

Guidance for formative research on maternal nutrition

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Infant & Young Child Nutrition Project



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The Manoff Group; and University Research Co., LLC.

455 Massachusetts Avenue NW, Suite 1000
Washington, DC 20001 USA
Tel: (202) 822-0033
Fax: (202) 457-1466
Email: info@iycn.org
Web: www.iycn.org

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Introduction

Maternal nutrition refers to the nutritional needs of women during the antenatal and postnatal period (i.e., when they are pregnant and breastfeeding) and also may refer to the time period before conception (i.e., adolescence). Maternal undernutrition affects the health of both mothers and children and, as a result, has broad impacts on economic and social development.

Undernourished pregnant women have higher reproductive risks, including death during or following childbirth. Many women suffer from a combination of chronic energy deficiency, poor weight gain in pregnancy, anemia, and other micronutrient deficiencies, as well as infections such as HIV and malaria. These along with inadequate obstetric care contribute to high rates of maternal mortality and poor birth outcomes. Undernutrition in pregnant women is directly linked to intrauterine growth retardation (IUGR), which results in low birth weight, pre-maturity, and low nutrient stores in infants. Maternal undernutrition also diminishes a woman's productivity, causing repercussions for herself, her family, her community, and the broader society.

It is well known that the effects of micronutrient deficiencies during pregnancy have severe consequences. Anemia (primarily due to poor iron status) is a major marker of maternal malnutrition, inasmuch as any level of anemia increases the risk for maternal mortality and morbidity and also diminishes women's productivity. During pregnancy, iodine deficiency disorders (which result from a lack of sufficient iodine in the diet) can result in serious and irreversible effects on child brain development and mental capacity, in the form of cretinism, and can lead to miscarriage, stillbirths, and early neonatal deaths. Maternal nutrition has a life-cycle (or intergenerational) element as well. Light-weight, short-stature women give birth to small, low-birth-weight babies who become short, light-weight girls and repeat the cycle of intergenerational undernutrition. Where and how to most effectively and efficiently break the intergenerational undernutrition cycle remains unclear.

Although projects focused on maternal health are common, projects focused specifically on maternal nutrition are rare. Research, program reports, and other materials specifically related to maternal nutrition principles, practices, and programs are not abundant either. This lack of attention to maternal nutrition may in part reflect a focus on mortality reduction rather than on overall consequences for child growth and development. The intergenerational (and thus more complicated) aspects of maternal nutrition may also have contributed to the inattention. While a clear consensus on the parameters of maternal nutrition and how best to intervene to improve it are still being developed, the importance of maternal nutrition and the critical role of nutrition behaviors during this period are widely known. Although not as well documented as the guiding principles for infant and young child nutrition, optimal maternal nutrition behaviors and actions have been outlined.¹

¹ Huffman S, Zehner E, Harvey P, Martin L, Piwoz E, Ndure K, Combest C, Mwadime R, Quinn V. *Essential Health Sector Actions to Improve Maternal Nutrition in Africa*. Washington, DC: The LINKAGES Project; May 2001. *Maternal Nutrition During Pregnancy and Lactation*. Washington, DC: The LINKAGES Project/The CORE Group; August 2004.

This guidance document is intended to increase the awareness and understanding of optimal maternal nutrition practices and, more importantly, to support people who are working to translate optimal practices into feasible actions and programs for a given country or region. Maternal nutrition practices vary substantially by culture, geography, social, economic, and other family and community factors. To develop effective social and behavior-change strategies and programs, it is essential to know local practices and how they impact maternal nutrition, and to understand the motivations or barriers to more pro-nutrition practices (those that are closer to optimal practices). Engaging in a formative research process, regardless of how restricted, will yield important insights that are necessary for program planning. This guidance presents the different elements of creating and implementing formative research for maternal nutrition, including:

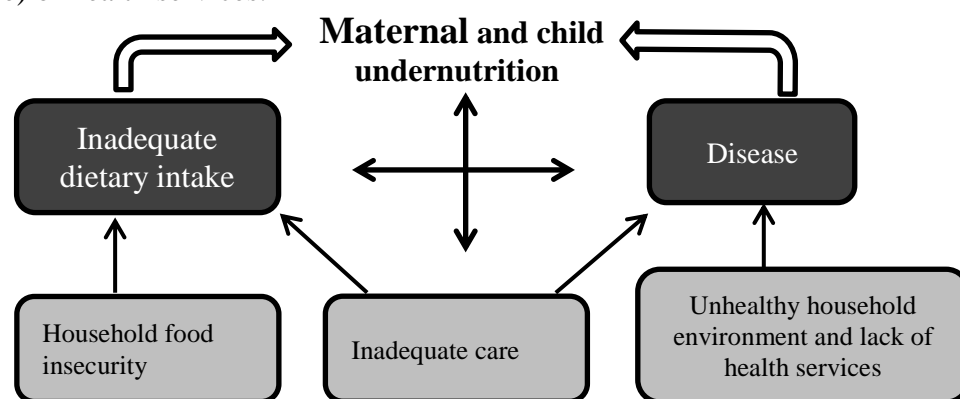
- Understanding the general maternal nutrition context by using all readily available data and information.
- Choosing the best research methods and participants.
- Developing effective research guides and tools.

This document is not a “how to” manual for planning and conducting formative research (see Appendix A for documents to assist with sample selection, planning, implementation, and analysis of formative research). Rather, this document provides specific information to help guide the development and design of a formative research process for a maternal nutrition program or intervention. Additional background reading and information on maternal nutrition are included in Appendix B.

Understanding the general context

Conceptual framework for maternal nutrition

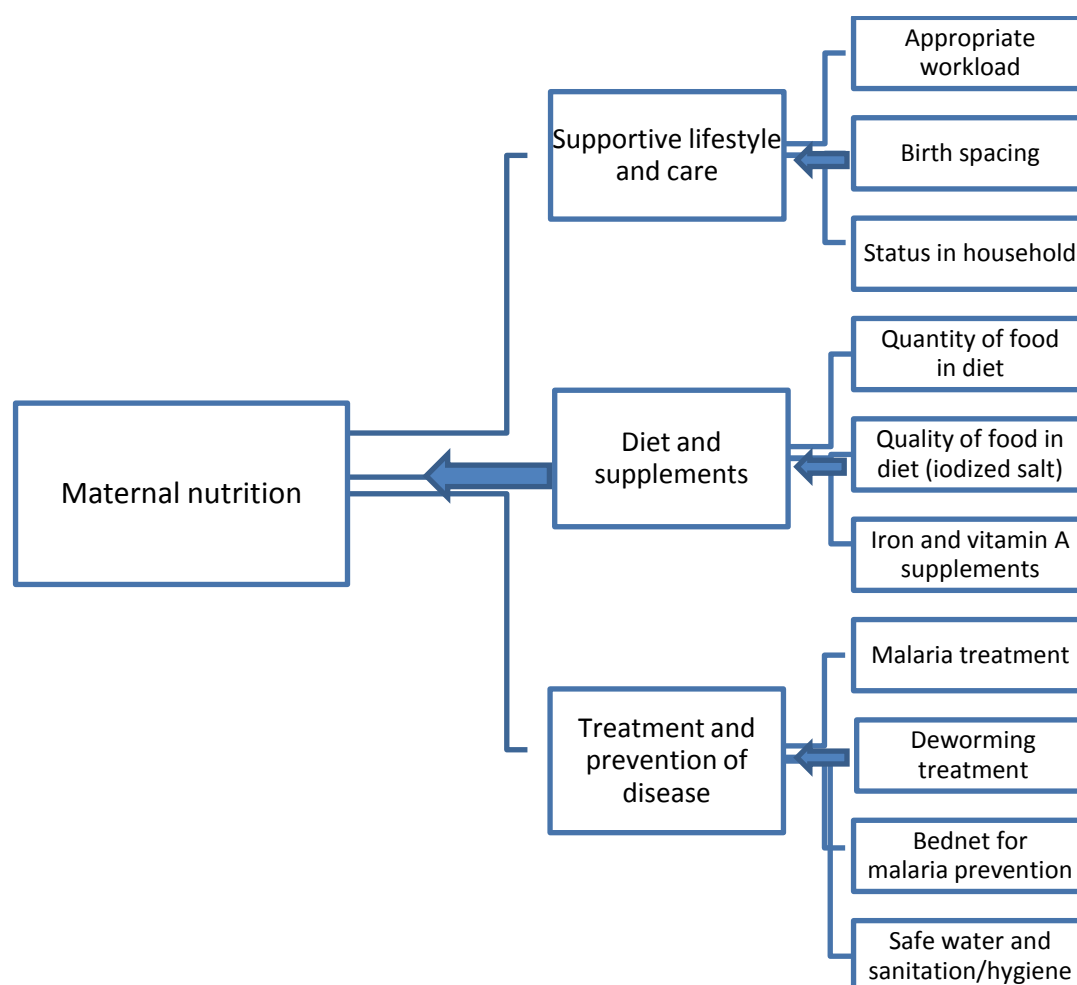
The general conceptual framework for maternal nutrition (or maternal undernutrition) is similar to the UNICEF conceptual framework for child undernutrition (see below). Immediate causes of maternal undernutrition include inadequate dietary intake and disease. Primary underlying causes are household food insecurity, inadequate care, and an unhealthy household environment and use (or lack of use) of health services.



