Webinar on
Recognizing the Complexity of Anaemia in Bangladesh and Developing Effective Strategies through National Consultation
Situation of Anaemia in Bangladesh

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UNICEF Bangladesh
The prevalence of anaemia and iron deficiency (ID) in Bangladesh

Understanding groundwater iron

Studies linking groundwater iron and iron deficiency anaemia (IDA)
  - JiVita
  - INFS/ UNICEF
Anaemia is still a public health problem in Bangladesh

### Prevalence of Anaemia in Different Surveys

<table>
<thead>
<tr>
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<th>National Surveillance Project 2001*</th>
<th>Bangladesh Demographic Health Survey 2011*</th>
<th>National Micronutrient Survey 2011-12**</th>
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</thead>
<tbody>
<tr>
<td><strong>Under 5 children</strong></td>
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<tr>
<td>47% (6-59 mons)</td>
<td>51% (6-59 mons)</td>
<td>33% (6-59 mons)</td>
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<td></td>
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<td>45% (6-23 mons)</td>
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<td><strong>Children aged 6-11 years</strong></td>
<td></td>
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<td></td>
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<td></td>
<td>19% (6-11 y)</td>
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<tr>
<td><strong>Women 15-49 years</strong></td>
<td></td>
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<tr>
<td>33.2% (women 15-49 yrs)</td>
<td>42% (women 15-49 yrs)***</td>
<td>26% (NPNLW 15-49 yrs)</td>
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</tbody>
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*HemoCue Rapid Testing Method using capillary blood
**HemoCue Rapid Testing Method using venous blood
*** Ever married women 15-49 yrs
### Anaemia and Iron Deficiency Anaemia in Bangladesh

<table>
<thead>
<tr>
<th></th>
<th>Anaemia (%)</th>
<th>Iron Deficiency Anaemia (%)</th>
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<tbody>
<tr>
<td>Preschool Children</td>
<td>33</td>
<td>7.2</td>
</tr>
<tr>
<td>School children (6-11 y)</td>
<td>19</td>
<td>1.3</td>
</tr>
<tr>
<td>NPNL Women</td>
<td>26</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Iron deficiency anemia is defined as hemoglobin<11.5 g/dl plus ferritin level<15.0 ng/ml in children 6-11 year and hemoglobin<12.0 g/dl plus ferritin level<15.0 ng/ml in children 12-14 year.

Estimates weighted to represent at the population level.

Ref: Sabuktagin, PHN 2016
The etiology of anemia is complex and many details of interrelationship among causes not well understood.
Anaemia may result from a number of causes. Approx. 50% of cases of anaemia are considered to be due to iron deficiency, but the proportion probably varies among population groups and in different areas, according to the local conditions (WHO 2011)

In Bangladesh, the contribution of Iron Deficiency to Anaemia is likely to be lower due to bioavailable iron in ground water
Distribution of Ground Water Iron in Bangladesh

- The results of the survey of 3534 boreholes from 61 of the 64 districts of Bangladesh
- The range of ground water iron in Bangladesh is <0.004 mg/l to 61.0 mg/l
- Iron is generally high in Bangladesh groundwater, not much difference between shallow and deep groundwater
- Area with groundwater iron concentration defined as “High” (≥2.8 mg/l)
- Area with groundwater iron concentration defined as “low” (<2.8 mg/l)
- Iron concentration is high in most parts of the ground water
- Dissolved iron is predominantly ferrous (Fe2+), a form that is readily absorbed through the intestine

Source: DPHE/BGS National Hydrochemical Survey (1998-99)
**High iron level in groundwater is associated with higher serum ferritin status (all populations)**

<table>
<thead>
<tr>
<th></th>
<th>Serum ferritin (ng/ml)</th>
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<tbody>
<tr>
<td></td>
<td>Preschool Children</td>
<td>NPNL Women</td>
<td>School-age Children</td>
</tr>
<tr>
<td>High Fe area</td>
<td>38.9 (1.9)*</td>
<td>67.9 (2.3)*</td>
<td>57.1 (1.8)*</td>
</tr>
<tr>
<td>Low Fe area</td>
<td>23.1 (1.9)</td>
<td>44.7 (2.2)</td>
<td>42.1 (1.6)</td>
</tr>
</tbody>
</table>

*P<0.001

Sabuktagin, PHN 2016
Other studies also confirmed association between ground water iron and low prevalence of iron deficiency and iron deficiency anemia in Bangladesh.
PANI (Project of Arsenic N’ Iron) in 2006-8: Study of iron and anemia status in non-pregnant women that followed the JiVitA-1 Trial

