0.a. Goal

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

0.b. Target

Target 2.2: By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.

0.c. Indicator

Indicator 2.2.3: Prevalence of anaemia in women aged 15-49 years, by pregnancy status (percentage)

0.g. International organisations(s) responsible for global monitoring

Institutional information

Organization(s):

World Health Organization (WHO)

2.a. Definition and concepts

Concepts and definitions

Definition:

Percentage of women aged 15−49 years with a haemoglobin concentration less than 120 g/L for non-pregnant women and lactating women, and less than 110 g/L for pregnant women, adjusted for altitude and smoking.

Concepts:

Anaemia: condition in which the concentration of blood haemoglobin falls below established cut-off values.

Iron deficiency state in which there is insufficient iron to maintain the normal physiological function of blood, brain and muscles (ICD-11, 5B5K.0 iron deficiency)

Iron deficiency anaemia: (ICD-11, 3A00, iron deficiency anaemia)

Blood haemoglobin concentration: concentration of haemoglobin in whole blood

4.a. Rationale

Rationale:

Anaemia is highly prevalent globally, disproportionately affecting children and women of reproductive age. It negatively affects cognitive and motor development and work capacity, and among pregnant women iron deficiency anaemia is associated with adverse reproductive outcomes, including preterm delivery, low-birth-weight infants, and decreased iron stores for the baby, which may lead to impaired development. Iron deficiency is considered the most common cause of anaemia, but there are other nutritional and non-nutritional causes. Blood haemoglobin concentrations are affected by many factors, including altitude (metres above sea level), smoking, trimester of pregnancy, age and sex. Anaemia can be assessed by measuring blood haemoglobin, and when used in combination with other indicators of iron status, blood haemoglobin provides information about the severity of iron deficiency. The anaemia prevalence for the population is used to classify the public health significance of the problem.

4.b. Comment and limitations

Comments and limitations:

Despite the extensive data search, data for blood haemoglobin concentrations are still limited, compared to other nutritional indicators such as child anthropometry (1, 24); this was especially true in the high-income countries of the WHO European Region. As a result, the estimates may not capture the full variation across countries and regions, tending to “shrink” towards global means when data are sparse. Additionally, it was not possible to incorporate into the analyses some potentially important predictors of blood haemoglobin concentration, especially dietary iron and iron supplementation, because of limited data.

4.c. Method of computation

Methodology

Computation method:

The anaemia status of women is assessed using blood haemoglobin concentrations. In surveys, blood haemoglobin concentrations are typically measured using the direct cyanmethemoglobin method in a laboratory or with a portable, battery-operated, haemoglobin photometer in the field that uses the azide-methaemoglobin method.

Prevalence of anaemia and/or mean haemoglobin in women of reproductive age were obtained from 303 population-representative data sources from 116 countries worldwide. Data collected from 1990 to 2016 were used. Adjustment of data on blood haemoglobin concentrations for altitude and smoking was carried out whenever possible. Biologically implausible haemoglobin values (<25 g/L or >200 g/L) were excluded. A Bayesian hierarchical mixture model was used to estimate haemoglobin distributions and systematically addressed missing data, non-linear time trends, and representativeness of data sources. Full details on statistical methods may be found here: Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data (Stevens et al, 2013). Briefly, the model calculates estimates for each country and year, informed by data from that country and year themselves, if available, and by data from other years in the same country and in other countries with data for similar time periods, especially countries in the same region. The model borrows data, to a greater extent, when data are non-existent or weakly informative, and to a lesser degree for data-rich countries and regions. The resulting estimates are also informed by covariates that help predict blood haemoglobin concentrations (e.g. maternal education, prevalence of sickle-cell disorders, mean weight-for-age z-score for children). The uncertainty ranges (credibility intervals) reflect the major sources of uncertainty, including sampling error, non-sampling error due to issues in sample design/measurement, and uncertainty from making estimates for countries and years without data.

