Strengthening maternal nutrition counseling during routine health services: A gap analysis to guide country programs

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Short title: Maternal nutrition counselling: A gap analyses

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Authorship: JAK formulated the research question, designed and carried out the gap analyses, compiled and interpreted the data and wrote the article.

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Abstract

Objective: The World Health Organization (WHO) recommends counselling on healthy eating, weight gain, and physical activity during antenatal (ANC) and postnatal care (PNC), yet advice and information are often not tailored to women’s nutritional needs and contexts. The purpose of the gap analyses was to identify key elements related to the provision of maternal nutrition counselling during routine health contacts and provide program considerations to strengthen quality service delivery.

Design: A search of PubMed, Cochrane Library, CINAHL Plus, and Scopus databases was conducted to retrieve studies from January 2010–December 2021. Using inclusion criteria, quantitative, qualitative, and mixed methods studies were included in the final gap analyses.

Setting: Low-, middle- and high-income country contexts.

Subjects: Following application of gap analyses criteria, thirty-seven articles from sixteen countries were included in the analyses.

Results: Gaps in delivery of maternal nutrition counselling include provider capacity building, frequency, content, and delivery platforms. Globally, counselling on appropriate weight gain during pregnancy is often not delivered with the desired content nor quality, while targeted counselling to overweight and obese women was provided in several high-income country contexts. Delivery of maternal nutrition counselling through multiple delivery platforms demonstrated improvements in maternal diet and/or weight gain during pregnancy.

Conclusions: Strengthening the integration of maternal nutrition counselling into pre- and in-service curricula, routine health provider training, supportive supervision, and provider mentoring is needed. Future efforts may consider generating global and regional weight gain guidelines and incorporating maternal nutrition counselling indicators as part of quality-of-care ANC/PNC standards, and routine health systems.

Keywords: nutrition during pregnancy, maternal nutrition, nutrition counselling, weight gain during pregnancy, pregnancy, lactation, antenatal care, postnatal care
Introduction

The 2021 Lancet series underscores the importance of adequate maternal dietary intake alongside scale up of complementary interventions, such as multiple micronutrient and calcium supplementation, through national health systems.\(^{1,2}\) Supporting pregnancy and postnatal care (PNC) is seminal- as data indicate countries’ progress towards attaining World Health Assembly targets for maternal anemia and low birthweight is slow.\(^{1,2,3,4}\)

Poor quality diets, inadequate access and quality of essential nutrition-health services and suboptimal diet-related behaviors and practices continue to hold back progress globally.\(^{5-7}\)

Worldwide shifts from traditional diets towards greater consumption of unhealthy “junk” foods, alongside sociocultural, economic and political factors, have contributed to a steady rise in the number of overweight (body mass index (BMI) $\geq 25$ kg/m\(^2\)) and obese (BMI $\geq 30$ kg/m\(^2\)) women from 69 to 390 million during 1975-2016.\(^8\) The recent COVID-19 pandemic and the Ukraine-Russia war has further disrupted food systems and threatens to exacerbate poor quality diets due to rising food prices, limited availability and access to nutritious foods, and an increasing reliance on cheap staples (i.e. cereals, roots and tubers) and ultra-processed foods in low and middle income countries.\(^{9,10,11}\)\(^{12}\)\(^{13}\) The 2022 State of Food Insecurity and Nutrition in the World (SOFI) report reveals that moderate or severe food insecurity disproportionately affects women more so than men, globally and across every region of the world.\(^{12}\) Underweight and anemia are likely to worsen - which affects 170 and 520 million women, respectively.\(^{13}\)

While maternal nutrition is considered integral to the 1000-day window of opportunity, programming efforts have largely neglected maternal nutrition and focused on prevention and treatment of child undernutrition.\(^{6,7,14}\) Maternal nutrition counselling during antenatal (ANC) and PNC is a core WHO recommendation for all women, regardless of nutritional status.\(^{15}\) Yet, often counselling is not tailored to women’s nutritional needs and situations with the quality, intensity and frequency required to achieve meaningful improvements in nutrition outcomes through current programming efforts (i.e. healthy dietary intake, maternal nutritional status).\(^{7,16}\)\(^{17}\)

Further, counseling on appropriate gestational weight gain is not adequately and consistently integrated as part of routine ANC in low- and middle-income countries.\(^7\) Recent meta-analyses reveal that excessive pregnancy weight gain is associated with higher risk of obesity, caesarean section and large for gestational age infants ,while inadequate weight gain increases risk of delivering a small-for-gestational age infant.\(^{18}\)
The objectives of this paper are to: 1) examine gaps in key elements of quality maternal nutrition counselling, including provider capacity building, frequency, content, and use of delivery platforms in low-, middle- and high-income countries and 2) offer program considerations to strengthen delivery of maternal nutrition counselling.

