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SPRING NUTRITION TECHNICAL BRIEF

A RAPID INITIAL ASSESSMENT OF THE DISTRIBUTION AND CONSUMPTION OF IRON–FOLIC ACID TABLETS THROUGH ANTENATAL CARE IN BANGLADESH

SEPTEMBER 2014

This document is part of a series of research briefs produced by USAID's Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project that use secondary analysis of Demographic and Health Survey data to determine barriers to distribution and consumption of iron–folic acid (IFA) through antenatal care systems in a range of countries. This brief describes key characteristics of and barriers to successful IFA supplementation in ***Bangladesh.***

ABOUT SPRING

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project is a five-year USAID-funded Cooperative Agreement to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute. SPRING provides state-of-the-art technical support and focuses on the prevention of stunting and maternal and child anemia in the first 1,000 days.

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DISCLAIMER

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OVERVIEW OF THE GLOBAL ANEMIA PROBLEM, INCLUDING IRON DEFICIENCY ANEMIA

The World Health Organization (WHO) defines anemia among women of childbearing age as the condition of having a hemoglobin concentration of < 12.0 g/dL at sea level; among pregnant women it is defined as < 11.0 g/dL. The hemoglobin concentration cutoff level that defines anemia varies by age, gender, physiological status, smoking status, and the altitude at which the assessed population lives.

The primary cause of anemia is iron deficiency, a condition caused by inadequate intake or low absorption of iron, the increased demands of repeated pregnancies—particularly if not well spaced (e.g., fewer than 36 months between pregnancies)—and loss of iron through menstruation. Other causes of anemia include vitamin deficiencies (such as a deficiency of folic acid or vitamin A), genetic disorders, malaria, parasitic infections, HIV, tuberculosis, common infections, and other inflammatory conditions. While iron deficiency anemia (IDA) accounts for about one-half of all anemia cases, it often coexists with these other causes.

Iron deficiency anemia is most common during pregnancy and in infancy, when physiological iron requirements are the highest and the amount of iron absorbed from the diet is not sufficient to meet many individuals' requirements (Stoltzfus and Dreyfuss 1998). Anemia's effects include increased risk of premature delivery, increased risk of maternal and child mortality, negative impacts on the cognitive and physical development of children, and reduced physical stamina and productivity of people of all ages (Horton and Ross 2003). Globally, IDA annually contributes to over 100,000 maternal deaths (22 percent of all maternal deaths) and over 600,000 perinatal deaths (Stoltzfus, Mullany, and Black 2004). Key anemia control interventions include promoting a diversified diet, iron-folic acid (IFA) supplementation during pregnancy, iron fortification of staple foods, prevention and treatment of malaria, use of insecticide-treated bed nets, helminth prevention and control, delayed cord clamping, and increased birth spacing.

MATERNAL ANEMIA IN BANGLADESH

The prevalence of anemia among pregnant women in Bangladesh is 50 percent, making it a severe public health problem as defined by WHO standards[1] (NIPORT, Mitra and Associates, and ICF International 2013). In terms of anemia severity, the majority of cases among pregnant and breastfeeding or non-pregnant women of reproductive age reported in the 2011 Bangladesh Demographic and Health Survey (BDHS) are classified as mild or moderate.[2] Less than one percent of anemia cases among these groups of women are diagnosed as severe. An anemia survey conducted in urban areas of Bangladesh and three rural districts of the Chittagong Hill Tracts (CHT) in 2003 by the Bangladesh Bureau of Statistics and the United Nations Children's Fund (UNICEF) suggests that the prevalence of maternal anemia is higher in rural areas than in urban areas. Roughly 41 percent of pregnant women and 36 percent of breastfeeding women were anemic in urban slum and non-slum areas, compared to 49 percent and 43 percent, respectively, of pregnant and breastfeeding women in rural areas of the CHT. In addition, a marked difference was observed between the prevalence of anemia in the CHT among pregnant women of ethnic minority groups (61 percent) and the prevalence among pregnant women who do not belong to ethnic groups (41 percent) (BBS and UNICEF 2003).

