Data DENT
Data for Decisions in Nutrition

Strengthening Household Survey Measures of Maternal Micronutrient Supplementation: Learnings from Ethiopia and Bangladesh

BRIEF

Key Findings:

- ***Micronutrient product recognition:*** Women in Ethiopia (ET) & Bangladesh (BD) recognized a limited number of the prenatal micronutrient products available in urban settings; the English term "iron" was used regardless of actual formulation (e.g., IFA or MMS); branding and packaging were critical for product recognition
- ***Question design:*** Shorter recall periods for pill adherence were feasible for currently pregnant women (7 days in ET, 1 month in BD)
- ***Visual aid design:*** Visual aids helped women differentiate between products based on pill color, shape, and/or packaging, but it was challenging to group images into categories that women understood
- Posing questions to currently pregnant women might improve the validity of adherence recall; validation against a gold standard is needed
- To facilitate monitoring, countries need to distinctively brand MMS compared to IFA and intensively promote it to increase product recognition

Background

One in four infants globally is born too early or too small.[1] Multiple countries, including Ethiopia and Bangladesh, are considering replacing iron folic acid (IFA) with United Nations International Multiple Micronutrient Antenatal Preparation (UNIMMAP) multiple micronutrient supplements (MMS) during Antenatal Care (ANC) to reduce low birth weight (LBW), preterm, and micronutrient deficiencies.[2,3]

Population-based household surveys can provide essential data on coverage of iron-containing supplements during pregnancy.[4,5] However, Demographic and Health Survey (DHS) style questions do not accurately measure the number of pills consumed across pregnancy (adherence) and do not differentiate between IFA and MMS.[6] There is a need to improve question design to increase respondent comprehension, facilitate more accurate adherence recall, and distinguish between prenatal micronutrient supplements.

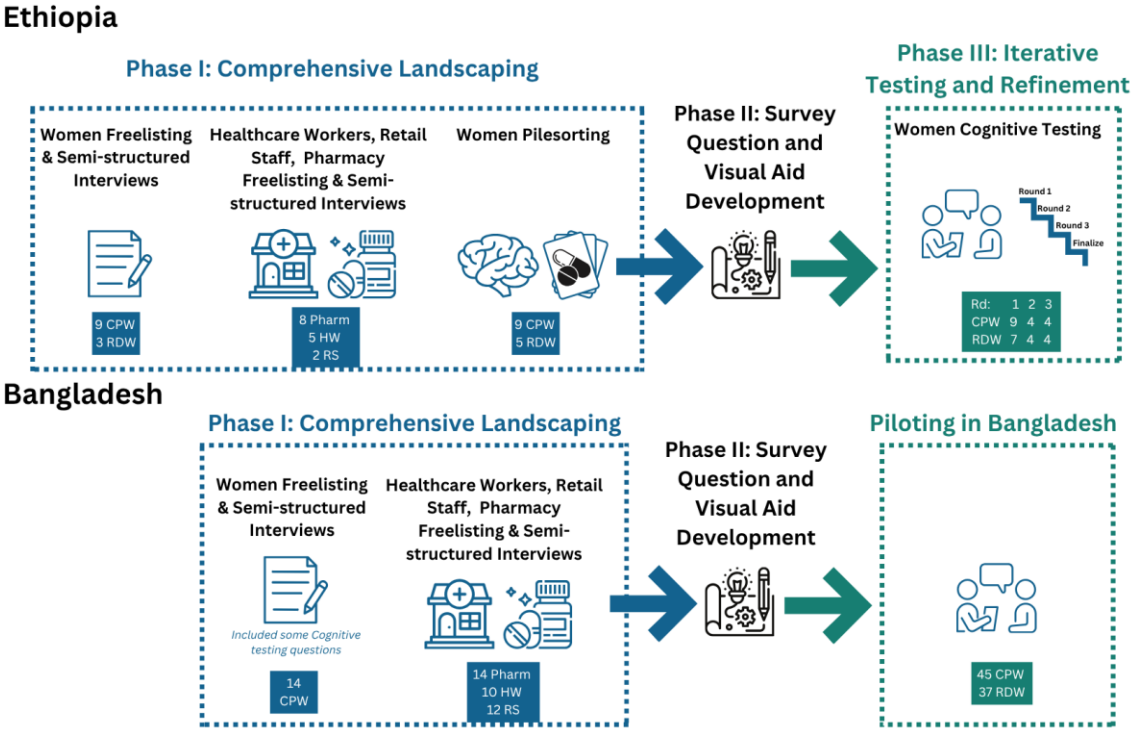
DataDENT carried out formative research in Ethiopia (ET) and Bangladesh (BD) in 2023-2024 to design, test, and refine household survey questions and visual aids to measure coverage of maternal micronutrient supplements during pregnancy. We present methods and key findings for the three research phases: Phase I. Comprehensive Landscaping, Phase II. Survey Question and Visual Aid Design; and Phase III. Iterative Testing and Refinement.

