Training Course on Child Growth Assessment

WHO Child Growth Standards

A

Introduction

World Health Organization

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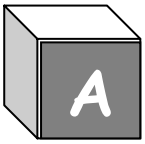

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"The project was designed and coordinated by Adelheid W. Onyango and Mercedes de Onis ..."--Acknowledgements.

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A: Introduction

Contents

A: Introduction

Child growth assessment

Basic growth assessment involves measuring a child's weight and length or height[1] and comparing these measurements to growth standards. The purpose is to determine whether a child is growing "normally" or has a growth problem or trend towards a growth problem that should be addressed. Module *B: Measuring a Child's Growth* and module *C: Interpreting Growth Indicators* explain how to:

- measure weight, length, and height;
- calculate body mass index (BMI);
- plot these measurements on growth charts; and
- interpret growth indicators.

Correct measurement, plotting, and interpretation are essential for identifying growth problems. If a child has a growth problem or trend towards a growth problem, the health care provider should talk with the mother or other caregiver[2] to determine the causes. It is then critically important to take action to address the causes of poor growth. Growth assessments that are not supported by appropriate response programmes are not effective in improving child health.

In circumstances such as extreme poverty or emergencies, growth assessment is aimed at identifying children who need urgent intervention, such as therapeutic or supplementary feeding, to prevent death. In the health facility settings described in this course, children with severe forms of undernutrition should be referred for specialized care. Children with obesity should be referred for medical assessment and specialized management. Non-severe problems can be managed through counselling, including age-appropriate advice on feeding and physical activity, as described in module *D: Counselling on Growth and Feeding*.[3]

The WHO child *Growth Records* include the growth charts and recommendations for feeding and care. These recommendations are a set of messages that could serve as a reference for parents, other child caregivers, and health care providers. The *Boy's Growth Record* and *Girl's Growth Record* are both provided with this course; the same feeding and care recommendations apply for boys and girls. These recommendations are also included in the annex to module *D: Counselling on Growth and Feeding*.

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[1] There are other growth measures (e.g. head circumference), but these are not covered in this course. **Length** of children less than 2 years old is measured lying down, while standing **height** is measured for children age 2 years or older. Throughout the modules the phrase **length/height** is used to indicate that the age-appropriate measurement for linear growth should be used.

[2] In this course the word "mother" is often used to refer to the child's primary caregiver. It is understood that the primary caregiver may be another person, such as the father, grandmother, or another relative or guardian.

[3] Note that counselling is only one part of effective growth promotion interventions. The "Growth Promotion Package" includes: 1. Regular assessment of child growth; 2. Decision making and action needed for the child; 3. Decision making and action at the community and program level to support actions in the household; and 4. Follow-up/feedback on the effects of actions taken at household and community/program levels. (See *Promoting the Growth of children: What Works*, Griffiths M, Dickin K, and Favin M, World Bank Nutrition Toolkit, 1996)

The WHO child growth standards

http://www.who.int/childgrowth/

In the past, growth references were developed using data from a single-country sample of children presumed to be healthy. There were no specific health behaviours required for children to be included in the reference sample. The result was a set of references that described the growth attained by children raised on modes of feeding and care that were typical of a particular time period and country.

The World Health Organization (WHO) has developed growth standards based on a sample of children from six countries: Brazil, Ghana, India, Norway, Oman, and the United States of America. The WHO Multicentre Growth Reference Study (MGRS)[1] was designed to provide data describing how children *should* grow, by including in the study's selection criteria certain recommended health behaviours (for example, breastfeeding, providing standard paediatric care, and not smoking). The study followed term babies from birth to 2 years of age, with frequent observations in the first weeks of life. Another group of children, age 18 to 71 months, were measured once, and data from the two samples were combined to create the growth standards for birth to 5 years of age.

By including children from many countries who were receiving recommended feeding and care, the MGRS resulted in prescriptive **standards** for normal growth, as opposed to simply descriptive references. The new standards show what growth can be achieved with recommended feeding and health care (e.g. immunizations, care during illness). The standards can be used anywhere in the world, since the study also showed that children everywhere grow in similar patterns when their nutrition, health, and care needs are met.

Additional benefits of the new growth standards include the following:

- The new standards establish breastfed infants as the model for normal growth and development. As a result, health policies and public support for breastfeeding will be strengthened.
- The new standards will help better identify stunted and overweight/obese children.
- New standards such as BMI (body mass index) are useful for measuring the increasing worldwide epidemic of obesity.
- Charts that show standard patterns of the expected growth rate over time enable health care providers to identify children at risk of becoming undernourished or overweight early, rather than waiting until a problem level is reached.

In addition to standards for physical growth, the WHO Child Growth Standards include six gross motor milestones (sitting without support, standing with assistance, hands-and-knees crawling, walking with assistance, standing alone, and walking alone) that healthy children are expected to achieve during specified age ranges between 4 and 18 months. The expected age ranges for achieving these milestones (or "windows of achievement") are included in the WHO child *Growth Records* provided with this course. This course, however, focuses on physical growth assessment and does not provide training on assessing motor development.

