

# **METHODS OF ASSESSING NUTRITIONAL STATUS**

**MbchB 5**

**2019**

## **Nutritional status**

**Definition:** Balance between dietary intake and metabolic requirements

- **Metabolic requirements** - Function of age, gender, physiological status, occupation and health status

## Reference Standards

**Definition: Sets of anthropometric measurements which are used as a norm against which other anthropometric data are assessed**

Used to standardize a child's anthropometric measurement by comparing the child's measurement with the median or average measure for children of same age and sex.

## Reference data/growth standards

1. *Harvard (Boston) Growth curves*: Data collected in 1930's & not separated by sex.
2. *Tanner Growth Curves* : Data collected in 1960, but from a homogeneous population.
3. The US *National Centre for Health Statistics (NCHS)* since 1970s. This data was based on growth of a mixture of both breastfed & artificially fed well nourished US children & presented by age and sex.

# Reference data/growth standards

- Since 2006: WHO Child Growth Standards used are based on data collected by **WHO Multicentre Growth Reference Study (1997-2003)**, & based on **Breastfed children**.
- **"Breastfeeding** is the standard for measuring growth with the WHO reference data/growth standard
- Download WHO anthro program at WHO Child growth standards-

at: [www.who.int/childgrowth/software/en/](http://www.who.int/childgrowth/software/en/):

Download the following too for a complete Anthro program:

1. Anthro for PC
2. Net framework



## **Criteria for ideal anthropometric reference data**

1. Measurements based on well-nourished, not over-nourished population.
2. Sample size should include at least 100-200 individuals in each age & sex group
3. Measurements taken with standardized measuring & recording techniques
4. Measurements should include all anthropometric variables necessary for evaluation of Nutrition status.
5. Precise knowledge of chronological age (birth date) should be obtained.

## **Criteria for ideal anthropometric reference data**

6. Sampling procedure should be defined & reproducible
7. Sample should be cross-sectional for comparison of cross-sectional nature
8. Data is periodically updated
- 9 Presentation of data is simple, easy to understand & available for anyone wishing to use it.

## Comparison of Anthropometric Data to Reference Standards

Taking age and sex into consideration, differences in measurements with the reference population can be expressed as:

1. Standard deviation units or Z-scores
2. Percentage of the median
3. Percentiles



## **Anthropometric Indicators**

## **Weight –for –Height/Length (W/H or WHZ)**

- Compares weight of a child compared to the reference weight of children of the same height
- Reflects recent weight loss or gain – **Acute/current malnutrition**
- Reflect a deficit of soft tissues – **an indicator of wasting observed as thinness**
- Assumes that weight and height are independent of age

## HEIGHT-FOR-AGE (H/A or HAZ)

- Compares the height/length of a child with median height of children of the same age
- Is a measure of **stunting** (deficient in skeletal development) due to **Chronic malnutrition**
- Associated with long term factors such as poverty or chronic food insecurity or recurrent illness

## **Weight –for –Age (W/A or WAZ)**

- Compares weight of a child to the reference weight of a child of the same age (median weight)
- **Is a measure of underweight ; used** to monitor children's growth & development
- Reflects either wasting or stunting or a combination of both.

## MUAC

- Mid-Upper Arm Circumference
- Used for screening (rapid determining) of malnutrition as an alternative to Weight-for-Height in stage 1
- Reflects recent weight loss or gain in weight
- Useful for screening for admission in Feeding Program
- Is a good indicator of mortality in either a hospital or community for severely malnourished children



## COMPUTATION OF NUTRITION STATUS INDICATORS

- The anthropometric measurements are related to NCHS/WHO reference population data using two methods:

- **As % of the reference median**

Observed measurement

\_\_\_\_\_ x 100%

Median measurement of reference data

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## COMPUTATION OF NUTRITION STATUS INDICATORS

- As Z-score (Standard Deviation) from the reference median

Observed measurement – median measurement of reference population

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Standard Deviation of reference population

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Standard Deviation of reference population

## SAMPLE CALCULATIONS

- Mrs. Ouma's 28 months old son Sam has a weight of 9.3 kg and measures 82.5 cm tall.
- Sam's age mates in the reference population data weigh 13.3 kg (SD=1.4 kg) with a height of 90.6 cm (SD=3.4cm)
- Children of Sam's height in the reference data however weigh 11.4 kg (SD=0.9kg)

# SAMPLE CALCULATIONS

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## Cont.....