FALTER POINTS IN WOMEN'S CONSUMPTION OF IRON–FOLIC ACID DURING PREGNANCY

WHO recommends that all pregnant women receive a standard dose of 30–60 mg iron and 400 µg folic acid beginning as soon as possible during gestation (WHO 2012). Ideally, women should receive iron-containing supplements no later than the first trimester of pregnancy, which means ideally taking

[1] WHO categorizes anemia's severity as a public health problem according to the condition's prevalence: < five percent, no public health problem; 5–19.9 percent, mild; 20–39.9 percent, moderate; ≥ 40 percent, severe.

[2] The BDHS hemoglobin levels used to diagnose the severity of anemia in non-pregnant women differ from those specified by WHO. The BDHS cutoffs for pregnant (P) and non-pregnant (NP) women in hemoglobin g/dL are mild, 10.0–10.9 (P), 10.0–11.9 (NP).

180 tablets before delivery. It is important to note, that many countries aim for women to receive 90 or more tablets during pregnancy.

Figure 1 shows a decision-tree analysis of how well the Bangladeshi antenatal care (ANC) system distributes IFA, and identifies four potential points at which the system might falter (highlighted in orange). The figure tracks the number and percentage of women who obtained ANC, those who subsequently received and consumed at least one IFA tablet, and those who consumed the ideal minimum number of tablets.[3] All data are based on BDHS questions asked of women who were in permanent unions and had been pregnant in the five years prior to being interviewed[4] (NIPORT, Mitra and Associates, and ICF International 2013).

Many supply-side aspects—including both adequacy of IFA tablet supplies and technical knowledge and practices of ANC providers—need to be considered when assessing how well an ANC program delivers IFA. In addition, as Falter Point 4 in Figure 1 clearly shows, the provision of IFA tablets to a pregnant woman is a necessary but not sufficient condition for the woman to consume the tablets, particularly at the ideal minimum level. Thus, demand-side factors also play a critical role in determining the coverage and effectiveness of a program. These include whether or not women seek ANC and the timing and number of visits, as well as the extent to which women are aware of the significance of anemia and IFA, ask for IFA tablets, and comply with the IFA regimen.

Understanding the relative significance of each falter point makes it possible to prioritize them for more in-depth analysis, providing a first step in an evidence-based approach to systematically improving the program. The BDHS does not collect information on the number of IFA tablets received by women. In the case of Falter Point 4, this lack of data creates ambiguities that make it impossible to fully understand whether shortcomings in the system relate primarily to supply- or demand-side factors. Despite this limitation, the decision-tree analysis presented in Figure 1 still enables prioritizing the falter points for more in-depth analysis and action at the national, district, and health center levels.

The 2007 BDHS rather than the 2011 survey is used because detailed IFA and ANC information was missing in the most recent survey. It is telling that while the 2011 BDHS conducted one of the few nationally representative surveys of anemia in Bangladesh, it did not ask women about their reception to or taking of IFA tablets. To our knowledge, this is the only DHS survey that did not ask women who were pregnant in the last three years and had a live birth if they had received or purchased IFA tablets during their last pregnancy. The 2007 BDHS also lacks information on whether or not women took the IFA tablets they received or purchased, and about the number of tablets taken throughout the pregnancy. Due to this lack of data, Falter Points 3 and 4 have not been determined; however, understanding the relative significance of Falter Points 1 and 2 provides a first step in an evidence-based approach to systematically improving the program.

ANALYSIS OF FALTER POINTS

FALTER POINT 1:

Did not attend at least one ANC visit

Forty percent of women did not have at least one ANC visit.

ANC's moderate coverage undercuts the program's potential as a vehicle for providing IFA.