Source: UNICEF conceptual framework, modified by *eMaternal and child undernutrition: global and regional exposures and health consequences* Prof Robert E Black MD, et al., Maternal and Child Undernutrition Study Group *The Lancet* - 19 January 2008 (Vol. 371, Issue 9608, Pages 243-260) *t* 2008

A more detailed picture of this broad conceptual framework, shown below in Figure 2, expands and refines the factors that contribute to maternal nutrition. It specifically highlights the most critical elements to be addressed in a program aimed at ensuring or improving maternal nutrition.

Figure 2: Framework for promoting maternal nutrition



Optimal maternal nutrition practices

The framework above can be translated into a set of essential actions that are protective of maternal nutrition. These recommended optimal actions (summarized in Table 1 below) reflect the benchmarks related to diet and micronutrients, disease prevention and treatment, and lifestyle factors against which maternal nutrition programs can be developed and monitored. However, these optimal practices do not define a specific program or intervention. Effective social and behavior change programs are based on a deep understanding of specific populations. Knowing the context in which maternal behaviors and practices exist is essential to knowing what can be promoted and supported to improve practices/behaviors for women. The formative research process—designing, implementing, analyzing, and using results—is the route to learning about different targeted “at risk” populations. Specifically, formative research for maternal nutrition would be designed to identify:

- The feasible pro-nutrition practices that will have the greatest positive impact on maternal nutrition.
- Acceptable alternatives for resolving problems and issues that prevent pregnant and lactating women from implementing pro-nutrition actions and practicing new behaviors.
- Major constraints to achieving more pro-nutrition practices.
- The strongest motivating factors and influences to encourage “better” practices.

Table 1: Maternal nutrition in pregnancy and while breastfeeding

Category	Optimal practices
Dietary quantity	Eat at least one extra serving of staple food (285 kcal) a day while pregnant and the equivalent of an extra meal (500 kcal) while breastfeeding.
	Consume enough extra calories to gain at least one kilogram per month in the second and third trimesters of pregnancy.
Dietary quality	Increase daily consumption of fruits, vegetables, animal products, and fortified foods.
	Use iodized salt.
	Decrease consumption of iron-inhibiting foods, such as tea, with meals.
Micronutrient intake	Take daily supplements of 60 mg iron and 400 micrograms folic acid or multiple vitamin/mineral supplements during pregnancy and during the first three months after delivery.
	If pregnant and anemic, take 120 mg of iron and at least 400 micrograms of folic acid per day for three months and then continue taking a daily dose of 60 mg iron for the next three months of pregnancy and the first three months after delivery.
	Only in areas where vitamin A deficiency is a severe public health problem, supplement with 10,000 IU of vitamin A (daily dose) or with up to 25,000 IU of vitamin A (weekly dose) during pregnancy.
	Postpartum vitamin A supplementation is not recommended.
Disease prevention and treatment (high priority for malaria and worms)	Seek immediate treatment for diet-related symptoms such as nausea, vomiting, diarrhea, fever, loss of appetite, sores in mouth, constipation, heartburn, and bloating. Diagnosis and treatment of malaria through antenatal care is a high priority.
	In the second and third trimesters, take at least two doses of intermittent preventive treatment (one dose is three tablets of SP--Sulfadoxine-pyrimethamine) for malaria. Doses should be at least one month apart. In areas with high HIV prevalence, give a third dose during the last antenatal care visit (taking national policies into account).
	Sleep under an insecticide-treated bed net and use insecticide-treated materials for curtains.
	Take a single dose of albendazole or mebendazole in the second trimester of pregnancy to prevent hookworm. In highly endemic areas, take an additional dose in the third trimester.
	Wash hands with soap before eating and only drink treated water.
Supportive lifestyle and care	Initiate breastfeeding in the first hour after birth and exclusively breastfeed for the first six months.
	Use family planning to delay the next pregnancy for at least three years after giving birth.
	Use contraceptives that are supportive of breastfeeding.
	Rest more during pregnancy and lactation. Reduce workload—for example, get help from household members such as mother, mother-in-law, baby’s father.

In addition, although research on maternal nutrition remains relatively limited, a general understanding of some of the major issues implicit in the conceptual framework and underlying the essential maternal actions is known. For example, access and availability of foods influence diet quality and quantity. Likewise, access and availability of health services affect the implementation of ideal health practices such as iron supplementation and seeking care for malaria and intestinal parasites. Table 2 below provides a checklist of some of the major topics to explore within the broad areas of inquiry relevant to formative research on maternal nutrition.

Table 2: Checklist of potential issues in achieving optimal maternal nutrition practices

Food availability or access
Lack of access to sufficient food due to poverty, intra-household dynamics, etc.
Lack of availability of sufficient and high-quality food, especially animal-source foods, due to poverty as well as to market, environmental, and geographic issues.
Lack of availability of micronutrient-rich foods.
Lack of access to iodized salt.
Lack of access to fortified foods and products.
Awareness and knowledge of special needs during pregnancy
Perceptions of healthy pregnancy and management for an easy, safe birth and a healthy newborn.
Lack of awareness of the need to increase caloric intake during pregnancy.
Lack of awareness of the need to increase the intake of high-quality, micronutrient-rich foods.
Lack of availability and access to supplements.
Unwillingness to change work patterns due to social and family reasons.
Health professionals or volunteer support for monitoring and guidance during pregnancy
Lack of awareness of the need to monitor pregnancy weight gain or look for overt signs of anemia.
Inability to easily access health professional or volunteer support for basic antenatal care and support.
Lack of attention on the part of health service staff and volunteers to the dietary needs of pregnant women due to lack of time, awareness, or knowledge.
Availability and access to micronutrient supplements
Lack of supplies and supply chain issues in the facility and community, especially resupply of iron tablets and other basic commodities.
Lack of understanding by health professionals of adherence issues linked to successful use of supplements.
Family and local support to meet extra food and supplement needs and rest during pregnancy and lactation
Lack of access to or use of formal and informal (volunteer-provided) health services.
Family and community perceptions and practices related to pregnancy care and support.
Lack of support within the family for extra food needs during pregnancy due to household dynamics.
Gender imbalances; expectations for work are unchanged.
Lack of awareness and understanding of pregnancy and lactation requirements.
Food preferences and beliefs
Individual food preferences that run counter to recommendations—for example, not consuming more fruits or vegetables or a fortified food.
Physical issues (nausea, other discomfort) that may limit regular consumption of iron-folate supplements.
Individual, family, or community food beliefs such as the desire to NOT gain too much weight during pregnancy for fear of having a large baby, dietary restrictions on foods, or picas.

Knowing the country, region, or project context

The first step in conducting research on maternal nutrition is to understand the country and program context; that is, identify what is already known and documented about maternal nutrition in the country where the formative research will be undertaken. Multiple sources of country-level information are available that might contribute to a maternal nutrition profile (see Table 3). The primary quantitative indicators of maternal nutrition include: body mass index (BMI), female adult height and weight, weight gain during pregnancy, iron and vitamin A status, measures of dietary diversity, and other micronutrient consumption proxy measures. Information on the use of health services, especially prenatal and antenatal care visits, can provide important tracking measures for maternal nutrition (Appendix D includes a list of definitions of key maternal nutrition indicators).

