

Anaemia in South Africa: the past, the present and the future

Despite some modest improvements described recently,¹ anaemia remains a significant global public health concern affecting both developed and developing countries. It affects a quarter of the global population, including 293-million (47%) children who are younger than five years of age. A prevalence of 42% and 30% has been described in pregnant and non-pregnant women, respectively.² Children and women of reproductive age are at high risk, partly because of physiological vulnerability, followed by the elderly. Africa and Asia are the most heavily affected regions, accounting for 85% of the absolute anaemia burden in high-risk groups.³ According to the World Health Organization global database on anaemia (1993-2005),³ this haematological disorder was considered to be a moderate public health problem at the time in South African preschool children, pregnant women and non-pregnant women of reproductive age.

There has been an increased awareness of anaemia and its consequences on the health and development of women and children in the past few decades. At the 65th World Health Assembly in 2012, an action plan and global targets for maternal, infant and child nutrition were approved, with a commitment to reduce anaemia prevalence by 50% in women of reproductive age by 2025, compared to the baseline set in the period 1993-2005.⁴ Although a recent systematic analysis¹ of population-representative data indicates a modest improvement in haemoglobin levels and a global reduction in anaemia prevalence (from 1995-2011), the war is far from won if the said targets are to be met timeously. Furthermore, anaemia prevalence remains unacceptably high in the poorest regions of the world.¹

Anaemia is considered to be an indicator of poor nutrition and poor health, and it is a marker of socio-economic disadvantage in many settings. The poorest and least educated populations are often at greatest risk of exposure to risk factors for anaemia and its consequences.⁵ Anaemia can be broadly classified into decreased erythrocyte production, increased loss of erythrocytes through increased destruction or blood loss, or both.⁵ The aetiology of anaemia is multifactorial, and the factors driving these processes include any of the following or combinations thereof: inadequate nutrition, e.g. iron, folic acid, vitamin B₁₂ and vitamin A; infectious disease, including malaria, tuberculosis, human immunodeficiency virus/acquired immune deficiency syndrome, self-transmitted helminths and schistosomiasis; and genetic haemoglobin disorders.^{5,6} Iron deficiency is thought to be responsible for at least 50% of all anaemia cases.³ More recently, the possible role of the gut microbiome in the pathogenesis of anaemia sparked renewed interest.⁷⁻⁹ The potential link between intestinal bacteria and anaemia is sourced in the intestinal toxin theories of the early 1900s, with consequent investigations of the gastrointestinal flora in anaemia demonstrating excesses of specific types of bacteria in this disease.¹⁰ Currently, studies are underway to further explore the nature of the link between anaemia and gut microbes. On the other hand, the consequences of anaemia and iron deficiency anaemia have been well described in terms of their impact on human health (including maternal and perinatal mortality), cognitive and physical development, and social and economic development.^{5,11}

On the home front, the recently launched South African National Health and Examination Survey (SANHANES-1) report¹² comes at an opportune time, and reports on updated national anaemia and iron status data that paint an encouraging picture, when compared to data from previous national surveys, including the 1995 South African Vitamin A Consultative Group (SAVACG)¹³ survey and the 2005 National Food Consumption Survey-Fortification-Baseline 1 (NFCS-FB-1).¹⁴ Anaemia (haemoglobin < 11 g/dl) prevalence was lower in the SANHANES-1 survey in children under five years of age, than it was in the NFCS of 2005 and the SAVACG survey, at 10.7%, 28.9% and 21.4%, respectively. Effectively, this translates to a 63% reduction in anaemia prevalence since 2005. SANHANES-1 reported iron depletion of 8.1% (3.8% higher than 2005), iron deficiency anaemia of 1.9% (83.2% lower than 2005) and anaemia due to other causes of 10.7%. Global and regional comparisons indicate that South African children fare much better than the rest of Africa, but not as well yet as high-income regions. (For example, NHANES of 1999-2002 in the USA reported an anaemia prevalence of 5.1%).^{1,15}

The manuscript by Taljaard et al¹⁶ in the current issue of the *South African Journal of Clinical Nutrition* further supports the positive SANHANES-1 findings¹² by reporting on the iron status of South African primary schoolchildren, as observed by independent studies conducted since the NFCS of 2005. Four studies in four provinces (KwaZulu-Natal, North West, Western Cape and Northern Cape) were identified, and all of them reported anaemia prevalence that was lower than that of the NFCS of 2005. Despite the inherent limitations of reporting on independent studies that are not representative of the national population, this paper makes an important contribution by reporting on the available data on primary schoolchildren specifically, and by strengthening the findings of the SANHANES-1 report.

