Malnutrition

Hunger and malnutrition is the greatest single threat to global public health

World Health organization
Coursera: Epidemiology

Epidemiology: The Basic Science of Public Health
by Dr. Karin Yeatts, Dr. Lorraine Alexander

Announcements

Welcome to Epidemiology: The Basic Science of Public Health

Welcome to Epidemiology: The Basic Science of Public Health! We’re excited you’re joining us in this MOOC and looking forward to spending the next six weeks with you. The course officially begins today, Monday, February 17.
World is crossing malnutrition red line, report warns

By Mark Kinver
Environment reporter, BBC News

13 November 2014

Top Stories

Miliband: I'm ready to lead country
Ed Miliband says he will "change the way the country is run" as he launches Labour's manifesto, with pledges on tax, the NHS, childcare and borrowing.

5 hours ago

Clegg would reject Tory welfare cuts

2 hours ago

Abducted Nigerian girls 'seen alive'

2 hours ago

Features
Malnutrition is a category of diseases that includes undernutrition, obesity, over-weight and micronutrient deficiency, among others.
Malnutrition is due to lack of nutritious food and might cause serious cases or mild cases. Serious cases include little or no weight gain, swelling of feet, dark spots, open peeling sores, thinness or loss of hair, lack of desire to laugh or play, sores inside mouth, failure to develop normal intelligence, dry eyes (xerosis), and blindness. Mild cases include slower growth, swollen belly, thin body, loss of appetite, loss of energy, anemia, desire to eat dirt, sores in corners of mouth, frequent colds, and other infections, night blindness. Starvation is due to not getting enough food to eat.
Malnutrition

- Morbidity ↑
- Wound healing ↓
- Infections ↑
- Complications ↑
- Convalescence ↓

- Mortality ↑
- Treatment ↑
- Length of stay in hospital ↑

↓ COST

↑ QUALITY OF LIFE
The vicious cycle

- Malnutrition
- Impaired child development
- Compromised immunity
- Infection
- Disease
- Energy loss
- Reduced productivity
- Poverty
- Impaired development of education and health system
- Socioeconomic & political instability
Risk groups

- Women
- Children
- Elderly
- Minorities

Girls are 3 times more likely to suffer from malnutrition than boys.
Table 12.1 Selection of ‘at-risk' mothers and children

<table>
<thead>
<tr>
<th>At-risk mother</th>
<th>At-risk child</th>
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<tbody>
<tr>
<td>Age below 15 and over 40.</td>
<td>Low birth weight.</td>
</tr>
<tr>
<td>Height below 150 cm.</td>
<td>Outcome of multiple pregnancy- twins, triplets etc.</td>
</tr>
<tr>
<td>First and after fifth pregnancy.</td>
<td>Birth order of 5 and above.</td>
</tr>
<tr>
<td>Pregnancy weight of less than 40 kg or weight gain of less than 7 kg in pregnancy.</td>
<td>Pregnancy in the mother before the child is 18 months old.</td>
</tr>
<tr>
<td>Previous history of still birth, neonatal death or low birth weight.</td>
<td>Absence of breast milk.</td>
</tr>
<tr>
<td>Presence of anaemia.</td>
<td>Recent measles, whooping cough, diarrhoea or any major illness.</td>
</tr>
<tr>
<td>Social problems such as alcoholism or unemployment of the bread winner.</td>
<td>History of malnutrition or death in a sib.</td>
</tr>
<tr>
<td>Abandoned mothers.</td>
<td>Lack of weight gain in the last two months.</td>
</tr>
<tr>
<td>Socially deprived groups.</td>
<td>Special problems, such as:</td>
</tr>
<tr>
<td>Short birth interval (&lt;24 months)</td>
<td>(a). illegitimate child; one-parent family abandoned child;</td>
</tr>
<tr>
<td></td>
<td>(b). unemployment; chronic illness, or alcoholism in parent;</td>
</tr>
<tr>
<td></td>
<td>(c). socially deprived group.</td>
</tr>
</tbody>
</table>

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Impact of Malnutrition

- Reduced mobility
- Increased risk of falls
- Reduced independence
- Infections
- Confusion
- Low mood
- Weight loss
- Low energy
- Muscle wasting
- Increased risk of fractures
- Increased risk of hospital admissions
Iron deficiency

- pregnant women, infants and children aged 1–2 years, 50%;
- preschool-aged children, 25%;
- schoolchildren, 40%;
- adolescents, 30–55%;
- non-pregnant women, 35%.
Risk factors for micronutrient malnutrition