Research Design

Study overview (Figure 1): In Phase I, we landscaped health providers and retailers to identify available products and interviewed currently pregnant (CPW) and recently delivered women (RDW) about how they differentiated between micronutrient products. In Phase II, we used these findings to draft survey questions and visual aids. In Phase III, we tested and refined the draft tools; ET included three rounds of cognitive testing. We used more streamlined methods in BD, building on learning in ET.

Setting & Participants: The study was conducted in urban ET (Addis Ababa) and both urban and rural BD (Dhaka, Sylhet, and Khulna). In Phase I & III, women were purposively sampled for diverse socioeconomic characteristics, including low education and potential exposure to MMS; ET included both CPW and RDW; Phase I in BD included CPW only, while Phase III in BD included CPW and RDW. Phase I landscaping included health facilities (public, private, NGO), pharmacies, and retail sites. Figure 1 includes sample sizes for each phase.

Figure 1. Comparing study phases in Ethiopia (ET) and Bangladesh (BD)[1]



[1]CPW = Currently pregnant women; RDW = Recently delivered women; Pharm = Pharmacy staff; HW = Healthcare worker; RS = Retail staff

Analysis methods: Interviews and cognitive testing were thematically coded to assess product recognition and recall processes. Free list salience analysis (Smith Index) used FLARES software; in ET pile sort data was analyzed using multidimensional scaling and cluster analysis.[7]

The DataDENT research partner in ET was Addis Continental Institute of Public Health (ACIPH) and in BD International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b). Studies were approved by IRBs in country and at the Johns Hopkins Bloomberg School of Public Health.

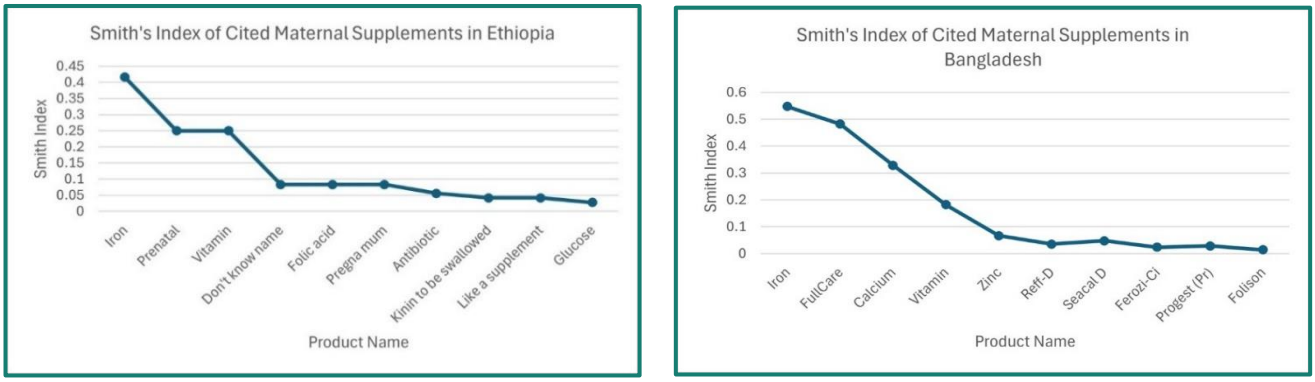
Results

Phase I. Comprehensive Landscaping

Comprehensive landscaping: ET sites had 23 unique products including iron, prenatal, vitamin, folic acid and "Pregna mum". BD sites had 135 unique products, including iron, "FullCare", calcium, vitamin, and zinc. Calcium is included in government ANC protocols in BD but not in ET.

Product recognition (Figure 2): During freelisting ET women listed an average of 1.8 products. The most salient terms were English words "iron" (0.42), "prenatal" (0.25), and "vitamin" (0.25). BD women listed an average of 2.6 products. The most salient terms were English words "iron" (0.55), "FullCare" (0.48), and "calcium" (0.33). Fullcare is an MMS product distributed in select NGO-supported clinics.

