

Invited paper

Iron deficiency anaemia – an old enemy

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SUMMARY Anaemia has remained a widespread public health problem in countries of the Eastern Mediterranean Region. Prevalence figures vary from a low of 17% to a high of over 70% among preschool children; from 14% to 42% among adolescents and from 11% to over 40% among women of childbearing age. Although the prevalence of anaemia has often been used as a proxy indicator for iron deficiency anaemia, this approach is not valid in settings where the etiology of anaemia is complex or unknown or where other micronutrient deficiencies of folate, vitamin B₁₂ and vitamin A can co-exist. An integrated, multifactorial and multisectoral approach has to be adopted comprising targeted interventions to provide iron supplements to especially vulnerable segments of the population, in particular pregnant women; food-based approaches to increase iron intake through food fortification and dietary diversification; and other measures combined with iron interventions where other causes of anaemia are prevalent.

Introduction

Anaemia remains a widespread public health problem with major consequences for human health as well as social and economic development. Although estimates of the prevalence of anaemia vary widely and accurate data are often lacking, it can be assumed that significant proportions of young children and women of childbearing age are anaemic [1,2].

The important health effects of anaemia, i.e. increased risk of maternal and child morbidity and mortality due to severe anaemia, have been well documented. In addition, the negative consequences of iron deficiency anaemia on the cognitive and physical development of children and on the work productivity of adults are of major concern [3].

Although iron deficiency anaemia remains a considerable public health problem, one should also keep in mind that, in addi-

tion to iron deficiency, anaemia also results from malaria, general inflammatory disorders or nutritional deficiencies of folate and vitamin B₁₂ as well as HIV/AIDS [4].

Anaemia in the Eastern Mediterranean Region

Over the years, significant progress has been made in improving the health and nutrition status of the people of the Eastern Mediterranean Region. The proportion of underweight, wasted and stunted children, as well as infant and under-five mortality rates, have all decreased as a whole, but with some inter-country variations [5].

In spite of this development, anaemia, particularly attributed to iron deficiency, among infants, preschool children and women of childbearing age has remained a widespread public health problem, irrespective of the family economic status and

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income level in most countries of the Region [6]. The overall situation of anaemia in countries of the Region was studied in 1995 [7] although the terms anaemia and iron deficiency anaemia were used interchangeably. The prevalence rate of anaemia was reported to be moderate in magnitude when compared with other developing regions, which could be partially due to under-reporting and lack of nationally representative data. A few countries had up-to-date national-level data on anaemia while available information in the majority of the situations was based on *ad hoc* surveys or small-scale studies on specific population groups.

The prevalence of anaemia in women of childbearing age ranged from around 20% in Jordan, parts of Egypt and parts of Oman to more than 60% in countries like Djibouti. Preschool children were more affected than women, with reported prevalence in excess of 60% in many countries [7]. Low intake of total dietary iron, proportionate high consumption of non-haeme iron, poor iron absorption due to iron-absorption inhibiting factors, such as tannins in tea and phytates in unleavened bread, were identified as the common causes of anaemia, in addition to high birth rates, short birth intervals and concurrent parasitic infections. The importance of genetic factors, particularly thalassaemias, remained another possibility but required further research for any conclusion to be drawn [7].

All subsequent assessments of the public health importance of anaemia carried out over the next decade have continued to report high prevalence of anaemia, mostly attributed to iron deficiency [8–10], with similar causative factors as reported earlier [7].

A review of published studies from countries of this Region indicates the per-

sistence of anaemia (presumably iron deficiency anaemia) in different age groups.

Among infants from 6 months onwards, a high prevalence of anaemia is reported, with iron deficiency anaemia being the single most important cause [11,12]. The prevalence of anaemia in preschool children has also remained high, varying from 29% to over 60% [13,14], although occasional reports do indicate a decline in the prevalence of anaemia in this age group [13]. Among preschool children, the magnitude of anaemia is reported to be associated with birth order (thereby indicating a gradual depletion of the iron stores of mothers after repeated pregnancies), low dietary iron intake, socioeconomic status and literacy level of mothers [13,14].

Among women of childbearing age, from both rural and urban backgrounds, the prevalence of anaemia has ranged between 20% and 70%, again mostly attributed to iron deficiency [15–18], in addition to deficiencies of folic acid and vitamin B₁₂ [11]. Income, literacy and family size are factors that affect total iron intake and anaemia status [15]. Women with anaemia are reported to have high fetal mortality [19] and deliver babies with lower birth weight, and low haemoglobin and serum ferritin levels as compared to non-anaemic women in different gestational age groups [11,17].

Most studies on adolescents have reported prevalence rates for anaemia ranging from 30% to 55% with the milder form of anaemia predominating (>80%) [18–23]; occasional reports have indicated improvement in anaemia status in this age group [23]. The high prevalence of anaemia among adolescents has been attributed to increased needs for iron due to rapid growth and menarche, low intake of iron-rich foods, inappropriate dietary choices, intestinal parasitic infestation and

frequent consumption of tea with meals, all or in various combinations [18,19,22,24]. The prevalence of anaemia declined sharply in boys after the age of 16 years coinciding with the end of a growth spurt while the prevalence of anaemia among girls started to rise after the age of 18 years as they proceeded to marriage and childbearing [19,22].