Groundwater Iron Intake was Associated with Iron Status of Women (n=207)

PANI study reported that

- Median Iron intake from water was 42mg/day (Range: 0.0, 150.4)
- Anaemia was common but not the result of iron deficiency.
- Dietary intakes of heme-iron and non-heme iron food sources were modest.
- Women maintained adequate iron stores most likely as a result of natural iron in groundwater.
- Thalassemia (28%) was an important cause of anaemia

Interpretation:

For every 10 mg/day increase in iron intake through water, ferritin concentration is expected to be 6% higher (95% CI 4% to 8%)
A significant proportion of pregnant women in areas of both LGWI and HGWI remained anaemic after IFA supplementation for 3.5 months, even after excluding the subjects with haemoglobinopathies from analysis.

Prevalence of IDA decreased significantly in the pregnant women only in areas of LGWI.

LGWI: Low Ground Water Iron
HGWI: High Ground Water Iron

Source: UNICEF/INFS Study 2016
Among pregnant women, routine IFA supplementation with 60 mg elemental iron and 400 μg folic acid, does not pose any significant risk of haemoconcentration and iron overload.

Source: UNICEF/INFS Study 2016
Multiple micronutrient deficiencies

If iron deficiency anaemia is not major cause, what are the other important causes of high prevalence of anaemia in Bangladesh?

In Bangladesh, the role of vitamin A is as large as iron to influence the haemoglobin outcome.

Effect Size for Iron and Vitamin A on Haemoglobin

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<tr>
<th></th>
<th>PSAC</th>
<th>SAC</th>
<th>NPNLW</th>
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<tr>
<td>S. ferritin</td>
<td>0.21</td>
<td>0.11</td>
<td>0.13</td>
</tr>
<tr>
<td>S. retinol</td>
<td>0.13</td>
<td>0.14</td>
<td>0.13</td>
</tr>
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Vitamin A deficiency: 27.6%
Folate deficiency: 7.4%
Vitamin B12 deficiency: 8.9%

Pregnant Women (UNICEF/INFS Study)

High Iron Area: 2.5%
Low Iron Area: 1.6%

If iron deficiency anaemia is not major cause, what are the other important causes of high prevalence of anaemia in Bangladesh?

- **No** nationally representative prevalence data of thalassemia
- **WHO estimates for Bangladesh**: Thalassaemia trait (3%), Haemoglobin E disease: 4%
- In a Northern district: **28%** among women *(R Merrill, APJCN 2012)*
- Two northern and two southern sub districts (17.2% in pregnant women) *(UNICEF/INFS study 2016)*
Outcomes from the National Anemia Consultation in Bangladesh

Rae Galloway
Independent Consultant
Technical consultation held during 24-25 July, 2016 in Dhaka, Bangladesh

Supported by:

- GAIN
  Global Alliance for Improved Nutrition
- Alive & Thrive
- UNICEF
- MI
  Micronutrient Initiative
- ICDDR, B
- Helen Keller International
Summary of country level evidence on key issues

Anaemia, ID and IDA:

- Anemia continues to be a public health problem and Iron Deficiency is not a major public health problem in Bangladesh
- Iron deficiency Anaemia (IDA) explains between 8-30% anaemia in Bangladesh (excluding pregnant women in low groundwater areas) which is lower than what was thought previously
- Iron content in water is positively associated with iron status and inversely associated with anemia
- Anaemia prevalence in children 6-23 months was 45% while all ID was 15%. IDA was about 10% or 25% of all anaemia (NMS 2011-12)
- IDA is still high in pregnant women, confirmed by smaller studies. In one study, IDA was 25% of anaemia in pregnant women living in high iron areas and 50% of anaemia in pregnant women living in low iron areas
- Anaemia is prevalent in adolescent girls in Bangladesh. No national data but some area based information available
Summary of country level evidence on key issues

**Thalassemia:**
- Thalassemia/hemoglobinopathies is an important composite cause of anemia but its relative contribution to national anaemia prevalence is not known.
- Low cost genetic testing should be instituted in the country for screening of thalassemia.

**Multiple micronutrient deficiencies (MMD):**
- MMD coexist and contribute to maternal anemia, poor maternal health, and adverse pregnancy and infant outcomes.
- In Bangladesh, vitamins A and B-12, and zinc deficiencies, which are associated with anemia, are high. The role of vitamin A has as large as iron in improving Hb. (NMS, 2014)
- More efforts to be needed to improve the quality of the diet of children.
Summary of country level evidence on key issues

Iron over dose

• IFA with 60 mg of iron may be too high and may be harmful to women living in high iron areas. IFA with 30 mg would meet the needs of pregnant women living in low iron areas.