Table 3: Nutrition literature review sources

Source of information	Description of data available
Demographic and Health Surveys www.measuredhs.com	Household, and female and male questionnaires , including data on: <ul style="list-style-type: none"> - Maternal health, including consumption of iron tablets and anti-malarial drugs, and use of antenatal and postnatal care. - Maternal nutritional status: anthropometric indicators for non-pregnant and pregnant women. - Micronutrients: iodization of household salt; micronutrient intake among mothers; prevalence of anemia in women. - Consumption of vitamin A–rich foods, vitamin A supplementation rates. - Minimum dietary diversity. - Other information in modules for malaria, water, sanitation and hygiene, and HIV.
WHO database on vitamin and mineral deficiencies www.who.int/vmnis/en/index.html	A resource that compiles national, within-country regional, and first-administrative level data on: <ul style="list-style-type: none"> - Vitamin and mineral nutritional status of populations in United Nations Member States. - Anemia, vitamin A deficiency, and iodine deficiency.
USAID Knowledge, Practices, and Coverage (KPC) Surveys www.mchipngo.net/controllers/link.cfc?method=tools_kpc_modules	Rapid knowledge, practices, and coverage survey questionnaires: <ul style="list-style-type: none"> - Module 3 includes maternal anthropometry questions. - Module 5 includes intermittent preventive treatment (IPT) during pregnancy, contraceptive use, knowledge of birth spacing, and iron tablet consumption.
UNICEF Multiple Indicator Cluster Surveys (MICS) www.childinfo.org/mics.html	Household surveys: information on malaria, WASH, HIV, and maternal health, including antenatal care.

Additional resources to consult for more quantitative survey data and qualitative information include:

- Ministries of health/health management information systems—many countries now have websites.
- Relevant journal articles and project documents:
 - Multidisciplinary journals (www.ingentaconnect.com)
 - US National Library of Medicine (www.ncbi.nlm.nih.gov/pubmed/)
 - International Information Support Centre (www.asksource.info/databases.html)
 - All USAID-funded project reports and documents (<http://dec.usaid.gov>)

Using secondary source data and information to guide formative research: an example

A literature review will help to identify the gaps in understanding that formative research will attempt to fill. To guide formative research, much can be revealed about the determinants of maternal undernutrition through quantitative information. The richer the sources available for existing background information, the better the formative research questions can be refined.

For example, Table 4 below shows readily available information related to maternal nutrition from three countries, Uganda, Nepal, and Honduras. In general, the information shows the poor state of maternal nutrition, and a varied pattern of antenatal care and of use of pro-nutrition services. While the practice of pro-nutrition behaviors varies, diet quality is inadequate in all three countries. On the surface, national-level indicators may look similar, but the reasons behind practices will differ by country. Also, although regional differences may be masked by national-level data in some countries, a national picture of maternal nutrition is a starting point. Developing a national profile focuses the research on high-priority maternal nutrition issues.

Table 4: Country profiles for Uganda, Nepal, and Honduras—quantitative data on maternal nutrition

Category and status	Uganda	Nepal	Honduras
Nutrition status (percent)			
Under 145 cm in height	1.9	10.4	9.8
Thin: BMI < 18.5	12.1	24.4	4.0
Overweight or obese: BMI > 25.0	16.5	8.5	46.6
Any anemia	41.9	36.2	26.7
Moderate and severe anemia	11.3	6.7	4.1
Nutrition-related health care practices (percent)			
Pregnant women consuming any iron syrup or tablets	63.1	59.3	80.6
Pregnant women consuming iron syrup or tablets for 90+ days	0.7	28.8	70.2
Women taking deworming medicine during pregnancy	26.8	20.3	6.9
Pregnant women using any antenatal care	94	44	92
First antenatal care visit (mean number of months of pregnancy)	5.5	4.6	2.9
Nutrition-related practices			

Diet diversity—mean number of food groups/day (0–9)	2.9	3.4	4.2
Consumed dairy in previous 24 hours (percent)	23.8	43.4	64.3
Consumed vitamin A–rich fruit or vegetable in previous 24 hours (percent)	19.6	19.8	32.7

Based on the information collected for these three countries, some of the country-specific priorities begin to emerge. For example, in **Uganda**, dietary improvement should focus on improving poor dietary diversity. It can be presumed (but should be tracked) that as diversity improves, food quantity would also improve. Given that adequate iron supplementation during pregnancy is almost non-existent, very high priority should be placed on learning how to improve adherence to iron supplementation. Some general research issues that might be addressed include:

- Disparities between foods available to the family and those eaten by the pregnant woman.
- Perceptions about diet during pregnancy on the part of the woman and family members, particularly related to consumption of “nutrient-dense” foods and animal-source foods.
- Ability and willingness among household members to place priority on providing quality foods for the pregnant woman.
- Availability of iron supplements and the potential to access iron supplements through private shops and community sources so that women might start taking them when they know they are pregnant even before they go for their antenatal care visit.
- Concerns of women who take iron pills; the reasons they give for not continuing to take supplements.

In contrast to the situation in Uganda, in **Nepal**, where a quarter of the women are thin, improving both the quantity and the diversity of food should be explored. In particular, the low consumption of vitamin A–rich vegetables is a concern given traditional dietary patterns. Overall, the use of nutrition-related (and antenatal care) services is the lowest of the three countries. This raises issues not only of access to care but also of women’s status. Some general research issues that might be explored include:

- The perceptions of women and other family members about diet during pregnancy, particularly related to eating extra quantities of food and specific nutrient-dense foods (such as fruits and vegetables, eggs), and increased use of dairy products. This includes ideas and perceptions about the ease of childbirth and changing diet.
- Pregnant women’s perceptions of their place in the household and the larger family context, and their willingness or ability to speak up about their health and about protections and support while they are pregnant. What is their level of self-efficacy?
- Awareness of family members about the needs of a pregnant and breastfeeding woman and their willingness to try to meet those needs.
- Attitudes toward “modern” health care and medicines, and obtaining care during pregnancy.
- Awareness of the symptoms of anemia and experience with iron supplements.

Finally, in **Honduras**, where many women are overweight, emphasis needs to be on eating nutrient-dense foods, particularly vitamin A–rich fruits and vegetables. Although the diet diversity score in Honduras was better than in Uganda and Nepal, it is still low, with an average

of 4.2 out of 9 food groups consumed each day. Coverage with iron supplements appears to be high, although anemia still affects a quarter of women, and that could be due to poor sanitation and lack of deworming. Some general research topics in this context might be:

- Availability and willingness (perceptions about the foods) to procure vegetables and fruits and other nutrient-dense foods such as eggs and dairy products for pregnant and lactating women.
- Perceptions of a healthy diet and of high-value foods both nutritionally and economically.
- Household sanitation practices and the level of parasites; how to improve hand washing, proper disposal of feces, and treatment of water to reduce parasites and infections.
- Other causes of anemia or contributors to anemia.

To define research questions, assembling the information gathered into a format that facilitates identification of knowledge gaps is particularly useful. A practical tool for this purpose, **The Optimal Maternal Nutrition Practices Matrix**, can be found in Appendix D. This matrix lists the optimal practices shown in Table 1 and contrasts them with what is known about current practices in a particular program setting including information on motivations and barriers and specific gaps in information. This matrix should be used throughout the research process, first to organize existing information gained from secondary data sources, and later on, to add highlights about what was learned from the primary research.

Choosing the research participants, methods, and plan

Based on program priorities and a review of quantitative information and any relevant qualitative studies, broad objectives for the formative research are set. Following this, more specific decisions can be made about the parameters of the formative research, such as who will participate and which methods will be used. The goal of the research plan is to choose respondents who can provide the most relevant and useful information about: maternal nutrition-related practices, who or what influences those practices, and who or what needs to be considered in facilitating change in practices. The choice of research methods will depend on which ones allow the respondents to provide the most accurate and useful information about maternal nutrition-related practices. As the research plan is refined, it may be necessary to sequence the research in phases since different methods may be more appropriate to gather certain types of information. Other considerations in planning include the size of the budget and the capacity of the researchers. Formative research is a learning process that begins from the general and moves to the specific. It starts with an understanding of current practices and progresses to knowing what and how certain critical practices can be improved including identifying the inputs needed to facilitate and motivate improved practices.

Research participants

The most common groups of participants for maternal nutrition-related formative research are:

- Women (usually divided by their trimester of pregnancy and immediate post-partum status).
- Husbands of pregnant women or women who have recently delivered.
- Mothers or mothers-in-law of pregnant women, particularly if living in same household.

- Other members of the community who might be involved in maternal care, such as the community health worker, local midwives, trained birth attendants, or others who visit or provide services to pregnant women.
- Individuals outside the immediate community, including at the health center, birthing center, store, or market.

