and the standard weight should be within ± 0.1 kg of the computed total weight




TESTING SENSITIVITY OF BALANCES (ADULT + STANDARD WT)

TESTING SENSITIVITY OF BALANCES (ADULT + STANDARD WT)

Weigh the Adult carrying 8(5+2+1) kg and 8.5., 8.7 and 8.8 kg as shown in the figures

The combined weight of adult and the standard weight should be within ± 0.1 kg of the computed total weight

OTHER PROBLEMS

Digital balances should never be stacked one on the top of the other

Always remove the battery and store it safely in a dry zip lock bag

If balance shows low battery or does not switch on – check the battery .

if in doubt about the battery change the battery and then undertake test for accuracy

OTHER PROBLEMS

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CHECKING ACCURACY OF THE DIGITAL WEIGHING MACHINE IN COMMUNITY SETTINGS

Weight is one of the most widely used parameters for assessment of nutritional status. It is therefore essential to ensure accurate recording of weight in nutrition surveys .

Digital weighing machines minimize errors in weighing.

Everyday before the weighing persons, digital weighing machine is to be checked for accuracy.

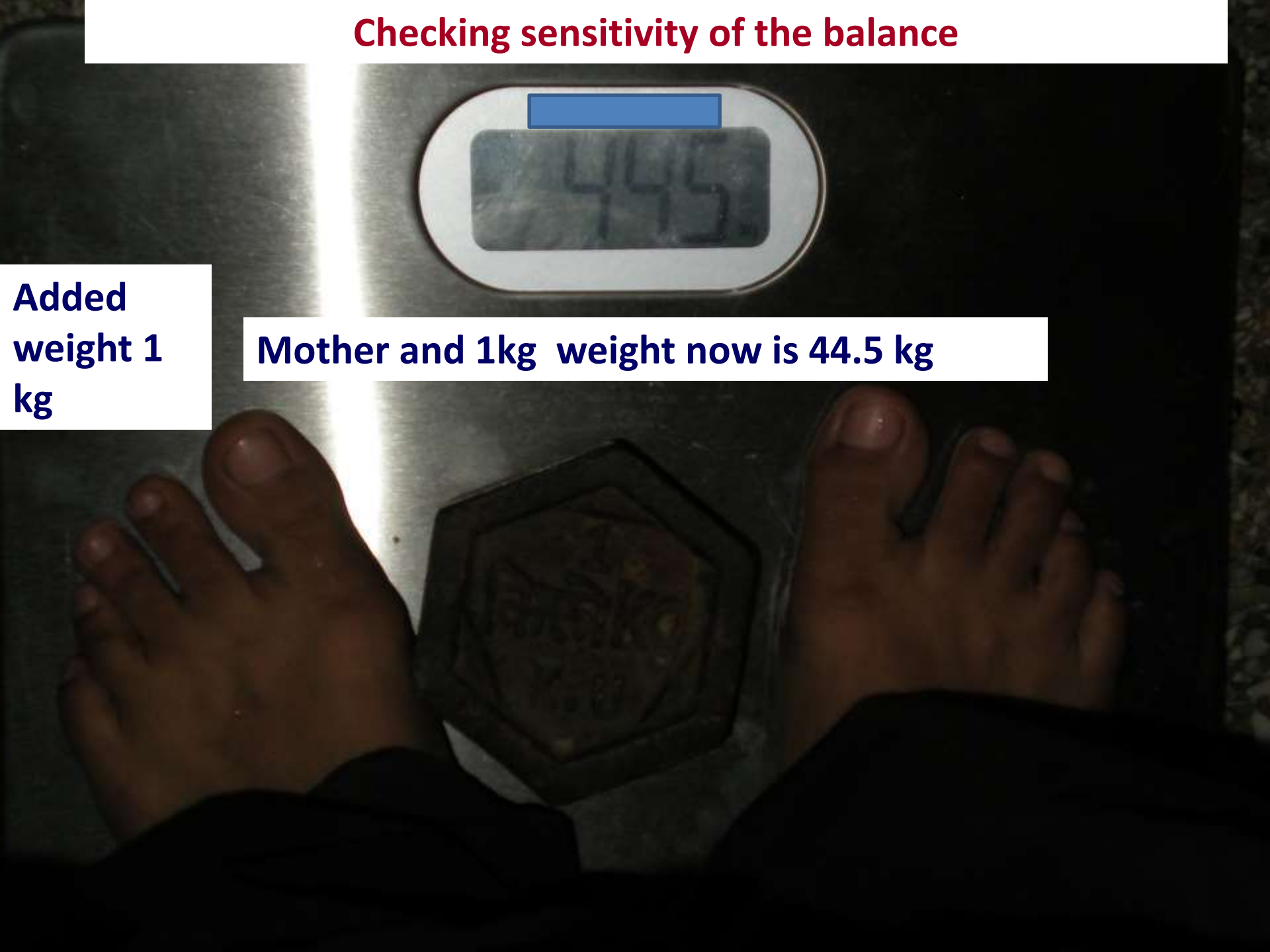
Weights certified by the Deptt of Weights and measures are available with the provision merchants and vegetable vendors

These certified weights can be borrowed for a short time to check the accuracy of the balance.