• IFA supplementation does not change the prevalence of anaemia and iron deficiency among pregnant women living in high and low iron ground water areas with 90% consumption coverage for only 3.5 mons.

• No information about amount of water consumed by young children 6-23 months when iron requirements are the highest.

• Overall coverage of consumption of IFA supplements by pregnant women is low all through the pregnancy period.
National Anaemia Consultation in Bangladesh

Recommendations:

**For Children**
- Improving iron stores at birth (e.g., delayed cord clamping), ensuring exclusive breastfeeding, and giving iron for LBW babies.
- Scale-up complementary feeding promotion for children 6-23 months including effective integration of multiple micronutrient powders (MNPs)

**For Pregnant Women**
- IFAS with lower dose of iron (30 mg) for pregnant women to avoid iron overload where ground water iron is high and strengthen scale up of the program
- Consider replacing IFA with MMS, as guided by the National Micronutrient Strategy

**For Adolescent Girls**
- The package of interventions should include nutrition education, deworming, and IFA supplements using multiple platforms and channels to reach them

Key areas as next steps
- Synthesizing the evidence to identify the aetiology of anaemia and their relative proportion to the causes of anaemia
- Operational research to evaluate cost-effectiveness as a next step in guiding the possible adoption of MMS during pregnancy in Bangladesh
- Evidence based scale-up complementary feeding promotion for children 6-23 months (adequate amounts and quality of diet) including effective integration of multiple micronutrient powders (MNPs)
Implication in policy and program

Prof. Nazma Shaheen
Director, Institute of Nutrition and Food Science
University of Dhaka
Policy and Strategy for Anaemia Prevention and Control in Bangladesh
National Strategy for Anaemia Prevention and Control in Bangladesh 2007

Overall goal:
To reduce by one quarter the prevalence of anaemia among high-risk groups of Bangladesh by 2015, based on the anaemia prevalence in 2001-3 for different target groups.

Targeted strategies for high risk group:
1. Micronutrient supplementation
2. Dietary improvement
3. Parasitic disease control
4. Family planning and safe motherhood

Recommended Strategies

Population based strategies:
1. Food fortification
2. Production of micronutrient rich foods through household food production, crop diversification, biotechnology and biofortification

Target to reduce anaemia by 2015

Anaemia and iron deficiency is one of the major areas that is addressed by this strategy; Recommended strategies

1. **Policy guideline and legislation:** Reviewing policy on IFA Supplementation for Adolescent and NPNL women; Considering policy on micronutrient supplementation during pregnancy; Need based targeted MNP supplementation for children aged 6-23 months

2. **Intervention program:** Supplementation as Short-term approach, Food fortification as a medium- to long-term approach and Improving dietary diversification

3. **Partnership and coordination:** Increasing coordination between ministries and partner organizations for IFA and MNP supplementation

4. **Capacity building:** In national, regional, district, facility and community level

5. **Advocacy and communication:** Priority actions are set for target audience: policy makers, key ministries, private sector, general population, service providers, development partners

6. **Monitoring, evaluation and research:** For IFA and MNP supplementation more research is needed to modify the current program, evaluate the program
Anaemia Control Programs in Bangladesh

For Children aged 6-59 months:
• Nationwide, under five children are not routinely given any intervention to prevent and control anaemia
• Only moderate and severe anaemic children are receiving treatment at Upazila Health Complexes, district and divisional hospitals following WHO guideline
• Bi-annual de-worming of children aged 24-59 months
• MNP supplementation integrated with IYCF for children aged 6-23 months in 91 Upazilas

For School age children (6-11 yrs)
• Bi-annual de-worming through school

For Adolescent girls (10-19 yrs):
• IFA supplementation two tablets in a week for three months
• Bi-annual de-worming of adolescent

For Pregnant women:
• Daily IFA supplementation throughout the pregnancy

For Lactating women:
• Daily IFA supplementation for three months
What is next for Bangladesh?

• Review dosage of iron in IFA
• Introduce MMS for pregnant mothers
• Continue MNP for children
• Ensure that IFA supplementation is not only single approach to reduce anaemia; other programs needed like
  • Parasitic disease control,
  • Diet quality improvement and
  • Food fortification;
• Strengthen coverage and reach with supplementation for targeted groups:
  • Adolescent girls and newly wed women in more remote locations
  • Improve programs that distribute IFA to women
  • Ensure adequate tablets are provided and women counseled to take supplements
Thank you