FALTER POINT 2:

Did not receive or purchase at least one IFA tablet

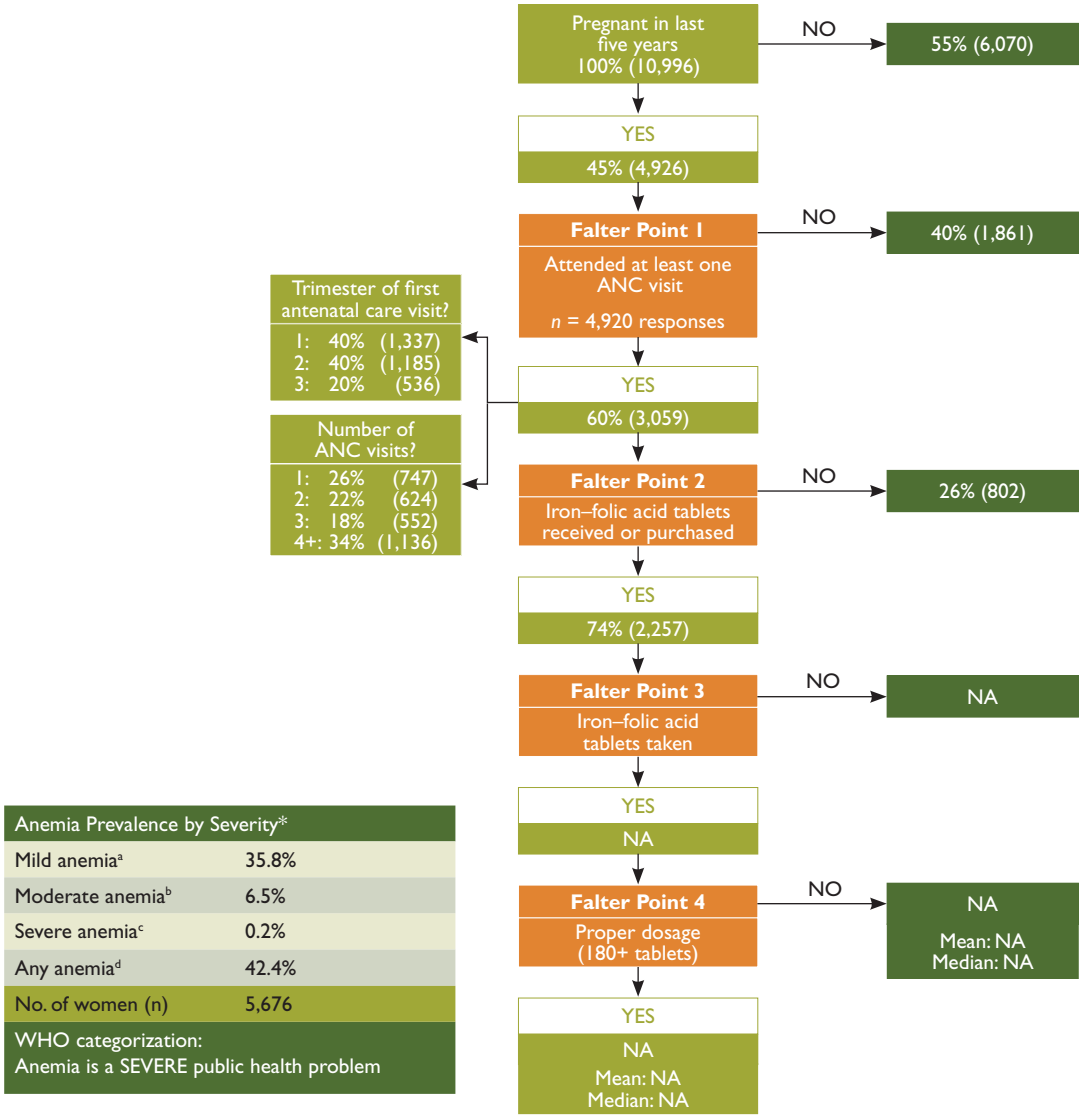
Of the women who had at least one ANC visit, 26 percent did not receive or purchase any IFA.

This supply-side constraint may be due to various system/supply-side performance shortcomings, which could reflect: (1) inadequate supply (e.g., stockouts); (2) inadequate provider knowledge; and/or (3) inadequate provider practices, whereby IFA may have not been provided.

[3] The BDHS asked about IFA tablets or capsules; this brief refers to all forms as "tablets."