Research participant groups should be defined and organized by environmental and cultural factors that are important in pro-nutrition practices, as this will facilitate interpretation of the data and drawing conclusions from the findings. To identify the important criteria that might be applied to organizing participant groups, start by finding out, for example, whether women and their families with different religious beliefs follow different dietary or health-related pregnancy practices. If they do, then this would be a factor to account for in the planning and analysis of the research. If not, then this would not be a key factor for the research. Typical factors that should be explored in defining who to include in the research and how many geographic areas to select include:

- Rural or urban location or proximity to a health facility.
- Highland, lowland, or coastal areas; or rainy and arid areas.
- Market accessible, market non-accessible.
- Ethnic groups.
- Religious groups.

Finally, segmenting the categories of research participants (pregnant women, recently delivered women, mothers of those women, traditional birth attendants, their religion, geographic location, etc.) even further according to additional criteria could help in the interpretation of the results of the research. For example, criteria that could be used to segment the sample of pregnant women might include the following:

- *Experience with pregnancy and birthing:* First time pregnant women and those who have had at least one pregnancy.
- *Woman's age:* Adolescent women and others. In certain cultures, younger women are often completely dependent on their mothers or mother-in-law.
- *Nutritional status or health status of woman:* Women who are having a “trouble-free pregnancy” and women who have had multiple health problems, don’t feel well, or who are HIV-positive.
- *Education level of the woman:* No schooling or less than three years of schooling and those with more than three years.
- *Woman's work status:* Women working outside the home (particularly in heavy labor) and women working in or near home.
- *Families' socio-economic status:* Women who are marginalized by socio-economic class or caste and those who are not.
- *Birth practice:* Mothers who delivered their child in a facility, by trained attendant, and those who delivered at home without a trained attendant.
- *Experience with a nutrition-promoting behavior:* For an investigation about adherence to iron supplementation, it would be beneficial to separate women into those who have taken the supplement, those who took it and stopped soon after beginning, and those who have never taken the supplement (a “doer / non-doer” segmentation).

Bear in mind, however, that implementing research that includes a finely segmented sample requires considerable field work in advance to be able to recruit the proper respondents who meets all of the segmentation requirements.

Research methods

The kind of information needed (current practices, potential practices, community norms, product availability, etc.) should dictate a particular formative research method since, depending on the sensitivity of the topic, not all methods lend themselves to truthful or insightful answers. Also, the amount of available time, as well as financial and human resources, will influence method selection. Even if time is limited, something can be done to better understand the potential program participant's point of view. If more time is available a multi-phased research activity is possible. The typical methods available and their uses as well as sources to consult for additional information are listed below in Table 5.

Table 5: Research methods and their use

Method	Use*	Key resources for more information
Pre-coded knowledge, attitudes, and practices (KAP) survey	Find the prevalence of particular practices in a given geographic area; differences and similarities among areas, ethnicities, and income levels; or certain relationships among practices.	USAID Knowledge, Practices, and Coverage Surveys (KPCS): www.mchipngo.net/controllers/link.cfc?method=tools_kpc_modules <i>Infant and Young Child Feeding Practices, Collecting and Using Data: A Step-by-Step Guide</i> . Atlanta: CARE; 2010.
Focus group discussions	Obtain information on norms, attitudes, and beliefs, but not on individual practices.	Mack N, Woodsong C, MacQueen KM, et al. <i>Qualitative Research Methods: A Data Collector's Field Guide</i> . Research Triangle Park, NC: Family Health International (FHI); 2005. Debus M (Porter/Novelli). <i>Methodological Review: A Handbook for Excellence in Focus Group Research</i> . Washington, DC: Academy for Educational Development (AED)/ Healthcom; 1990. de Negri B, Thomas E. <i>Making Sense of Focus Group Findings: A Systematic Participatory Analysis Approach</i> . Washington, DC: AED; 2003.

Method	Use*	Key resources for more information
In-depth individual interviews with women	Understand what is done on a daily (or frequent) basis and less frequently; understand the reasons for practices, and influences on practices and the context in which decisions about nutrition-related practices occur. This method is often combined with dietary assessments and participant observations.	<p>Mack N, et al. 2005.</p> <p>Favin M, Baume C. <i>A Guide to Qualitative Research for Improving Breastfeeding Practices</i> (Expanded Promotion of Breastfeeding Program). Washington, DC: USAID; 1996.</p> <p>The LINKAGES Project. <i>Formative Research: Skills and Practice for Infant and Young Child Feeding and Maternal Nutrition</i>. India: The LINKAGES Project; January 2003.</p> <p>Dicken K, Griffiths M, Piwoz E. <i>Designing by Dialogue: A Program Planner's Guide to Consultative Research for Improved Young Child Feeding</i>. Washington, DC: Support for Analysis and Research in Africa (SARA) Project; 1997. www.manoffgroup.com/resources/Designing%20by%20Dialogue.pdf</p> <p>Davis TP. <i>Barrier Analysis Facilitator's Guide: A Tool for Improving Behavior Change Communication in Child Survival and Community Development Programs</i>. Washington, DC: Food for the Hungry; 2004. https://caregroupinfo.org/vids/bavid/player.html</p>
Key informant interviews	Understand the role of “gate-keepers” or decision-makers on maternal nutrition practices within the family or broader community.	See references above.
Trials of improved practices	Test out actual “new” or modified practices in order to gain additional insight into how programs and efforts to support them can best be designed.	<p>Dicken K, et al. 1997</p> <p>Favin M, and Baume C. 1996</p>
Market survey	Obtain information on the availability and costs of different foods or potential food options in the diet.	<p><i>ProPAN: Process for the Promotion of Child Feeding</i>. Washington DC: Pan American Health Organization (PAHO); 2003. www.paho.org/English/AD/FCH/NU/ProPAN-Index.htm</p>

Method	Use*	Key resources for more information
Dietary analysis	Obtain information about the nutritional adequacy of the diet, or to estimate adequacy of a particular nutrient.	ProPAN, 2003. Dicken K, et al.1997 The LINKAGES Project. <i>Formative Research: Skills and Practice for Infant and Young Child Feeding and Maternal Nutrition</i> . India: The LINKAGES Project; January 2003.
Recipe trials	Obtain information about foods available at home and how women might combine them in a special food for pregnancy and lactation.	Dicken K, et al. 1997

*While many of the sources of information, protocols, and manuals focus on infant and young child feeding, they can be adapted for exploring maternal diet and other nutritional topics.

Some of the more common missteps to avoid in matching information needs with collection methods include:

- Using a method based upon what the researcher is familiar with or a method that is currently popular, rather than choosing the best method(s) to answer the questions posed for the formative research.
- Conducting focus group discussions to gather information about daily practices. Focus groups do not allow for “honest” answers about practices because participants are often reluctant to describe what they do in front of people they know, or they will mimic what others say. Focus groups are good methods for discussing notions of care during pregnancy or the post-partum period; beliefs about the properties of foods; typical practices or beliefs about pregnancy, delivery, and breastfeeding in the community; and ideas about what might or might not be acceptable to change and why.
- Asking key informants such as nurses and village leaders to provide information on women’s practices. They cannot speak credibly about what women do and why; their answers are speculative and biased by their own opinion and/or professional training.
- Assuming that defining current behaviors and determinants will lead to answers about the feasibility of potential changes or new practices. The determinants of current behaviors are not necessarily determinants of new behaviors. Rather, they are merely a starting point for defining what and how a practice might be modified (see Box 1).
- Thinking that baseline or quantitative surveys, which collect information on prevalence of certain practices or beliefs, provide insight into practices. Survey results seldom answer precisely why or how certain practices are followed. When they do try to probe the reasons behind a particular practice, the need to categorize or shorten the response often skews insight into the logic behind a certain practice and can lead to a misunderstanding about the true rationale. Once the qualitative research has been done to

better understand peoples' thinking and motivations, a quantitative survey can be used to estimate their prevalence and change over time.

Box 1: Current behaviors do not always determine new behaviors

In many countries, the vast majority of women delay the initiation of breastfeeding. They say they delay offering the breast because it is a tradition and that those attending the birth recommend against giving colostrum to the baby. They cite many disadvantages to giving colostrum and seem to firmly support delayed initiation.

Based on this information, many programs have felt these beliefs are too firmly held to try and change. However, experience shows that when Trials of Improved Practices (TIPs) research is used to ask mothers to try to breastfeed immediately and to offer colostrum, and they are offered information about colostrum's benefits and the benefits of early initiation, the mothers are willing to try and virtually all make the change. The determinants of the new behavior in this case are "new" information about the increased chance of survival that immediate breastfeeding offers and the respected advice of a health professional encouraging immediate breastfeeding.