[1] de Onis M, Garza C, Victora CG, Bhan MK, Norum KR, editors. WHO Multicentre Growth Reference Study (MGRS): Rationale, Planning and Implementation. Food Nutr Bull 2004;**25** (Suppl 1):S1–89.

Purpose of this training course

This course has been designed for health care providers who measure and assess the growth of children or supervise these activities, so that implementation of the new growth standards will be accompanied by good measurement and plotting techniques. Course participants may include paediatricians, family practice physicians, nurses, clinical officers, health assistants, and nutritionists working in the public and private sectors.

The course teaches the skills and knowledge needed to measure the weight and length/height of children; assess growth in relation to the new growth standards; and counsel mothers about growth and feeding. For some participants, the skills and knowledge taught will reinforce earlier training. For others, the material will be new. Error in measurement and in plotting growth measurements on charts is common, and even the most experienced professionals can benefit from review. Also, many countries do not routinely assess linear growth, and the course shows how important such assessment is to determine wasting, stunting, and overweight/obesity. The specific learning objectives of the course are listed on page 5 of this module.

It is assumed that participants in the course have basic mathematical skills but may not be familiar with graphing and the interpretation of graphs. Some participants in the course may be familiar with older versions of growth charts but need to understand and practise using the new ones.

It is expected that participants will use the growth assessment and counselling procedures taught in this course when they return to their jobs. In order to use these procedures, health care providers will need:

- basic measuring equipment such as a taring scale and length/height board,[1]
- tools for recording a child's measurements over time and comparing a child's growth with the growth standards (such as the *Boy's Growth Record* and *Girl's Growth Record* provided with this course),
- time and space available in the clinic setting to conduct growth assessments and counsel mothers and other caregivers.

[1] Measuring equipment is described in detail in Module B: *Measuring a Child's Growth*.

Course methods and materials

This course uses a variety of instructional methods, including reading, written exercises, discussions, role plays, demonstrations, and practice with real children. Practice, whether in written exercises or with real children, is considered a critical element of instruction.

The training course includes the following modules (booklets):

A: Introduction *(includes a glossary with definitions of terms)*
B: Measuring a Child's Growth
C: Interpreting Growth Indicators
D: Counselling on Growth and Feeding
E: Photo Booklet

Modules B–D are instructional units that contain exercises, while modules A and E contain information and photos to accompany the instruction. The modules are intended to be completed in sequence, for example, in a 3½-day training session. During the course, small groups of participants are led and assisted by "facilitators" as they work through the modules. The facilitators are not lecturers as in a traditional classroom. Their role is to answer questions, provide individual feedback on exercises, lead discussions, etc. For the most part, participants work at their own pace through the modules, although in some activities the small group works together. **Answer sheets** for exercises are provided in a tablet and will be distributed by facilitators as needed throughout the course.

A number of job-aids are provided that participants will find to be useful and convenient references when they return to their health facilities:

- ***Boy's and Girl's Growth Records*** – These separate booklets for boys and girls contain all of the charts needed to record and assess growth from birth up to 5 years of age. The *Growth Records* also include messages for health care providers, mothers, and other caregivers about recommended feeding and care of children up to 5 years of age.

- ***WHO Child Age Calculator*** – This rotating disk is a tool for calculating a child's age in completed weeks, months, or years and months.

- ***Weighing and Measuring a Child*** – This job-aid summarizes the steps and important details involved in weighing a child and measuring length or height. This job-aid also includes a ***BMI table*** that allows users to determine a child's BMI without a calculator, by looking up the child's length or height (in cm) in relation to weight (in kg).

- ***Investigating Causes of Undernutrition*** and ***Investigating the Causes of Overweight*** – These two job-aids are bound together, back to back. *Investigating Causes of Undernutrition* is on one side of the booklet. If you turn the booklet over, you will find *Investigating the Causes of Overweight* printed in a different colour.

  The relevant job-aid can be used to counsel the mother or caregiver of a child who has a problem of undernutrition or overweight. Each job-aid suggests questions to ask in order to determine the causes of the nutrition problem, as well as advice specific for the causes that are identified.

Learning objectives

Each instructional module of this course will provide information and examples and allow you to practise certain skills related to growth assessment and counselling. Exercises are provided in each module. The skills and information presented in the instructional modules (B–D) will prepare you to do the following:

B: Measuring a Child's Growth

- Start a *Growth Record* for a child and select pages to use at a given visit.
- Determine a child's age today.
- Recognize clinical signs of marasmus and kwashiorkor.
- Weigh a child and record weight.
- Measure and record length or height.
- Determine BMI (body mass index) by referring to a table or using a calculator.

C: Interpreting Growth Indicators

- Plot points for growth indicators on line graphs.
- Interpret plotted points for growth indicators, and identify normal growth and growth problems.
- Interpret trends on growth charts and identify whether a child is growing normally, has a growth problem, or is at risk of a growth problem.

