

Strategies of the Pan American Health Organization/World Health Organization for the Control of Iron Deficiency in Latin America

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Iron deficiency anemia is one of the major micronutrient deficiencies in the world. Its etiology is well understood, and inexpensive solutions to the problem have been identified. Nevertheless, the problem persists. This paper estimates the magnitude of iron deficiency anemia and presents strategies suggested by the Pan American Health Organization of the World Health Organization (PAHO/WHO) for adoption by individual countries.

Introduction

Iron deficiency is one of the world's most common disorders and occurs when the amount of iron available is insufficient to meet an individual's needs. Over an extended period, it leads to anemia. Estimates indicate that over 2 billion people suffer from iron deficiency, and more than half of them are anemic. The prevalence of anemia among pregnant women, infants, and children under the age of 2 years in poor countries is over 50%. Prevalence of anemia in preschool children aged 3 to 5 years, school-age children, and women of childbearing age is lower, but still significant. This situation persists despite the availability of effective, low-cost interventions for prevention and treatment.^{1,2}

Functional Consequences of Iron Deficiency

Anemia in infants and children is associated with retardation in growth and cognitive development and with lower resistance to infection. In adults, anemia produces fatigue and diminished work productivity. In pregnant women, it is associated with low-birth-weight infants and increased perinatal mortality. Iron deficiency inhibits the body's ability to regulate temperature when exposed to cold and it alters hormonal production and metabolism, affecting neurotransmitters and thyroid hormones associated with neurological, muscular, and temperature-regulating functions.^{3–11}

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While iron deficiency affects cognitive development in all age groups, the effects of anemia in infancy and during the first years of life may be irreversible, even with treatment. Ten percent of infants in developed countries and 30–80% in developing countries are anemic by the age of 1 year. These children will suffer from psychomotor retardation, and by the time they attend school their language abilities and fine motor coordination will have diminished significantly.¹

Situation in the Americas

The available information on iron deficiency and anemia in the Americas (North, South, and Central America) indicates that approximately 94 million people suffer from an iron deficiency and/or iron deficiency anemia.² Among this population, pregnant women and small children have the highest prevalence of iron deficiency anemia, as seen in Table 1.

The prevalence of anemia is lower in the Americas than in other regions. However, this does not mean that anemia is not a significant problem. It is estimated that for each person with anemia there is at least one more with iron deficiency; a significant proportion of the population (including all pregnant women) is affected. The problem is extremely severe in some areas of the region—for example, in the Caribbean and the Andean countries, estimates place the prevalence of anemia among pregnant women at around 60%.

With isolated exceptions, few countries have detailed national information on the prevalence of anemia. Ecuador, for example, reported a national prevalence rate of anemia at 70% in children 6 to 12 months of age and 45% in children 12 to 24 months.¹³ The case studies coincide in reporting that the most affected population groups are newborns with low birth weight, children under 2 years of age, and pregnant women.^{14,15}

Goals of the World Summit for Children and Plan of Action

In response to the overwhelming evidence that iron deficiency is an enormous problem and that it has limitless negative consequences for the world's population, more than 170 countries made a commitment at the World Sum-

Table 1. Magnitude of the Iron Deficiency and Anemia Problem^a

Regions	Population with Iron Deficiency or Anemia (millions)	Prevalence of Anemia in Pregnant Women (%)
Africa	206	52
The Americas	94	40
Europe	27	18
Eastern Mediterranean	149	50
Southeast Asia	616	74
Western Pacific	1058	40
Developed countries		18
Developing countries		56
Total	2150	51

^aFrom reference 12.

mit for Children to reduce the prevalence of anemia in pregnant women by one-third by the year 2000. As a specialized agency of the United Nations, the Pan American Health Organization of the World Health Organization (PAHO/WHO) designated the problem of iron deficiency and anemia a priority for action in its Regional Plan on Food and Nutrition.

PAHO/WHO has proposed a series of regional, national, and local activities to be implemented in Latin America until the year 2000 that will contribute to meeting the summit's goal of substantially reducing the high prevalence of iron deficiency and anemia. The plan will then be evaluated to determine the impact of the technical cooperation provided by PAHO/WHO in this area.

Activities

At the regional level, an advisory group has been formed with representatives from various multilateral and bilateral organizations, nongovernmental organizations (NGOs), and donor agencies. This advisory group meets periodically to analyze the experiences in the Americas and other regions, to share proposals for collaborative work, and to review the progress of the agreements.

A World Wide Web home page has been created offering information to anyone who has access to the Internet. Also, an e-mail listserv, available by free subscription, has been established for distributing information to centers, universities, and individuals in the region.

A network of consultants specializing in areas relevant to the different lines of intervention, along with a system for their training and orientation, has been placed at the countries' disposal to combat iron deficiency and anemia. Similarly, a number of useful operational guidelines have been developed at the local level on the different components of the program interventions.