Exploring the mother's perceptions about a practice while she is being confronted with its implementation demonstrates that the real barriers and motivations to doing something "new" are often very different from the reasons for maintaining the current behavior. In this case, uncovering the cogent benefits and having them communicated by a trusted source often lead to widespread and rapid change. While this is not always the case, exploring determinants of new behaviors (in addition to understanding current behavior) through the process of asking a small sample to try "new" behaviors allows for more clarity about the requirements of change.

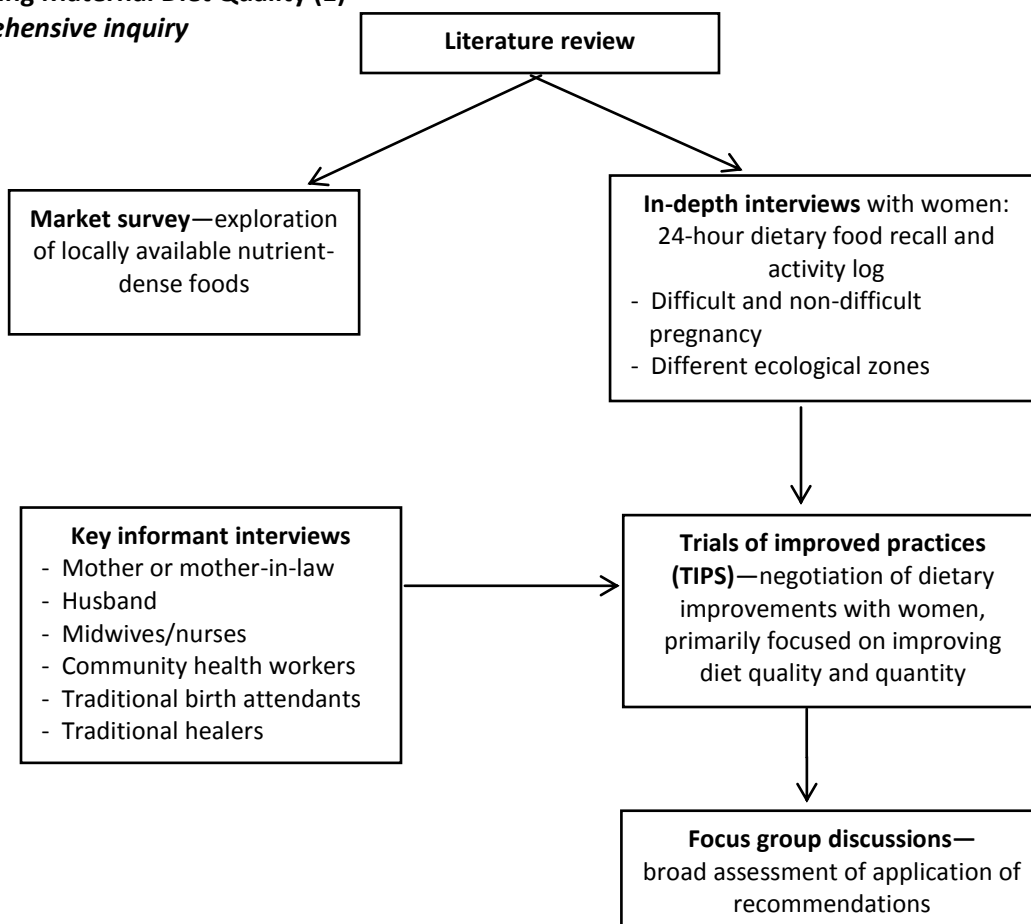
Research plan

There are many ways to structure a formative research activity to answer the array of research questions that programs usually want answered. There is no one correct way—it is context specific, and depends on the time and budget available. From a technical point of view, selecting the right people and the right methods to obtain the most valid or true information regarding attitudes and practices, and their influences and determinants is essential to creating a plan that will yield fruitful results. Box 2 provides two examples of research plans that involve a number of methods and participants, both of which could yield useful information for program design.

Box 2: Examples of research plans

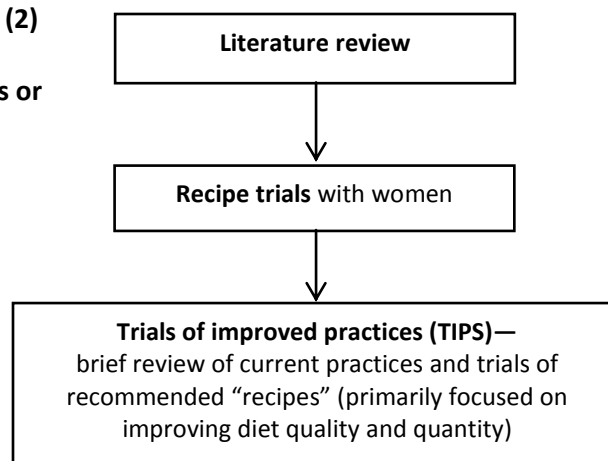
Improving Maternal Diet Quality (1)

Comprehensive inquiry



Improving Maternal Diet Quality (2)

Limited inquiry (focused mainly on foods, as opposed to practices or social context)



Defining specific research questions, guides, and analysis tools

Developing a research plan that will answer the pressing program design questions and that fits within budget, time, and personnel constraints addresses only part of research preparation. For each method or research activity and, often, for each participant group that will be involved in the method, a question guide is needed. Multiple instruments/tools are usually required to provide structure and organization for the investigators and to ensure that basic information is collected along with additional probing/contextual information that provides more individualized and detailed data.

Information collection techniques

Shaping the tools that will be employed for information collection requires skill and creativity. The way a question is posed or the order in which the questions are asked often leads to bias in the answers. To minimize interviewer bias or to help elicit more unbiased responses from respondents who might be inclined through direct questioning to provide what they feel is the “right answer” or “what the investigator wants to hear,” it is best in some cases not to ask questions at all. Observation or offering a picture or a sentence to be completed is effective to begin discussions and gather ideas and thoughts.

Regardless of the method, the techniques employed in the research (see Box 3 for examples) are often the difference between research that will offer new insights and research that only confirms current thinking or conventional wisdom. For example, options for how to improve diet quality can be obtained by having women sort pictures of common foods into piles based on availability in her area and then based on frequency of family use. This exercise can rapidly indicate the available foods that might be used with more frequency in her diet and can be a more promising avenue to discuss improvements than suggestions being posed by the investigator. Likewise, when asking women to describe how they are

Box 3: Examples of information collection techniques

Projective techniques—these are stories or photographs that are shared with participants in order for them to “project” their feelings about a particular topic or person in describing the photo or finishing the story. For example, a variety of photographs of people can be displayed and research participants can describe from whom they would seek advice about child care or health and why, or they can describe who is a good parent and why. These insights are helpful in understanding motivations for particular behaviors.

“Free listing” or “pile sorts”—these techniques are used to better understand processes, associations, or priorities that people give to certain things like foods. For example, people might be asked to sort foods into those that have hot and cold properties; body building or body purification properties; good first foods or those inappropriate before a child has teeth, etc.

Observations—these can be structured (usually a checklist) or unstructured and are typically used to get information on the physical environment or on actual feeding practices or interactions.

24 hour dietary recall—this detailed listing of every food consumed by amount and time of day allows for a more accurate understanding of intake than simple questioning. However, the interviewers require special training, standard measuring instruments must be provided, and professional assistance is needed to analyze and interpret results.

feeling while pregnant, a more accurate accounting can be obtained when they look at pictures of women and talk about how they imagine each woman is feeling. Then the investigator can ask which woman best represents her.

Different techniques (and research methods) can be combined to verify respondents' answers. For example, in-depth interview questions about hand washing might be followed by an observation of whether or not the house has a hand washing station. Table 6 below illustrates techniques that work well with different inquiry methods.

Table 6: Inquiry methods and commonly used information gathering techniques

Method	Common techniques
Focus group discussion with mothers-in-law (MIL) of pregnant women, or mothers in the case of unmarried women or pregnant women who reside with their mothers	<ul style="list-style-type: none"> • Open discussion with probes. • Photo-sort with various photos of MIL with their daughters-in-law to elicit a discussion of relationships and responsibilities of MIL for their pregnant daughters-in-law; images of foods to discuss what foods are good for pregnant women and what their role is in ensuring a healthy diet for their pregnant daughter-in-law. • Stories of particular family scenarios to which the interviewee offers an ending.
In-depth interview with a pregnant woman	<ul style="list-style-type: none"> • Open-ended questions about practices. • Dietary assessment: 24-hour or one-week food recall to understand what she has eaten recently. • Observation of a meal to assess quantity and quality of the diet; review of stores of food in the home and what the rest of the family is eating to assess potential opportunities for the woman to improve her intake. • Photo-sort with pictures of women who are not known but who have characteristics similar to women in the area; the woman can be asked to describe who is having a healthy pregnancy and who is not and why; then she can be asked to talk about which woman best reflects her own situation and why.
Recipe trial with pregnant and lactating women to find particular high-nutrient foods for them	<ul style="list-style-type: none"> • Free-listing to see the various properties of foods. • Participant-observation, to see how foods are combined and prepared, and to see combinations the women make from nutrient-dense foods. • Trying/cooking different foods/combinations, to see the women's reaction and preferences and whether they think they might make the recipes at home.