These apparent successes in South Africa can possibly be attributed to various nutritional and/or health factors and combinations thereof, including the national food fortification programme that was implemented in 2003, vitamin A supplementation [vitamin A deficiency improved from 64% (NFCS of 2005)¹⁴ to 44% (SANHANES-1)],¹² better infant and young child feeding practices, improved primary health care (including deworming programmes), and better care of sick children, amongst others.¹²

The SANHANES-1¹² survey further reported the prevalence of anaemia in adult females of 22%, and in adult males of 12.2%, classifying it as of moderate and mild public health importance, respectively.³ SANHANES-1 noted improvements in the prevalence of anaemia in women of reproductive age (16-35 years), when compared to the NFCS of 2005 findings¹⁴ (23.1% vs. 29.4%), with a slight reduction in iron deficiency anaemia (9.7% vs. 10.5%). The SANHANES-1 survey is the first to provide an estimate on national anaemia prevalence in adult men. Infectious diseases and poverty probably play an important role in the current observed anaemia prevalence in these adult groups. The results indicate that South Africa has an overall anaemia prevalence that is inbetween that of developing and developed countries.

The prevalence of anaemia in the elderly is not well researched, and the plight of this group should not be forgotten. SANHANES-1¹² reported an anaemia prevalence of 25.9% and 17% for males and females aged 65 years and older, respectively. Anaemia is common in older people living in the community, and is particularly common in nursing home residents and those admitted to hospital.¹⁷ Anaemia in the elderly is associated with significant health consequences, a worse prognosis and increased morbidity and mortality.¹⁷ A recent systematic review¹⁸ suggested associations between anaemia in the elderly and global cognitive decline, as well as the incidence of dementia. This systematic review shows a probable association between anaemia and cognitive performances, particularly with regard to executive functions.¹⁸ If a causal relationship between anaemia and cognitive decline is found, this could offer an opportunity for prevention through the correction of reversible anaemia. An ageing world population will undoubtedly have an impact on healthcare provision,¹⁷ and thus the economy. Hence, the need to better understand and prevent anaemia in the elderly is critically important.

Despite the apparent success reported in South Africa to date, now is not the time to become complacent! Considerable work needs to be achieved to ensure further improvements and effective anaemia control. A special case could be made for the elderly, who incidentally now reportedly have a higher prevalence of anaemia than children under five years of age in South Africa. The expected explosion in the number of older people, coupled with the consequences of anaemia and its impact on healthcare costs, justifies the need for further investigation into the nature of, and preventive strategies for, anaemia, in this group.

Early infancy strategies to lower the risk of anaemia and to break the cycle of iron depletion between generations should include optimising the nutritional status of the mother, delayed cord clamping at delivery,^{19,20} the improvement of infant feeding practices (including exclusive breastfeeding for six months, and access to fortified complementary food and iron supplements, if relevant), and the prevention and treatment of parasitic and other infectious diseases.^{5,21} Food-based approaches to increase iron intake through food fortification and dietary diversification (including the intake of bioavailable iron and animal food sources) and appropriate iron supplementation, are important sustainable nutritional strategies that can be used to prevent iron deficiency.^{4,6} Ideally, a combined approach, including iron interventions and other measures, are needed in settings where iron deficiency is not the only cause of anaemia, which is also highly relevant, based on the SANHANES-1 findings,¹² in the South African context.

In conclusion, and bearing in mind the multifactorial aetiology of anaemia, it is clear that an evidence-based, holistic and integrated (multifactorial and multisectoral) approach is necessary to further improve current strategies and to establish additional effective ones to ensure further progress.⁶ Strategies should always be tailored to local conditions, taking into account the immediate and distal determinants of anaemia in a particular setting.^{5,6} It is important to keep in mind the large differences that exist in South Africa at provincial level that may impact on the success of intervention programmes in this regard. Firm political commitment, the engagement of diverse stakeholders, strong partnerships that involve all relevant sectors, and further capacity building to effect the necessary change, are crucial for success.^{6,22} It is also important to increase the awareness of healthcare workers and the public with regard to the importance of anaemia and its associated health risks.

And, finally, an operational surveillance system is crucial to monitor anaemia prevalence and the effectiveness of interventions.⁶ The benefits of even better anaemia control could be indeed significant. Besides mortality benefits, cognitive benefits would lead to improved work productivity and school performance, and contribute to better health and economic outcomes for all.^{1,5}

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