Figure 2. Freelisting: Salient terms ranked by Smith Index value



Product differentiation: Women in ET and BD differentiated supplements based on perceived purpose, packaging, color, and branding rather than micronutrient composition; the term "iron" was often used by women to describe supplements that contained other micronutrients.

Adherence recall: In both ET and BD women recalled supplement adherence by anchoring to routines, ANC visit timing, and blister pack completion, often estimating intake in months or by number of full packs consumed.

Phase II. Survey Question and Visual Aid Design

Question design: In ET, we used Phase I findings to adapt DHS-8 standard questions (Table 1) for RDW and designed new questions with a shorter recall period for CPW; in BD, we made small adaptations to the final questions from ET.[8]

Visual aid design (Figure 3): We selected product images captured in Phase I to represent categories of products (e.g., iron, prenatal, multiple micronutrient supplements, calcium).

Figure 3. Final Visual Aids (ET & BD)

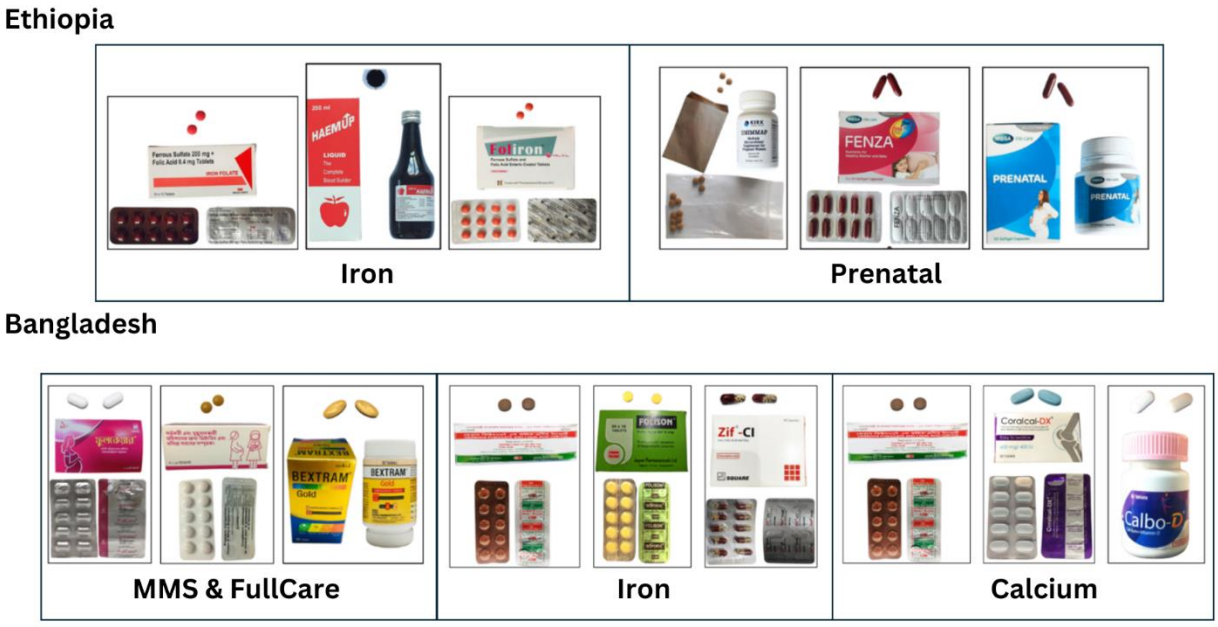


Table 1. Demographic and Health Surveys (DHS) core questionnaire

No.	Questions and Filters	Coding Categories
426	During this pregnancy, were you given or did you buy any iron tablets or iron syrup? SHOW TABLETS/ SYRUP/ MULTIPLE MICRONUTRIENT SUPPLEMENT.	YES 1 NO 2 DON'T KNOW 8
427	Where did you get the iron tablets or syrup? Anywhere else? PROBE TO IDENTIFY THE TYPE OF SOURCE IF UNABLE TO DETERMINE IF PUBLIC, PRIVATE, OR NGO SECTOR, RECORD 'X' AND WRITE THE NAME OF THE PLACE(S).	*See DHS-8 model woman's questionnaire (Q 427) for the list of response options*
428	During the whole pregnancy, for how many days did you take the iron tablets or syrup? IF ANSWER IS NOT NUMERIC, PROBE FOR APPROXIMATE NUMBER OF DAYS.	DAYS [ ] DON'T KNOW 998

Phase III. Iterative Testing and Refinement / Piloting

Most of the cognitive challenges that were identified in ET and BD fall into two main areas: 1) comprehension of terminology, 2) temporal recall of initiation, duration, and frequency of product intake. Table 2 summarizes key insights and question adaptations made during Phase 3.