Research questions

The specific research questions that a formative research plan will address will be determined through the process described in this guide: using secondary sources to help begin to determine priorities, to learn what is known and where gaps exist in information on maternal nutrition, and to identify needs for audience segmentation. The program budget and project/program expectations are also major factors in deciding how the formative research can and will proceed. The research topics and questions will depend on these decisions. Previous global experience investigating behaviors and practices related to maternal nutrition can also serve as a useful guide during these processes of formative research design. Table 7 provides a summary of the type of information that might be explored with different audiences/research participants when the focus is on maternal diet and iron supplementation. Appendices E, F, and G provide samples of formative research tools that have been used for maternal nutrition research.

Table 7: Information by participant

Topic	Research participant	Information around which to form questions or develop other information-gathering techniques
Perceptions about pregnancy and diet, including both the quantity and quality of food	First-time pregnant women and multiparous women	Experience with pregnancy to-date and observations about diet and its effect.
		Ideas about foods and their effects on the developing fetus.
		Who offers advice, and what is that advice.
		Extent to which she is adhering to advice; why or why not.
		Foods served yesterday in the house for the main meals; her consumption of those foods; why or why not eaten.
		Thoughts on how her diet will change over the course of the pregnancy; amounts she will eat per meal and per snack; foods will she add or avoid.
		Circumstances that will affect her ability to get food over the course of her pregnancy (for example, change in seasons, migration, husband outside the home for work).
		Expectations about and knowledge of foods, or nutrition-related practices to follow or avoid.
	Post-partum women who are breastfeeding	Reaction to specific suggestions about diet and whether a woman has the ability to alter her diet.
		Experience breastfeeding and general recuperation from the birth.
		Description of her diet compared to pre-pregnancy and during pregnancy; eating habits now—whether she eats approximately the same quantity, more than normal, or more than during her last trimester before birth.
		Ideas about adding more food at each meal, snacking on the family food while preparing it, or taking an extra meal during the day.
		Thoughts about her milk production and transfer of nutrients in milk to babies.
		Reaction to specific suggestions about diet and whether a

Topic	Research participant	Information around which to form questions or develop other information-gathering techniques
		woman has the ability to alter her diet.
	Mothers or mothers-in-law present in home	Perceptions of her daughter's or daughter-in-law's pregnancy.
		Knowledge of foods, or nutrition-related practices to follow or avoid.
		Participation in household food decisions and cooking.
		Foods served yesterday in the house for the main meals and what foods are generally available in the household.
		Report of what happens at meal time and whether she eats with her daughter or daughter-in-law.
		Thoughts on certain dietary recommendations to improve the nutrition/health of the pregnant woman.
		Opinion on whether she could advocate for or affect diet changes—why and why not.
	Community health workers and/or midwives	Knowledge of foods, or nutrition-related practices to follow or to avoid during pregnancy and post-partum periods.
		Current advice and particular information they provide about diet under specific conditions.
		Opinions about their role and ability to help women improve their diets.
		Opinions about which changes are possible under what circumstances, such as the pre-harvest/lean season and the post-harvest season of more abundance.
<p>Adherence to recommendations for iron-folate supplementation</p> <p><i>Multiple country studies show that the three danger periods for quitting are: the first few days, when side effects are worse; a week to 10 days after starting, when anemic women feel much better/"cured"; and when their</i></p>	Pregnant women and those up to four months post-partum with no experience taking iron-folate pills	Experience with pregnancy to-date or with birth and general health and feelings of tiredness.
		Knowledge about and experience with symptoms of anemia ("tired blood") and its causes, effects, and possible remedies; explore women's categorization and name for the condition.
		Knowledge of iron tablets and classification as a diet supplement or medicine.
		Opinion about taking the tablets daily for many months, including potential positives and negatives or fears.
		Who would have to decide whether she could take tables—is it her decision alone?
		Would she be willing to try for a month?
	Pregnant women and those up to four months post-partum with experience taking iron-folate pills	Same topics as above.
		Why were tablets taken—for prevention or treatment?
		Experience with the tablets: did they feel better or worse, and what was done if the tablets made them feel worse.
		Source of tablets and advice given with tablets.
		Ideas about where to find the tablets.

Topic	Research participant	Information around which to form questions or develop other information-gathering techniques
<i>initial supply of tablets runs out and they need to make an effort to get re-supplied. Research questions should probe feelings and practices at these times.</i>		Period of time taking tablets. Why did they quit?
		Where were the tablets stored when taken during the day?
		How did they remember to take the tablets every day?
		Amount of tea, coffee, or milk consumed.
		Opinions of others about the tablets.
		Opinion about trying the tablets again for a month.
	Health center staff	Iron-folate distribution within pre-natal and post-partum care.
		Knowledge about the tablets and their main side effects.
		Knowledge of advantages of taking the tablets; disadvantages of taking them or stopping before a full 90-day supply has been taken.
		Consistency of supply at the health center.
		How tablets are administered—how many at a time, in what kind of container, and with what advice.
		General experience with women taking the iron tablets and how reported problems are resolved.
	Shopkeepers and pharmacists	Product that they sell for anemia or “tired blood”?
		Why for anemia? Knowledge of anemia.
		Do women ask for help in finding products or do they request products by name?
		Is there always a consistent stock of the anemia-control items?
		Do they dispense advice on how to take the product?

Analyzing and communicating results

Thinking about and planning for analysis and reporting should be discussed at the planning stage of the formative research. Setting up summary sheets and matrices to catalogue findings during tool development will ensure that each piece of the instrument is generating information that can be used to answer the research questions. Developing the analysis tools ahead of time (during planning and design of research) saves time and allows for analysis to begin in the field. Also, ensuring that the field supervisors know the type of analysis that is expected will allow them to focus on the information collection.

At a minimum, the matrix in Appendix D can be modified, expanding sections or making multiple matrices, one for each population segment to begin to catalogue responses and use in the field. Additional tally sheets can be set up to allow a field supervisor to look for trends in responses so they can assess if the research questions should be expanded to capture important variances. For example, to determine if interesting patterns emerge that need further exploration,

separate tallies can be kept on various practices of women who live in nuclear or in extended families, or who might be within or beyond a 30-minute walk to the nearest health practitioner.

Since most formative research is in-depth and qualitative (even if it has quantitative aspects such as dietary recalls), it is critical to plan for case studies or typology analysis to illustrate important points about what was discovered during the field work. For example, while talking about what most pregnant and lactating women are eating, it is often instructive to highlight a particularly poor diet as well as one of the best diets to show the extremes, and to show that some deficiencies exist even in the best diets. Similarly, if women's time appears to be an important limiting factor, then offering examples of women's time allocation would allow more insight than simply summarizing how many hours women work each day. Because qualitative research is exploratory and not static, daily briefings of the field workers should always include their observations about interesting deviations from the planned topic areas, and/or new relationships or patterns they have observed during the course of their interviews or visits. These observations can be looked at in light of the tallies that are being done and instruments modified to incorporate new lines of inquiry.

Formative research reports should go beyond a descriptive report of the information collected by method or participant group. The insights come from the researcher's synthesis looking across the findings from the various methods and participant groups. Some key principles to keep in mind when synthesizing the results from qualitative research include:

- Summarize and compare findings/results from all research methods used **by participant group**. Also summarize and compare findings/results from all the research methods **by practice** across participant groups. Summaries should highlight the majority practices and the common opinions among the participants while also noting the range of opinions and practices by the different characteristics of the respondents. The summaries will also identify the range of reasons behind the practices/responses. By comparing responses across methods and participant groups, it is possible to “triangulate” the results to find the most reliable answer to what is being practiced, by whom, and why. This cross comparison is also an opportunity to look for contradictions between what was said and observed, and to offer possible interpretations. For example, women report eating animal-source foods but none are observed in the home on interview day. An interpretation of this might be that women know these foods are important and desirable, but they are not a daily staple.
- Clarify and summarize processes that also arise out of the results and highlight patterns and trends. Use diagrams to show the usual sequence of practices and others to show significant deviations from these sequences. Developing taxonomies to describe poor health related to diet which include symptoms, causes, and remedies can also be helpful. Decision charts or algorithms that pertain to different participant groups can be helpful for articulating differences. For example, a decision tree could show when and from whom women seek advice for pregnancy-related questions. A taxonomy could be built for mothers' beliefs about “morning sickness” and how to address them.
- Interpret the findings to develop recommendations. Formulate action recommendations for each major finding or group of findings related to a specific topic or question. The recommendations must flow from the findings and not merely be a restatement of the

findings. Some recommendations have become commonplace or part of conventional wisdom and are expected; therefore, it is important to mention when a particular, expected recommendation is not offered because it is not supported by the research. Often “therefore” is a good transition from a finding to recommendation as follows:

Finding: A significant portion of women given iron-folate pills will take the 15- or 30-day supply, but they don’t seek a refill.