Areas of Cooperation

To be successful in combating iron deficiency and anemia, PAHO/WHO suggests that countries develop a set of par-

allel interventions with short-, medium-, and long-term impacts. This implies the use of a comprehensive approach consisting of a set of interventions to be carried out by the health sector and other sectors in their respective fields. These interventions are fortification of a widely and frequently consumed food product that is low cost and readily available in the market; provision of iron supplements to pregnant women and children under 2 years of age; dietary diversification promoted through marketing activities, mass communication, and education; and epidemiologic surveillance to monitor the impact of interventions.

Steps to Be Taken

In order to formulate an integrated strategy for the management of iron deficiency, PAHO recommends starting out with a situation analysis that reviews the following aspects.

The Level of Iron and Anemia in the Population. PAHO proposes collecting available information to determine the magnitude and severity, sex and age distribution, and geographical distribution of the problem; the presence of other deficiencies and parasitic infections; and characteristics of the diet. Most countries in the Americas do not, in fact, have such information. If the information available is not sufficient to develop a baseline to support the design of interventions and subsequent impact assessment, the next step would be to design a proposal to collect the necessary information. Rapid assessment studies should be conducted to provide the minimum amount of information necessary for sustaining the programs to be implemented rather than resorting to sophisticated or expensive research projects to construct baseline information.

This document does not mention sampling techniques, indicators, or methodologies for collecting the information. If a country requests technical cooperation, PAHO/WHO will provide support using its own technical staff or through its network of consultants to design a survey for data collection to construct a baseline.

Analysis of the Industrial Capacity to Fortify Food Products. It is necessary to identify the food products that can serve as vehicles for fortification and to assess the industrial capacity to process them, including analysis of equipment, laboratories, and qualifications of technical personnel. The packaging, distribution, and marketing of the products to be fortified must also be analyzed. In this manner, it will be possible to determine what modifications and improvements are needed for a successful fortification program.

Analysis of the Health Delivery System. To carry out a program of iron supplementation for pregnant women and small children, it is first necessary to analyze the health delivery system in terms of access and coverage, the level of knowledge of health personnel, and the tasks performed at each level. Also, the health facilities must have adequate storage capacity for materials and equipment used in supplementation programs.

Technical Capability. To determine the appropriate type of technical support for each country, it is necessary to ascertain the local technical capability in the areas that require development (e.g., management and upgrading of the industrial infrastructure for fortification, design of monitoring and surveillance systems, quality control, mass communication or social marketing activities, and training activities for health personnel). Ascertaining local capability helps define when technical cooperation should be provided and what form it should take.

PAHO/WHO is in a position to channel technical cooperation for the design of global strategies to manage anemia and iron deficiency. To accomplish this objective, the organization can mobilize human resources to respond to specific technical support needs through its network of consultants or in coordination with other cooperating agencies.

Economic Feasibility. To guarantee the viability of a national program, an economic feasibility study of the proposed intervention would determine what funding would be provided by the state, as well as the availability of private funding, donations, or loans.

Political Commitment. An essential element for the viability of a program, political commitment must be measured in terms of the allocation of resources and high-level political leadership sufficient to ensure that governments assume responsibility for implementing the proposal. In this respect, among PAHO/WHO's many tasks is advocacy at all technical and political levels, because without political commitment, it is unlikely that any proposal, however well conceived, can be successfully implemented.

Once the situation analysis has been completed, the next step is to proceed with preparation of the proposal that constitutes the framework for each intervention: fortification, supplementation, and diet diversity through mass marketing, communication, education, and nutritional surveillance. It is not the purpose of this document to go into

the specifics of the components of each intervention, but it should be noted that development of each intervention involves special skills and techniques that require the support of different specialists.

Table 2 presents the components that should be included in proposals for programs to combat iron deficiency. Once the situation analysis has been completed, the objectives, strategies, plan of action, and management and support activities should be defined. Each component should be explicit so that the functioning of the proposed program can be appreciated.

Table 3 indicates the minimum components that a fortification proposal should contain which should be adapted to the situation in each country. For example, it is recommended that fortification be carried out in a food item that is widely consumed. In addition, several countries have the additional potential for food fortification aimed at specific population groups—for example, the school-age population. Equally important is the adoption of legislation that clearly defines the components of a fortification program.

From the outset, it is essential that the components and methodology of implementing quality assurance programs be clearly defined. When the fortification proposal is drafted, each component must be described as clearly as possible.

Table 4 presents the elements to consider in the design of a proposal for iron supplementation. At this point, it is extremely useful to have information on the infrastructure, quality, and coverage of health services. Because the level of coverage of prenatal care is low in many countries, alternative mechanisms must be adopted for the early identification of iron deficiency and monitoring of pregnant women and children under 2 years of age who should receive iron supplements.

Every supplementation program requires the design of a system for early detection, monitoring, and evaluation. Operations manuals will be needed for staff in the field. These manuals should provide detailed instructions on how to identify the target population, conduct the evaluation, identify risk, carry out educational activities, and record and interpret information. The manuals also should indicate which instruments to use and how to use them. Finally, they should define the operational mechanisms for reaching beneficiaries with the supplement, procuring and storing the supplements, and distributing and controlling them.

