Reducing Anemia and Changing Dietary Behaviors among Adolescent Girls in Maharashtra, India

Anemia among women causes many serious health problems and is pervasive in developing countries. Anemia can result in adverse pregnancy outcomes, and severe anemia can lead to maternal deaths, reduced work productivity and impaired physical capabilities.

India has the highest prevalence of iron-deficiency anemia among women, including adolescents, worldwide. Between 60 percent and 70 percent of Indian adolescent girls are anemic (Hemoglobin (Hb) < 12 g/dl). Adolescence - a period of growth and development - is a good time to intervene, both before a first pregnancy and during pregnancy, yet Indian public health programs lack strategies to tackle iron-deficiency anemia in adolescent girls.

To address this strategic gap, the Institute of Health Management, Pachod (IHMP), in collaboration with the International Center for Research on Women (ICRW), conducted a participatory nutrition education intervention study in Pune city, Maharashtra to improve dietary behaviors and iron status, and reduce prevalence of iron-deficiency anemia of unmarried adolescent girls. Results show that the intervention led to these improvements.

Data and Methodology

IHMP conducted a census of 1,142 adolescent girls in 16 slums in Pune in 2001. Of these, 811 were surveyed for information on dietary and morbidity history, anthropometric measures, menstrual history, daily frequency of meals, consumption of locally available iron-rich foods, and workload within and outside the home. Blood samples were taken from 803 girls to measure hemoglobin (Hb). Logistic regression was used to determine the predictors of anemia (Hb < 12 g/dl cut-off). Independent variables included economic status, consumption of iron-rich foods, number of meals eaten in a day, use of lemon with meals (which increases iron absorption), morbidity in the past year, hours worked in a day and whether menses had started.

The nutrition problem in these communities was not primarily about a lack of nutritious food. Girls because of their lower social status often were the last in a family to eat and, therefore, more likely to eat too little food or food of low nutritional quality. As such, the intervention focused on providing nutrition education and changing social norms. The intervention was structured as a three-year community intervention trial with 10 intervention slums (1,000 girls) and six control slums (752 girls), and engaged adolescent girls on key dietary change messages via activities such as food fairs and recipe competitions. Community-based health workers visited homes monthly and assessed girls' dietary patterns, promoted nutritional messages, and shared information on seasonally available, low-cost iron- and vitamin C-rich foods. An endline was conducted after the intervention.

Figure 1: Select Baseline Characteristics of Girls

Average age (completed years):	14 years
Percent currently in school:	76%
Percent working outside the home:	5%
Percent working two or more hours in the home:	69%
Percent achieved menarche:	50%
Anemia and dietary behavior	
Percent anemic (Hb<12gm/dL):	58%
Percent severely anemic (Hb<7gm/dL):	1.3%
Percent eating two or less meals daily:	40%

(N=811)
Source: IHMP-ICRW

Impact of Anemia Prevention Program on Dietary Behavior, Iron Status and Anemia

Predictors of anemia: Logistic regression of baseline data showed that anemia was significantly more likely among girls who ate two or fewer meals in a day, had been sick in the past year and consumed few iron-rich foods.

Changes in dietary behavior: Comparisons of changes between baseline and endline in the intervention and control sites showed that the intervention influenced dietary behavior. The

Figure 2: Changes in Dietary Behavior: Baseline-Endline (%)

3+ meals daily	Baseline	Endline
Study site	2.9 %	27.7 %
Control site	5.8 %	3.5 %
Fruit consumption 4+/week	Baseline	Endline
Study site	50.0 %	64.6 %
Control site	46.8 %	59.0 %

Control Baseline & Endline N=359 & 424
Interv.Baseline & Endline N=452 & 602
Source: IHMP-ICRW

percent of girls who ate three or more meals a day increased significantly in the intervention site as compared to the control site. Fruit consumption increased in both study and control site.

Effect on iron status: Between baseline and endline, blood testing showed that mean Hb levels increased from 5.8 to 9.5 g/dl for severely anemic girls, and from 8.9 to 11.2 g/dl for moderately anemic girls.

Recommendations

- Focus the India government's anemia prevention and control program not just on adults, but also adolescents.
- Use participatory nutrition education more widely among adolescent girls to improve their diets and iron status.
- Include nutrition education in iron supplementation programs to help maintain improved iron status.
- Promote key dietary behavior messages for girls in settings like the Pune city slums: Eat three or more meals a day; eat with the family so girls eat enough; eat green vegetables daily; and eat lemon, gooseberry or other vitamin C-rich foods with meals.

For more information on this project contact:

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Reducing Iron-Deficiency Anemia and Changing Dietary Behaviors among Adolescent Girls in Maharashtra, India (2000-2003)

Objectives: Estimate the prevalence of anemia in unmarried adolescent girls (ages 10-19), identify the determinants of anemia, and intervene to improve iron status by enhancing diet.

Program Structure: Weekly iron and folic acid tablets given in first three months; ongoing nutrition education through home visits and meetings conducted by community health workers over three years, participatory activities such as food fairs; community project through IHMP's life skills program; and audiovisual materials such as flash cards and posters developed by the adolescent participants.

Target group: Unmarried adolescent girls, ages 10-19.

About IHMP and ICRW's Adolescent Reproductive Health Program in India

The Institute for Health Management, Pachod (IHMP) is based in Pachod, rural Aurangabad district, Maharashtra, India, with an office in Pune city. The anemia program started in Pune city slums and expanded to rural Aurangabad. IHMP's anemia program, funded by the Ford Foundation and Rockefeller Foundation, is part of a broader multi-partner program, led by the International Center for Research on Women (ICRW), aimed at improving girls' reproductive health. That research program, the Adolescent Reproductive Health Program in India, was funded by the Rockefeller Foundation.