Therefore: The need for resupply of iron-folate pills requires reinforcement and the source must be convenient.

Recommendation: Initial counseling about the iron-folate tablets should include where to get a resupply and that the supply should be available in the community including through a home visit made by the community health worker.

Appendix A: Sources of information on formative research methods

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Appendix B: Maternal nutrition background documents

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Appendix C: Assessing maternal nutrition

The major indicators of maternal nutrition status include measures of body mass index (BMI), female adult height, weight gain during pregnancy, iron and vitamin A status and, as a proxy measure, low-birth-weight infants.

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight, and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). For example, an adult who weighs 70 kg and whose height is 1.75 m will have a BMI of 22.9.

Table 8: International classification of adult underweight according to BMI (kg/m²)

Classification	Principal cut-off points BMI
Underweight	<18.50
Severe thinness	<16.00
Moderate thinness	16.00 – 16.99
Mild thinness	17.00 – 18.49
Normal range	18.50 – 24.99
Overweight	>25.0

Source: World Health Organization

Female adult height that is below 145 centimeters is associated with higher risks of miscarriage, stillbirth, and delivery of a low-birth-weight infant. Because of these risk factors, short stature women require monitoring during pregnancy.

Pregnancy weight gain is not used as a population-based indicator of maternal nutrition, nor is it frequently applied in low-resource communities where pregnant women do not receive prenatal care regularly. Also, recommendations for weight gain during pregnancy, which vary according to pre-pregnancy weight and other factors, are under review.

Iron status is best understood as a continuum from iron deficiency with anemia, to iron deficiency with no anemia, to normal iron status with varying amounts of stored iron, to iron overload. The most common method of screening individuals or populations for iron deficiency involves determining the prevalence of anemia by measuring blood hemoglobin levels. The cut-off values for hemoglobin levels corresponding to anemia among women at different ages and pregnancy status are shown in Table 9.

Table 9: Hemoglobin levels below which anemia is present in a population

Age and/or status	Hemoglobin g/l
Non-pregnant women (above 15 years)	120
Pregnant women	110
Girls 12–14	120

Source: World Health Organization

Vitamin A deficiency is clinically assessed via eye signs and questions about night blindness and biochemically determined concentrations of retinol in plasma or serum. Deficiency is considered a public health problem when the prevalence of night blindness is 5 percent or higher in pregnant women or 5 percent or higher in children 24 to 59 months OR serum retinol levels among children 6 to 71 months are below 0.70 $\mu\text{mol/l}$ as follows:

- 2 to 9 percent (mild)
- 10 to 19 percent (moderate)
- >20 percent (severe)

Appendix D: Optimal maternal nutrition practices matrix

Ideal practice (recommendations)	Current practice	Motivations and barriers to improved practice	Gaps—questions needing answers
Dietary quantity			
Eat at least one extra serving of staple food (285 kcal) a day while pregnant and the equivalent of an extra meal (500 kcal) when breastfeeding.			
Consume enough extra calories to gain at least one kilogram per month in the second and third trimesters of pregnancy.			
Dietary quality			
Increase daily consumption of fruits and vegetables, animal products, and fortified foods.			
Use iodized salt.			
Decrease consumption of iron-inhibiting foods/fluids such as tea with meals.			
Micronutrient intake			
Take daily supplements of 60 mg iron and 400 micrograms folic acid or multiple vitamin/mineral supplements during pregnancy and first three months after delivery.			
If pregnant and anemic, take 120 mg of iron and at least 400 micrograms folic acid per day for three months and then continue taking a preventive dose of 60 mg iron for next three months of pregnancy and the first three months after delivery.			
Where vitamin A deficiency is a severe public health problem, supplement with 10,000 IU vitamin A (daily dose) or up to 25,000 IU vitamin A (weekly dose) during pregnancy.			

Ideal practice (recommendations)	Current practice	Motivations and barriers to improved practice	Gaps—questions needing answers
Disease prevention and treatment (high priority for malaria and worms)			
Seek immediate treatment for diet-related symptoms: nausea, vomiting, diarrhea, fever, loss of appetite, sores in mouth, constipation, heartburn, and bloating.			
In endemic malaria areas, the second and third trimesters take anti-malarial drugs to treat malaria regardless of symptoms (depending on national policies).			
Use insecticide-treated materials (bed nets, curtains).			
Take a single dose of albendazole or mebendazole in the second trimester of pregnancy as treatment for hookworms. In a highly endemic area, take an additional dose in the third trimester.			
Wash hands with soap before eating, and drink treated water.			
Supportive lifestyle and care			
Initiate breastfeeding in the first hour after birth and exclusively breastfeed for the first six months.			
Practice family planning for at least three years following the birth of a child.			
Use contraceptives that are supportive of breastfeeding.			
Avoid heavy labor or lifting during pregnancy, and rest more during pregnancy and lactation.			

Appendix E: Focus group discussion guide: Pregnant women and diet

- To understand pregnant women's perceptions about food, their own health and the health of their baby.
- To know women's opinions about particular recommendations for improving their diets.

Main topic	Key questions	Probes
The relation between diet and health during pregnancy including the health of the baby	I would like to show you some pictures of several pregnant women and I would like you to discuss who you think is healthy and having a good pregnancy and who is sick or might be having problems with her pregnancy.	Why are the women either healthy or sickly/with problems?
		Is their diet an influence and if so what is it about their diet?
		Is their "good" or problem pregnancy affecting their unborn baby, how?
	Now let's talk about women in this community. Which pictures best reflect the experience of women in this community?	Why and why not?
	What is the experience of women in this community with delivery/birthing?	Is the experience connected to her diet during pregnancy?
	Are most babies born healthy or are there many unhealthy newborns?	Is the experience connected to her diet during pregnancy?
Where women get information about diet during pregnancy, and adherence to the advice	Can anyone here tell me about some advice they have received about what to eat during their pregnancy? Who offered it or where did you learn about the recommendation?	Probe different sources of information: people in the family, relatives outside of the house, health practitioners, radio, TV, etc.
		What does the group think about the different pieces of advice?
		Would they follow the advice? Why and why not?
Reaction to recommendations from trials of improved practices	<p>Now I would like to share with you some recommendations that women in other communities have made about ways they have found to improve their diets during their pregnancy. I would like to hear what you think about them.</p> <ul style="list-style-type: none"> • Eat more food, by eating an extra tortilla mid-day and in the evening. • Eat more food by serving an additional large spoonful of beans with the meal twice a day. • Don't add food at meal time, but instead eat a snack like a small serving of beans and rice or a tortilla with beans or cheese. • Eat egg or cheese every day or at least several times a week. • Eat a serving of fruit or vegetable every day. This can be a mango, or a large piece of papaya, or carrots or tomatoes added to the food being prepared mid-day. 	<p>Opinion</p> <p>Feasibility</p> <p>Advantages or disadvantages</p> <p>Would someone in the household have to agree to this practice for you to try it?</p> <p>Would you be willing to try to follow the recommendation tomorrow or in this week?</p>

Appendix F: In-depth interview: Pregnant woman about her diet

(This would generally be a section of an in-depth interview that would also include: demographic info on the family; health of the pregnant woman during her pregnancy; pregnant woman's aspirations for her unborn child, and what she believes she can do to ensure the baby's health.)