### Reference data

- Median weight for same age = 13.3 kg (1 SD=1.4)
- Median weight for same height = 11.4 kg (1SD = 0.9)
- Median height for same age = 90.6 cm (SD = 3.4 cm)

## Cont...

What is Sam's nutritional status:

- i) weight-for-age (% of reference median/z-score)
- ii) Weight-for-height (% of reference median/z-score)
- iii) Height-for-age (% of reference median/z-score)

## MEDIAN WEIGHT

- Weight-for-age =  $9.3/13.3 \times 100\% = 69.9$  (70%)
- Weight-for-height =  $9.3/11.4 \times 100\% = 81.5\%$
- Height-for-age =  $82.5/90.6 \times 100\% = 91\%$

## Classification of Malnutrition by Indicator

	Well nourished	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
Oedema	NO	NO	NO	YES (Oedematous malnutrition)
Weight-for-Age	91% -110% (+2 to -1SD)	81% - 90% (-1 to -2SD)	60-80% (-2 to -3SD) Underweight, (with Oedema, then Kwashiorkor)	<60% (-3SD) Severe underweight (With Oedema then: Marasmic/ Kwashiorkor) No Oedema then Marasmus)
Height-for-Age	95%-110% (+2 to -1SD)	90% to 94% (-1 to -2SD)	80% to 89% (-2 to -3SD) Stunted (Chronic Malnutrition)	<80% (-3SD) Severe Stunting
Weight-for-Height	90% - 120% (+2 to -1SD)	80% - 89% (-1 to -2SD)	70% to 79% (-2 to -3SD) Wasted (Acute Malnutrition).	<70% (<-3SD) Severe Wasting (Severe Acute Malnutrition)

## Classification of Malnutrition

	Well nourished	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
MUAC (Children)	>13.5cm	12.5 to 13.5cm	12.0 to 12.5cm Wasted	11.5 to 12.0cm (Severe wasting)
MUAC (Adult Women – pregnant)			Less than 23.0 cm.	Less than 20.7 cm
Other adults	18.5 cm or more		16-18.5 cm	Less than 16cm
Body Mass Index	Men: 20 - 25 Women: 19-24	17 to <18.5 Mild, Thinness	16 to <17 Moderate thinness	<16 (Severe Thinness)



# Sample Class Assignment on output

In this assignment on stunting, you need to mention:

1. Total number of children in the survey
2. Overall prevalence of stunting for all children, both severe and moderate (Indicate prevalence and 95% CI)
3. Age group most affected (Indicate prevalence and 95% CI)
4. Age group Least affected (Indicate prevalence and 95% CI).
5. You can then use information in No. 2-4 in discussion and recommendations section of report.
6. Remember to include the Table, labeled and refer to it while writing No. 1-4 above.

Age groups	N	Severe malnutrition		Moderate malnutrition	
		% < -3SD	(95% CI)	% < -2SD	(95% CI)
Total	713	9.8	(7.5%, 12%)	29.8	(26.3%, 33.2%)
(0-5)	121	1	(0%, 3.1%)	10.2	(4.4%, 16%)
(6-11)	97	3.3	(0%, 7.3%)	16.8	(8.8%, 24.7%)
(12-23)	136	11.7	(6%, 17.5%)	36.9	(28.4%, 45.3%)
(24-35)	94	23.6	(14.4%, 32.7%)	51.7	(41.1%, 62.3%)
(36-47)	119	11	(5%, 17%)	33.8	(24.9%, 42.7%)
(48-60)	145	9.8	(4.6%, 14.9%)	30.5	(22.7%, 38.4%)

## **From Wards and hospital premises Each group measures 5 children**

1. Age/sex
2. MUAC
3. Weight
4. Presence of bilateral oedema

**Target:** Stable children

**Output:** Summary of Children weighed/measured

- Core measures taken, computation of indicators and interpretation
- Analyze data using ref standards provided and complete table
- Enter data in WHO Anthro or Ms. Excel for analysis of nutritional status of children measured
- Summarise challenges encountered