[4] The BDHS provides a population-based, nationally representative sample of all women in Bangladesh.

Figure 1. Analysis of Falter Points Related to Distribution and Consumption of IFA through Bangladesh's ANC Program in 2011, Women of Reproductive Age (15–49 Years), *n* = 10,996



Anemia Prevalence by Severity*	
Mild anemia[a]	35.8%
Moderate anemia[b]	6.5%
Severe anemia[c]	0.2%
Any anemia[d]	42.4%
No. of women (n)	5,676
WHO categorization: Anemia is a SEVERE public health problem	

Main Conclusions: Given the moderate 2007 ANC coverage rate, ANC is an underutilized platform for distributing IFA in Bangladesh. Nearly three quarters of women who had at least one ANC visit, 74 percent, received or purchased IFA tablets. While data was unavailable to provide estimates for Falter Points 3 and 4, supply and demand side constraints should be investigated to uncover potential shortcomings within the system.

Percentages are calculated from weighted data and may vary slightly from the unweighted observations-based calculations. one percent of women who were pregnant in the last five years did not have any ANC visits but received or purchased IFA from another source.

*Percentage of women 15–49 years based on Hemoglobin levels, Hb (g/dL)

[a]NPW 10.0≤Hb≤11.9, PW 10.0≤Hb≤10.9 [b] NPW 7.0≤Hb<9.9, PW 7.0≤Hb<9.9 [c]NPW Hb<7.0, PW Hb<7.0 [d]NPW Hb<12.0, PW Hb<11.0

Non-responses, no data (NR/ND) were recoded to "No" for "'At least 1 ANC visit?", "IFA tablets received?" and "IFA tablets taken?" and to zero for "Number of tablets taken?".

Anemia prevalence data are provided as a reference point, signaling the general order of magnitude of the anemia public health problem. The ANC utilization data is based on self-reported data of women 15–49 years in permanent unions and pertains to their last pregnancy in the last five years prior to the DHS.

Source: Calculations are from the Bangladesh Demographic and Health Survey (2007). Anemia levels are from the Bangladesh Demographic and Health Survey (2011).

Unfortunately, the BDHS does not report the source(s) of the IFA tablets women received or purchased, and a notable percentage of women attending ANC get IFA tablets from a different source. Nineteen percent of Bangladeshi women who received or purchased IFA did not have any ANC visits (not shown), a very high percentage compared with an average of three percent across 20 other low- and middle-income countries. We cannot ascertain whether or not those who received ANC obtained their IFA from their ANC provider. However, women who attend ANC may be more likely to be aware of, to value, and also to take IFA tablets, regardless of where they obtain them. Thus we would expect a high correlation between the number of women who had at least one ANC visit and those who received or purchased IFA, which is consistent with the data. Women who had one or more ANC visits and who did not receive any IFA represent a missed opportunity to reduce the risk of anemia among a high-risk population.

FALTER POINT 3:

Did not take at least one IFA tablet

These data are not available.

Although data were unavailable, in general, this demand-side constraint may be a result of women not understanding the significance of anemia and/or that of IFA. This misunderstanding may reflect: (1) inadequate provider counseling and follow-up; (2) women's beliefs about actual or possible side effects; or (3) sociocultural factors.

FALTER POINT 4:

Did not consume 180 or more IFA tablets

These data were not available.

Data were unavailable to determine this falter point; however, possible causes for this falter point typically include women who began ANC after the first trimester, and women who had fewer than WHO's recommended four ANC visits during their last pregnancy and may have started their ANC too late or not have had enough visits to receive 180 tablets (given IFA distribution protocols). In Bangladesh in 2007, 40 percent of pregnant women had their first ANC visit within the first trimester and 34 percent had four or more ANC visits.