- Monotonous diet resulting in low micronutrient intake, and poor bioavailability, especially of minerals.
- Low intake of animal source foods.
- Low prevalence of breastfeeding.
- Low micronutrient density of complementary foods.
- Increased physiological demands for growth during pregnancy and lactation.
- Increased demand due to acute infection (especially if infection episodes are frequent), chronic infection (e.g. tuberculosis, malaria and HIV/AIDS) and disease (e.g. cancer).
- Poor general nutritional status, in particular, protein–energy malnutrition.
- Malabsorption due to diarrhoea or the presence of intestinal parasites (e.g. *Giardia lamblia*, hookworms).
- Increased excretion (e.g. due to schistosomiasis).
- Seasonal variations in food availability, food shortages.
- Social deprivation, illiteracy, low education.
- Poor economic status and poverty.
Nutritional deficiency
DALY WHO 2004
Malnutrition hotspots

The shaded countries have a high under-five mortality rate (greater than 50 per 1,000) and greater than 30% of stunting in under-fives.

The following legend represents wasting in the under-five population of these countries:

- Countries with more than 45% acute malnutrition*
- Countries with more than 30% acute malnutrition*
- Countries with more than 4% acute malnutrition*
- No data

* No data
Overpopulation

There are more people living inside this circle than outside of it.
The toll of malnutrition
Global deaths of children under 5 by cause
2008, % of total

- Pneumonia: 18
- Diarrhoea: 15
- Prematurity: 12
- Malaria: 9
- Birth asphyxia: 9
- Other: 34
- HIV/AIDS/Measles: 3

Total deaths: 8.8m
(35% of which are associated with malnutrition)

Sources: WHO; IFPRI

Malnutrition (% of children under 5 years of age)
- < 5%
- 5-10%
- > 40%
- 10-20%
- not in survey
- 20-30%

Children < 5
Classifying malnutrition

Figure 1
Suggested new classification of severe malnutrition

- **Complicated malnutrition**
  - < 80% of median weight for height, OR bilateral pitting oedema, OR MUAC < 110 mm
  - AND one of the following:
    - Anorexia
    - LRTI
    - High fever
    - Severe dehydration
    - Severe anaemia
    - Not alert

- **Severe uncomplicated malnutrition**
  - < 70% of median weight for height, OR bilateral pitting oedema, OR MUAC < 110 mm
  - AND:
    - Appetite
    - Clinically well
    - Alert

- **Moderate uncomplicated malnutrition**
  - 70-80% of median weight for height, AND no oedema OR MUAC 110-125 mm
  - AND:
    - Appetite
    - Clinically well
    - Alert

<table>
<thead>
<tr>
<th>Inpatient</th>
<th>Outpatient Therapeutic Care</th>
<th>Outpatient Supplementary feeding</th>
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<tbody>
<tr>
<td>IMCI/WHO protocols</td>
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</table>
Chronology of Malnutrition
Minorities

Rohingya Muslims face starvation
FRANCIS WADE

AID groups have warned of an impending humanitarian catastrophe in western Myanmar as authorities attempt to isolate tens of thousands of the displaced ethnic Rohingya minority in camps described by one aid worker as “open air prisons”.

Nutritional Practices among Ethnic Minorities and Child Malnutrition in Mountainous Areas of Central Vietnam

Author(s)
Le Thi Huong, Vu Thi Thu Nga

ABSTRACT
Background: Despite the success of National Action Plan on Nutrition program in reducing malnutrition among children under 5 years old in Vietnam in recent years, the rate of malnutrition in Vietnam remains higher than that rate in other surrounding countries. The rate is especially high in mountainous areas. This study aims to explore the association between the mother’s nutrition care practice and the nutritional status of their children.
Wars

“THIS WHOLE WAR IS A WAR ON CHILDREN. LACK OF FOOD, LACK OF WATER, SHELLS – THEY ALL KILL CHILDREN FIRST.”

AHMAD, FATHER OF TWO-YEAR-OLD ZEINA

Hunger in a War Zone: The growing crisis behind the Syria conflict

Syria’s children at risk of malnutrition

Lack of access to food and soaring prices have left the children of Syria at risk of malnutrition, Save the Children warns today.

More than four million Syrians – over two million of them children – are unable to produce or buy enough food.