4.f. Treatment of missing values (i) at country level and (ii) at regional level

Treatment of missing values:

- ***At country level:***

A Bayesian hierarchical mixture model was used to estimate haemoglobin distributions and systematically addressed missing data, non-linear time trends, and representativeness of data sources. The full description of the methodology for country and region estimates can be found at Supplement to: Stevens GA, Finucane MM, De-Regil LM, et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. Lancet Glob Health 2013; 1: e16–25. Available at https://www.thelancet.com/cms/10.1016/S2214-109X(13)70001-9/attachment/e073f9da-1330-4a1d-a1a0-67caf08c11bf/mmc1.pdf

- ***At regional and global levels:***

Distributions for regions were calculated as population-weighted averages of the constituent countries (see treatment of missing values at country level).

4.g. Regional aggregations

Regional aggregates:

Distributions for regions were calculated as population-weighted averages of the constituent countries (see methodology for deriving country-level estimates above).

6. Comparability/deviation from international standards

Sources of discrepancies:

Estimates were generated based on methodology that adjusted for the main sources of discrepancies.

4.h. Methods and guidance available to countries for the compilation of the data at the national level

Methods and guidance available to countries for the compilation of the data at the national level:

This indicator is part of the Global Nutrition Monitoring Framework (GNMF), for which operational guidance is offered to countries – the Global nutrition monitoring framework: Operational guidance for tracking progress in meeting targets for 2025 available at https://www.who.int/nutrition/publications/operational-guidance-GNMF-indicators in the six UN official languages.

WHO is also collaborating with UNICEF, the US Centers for Disease Control and Prevention and Nutrition International to update a Micronutrient Survey Manual, containing details about conducting and national nutrition survey and reporting results.[1]

1 http://mnsurveytoolkit.nutritionintl.org/ ↑

4.j. Quality assurance

Quality assurance:

Survey data provided in peer-reviewed publications or survey reports are screened for inclusion in the WHO Micronutrients Database. Eligibility criteria include: details of the sampling method are provided; the sample was representative of at least the 1st administrative level (e.g. state, province, canton, oblast); the sample was population-based, household-based, or facility-based (i.e., for pregnant women, newborns, and preschool and school-age children); the sample was cross-sectional or was the baseline assessment in an intervention programme; and the study used standard, validated data collection techniques and laboratory methodology. If there are particular concerns regarding the reported data, attempts are made to discuss these concerns with a country representative.

3.a. Data sources

Data sources

Description:

The preferable source of data is population-based surveys, followed by data from surveillance systems. In some cases, anonymized individual-level data are obtained from multi-country surveys, including demographic and health surveys, multiple indicator cluster surveys, reproductive health surveys and malaria indicator surveys. However, the Micronutrients Database of the WHO Vitamin and Mineral Information System (VMNIS) (https://www.who.int/vmnis/database/en/) compiles and summarizes data on the micronutrient status of populations from various other sources, including data collected from the scientific literature and through collaborators, including WHO regional and country offices, United Nations organizations, ministries of health, research and academic institutions, and nongovernmental organizations.

3.b. Data collection method

Collection process:

A PubMed search was carried out for relevant search terms related to anaemia, haemoglobin and iron status, searching for studies published after 1 January 1990. In addition to indexed articles, many reports of national and international agencies were identified and accessed through requests to each corresponding organization. Once survey data are compiled and the Bayesian hierarchical mixture model is run to generate anaemia estimates, countries are sent a memorandum to provide a background to the estimates and explain the process. Information on the survey data used to generate the estimates for that country, estimates for the year 2015, and the resulting plots for each country are provided along with an explanation of the methodology used in generating the estimates. Countries are requested to provide feedback within six weeks.

5. Data availability and disaggregation

Data availability

Description:

Prevalence of anaemia and/or mean haemoglobin in women of reproductive age were obtained from 303 population-representative data sources from 116 countries worldwide. Data collected from 1990 to 2016 were used.

Time series:

Estimates for 2000 to 2016 were derived in the latest exercise

Disaggregation:

Anaemia prevalence data are generally reported disaggregated by age, sex, income, geographic region (within country) and 1st administrative level within a country. When producing estimates of anaemia for the purpose of contributing to the monitoring of SDGs, estimates are produced for women of reproductive age (15-49 years) by pregnancy status (pregnant or non-nonpregnant) for each country. Data are then aggregated by WHO or UN region and for the global level.