The Nutrition Unit of the World Health Organization's Regional Office for the Eastern Mediterranean compiled basic information on the overall nutrition situation in the Member States through a questionnaire survey. This information is presented in Table 1 [25]. The information does not identify the different types of anaemia or the methodologies used to determine these

data. Prevalence data of anaemia in a number of age categories from several Member States are also not available. No definite pattern in the prevalence of anaemia can be discerned from Table 1 other than the fact that anaemia affects all Member States and all age groups. Anaemia varied from a low of 17% in Saudi Arabia to a high of over 70% in Yemen among preschool children; from 14% in the United Arab Emirates to 42% in Pakistan among adolescents; and from a low of 11% in Egypt to over 40% in the Syrian Arab Republic and Oman among women of childbearing age. The comparatively low prevalence of anaemia among adult males noted here may be attributed to the high iron intake in the form of meat as reported in countries of this Region [26].

Table 1 Prevalence (%) of anaemia in different age groups from selected countries of the Eastern Mediterranean Region [26]

Country	Population group							
	Infants 0-6 months	Children 6-59 months	Children 5-14 years	Pregnant women	Lactating women	Women of child bearing age	Adult men	Elderly (males & females combined)
Bahrain		48.3	41.6	33.5		37.3	20.9	58
Egypt		25		26	19	11		
Jordan	8.8		15.3	35	35	28		
Islamic Republic of Iran		15-30		20-43		33.4	7.9-9.9	20-25
Lebanon		23		25				
Morocco		35.4		45.5		30.1	9.9	
Oman			41	38		40		
Pakistan		60	42	45	22.5	30	30	
Palestine		52.8		44.7		36.2		
Saudi Arabia	14.8	17.2	15.9			18.3	15.8	
Syrian Arab Republic		23				40.8		
United Arab Emirates		34	14	14				
Yemen		73.5						

In Table 2, information from 1995 [7] and 2002/2003 [25] is compared. In spite of the lack of matching information in several age categories between 1995 and 2002, it would seem that the prevalence of anaemia has not changed over the years.

Member States have become aware of this persisting public health problem and in recent years some efforts have been made to identify the prevalence of anaemia with precision through national anaemia/micronutrient surveys. The national survey on anaemia in Jordan in late 2002 reported that 20.3% of children between 12 and 59 months of age were anaemic, 50% of whom had iron deficiency anaemia [28]. In women of childbearing age, the prevalence of anaemia was 32.3% with 70% of anaemia being due to iron deficiency; the survey did not identify the other causes of anaemia. The survey also reported that in children between 12 and 59 months and in

women of childbearing age, while the haemoglobin levels were within normal range, serum ferritin levels were low, thereby indicating that haemoglobin was not a sensitive measure of iron deficiency [27].

A cross-sectional study of Bahraini women in the age group 14–49 years was carried out in early 2002, 6 months after the initiation of the national programme of fortifying wheat flour with iron and folic acid [29]. Using the dual criteria of haemoglobin and serum ferritin, the survey reported that the prevalence of overall anaemia was 51.3% among the women, 24.5% of which was due to iron deficiency. The authors concluded that there was no significant difference in the prevalence of anaemia between this survey and the national nutrition survey conducted before the initiation of the national fortification programme [28].

Table 2 Comparison of anaemia prevalence (%) between 1995 and 2002/2003 in selected countries of the Eastern Mediterranean Region [7,26]

Country	Children 6–59 months		Pregnant women		Women of childbearing age	
	1995	2002	1995	2002	1995	2002
Bahrain	34	48.3		33.5	40	37.3
Egypt	75–90	25	21–5	26		11
Jordan				35	23.4	28
Islamic Republic of Iran	>30	15–30	20–50	20–43		33.4
Lebanon		23				
Morocco	27–47	35.4	20	45.5		30.1
Oman	60		54	38	15–48	40
Pakistan	65	60	45			22.5
Palestine	58–76	52.8	23–44	44.7		36.2
Saudi Arabia		14.9	11–19	15.9		18.3
Syrian Arab Republic	53	23	49			40.8
United Arab Emirates	28–76	34	22–62	14		
Yemen	17–66	73.5			5–36	

Conclusions

Greater food availability does not necessarily equal better nutrition or health status. Nowhere can this be better demonstrated than in the case of anaemia, which continues to occur in all strata of people in Member States of the Eastern Mediterranean Region [2,25,28].

Because of the comparative ease of determination of haemoglobin concentration, the prevalence of anaemia has often been used as a proxy indicator for iron deficiency anaemia [2,29]. While this approach may be useful where iron deficiency is known to be the major cause of anaemia, it is not valid in settings where the etiology of anaemia is complex or unknown or where other micronutrient deficiencies that can cause anaemia co-exist. Other nutritional deficiencies other than iron, such as folate, vitamin B₁₂ and vitamin A, can also cause anaemia, although the magnitude of their contribution is unclear [2,11,27]. In addition, the impact of haemoglobinopathies on anaemia prevalence needs to be considered among some populations [2,7]. Infectious diseases, in particular malaria and helminth infections, and other infections such as tu-

berculosis and HIV/AIDS are important factors contributing to the high prevalence of anaemia in many populations [2,30–32].

The recent joint statement by the World Health Organization and the United Nations Children's Fund on an integrated approach for effective anaemia control [2] states that "only by recognizing the complexities associated with anaemia can effective strategies be established and progress made."

The integrated, multifactorial and multi-sectoral approach mentioned in the joint statement will comprise: targeted interventions to provide iron supplements to especially vulnerable segments of the population, in particular pregnant women; food-based approaches to increase iron intake through food fortification and dietary diversification; other measures combined with iron interventions where other causes of anaemia are prevalent; integration of intervention strategies into the existing primary health care system and existing national food and nutrition programmes. Such an approach will be evidence-based and take into account the specific etiology and prevalence of anaemia in a given setting and population group [2].

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