We have gathered testimony from residents trapped by fighting and enduring siege-like conditions, as well as from refugees who have fled to neighbouring countries, that details the desperate struggle of families

The Trajectory of Malnutrition in Iraq Under Sanctions

Pakistan

National Nutrition Survey 2011

Aga Khan University, Pakistan
Pakistan Medical Research Council (PMRC)
Nutrition Wing, Ministry of Health, Pakistan
According to the study, the stunting rate among children under the age of five years has increased from 41.6 per cent in 2001 to 43.7 per cent in 2011. PHOTO: FILE
نومولود بچوں کی اموات میں پاکستان سرفہرست،

بچوں کے لیے کام کرنے والی عالمی تنظیم سیو دی جلدہر کا کہنا ہے کہ مرده بچوں پیدا ہونے اور پیدائش کے دن میں فوت پو جانے والے بچوں کی تعداد کے حوالے پاکستان سرفہرست ہے۔

پاکستان: نومولود بچوں کی اموات زیادہ کیون؟
Fig 6.2: Prevalence of malnutrition in Pakistan (children under 5 years of age)

- Pakistan: 44% Stunted, 15% Wasted, 16% Underweight
- Urban: 32% Stunted, 13% Wasted, 27% Underweight
- Rural: 33% Stunted, 16% Wasted, 46% Underweight
Fig 6.3: National stunting rates for children under 5 years of age

- **Pakistan**: 22% Severe Stunting, 22% Moderate Stunting
- **Urban**: 16% Severe Stunting, 21% Moderate Stunting
- **Rural**: 24% Severe Stunting, 22% Moderate Stunting
Fig 6.6: National malnutrition trends

- Stunting
- Wasting
- Underweight
Fig 3.3: Formal education of mothers

- **Pakistan**: 9% (Illiterate), 20% (1-5 Years), 4% (6-10 Years), 11% (Above Matric).
- **Urban**: 19% (Illiterate), 15% (1-5 Years), 22% (6-10 Years), 16% (Above Matric).
- **Rural**: 13% (Illiterate), 30% (1-5 Years), 16% (6-10 Years), 10% (Above Matric).
- **Punjab**: 59% (Illiterate), 13% (1-5 Years), 53% (6-10 Years), 16% (Above Matric).
- **Sindh**: 4% (Illiterate), 16% (1-5 Years), 10% (6-10 Years), 6% (Above Matric).
- **KP**: 6% (Illiterate), 16% (1-5 Years), 6% (6-10 Years), 8% (Above Matric).
- **Balochistan**: 3% (Illiterate), 8% (1-5 Years), 6% (6-10 Years), 12% (Above Matric).
- **FATA**: 1% (Illiterate), 5% (1-5 Years), 6% (6-10 Years), 13% (Above Matric).
- **AJK**: 13% (Illiterate), 39% (1-5 Years), 18% (6-10 Years), 7% (Above Matric).
- **GB**: 11% (Illiterate), 20% (1-5 Years), 62% (6-10 Years), 7% (Above Matric).
Fig 4.1: Food insecurity situation

- Pakistan: 10% severe, 28% moderate, 20% without hunger
- Urban: 8% severe, 27% moderate, 18% without hunger
- Rural: 11% severe, 29% moderate, 21% without hunger
- Punjab: 9% severe, 32% moderate, 19% without hunger
- Sindh: 17% severe, 21% moderate, 34% without hunger
- KP: 5% severe, 21% moderate, 6% without hunger
- Balochistan: 12% severe, 34% moderate, 18% without hunger
- FATA: 6% severe, 27% moderate, 8% without hunger
- AJK: 4% severe, 31% moderate, 22% without hunger
- GB: 9% severe, 22% moderate, 9% without hunger
Fig 5.5: Micro-nutrient supplementation during last pregnancy

- Iron: Pakistan 24%, Urban 33%, Rural 20%
- Folic Acid: Pakistan 25%, Urban 36%, Rural 21%
- Micronutrient: Pakistan 4%, Urban 4%, Rural 4%
- Calcium: Pakistan 36%, Urban 49%, Rural 30%
Fig 5.12: Maternal anaemia

- Pakistan: 51% Non-Pregnant, 52% Pregnant
- Urban: 50% Non-Pregnant, 52% Pregnant
- Rural: 52% Non-Pregnant, 52% Pregnant
- Punjab: 49% Non-Pregnant, 50% Pregnant
- Sindh: 62% Non-Pregnant, 61% Pregnant
- KP: 34% Non-Pregnant, 30% Pregnant
- Balochistan: 49% Non-Pregnant, 48% Pregnant
- AJK: 42% Non-Pregnant, 43% Pregnant
- GB: 24% Non-Pregnant, 35% Pregnant