Table 2. Summary of Cognitive Interview (ET) and Piloting (BD) results

Question Topic	Key Findings & Adaptation Made
Comprehension of Terminology	
Terminology: "Vitamin", "Iron", "Folic Acid", "Prenatal"	• In ET, "Iron" was well understood, but "folic acid" and "prenatal" were inconsistently interpreted. "multivitamin" was not understood. • Adapted ET to 'iron or iron-folic acid' and 'iron with many vitamins or prenatal' • In BD "iron," "medicine," or specific local names were commonly used. • Final BD questions included the terms "MMS tablet or FullCare," "supplements with multiple micronutrients," and "iron tablet or syrup."
Visual Aid Use	• In ET, visual aids improved comprehension and response plausibility. • Women relied on packaging form (bottle, loose pills, blister packs) for supplement identification. • Visual aid revised to show real-world formats, including blisters, bottles, and loose pills repackaged in sachet or envelope. • It was challenging to group images into categories women intuitively understood; many interpreted the images as representing specific products rather than broader categories (e.g., IFA, MMS).
Temporal recall	
Timing of Initiation (Start)	• In ET and BD, month-based recall was better understood than week-based. • Dropped 'weeks' and retained 'months' in questions.
Duration of Intake	• In ET, women could recall number of months taken; responses were consistent with cross-check questions. • Question retained in final tool.
Usual Intake	• In ET, women could report how many days in a "usual week" or "usual month" they took the supplement in their previous pregnancy using an open-ended response; this provided more plausible responses than categorical responses of "daily" or "always." • Question shifted to asking about "usual" with open-ended responses
7-Day Recall / Weekly Intake	• In ET, open numeric recall (report 0-7 days/week) provided more plausible responses than categorical responses (e.g., sometimes; 1-2 days). • Open response format retained, categorical format dropped.
7-Day Recall/Month Recall / Total Days Taken Over Pregnancy	• In ET, CPW provided more plausible responses to 7-day recall compared to a month or 30-day recall; RDW women overestimated response to total days of pregnancy or said it was too difficult to answer. The total days of pregnancy question was dropped. • In BD, CPW provided plausible responses to both 7-day and month recall; total days of pregnancy were overestimated or difficult to answer.

The initial questions were modified across two rounds of testing in Ethiopia and further refined during piloting in Bangladesh. Findings from cognitive testing informed revisions to question wording, response options, and visual aids to improve women's comprehension. The final set of questions (Table 3) reflects these adaptations and was designed to align with the DHS-8 model woman's questionnaire, while incorporating visual aids (Figure 3) to support women's recognition and recall of products.

Table 3. Final Questions

QUESTION **Blue text: RDW (last 2 years) | *Green text: CPW. Q2 country-specific text***		RESPONSE OPTIONS
1. During **[**your last pregnancy | *this pregnancy***]**, were you given, or did you buy any tablet or syrup that contains iron? [SHOW VISUAL AID]		YES 1 NO 2 DON'T KNOW 8
2. During **[**your last pregnancy | *this pregnancy***]** were you given or did you buy any of the following? A. [BD - MMS TABLET OR FULLCARE] B. [BD - SUPPLEMENTS WITH MULTIPLE MICRONUTRIENTS?] | [ET – IRON WITH MANY VITAMINS OR PRENATAL] C. [BD - IRON TABLET OR SYRUPS] | [ET – IRON OR IRON FOLIC ACID] [SHOW VISUAL AID]		A-C. YES 1 NO 2 DON'T KNOW 8
3. During **[**your last pregnancy | *this pregnancy***]**, how many months pregnant were you when you first started taking [**LIST PRODUCT IF Q2 = YES**]?		MONTHS [ ] DON'T KNOW 98
4. **RDW** a. During **your last pregnancy**, how many months did you take [LIST PRODUCT IF Q2 = YES]? b. During **your last pregnancy**, how many days in a usual WEEK did you take [LIST PRODUCT IF Q2 = YES]?	4. ***CPW*** c. How many days did you take the [LIST PRODUCT IF Q2 = YES] last MONTH?	4a. MONTHS [ ] DON'T KNOW 98 4b/c. DAYS [ ] DON'T KNOW 998
5. During [**your last pregnancy** | ***this pregnancy***] where did you get these [LIST PRODUCT IF Q2 = YES]? Anywhere else?		*List modified from DHS-8 model woman's questionnaire (Q 427)*

Conclusion

This study provides a replicable approach for developing context-adapted questions and visual aids for measuring health and nutrition intervention coverage in household surveys.