Mother standing straight on the digital balance

Checking sensitivity of the balance

Checking sensitivity of the balance



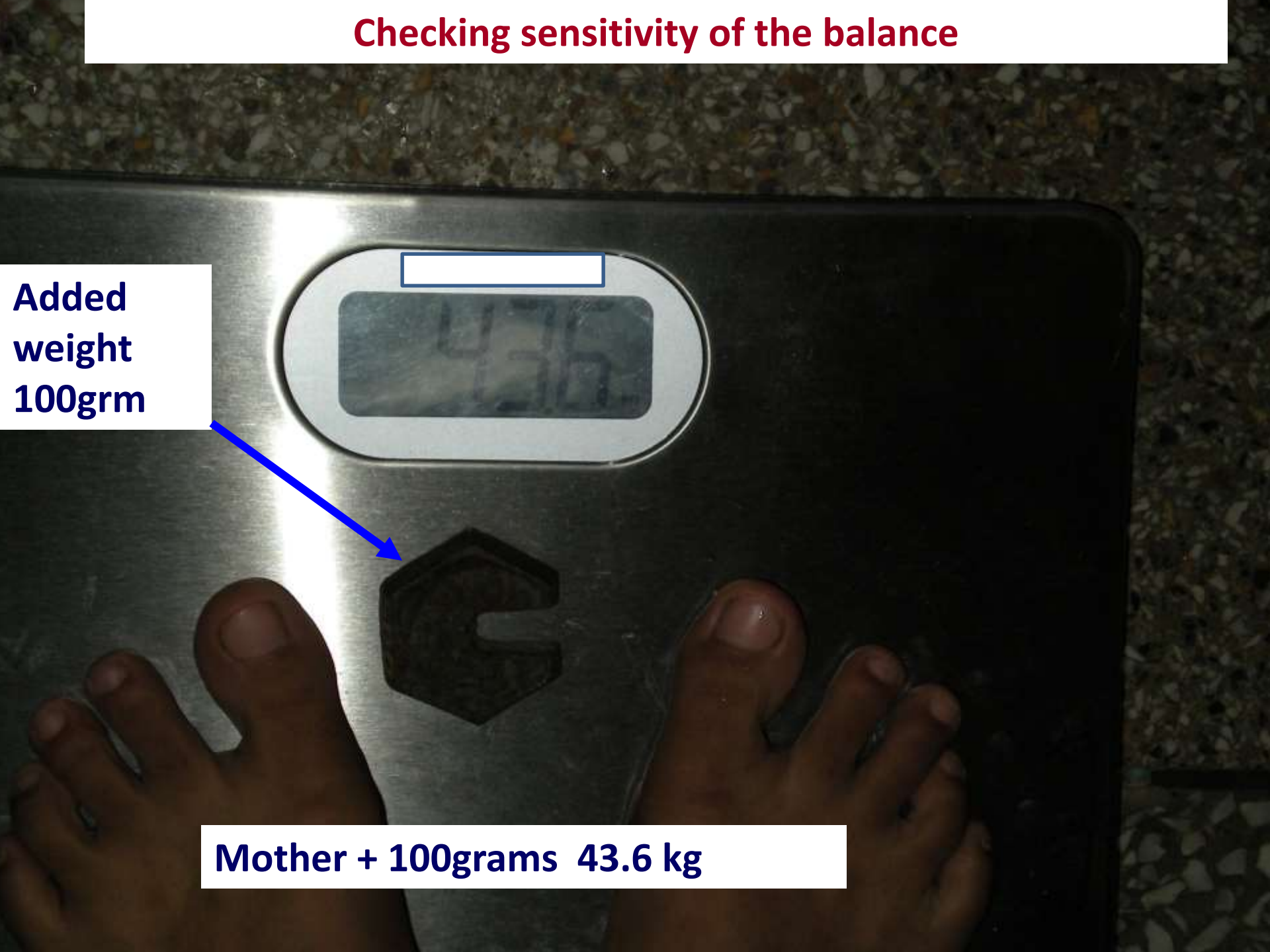
Added weight 1 kg

Mother and 1kg weight now is 44.5 kg

Checking sensitivity of the balance

Mother +500grams 44 kg

Checking sensitivity of the balance



WEIGHING INFANTS, CHILDREN AND ADULTS

MEASUREMENT OF INFANT'S WEIGHT

Weight when mother is carrying the infant is 59.3 kg

Weight of mother is 54.2 kg

Therefore infant's weight is 5.1kg

MEASUREMENT OF INFANT'S WEIGHT

Infants are usually comfortable when they are being carried by the mother/ care giver

Mother carrying the infant is weighed

Then mother alone is weighed

The difference in the weight between mother+ infant (51.5 kg) and mother alone (43.4 kg) is the weight of the infant (8.1 kg)

In urban settings many fathers share the parenting tasks of their children

They respond readily and help survey teams

Young children who watch their mothers and other children getting weighed , will willingly stand and get weighed

Child who are not happy should be cajoled so that they happily get on to the balance for getting weighed . His weight is 12.3kg

This man's weight is 48.9 kg

This girl weighs 38.8kg