D: Counselling on Growth and Feeding

- Inform a mother about the results of her child's growth assessment.
- Give appropriate feeding recommendations for a child's age.
- Interview a mother to investigate causes of undernutrition.
- Give advice related to specific causes of undernutrition.
- Interview a mother to investigate causes of overweight.
- Give advice related to specific causes of overweight.

Glossary

accuracy .....correctness. The accuracy of a measurement depends on whether the instrument is correctly calibrated and whether the observer measures correctly (i.e. takes, reads, and records the measurement correctly).

BMI.....body mass index; a number that indicates a person's weight in proportion to height/length, calculated as kg/m^2.

BMI-for-age.....a growth indicator that relates BMI to age.

calibrate .....to check a measuring instrument for accuracy and adjust if necessary and possible.

care for development .....care intended to stimulate emotional, intellectual, and motor development.

germinated.....seeds soaked to the point at which the root tip shows (but not fully sprouted). Germinated seeds are easier to digest than un-germinated seeds.

gestational age .....the number of weeks of pregnancy.

gross motor development ....development of movement and body control related to use of the larger muscles (e.g. development of crawling and walking skills), as contrasted with fine motor development (e.g. use of hands and fingers to grasp small objects). *See gross motor milestones below.*

gross motor milestones .....important achievements related to movement and body control, including sitting without support, standing with assistance, hands-and-knees crawling, walking with assistance, standing alone, and walking alone.

infantometer .....a board designed to be placed on a horizontal surface to measure length (lying down) of a child less than 2 years old.

kwashiorkor.....a form of severe undernutrition referred to alternatively as oedematous malnutrition. Symptoms may include oedema; thin, sparse or discoloured hair; and skin with discoloured patches that may crack and peel.

length/height-for-age.....a growth indicator that relates length or height to a child's age.

marasmus.....a form of severe undernutrition referred to alternatively as non-oedematous malnutrition. A child with marasmus is severely wasted and has the appearance of "skin and bones."

median.....the middle value in a rank-ordered series of values.

micronutrients .....nutrients such as vitamins and minerals present in foods in small amounts, needed by the body for growth and prevention of infections.

multiple birth.....birth of more than one child at the same time, e.g. twins.

obese .....severely overweight; weight-for-length/height or BMI-for-age above the 3 z-score line.

obesity.....the condition of being obese.

oedema .....swelling due to excess fluid in the tissues.

overweight.....weighing too much for one's length/height; weight-for-length/height or BMI-for-age above the 2 z-score line.

perinatal.....around the time of birth.

perpendicular .....positioned at a right angle (90° angle).

precision.....the smallest exact unit that an instrument can measure. For example, the UNISCALE measures with precision to the nearest 0.1 kg.

recumbent.....lying down.

SD score.....standard deviation score. *See z-score*.

stadiometer .....a board for measuring the standing height of children age 2 years or older.

stagnation.....staying the same. A flat growth line indicates stagnation of growth.

stunted.....short for one's age; length/height-for-age below the −2 z-score line. **Severely stunted** is below the −3 z-score line.

symmetrical .....the same (mirror images) on opposite sides separated by a straight line.

tare.....as used in these modules, to store a weight in the memory of a scale so that an additional weight can be registered independently. In **tared weighing**, the scale is re-set to zero while an adult is still standing on it; when the adult is then given a child to hold, only the child's weight appears.

taring scale.....a scale that can be re-set to zero while someone (who has just been weighed) is still standing on it. When she then holds a child on the scale, only the child's weight appears.

term .....a birth occurring at 37–41 completed weeks of pregnancy. A **pre-term** birth is early (i.e. before 37 weeks). A **post-term** birth is late (i.e. at or after 42 weeks).

undernourished .....any of the following:

- underweight or severely underweight (below the −2 or −3 z-score line in weight-for-age)
- wasted or severely wasted (below the −2 or −3 z-score line in weight-for-length/height or BMI-for-age)
- stunted or severely stunted (below −2 or −3 z-score line in length/height for age). But if overweight or trending toward overweight, the child is no longer considered as primarily undernourished.

undernutrition .....the condition of being undernourished.

underweight .....weight-for-age below the −2 z-score line. **Severely underweight** is below the −3 z-score line.

UNISCALE .....an electronic scale made by UNICEF that allows tared weighing.

wasted .....weight-for-length/height or BMI-for-age below the −2 z-score line. **Severely wasted** is below the −3 z-score line.

weight-for-age .....a growth indicator that relates weight to age.

weight-for-length/height .....a growth indicator that relates weight to length (for children less than 2 years old) or height (for children age 2 years and older).

z-score .....a score that indicates how far a measurement is from the median. Also known as standard deviation (SD) score. The reference lines on the growth charts (labeled 1, 2, 3, −1, −2, −3) are called **z-score lines**; they indicate how far points are above or below the median (z-score 0).

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Printed references are listed below. Most references published by the World Health Organization are also available on the internet at www.who.int. Information about the WHO child growth standards is available at http://www.who.int/childgrowth/en.

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