Questions on diet during pregnancy

1. Can you tell me how you have been eating during your pregnancy?
 - a. Have you made any modifications from what you did before you became pregnant? What specifically and why?
 - b. In terms of the quantity of food that you are eating, how does it compare to the amount you ate pre-pregnancy? (quantities per meal and number of times)
 - c. In terms of what foods you are eating, have you made any changes? What foods have changed and why? Probe about what foods might be eliminated and what specifically might be added.
2. Are you hungrier now that you are pregnant or do you seem to have less appetite? Why do you think this is the case?
3. Do you think a pregnant woman should be careful about what she eats? Why?
4. In this community what do women usually do in terms of their diets? Are there foods that women try to get at different times of their pregnancy or that they try to avoid? Are there foods that are particularly good or bad for the growing fetus?
5. Now let's talk more about how you have been eating the past few days.
 - a. How many times a day do you eat? How many meals? And, how many smaller meals?
 - b. Before breakfast do you eat something? Do you eat anything between breakfast and the mid-day meal? And, between mid-day and dinner?
 - c. What about after dinner, before you go to bed, do you eat anything?
6. Do you have favorite foods or anything else that you are eating a lot of now that you are pregnant? Are there foods that are particularly appealing to you now that you are pregnant? Are you able to get these foods as much as you would like?
7. Some pregnant women find that they like things that are not normally considered foods, are there things that you would not normally eat that you are eating now?
8. Now I would like to ask you about a few specific foods: beans, rice, and corn.
 - a. Are you eating more, the same, or fewer beans now than before you were pregnant? Why?
 - b. Are you eating more, the same, or less rice now than before you were pregnant? Why?
 - c. Are you eating more, the same, or less corn now than before you were pregnant? Why?
 - d. Are these foods good for pregnant women? Which ones and why? If a pregnant woman doesn't get enough of these foods is there a problem?
 - e. Are any of these foods harmful to a pregnant woman? Which ones and why?

9. Now I would like to ask you about your consumption of eggs, milk, cheese, and meats of all kinds.
 - a. Are you eating more, the same, or fewer eggs now than before you were pregnant? Why?
 - b. Are you eating more, the same, or less milk and cheese now than before you were pregnant? Why?
 - c. Are you eating more, the same, or less meat of any kind now than before you were pregnant? Why?
 - d. Are these foods good for pregnant women? Which ones and why? If a pregnant woman doesn't get enough of these foods is there a problem?
 - e. Are any of these foods harmful to a pregnant woman? Which ones and why?
10. Now I would like to ask you about your consumption of fruit and vegetables, particularly those that are dark green.
 - a. Are you eating more, the same, or less fruit now than before you were pregnant? Why? Which fruit do you prefer?
 - b. Are you eating more, the same, or fewer vegetables now than before you were pregnant? Why? Which vegetables do you prefer?
 - c. Are these foods good for pregnant women? Which ones and why? If a pregnant woman doesn't get enough of these foods is there a problem?
 - d. Are any of these foods harmful to a pregnant woman? Which ones and why?
11. Have you changed any of the ways that you prepare food since you have been pregnant? For example, what about fried foods? What about foods with salt or sugar?
12. Are there any special foods or preparations or products that you are taking as diet supplements while you are pregnant?
 - a. Vitamin pills? (ask about iron-folate pills in detail separately)
 - b. Tonics?
 - c. Herbs?
 - d. Foods that are fortified like a cereal product?
13. Now I would like to talk about what you ate in the previous 24 hours.
(Insert a 24- hour dietary food recall)
14. Now I would like you to think about the last week and tell me if there are foods that you did not eat yesterday, but that you have eaten several times in the past week. What were they?

Appendix G: Trials of improved practices (TIPs) guide for use of iron-folate tablets

TIPS initial visit/interview

Introductory questions on pregnancy and anemia

1. Is this your first pregnancy?
2. How are you feeling? How has your health been during your pregnancy?
3. In general how have you been taking care of yourself during your pregnancy?
4. Have you made any visits to the health center/clinic or elsewhere?
 - a. Where? Why?
 - b. Is this where you have gone in other pregnancies?
5. How have you been eating during your pregnancy?
 - a. The same as before?
 - b. More food or less food?
 - c. Different foods? Why?
6. Are you taking any medicines? Vitamins? Tonics? Injections? Home remedies? Herbs?
 - a. Why?
 - b. With what frequency?
7. When a woman is pregnant do you think that there is any change that happens to her blood? Is it the same as a woman who is not pregnant?
8. During this pregnancy or a previous pregnancy, have you had any problems such as dizziness, weakness, headaches, heart palpitations, or extreme tiredness?
 - a. Why do you think they have occurred?
 - b. Are these feelings serious or normal for a pregnant woman?
9. Have you ever heard of anemia? Do you know what happens if someone says that a pregnant woman has anemia? (If she has heard of anemia, ask for more explanation.)
10. Why does a pregnant woman get anemia?
11. Can she avoid getting anemia/becoming anemic? How?
12. Can anemia be cured? How?

Questions on knowledge and use of iron-folate supplements

1. Do you know these tablets (show her the local iron-folate tablets)?

2. Do you know that some women take these tablets during their pregnancy? Do you know why? Do you know anyone who has taken them?
3. At any time have you taken them, either during this or an earlier pregnancy?
(If she has taken iron tablets, ask the next question)
4. For how long have you been or did you take the tablets? How was your experience? If she is not currently taking them, why did she stop taking them?

Introduction of the trial with the iron-folate tablets/supplement

- Explain to the woman that the municipal health professionals at the hospital and health facilities would like to know about women's opinions of the iron-folate tablets they distribute. Would she be willing to try the tablets and offer her opinion of the experience? Her experience will help the health professionals serve pregnant women better and improve the quality of their prenatal care services.
- Inform the woman that medical professionals believe that anemia is a condition that is especially dangerous for pregnant women and their unborn child and that taking the tablets is important in order to prevent the pregnant woman from developing anemia. The iron-folate tablet is a "vitamin" that is special for the pregnant woman to prevent anemia by strengthening the blood, giving the woman more strength and helping to improve her appetite and preventing her from becoming weak. Preventing anemia will help in making the birth less dangerous and will give her more strength for it.
- Explain that you are going to give her the tablets to take, and that she must take them as instructed.
- Give her the tablets (21 tablets or enough for 3 weeks)
- Tell her that she needs to take one tablet each day. She should decide when each day she would like to take the tablet.
- Talk with her about taking the tablets on an empty stomach—not with a meal.
- Explain that if she has any bad feelings such as indigestion, nausea, stomach pains, or constipation, she can take the tablets with a piece of banana or a citrus fruit like an orange or with juice.
- She should know that if her stools change color, this is normal and is a sign that the tablets are doing their job.
- Ask her to avoid coffee and tea around the time that she takes her tablet.
- Ask her where she will store her tablets. It should be in a safe place that children cannot access and that will keep the tablets dry.

- Tell her you will come back in about 3 weeks to talk to her about her experience with the tablets. Ask her about a good time to find her at home.
- Ask if she has any questions about the tablets or what she is going to do. Ask her to tell you what the agreement is about how she is going to take the tablets.
- Note any comments or reactions from the woman when she is being introduced to the tablets and any accommodations that she has suggested regarding her willingness/ability to participate in the trial.

TIPS follow-up visit

Follow-up questions—after the trial period

1. How have you been since we last met? How is your pregnancy progressing and how do you feel?
2. Do you have any iron-folate tablets remaining? If she does, ask to see them (note the number) and note how they were stored and their condition.
3. If she does have tablets remaining, ask her why they were not taken.
4. If there are no tablets remaining, ask her to tell you where and how she stored her supply and if there were any problems with the tablets.
5. Ask her to describe how she took the tablets: how many per day, at what time, and whether she needed to take the tablet with food.
6. Did she have any difficulty remembering to take the pill? How did she remember, or what does she think she could do to make remembering easier?
7. Did anyone else in the house know that she was taking the tablets? Did they comment and, if so, what did they say?
8. After taking the tablets, what is the woman's reaction: probe about both good and bad aspects and how she handled the bad aspects.
9. Did she notice any health effects? Probe about good effects such as more appetite, more strength, and less tiredness, and the bad effects like constipation and nausea.
10. Ask her again about the tablets: Was there anything about the tablets that she didn't like or that made it difficult for her to take the tablets? (size, color, taste, smell, difficulty swallowing, the frequency of taking them...)
11. Is she willing to continue taking the tablets until her child is born and even for a few months after her child is born?

12. If she is willing, where does she think she could get a resupply of tablets? Where would she prefer to go to get a resupply? (health center, community health worker, midwife, local healer, pharmacy, shop, other)
13. If she had to buy the tablets, would she be willing?
14. Would she be willing to tell her friends about the tablets? What would she say?
15. Would she like to have more tablets left with her at this moment? Why or why not?
16. Does she have anything else she would like to say about her experience with the iron-folate tablets?