To carry out mass marketing, communication, education, and dietary diversification campaigns, it is necessary to define the topics and messages to be transmitted to the population, the means to be utilized, and the costs, frequency, and type of interpersonal activities that should be used.

Successful epidemiologic surveillance requires permanent sources of data of uniformly high quality from representative samples and depends on the ability to conduct

Table 2. Elements to Consider in the Design of a Comprehensive Proposal for the Management of Iron Deficiency and Anemia^a

Duration
Responsible institution
Situation analysis
Political commitment
Clinical and epidemiologic situation of iron deficiency/anemia and the existence of programs
Rationale
Institutional framework
Anticipated benefits
Objectives
General
Specific/operational
Impact
Strategies
Fortification
Supplementation
Mass marketing, communication, education for advocacy, and dietary diversification
Epidemiologic surveillance
Plan of action
Managerial organization
Data collection to determine the prevalence of iron deficiency and anemia as baseline information
Determination of food consumption; identification of iron absorption inhibitors and stimulators in the diet; identification of widely consumed food products
Analysis of the viability of supplementation; definition of the target population
Analysis of the viability of fortification
Support activities
Advocacy
Mass communication
Operations research
Management
Interagency coordination
Linkage with other sectors
Linkage with other programs
Role of specialized institutions
Negotiation with sources of financing

^aAdapted from reference 12.

Table 3. Elements to Consider in the Design of a Proposal for Iron Fortification^a

Reasons for fortification	Advantages Opportunities Limitations
Definition of target population	Total population Pregnant women Children under 2 years of age Adolescents
Selection of the vehicle	Low-cost and widely consumed food
Definition of the levels of responsibility	Legislation Quality assurance Epidemiologic surveillance Financing
Infrastructure	Industrial infrastructure Availability of technology Quality control system
Selection of the fortifier	Cost Availability and access Effects on household food preparation
Communication	Acceptability Advocacy Mass marketing
Monitoring of the process	Promotion of the industry At the industry level At the consumer level
Impact assessment	Population at risk Total population Sustainability

^aAdapted from reference 12.

Table 4. Elements to Consider in the Design of a Proposal for Iron Supplementation

Definition of program of action for supplementation
Estimation of number and proportion of pregnant women and children under 2 years of age to receive supplementation
Definition of mechanisms for early identification, monitoring, and surveillance
Definition of supplement, dose, and frequency of consumption
Definition of operational mechanisms of supplementation program
Design of instruments utilized in supplementation
Definition and application of field testing
Training of field personnel
Preparation of manuals and standards
Monitoring of process
Impact assessment

periodic surveys. Surveillance systems must be low cost and should be based on parameters that are easy to establish in the field.

These activities should not be the responsibility of a single specialist or individual. Technical working groups will have to be formed and can be supported by specialists who either reside in or could be brought in to the countries to help manage the program. PAHO can play an important collaborative role in this process by identifying specific technical needs, preparing proposals, and mobilizing resources.

Necessary Complementary Activities

Interagency Coordination and Resource Mobilization.

According to PAHO/WHO, it is essential to establish mechanisms to coordinate the activities of multi- and bilateral technical cooperation agencies, NGOs, and donor organizations to optimize the use of resources and the impact of interventions. It is therefore necessary to promote and facilitate collaborative efforts that contribute to national strategies to combat iron deficiency and anemia.

Information Generation and Dissemination. PAHO/WHO disseminates information and promotes the production of technical position papers on iron deficiency and anemia to ensure that countries have access to this information. To accomplish this task, PAHO/WHO uses its own materials and documents produced by other agencies, thus making it possible for people to have access to ongoing programs. Information is disseminated through conventional means of distribution through the Internet and the e-mail listserv.

Human Resource Development. Workshops and seminars are organized and promoted by PAHO/WHO to update methodologies for writing proposals for interventions, management, surveillance and monitoring, quality control,

and other related aspects of program planning, design, and implementation. These workshops may be conducted at the regional level to promote the sharing of experiences or at the local level to develop specific skills and expertise in, for example, quality assurance monitoring.

Research Promotion. PAHO/WHO promotes and supports research that is essentially operational and whose results can be utilized immediately at the regional, national, and local levels.

Technical Cooperation to the Countries. Direct cooperation is available from PAHO/WHO to countries to support the components of a comprehensive strategy to reduce the high prevalence of iron deficiency and anemia. Technical assistance is provided from diagnosis to impact assessment, and to promote institutional strengthening. PAHO/WHO has two specialized centers for this purpose: the Institute of Nutrition of Central America and Panama (INCAP) and the Caribbean Food and Nutrition Institute (CFNI). PAHO/WHO also has a team of regional advisors located at its headquarters and a network of temporary consultants.

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