Tailoring survey questions to reflect women's perspectives improves comprehension and recall. The revised and refined questions used local terms for products. Adherence questions were based on how women recall their consumption (i.e., in months rather than days).

At the time of our study, the UNIMMAP formulation of MMS was not widely distributed in either country. There were no commonly understood terms for "multivitamin" or "MMS" in either context. In some cases, women who had prior exposure recognized MMS products by brand name (e.g., Fullcare). This suggests that to facilitate accurate recall, national programs should design MMS packaging and messaging with distinct branding relative to IFA.

Posing survey questions to CPW is innovative but also has trade-offs in terms of survey design and comparability of data across time. Short-term recall of adherence in CPW is likely to be more accurate than recall across all of pregnancy by RDW. However, during the household listing and sampling, it may be challenging to accurately identify pregnant women and to ensure a sufficient sample size. Therefore, to improve estimates and inferences about supplement adherence, we recommend including questions for CPW in addition to – and not instead of – questions for RDW. It should also be noted that the questions for RDW will not produce adherence data that are comparable to the questions in DHS-8. This has important implications for monitoring coverage trends.

We did not validate questions against a gold standard and cannot state the degree to which these new measures elicit more accurate results. Before these questions can be confidently used, both in the present context and in future scenarios where MMS is scaled, validation studies are essential.

References

1. World Health Organization, UNICEF, UNFPA, Partnership for Maternal, Newborn & Child Health, March of Dimes. Born too soon: decade of action on preterm birth [Internet]. Geneva: World Health Organization; 2023 [cited 2025 Jun 19]. Available from: https://www.who.int/publications/i/item/9789240073890
2. Keats EC, Haider BA, Tam E, Bhutta ZA. Multiple micronutrient supplementation for women during pregnancy. Cochrane Database Syst Rev. 2019;3:CD004905.
3. Smith ER, Shankar AH, Wu LSF, Aboud S, Adu-Afarwuah S, Ali H, et al. Modifiers of the effect of maternal multiple micronutrient supplementation on stillbirth, birth outcomes, and infant mortality: a meta-analysis of individual patient data from 17 randomised trials in low-income and middle-income countries. Lancet Glob Health. 2017 Nov;5(11):e1090–100.
4. Buckland AJ, Thorne-Lyman AL, Aung T, King SE, Manorat R, Becker L, et al. Nutrition data use and needs: findings from an online survey of global nutrition stakeholders. J Glob Health. 2020 Dec;10(2):020401.
5. Bryce E, Munos M, Lama TP, Khatry SK, LeClerq S, Katz J. Validation of maternal report of receipt of iron–folic acid supplementation during antenatal care in rural southern Nepal. J Nutr. 2022 Jan;152(1):310–8.
6. Walton S, Wood E, Munos M. How many tablets did you take during pregnancy? Addressing the challenges of maternal micronutrient coverage measurement [Internet]. DataDENT; 2023 Oct 9 [cited 2025 Jun 19]. Available from: https://datadent.org/how-many-tablets-did-you-take-during-pregnancy-addressing-the-challenges-of-maternal-micronutrient-coverage-measurement-2/
7. AnthroCogs. *FLARES – Free List Analysis under R Environment using Shiny* [Internet]. n.d. [cited 2025 Jun 19]. Available from: https://anthrocogs.com/shiny/flares/
8. The DHS Program. *DHS Questionnaires and Manuals* [Internet]. [cited 2025 Jun 19]. Available from: https://www.dhsprogram.com/publications/publication-DHSQ8-DHS-Questionnaires-and-Manuals.cfm

Project Note

DataDENT (Data for Decisions in Nutrition, www.datadent.org) aims to transform the availability and use of nutrition data by addressing gaps in nutrition measurement and advocating for stronger nutrition data systems. This work was carried out by the following DataDENT partners: Institute for International Programs at Johns Hopkins Bloomberg School of Public Health (JHBSPH), Addis Continental Institute of Public Health (ACIPH), International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b). This work was funded by the Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Gates Foundation.