3.c. Data collection calendar

Calendar

Data collection:

Data on anaemia are continuously being collected from survey report and manuscripts and entered into the WHO Micronutrients Database.

3.d. Data release calendar

Data release:

There is no fixed date in which the new round of anaemia estimates will be generated; however, estimates are generally generated every three tofive years.

3.e. Data providers

Data providers

There are two main data sources of survey data for anaemia: 1) reports generated by countries or implementing partners and 2) published manuscripts. Occasionally, Member States, regional offices, the international community or colleagues managing other databases within WHO provide reports directly to staff responsible for maintaining the WHO Micronutrients Database. If data meet the eligibility criteria, they are entered into the database. Reports and publications are primarily requested and collected from:

- Ministries of Health through WHO regional and country offices,
- National research and academic institutions,
- Nongovernmental organizations, and
- Organizations of the United Nations system.

3.f. Data compilers

Data compilers

WHO compiles the data fed into the Micronutrients Database of the WHO Vitamin and Mineral Information System (VMNIS).

7. References and Documentation

References

URL:

https://www.who.int/nutrition/global-target-2025

http://apps.who.int/iris/bitstream/handle/10665/259904/9789241513609-eng.pdf;jsessionid=4F4165EBA8F217E2F555AE98E977981D?sequence=1

https://www.who.int/nutrition/publications/globaltargets2025_policybrief_anaemia/en/

References:

WHO. Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition. Geneva: World Health Organization; 2014

Every Woman Every Child. Global strategy for women's, children's and adolescents' health. New York: United Nations; 2015

WHO. Global Nutrition Targets 2025: Anaemia policy brief (WHO/NMH/NHD/14.4). Geneva: World Health Organization; 2014

0.f. Related indicators

Related indicators

Goal 1. No poverty:

The capacity for physical work is hampered when people are anaemic. Anaemia is estimated to contribute to 17% lower productivity in heavy manual labour and 5% lower productivity in other manual labour. A modelling exercise in India estimated that a birth cohort of individuals with iron-deficiency anaemia (IDA) in 2013 will lose more than US$ 24 million over their lifetimes as a result of productivity loss due to IDA.

Additionally, the mental capacity that is undeveloped when children are iron deficient affects their academic performance and future earnings potential. Consequently, childhood anaemia is associated with a 2.5% drop in wages in adulthood, affecting both productivity and economic growth.

Nutrient deficiencies that can contribute to anaemia include iron, riboflavin, folic acid, zinc, vitamin B12, and vitamin A. Currently, more than 80 countries have legislation to add one or more of these nutrients to wheat flour, maize flour, and/or rice. Adding these nutrients to commonly consumed grains is one step toward improving productivity and thereby reducing poverty.

Goal 3. Good health and well-being:

Maternal and newborn health:

Anaemia during pregnancy increases the risk of maternal and perinatal mortality. Anaemia during pregnancy also contributes to low birth-weight infants, which the World Health Organization (WHO) defines as weighing less than less than 2500 grams or 5.5 pounds. Newborns that are born small are prone to death and diseases while they are young. If they survive, they are at an increased risk for poor mental development in childhood and chronic health problems such as diabetes and heart disease later in life.

Non-communicable diseases:

Anaemia is a non-communicable disease. As noted above, nutritional anaemia is caused by vitamin and mineral deficiencies.

Goal 4. Quality education

Poor health in childhood can lead to reductions in educational achievement. While iron deficiency limits cognitive development, children who have adequate iron have more energy to participate in classroom exercises, and they are more mentally prepared to master the material.

A large body of literature documents the positive impact of iron interventions on tests of cognitive and motor development. This review found, “the available evidence satisfies all of the conditions needed to conclude that iron deficiency causes cognitive deficits and developmental delays and that these can be at least partially reversed by iron therapy, though the effect may diminish among older children.”

Goal 5. Gender equality

Anaemia rates in females are much higher than males. While anaemia rates decrease for males by the end of puberty, they remain high for females through reproductive years due to menstruation.

Therefore, reducing anaemia contributes to boosting females’ relative academic performance and worker productivity and helps achieve gender equality.

For more details, see Food Fortification Initiative - Fortify to Address Sustainable Development Goals (http://www.ffinetwork.org/why_fortify/SDGs.html).