Globally, research has found that other common causes of Falter Point 4 include: (1) providers do not have access to adequate supply; (2) women do not receive an adequate number of tablets because they have little access to care, start ANC late, or do not have enough ANC visits, making it difficult to obtain 180 tablets (given IFA distribution protocols); (3) providers do not provide adequate counseling or follow-up; (4) women do not adhere to the regimen, which may be due to difficulty in remembering to take the tablets daily, not knowing all the tablets are necessary, fear of having a big baby, side effects, or tablet-related issues (taste, size, color, coating, packaging/storage problem). Further research is needed to determine the specific reasons for this falter point in Bangladesh.

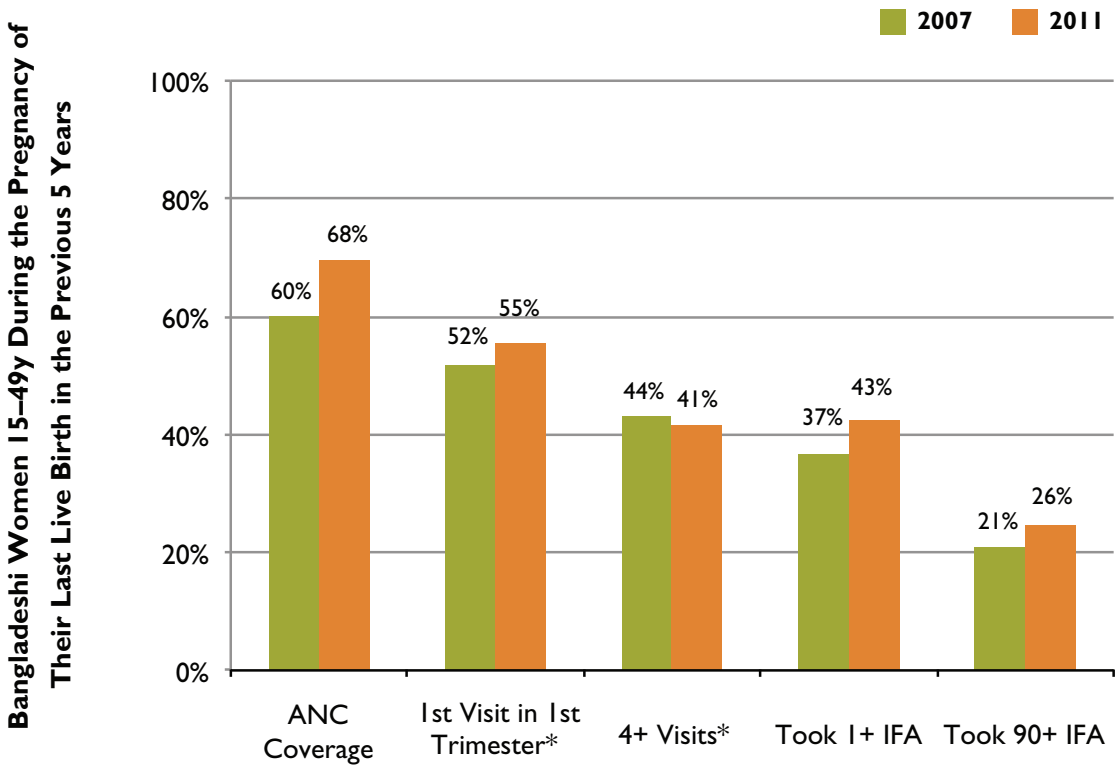
ANALYSIS BY SOCIODEMOGRAPHIC VARIABLES AND TRENDS OVER TIME

A comparison of data from the 2007 and 2011 BDHS (Figure 2) highlights trends in ANC coverage in Bangladesh. Over the five-year period, ANC coverage increased from 60 to 68 percent; however, this rate remains among the lowest in the world. The percentage of women receiving ANC from a skilled provider and having the WHO-recommended number of ANC visits also increased over the period. In 2011, 41 percent of all women had four or more ANC visits during their pregnancy and more than one-half (55 percent) were receiving ANC from a skilled provider. The leading source of ANC has also shifted from the public to the private sector. If this trend continues, government officials might seek to reassess how they allocate resources and move to include the private sector in IFA supplementation efforts.

