

Background

Anaemia exists when circulating red blood cells are insufficient to meet physiological oxygen-carrying needs. Anaemia is conventionally identified when the haemoglobin concentration falls below a defined cutoff. Accurate case definition of anaemia is crucial for clinical patient care, understanding the epidemiology, and for planning and monitoring of public health interventions. Anaemia has implications at individual and public health levels.

In the clinic, diagnosis of anaemia and assessment of its underlying causes are routine across almost every field of primary care and hospital practice. Anaemia might present symptomatically (e.g. with fatigue, dizziness, exertional breathlessness, palpitations, exacerbations of cardiac failure, and angina) or be detected incidentally during routine screening or as part of an evaluation of almost any medical condition. Anaemia can have long-term consequences: in pregnancy, anaemia is associated with increased risk of caesarean section and maternal mortality, and may contribute to adverse newborn outcomes, including reduced birthweight and gestational duration. Anaemia in children has been linked to impairments in short-term and longer-term cognitive development, which can be irreversible.

Anaemia is a global public health concern, especially afflicting adolescent girls, women 15–49 years of age, pregnant women, and children in low- and middle-income countries. WHO estimates that in 2019 30% (571 million) of women aged 15–49 years, 37% (32 million) of pregnant women, and 40% (269 million) of children 6–59 months of age were affected by anaemia, with the WHO African Region and South-East Asia Region being most affected (1).

The main determinants of anaemia include nutritional deficiencies, genetic haemoglobin disorders, infections (e.g. malaria, schistosomiasis, hookworm), and various conditions (e.g. gynaecological conditions in women, gastrointestinal disease, frequent blood donation and chronic diseases) that lead to blood loss or the destruction of red blood cells. Some reports indicate that iron deficiency anaemia accounts for about 60% of the total global cases of anaemia and is the most significant cause of anaemia-related disability. Infection is also a common cause of anaemia, accounting for about 10–15% of total anaemia cases, with variations by setting and disease burden. An estimated 5% of the global population carry a gene variant of haemoglobin causing a severe disorder, including sickle cell disease or a form of thalassemia, with the percentage being higher in populations in Africa (18%) and Asia (7%). α -thalassaemia carriage might partly explain low haemoglobin concentrations identified in otherwise healthy and well-nourished populations of African Americans. Glucose-6-phosphate dehydrogenase deficiency is another inherited genetic disorder that causes red blood cells to break down prematurely, which can lead to anaemia. This deficiency is one of the most common inherited enzyme abnormalities in humans, and its distribution tends to overlap with areas where malaria is endemic. The proportion of anaemia due to genetic disorders in low- and middle-income countries is likely to rise as other causes (e.g. nutritional deficiencies, infectious diseases) become progressively better controlled (2, 3).

Socioeconomic status, education, and gender inequality are tightly linked to anaemia and affect its prevalence through several pathways. Poverty and low educational attainment are associated with unhealthy living and working conditions—including poor water quality, sanitation, hygiene, and infrastructure—leading to increased disease. Further, the three main contributors to anaemia (nutrition, genetic haemoglobin disorders, and infections) are all fundamentally linked to poverty. In some settings, gender inequality and cultural practices related to marriage and pregnancy increase the risk for developing anaemia. Women and adolescent girls have an especially increased risk of anaemia when their access to health care, education, and household resources is limited (2, 4).

Multiple interventions are aimed at alleviating the burden of anaemia in many low-, middle-, and high-income countries worldwide, and decisions around the choice of intervention and their implementation and monitoring is founded on measuring the prevalence of anaemia and its distribution in different segments of the population, notably the most vulnerable groups such as menstruating women and adolescent girls, pregnant and postpartum women, and young children (4). A reduced prevalence of anaemia may also indicate success of infection control programmes, such as malaria prevention (5) or long-term effects of deworming, in areas where these conditions are endemic.