Legend:
- Green: Non-Pregnant Women
- Yellow: Pregnant Women
Fig 5.20: Vitamin-D deficiency (pregnant women)

- **Pakistan**: 18% Severe deficiency, 45% Deficiency, 22% Desirable
- **Urban**: 15% Severe deficiency, 40% Deficiency, 34% Desirable
- **Rural**: 18% Severe deficiency, 45% Deficiency, 22% Desirable
- **Punjab**: 18% Severe deficiency, 43% Deficiency, 28% Desirable
- **Sindh**: 16% Severe deficiency, 46% Deficiency, 21% Desirable
- **KP**: 23% Severe deficiency, 46% Deficiency, 18% Desirable
- **Balochistan**: 11% Severe deficiency, 52% Deficiency, 22% Desirable
- **AJK**: 21% Severe deficiency, 32% Deficiency, 44% Desirable

Legend:
- Severe deficiency (<8.0 ng/mL)
- Deficiency (8.0 - 20.0 ng/mL)
- Desirable (>20.0 - 30.0 ng/mL)
A national task force will soon be constituted to address malnutrition issues in the country.

Minister for Planning and Development Ahsan Iqbal
How to tackle
How to tackle
The triple A cycle
UNICEF 1990

Assessment of the situation of children and women

Analysis of the causes of the problems

Action based on the analysis and available resources
Traditional Bio-Medical Concept

- Inadequate energy intake
- Low birth weight
- Decrease immunity
- Recurrent ARI/GI tract infections

Malnutrition in children
Politico- Developmental Concept

Uncontrolled Urbanization

- Poverty & Illiteracy
- Large family size/no contraception use

- Inadequate energy intake
- Recurrent infections/Decrease immunity

- Underweight mother
- No access to govt. health facility

- Low birth weight
- Worm infestation

- Poor personal hygiene
- Poor environmental conditions

- Wrong Breast feeding practices
- No Immunization

Availability Of health facility

Social & Political Discrimination

Lack of political Commitment

Poor living conditions in urban slums
TAP TURNERS OR FLOOR MOPPERS?
"This is the first year in history that more people will die of obesity than of malnutrition." Jess Greenwood #wired12
Malnutrition Care Plan
The Assessment Process

1. Nutrition Risk Screening
   - No Risk Identified
   - Risk of Malnutrition Identified

2. Detailed Assessment
   - Normal GI Function, Including Ability to Swallow
   - Normal GI Function, But Unable to Swallow
   - GI Tract Inaccessible, Absent and/or Dysfunctional
The eatwell plate

Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.

- Fruit and vegetables
- Meat, fish, eggs, beans and other non-dairy sources of protein
- Foods and drinks high in fat and/or sugar
- Milk and dairy foods
- Bread, rice, potatoes, pasta and other starchy foods
The shape of things to come
Figure 12.5 Developing a social network around MCH and nutrition services
Each box □ is a distinct technical-cum-administrative unit in the health sector

1. Promotion of breast-feeding
2. Education for food and personal hygiene
3. Education for feeding during and after diarrhoea

DIARRHOEAL DISEASE CONTROL

IMMUNIZATION
1. Growth monitoring
2. Injection of iodinated oil for IDD control
3. Administration of vitamin A megadose

HEALTH MANPOWER DEVELOPMENT
Nutrition training of health workers at different levels

1. Nutrition and health education
2. Growth monitoring for appropriate action
3. Supplementary feeding
4. Identification and management of specific deficiencies e.g. anaemia and xerophthalmia
5. Promotion and protection of breast-feeding

PRIMARY HEALTH CARE

NUTRITION UNIT
Nutrition promotion

HOSPITALS
Community surveys for malnutrition of affluence

OUT-PATIENT
1. Dietary advice for nutrition promotion and rehabilitation

IN-PATIENT
Dietary treatment of diseases

MATERNAL AND CHILD HEALTH CARE AND FAMILY PLANNING

1. Growth monitoring for appropriate action
2. Antenatal care and post-natal care
3. Control of nutritional anaemia
4. Supplementary feeding
5. Nutrition education
6. Birth spacing for maternal nutrition promotion
7. Promotion of breast-feeding

HEALTH EDUCATION
1. Education for nutrition improvement
2. Nutrition awareness through mass awareness

HEALTH EPIDEMIOLOGY AND INFORMATION
1. Monitoring of nutritional situations
2. Collection of nutrition-related health indicators