OVERALL CONCLUSIONS AND RECOMMENDATIONS

The 2011 BDHS reports the prevalence of anemia among women of childbearing age at 42 percent; however, findings from the Bangladesh National Micronutrient Survey (BNMS) conducted in 2011–2012 suggest that anemia levels among non-pregnant and non-lactating women have declined in recent years and are substantially lower than other recent health surveys suggest (icddr,b et al. 2013).

Figure 2. ANC Indicators in Bangladesh, 2007–2011



*Among women who attended ANC

The BNMS finds that the prevalence rate of anemia among non-pregnant and non-lactating women is 26 percent, categorizing the situation as a moderate public health concern according to WHO standards. This large gap in anemia prevalence estimates may be due in part to the testing methods. The BNMS used venous blood for hemoglobin testing, a method that is noted in the final report as being more reliable and consistent than the capillary blood samples used for testing hemoglobin levels in most public health studies, including the BDHS. Of further interest in the BNMS is that, despite low consumption of foods containing iron and a lack of iron fortification in processed foods, iron deficiency for the overall population was lower than expected. This lower level was correlated with high iron levels in groundwater (icddr,b et al. 2013).

Iron deficiency anemia among women in Bangladesh is treated by supplementation with IFA tablets given to postpartum mothers within six weeks of childbirth. Nationally, only 50.3 percent of mothers received any IFA supplementation in 2009. The rate was higher in urban settings (60.7 percent) than in rural settings (47.4 percent). Coverage was highest in Rajshahi (60.1 percent) and Chittagong (52.0 percent), while the lowest coverage was observed in Sylhet (31.5 percent) (WFP, UNICEF, and IPHN 2009). The 2004 BDHS estimated IFA coverage—defined as the percentage of women, among all women who were pregnant in the past five years, who received and took at least one IFA tablet—at 50 percent. This suggests that little progress has been made in expanding IFA coverage (although we cannot determine how the number of IFA tablets received or purchased and consumed has changed). Similar to 2009 rates, IFA coverage in 2004 was higher among urban women (64.2 percent) than among their rural counterparts (46.3 percent). Among the country's divisions, rates differed only slightly, from 46.1 percent in Barisal to 53.2 percent in Khulna (NIPORT, Mitra and Associates, and ORC Macro 2005).

Several programs and policies feature anemia prevention and iron supplementation as central to improving maternal health. Key among these is the National Strategy for the Prevention and Control of Anemia, adopted by the government in 2007. The strategy has an overarching goal of reducing

the prevalence of anemia among high-risk groups, which includes pregnant and lactating women, by one-quarter by 2015. In addition, the National Guidelines for the Prevention and Treatment of Iron Deficiency Anemia were established by the Institute of Public Health Nutrition in 2001, and included the recommendation for iron supplementation for women of childbearing age. Iron–folic acid supplementation has been the key intervention in most divisions of the country and is provided through several distributors, such as Family Welfare Visitors (under the Directorate General of Family Planning), as part of routine ANC services provided through Satellite Clinics and Maternal and Child Welfare Centers. Although numerous nutrition programs and structures exist, the lack of a coordinating body to oversee and monitor their progress and development has been a major constraint, resulting in an overall disconnect between the government health structures and the communities they are meant to serve (WFP, UNICEF, and IPHN 2009). This is likely a key reason that anemia and IFA policies have been inconsistent and relatively ineffective. The fact that the BDHS no longer tracks IFA tablets despite high anemia rates among women, particularly pregnant women, further emphasizes this disconnect.

Ensuring access to quality ANC is essential to achieving Millennium Development Goal (MDG) 5: to reduce maternal mortality and improve maternal health. Bangladesh's current maternal mortality rate (MMR) is 194 maternal deaths per 100,000 live births, an impressive reduction from the MMR of 574 in 1990. If Bangladesh continues on its current path, it will likely reach its MDG 5 target of 143 by 2015 (GED 2012); however, more must be done to improve maternal health, including improving ANC access and coverage. Improving the distribution of IFA through the ANC program is an important strategy for preventing and controlling anemia in Bangladesh, and for improving the nutrition and health status as well as the mental and physical capacity of women of reproductive age.

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