**Design and Methods**

A gap analyses was conducted on actual vs. recommended elements of maternal nutrition counselling during pregnancy and lactation carried out globally. The analyses was comprised of a review of peer-reviewed and grey literature, followed by programmatic considerations. Elements related to quality maternal nutrition counseling are: provider capacity building (i.e. interventions such as courses/tools for improving provider knowledge and/or counselling skills), frequency, content (i.e. counselling on maternal diet, weight gain during pregnancy and/or physical activity during ANC and/or PNC) and delivery platforms, based on evidence from several seminal papers, WHO recommendations and standards of care for ANC and PNC. These elements are described in a conceptual framework (see Figure 1) which delineates key components of quality maternal nutrition counselling provided at routine facility and community ANC and PNC services.

The search strategy was developed and included the following key words in various combinations of the Medical Subject Headings (MeSH) terms: “maternal nutrition,” “eating,” “maternal diet,” “maternal dietary intake,” “counseling,” and “health care.” Articles on counselling for micronutrient (i.e. iron folic-acid supplementation) are excluded from this gap analyses, as this analyses focuses on specific, neglected areas of maternal nutrition counselling, inclusive of counselling on maternal diet, weight gain during pregnancy and physical activity. PubMed, Cochrane Library, CINAHL Plus, and Scopus databases were searched using the above key words, and libguides, opengrey.eu, greylit.org, greynet.org, were perused for nonpublished, grey literature of program reports published from January 2010–December 2021. Quantitative, qualitative, and mixed methods studies were included in the final gap analyses, based on quality of evidence presented in the studies.

The initial search resulted in 506 peer-reviewed articles. Titles and abstracts were reviewed and screened to determine initial inclusion. Exclusion criteria included studies/trials with non-human subjects (i.e., animals); articles reporting only study/clinical trial protocols, systematic reviews, data and literature reviews, and articles that reported maternal counselling focused solely on
infant and/or young child nutrition, articles that focused on behaviors and/or medical interventions associated with addressing or treating smoking cessation, gestational diabetes, HIV/PMTCT, and articles that examined specific individualized dietary interventions tailored to obese women/excessive weight gain, rather than public health approaches. After this initial exclusion of these articles, 37 articles were confirmed for final inclusion in this gap analyses (see Table 1).

The final 37 articles were chosen based on the following criteria and elements defined in the conceptual framework: (a) identified specific elements related to the provision and/or quality of maternal diet counseling during pregnancy and post-partum (i.e. time, frequency) (b) provided data on key elements that affected counseling given on maternal diet during pregnancy and post-partum/lactation, including provider capacity, content, frequency, and/or delivery platforms c) provided information on counseling on appropriate weight gain during pregnancy and/or physical activity/maternal rest, within the context of counseling on maternal nutrition (if a, and b criteria were met).

Findings
This gap analyses examined key elements of quality maternal nutrition counselling, which is comprised of building provider capacity to counsel, frequency, content (i.e. weight gain and physical activity during pregnancy, healthy eating during antenatal and postnatal periods), and delivery platforms (see Table 1).

Capacity building for health providers on maternal nutrition counselling
Two studies examined capacity building interventions (course / tools) on improvement of provider knowledge and counseling provision during ANC. In Brazil, a 16-hour training course and three workshops on healthy eating and physical activity during pregnancy resulted in improved provider knowledge scores, as well a greater proportion of women who reported receipt of guidance on “leisure-time walking” (50.7% vs. 19.1%) and “healthy eating” at ANC (58.6% vs 33.3%) (23). In Benin, pictorial job aids (capacity building tools) which were used to counsel health providers, showed higher receipt of messages on “eating more and varied” during pregnancy (+4.8 ppt), and breastfeeding messages (+32.0 percentage points (ppt)- early initiation, +41.3 ppt- exclusive breastfeeding) in intervention vs. control arm. (22)
Frequency of counselling on maternal nutrition

Two studies reported that frequent attendance at ANC, either early in pregnancy or the number of visits, may not result in greater receipt of maternal nutrition counseling on the topics of dietary intake, breastfeeding, weight gain during pregnancy or physical activity.\(^{(24)}\)\(^{(25)}\) In Malawi, while ANC attendance was high, women received, on average, 1 instance of nutrition counseling and rarely received breastfeeding counselling on early and/or exclusive breastfeeding during ANC (0.06 instance). Counselling on adequate nutrition during pregnancy was observed in less than half (44%) of first visits and one-third (33%) of later ANC visits (4\(^{th}\) and onwards).\(^{(24)}\) In Australia, in a study of pregnant women, at 36 weeks’ gestation, only 21% of women “sometimes-always” received counselling on the amount of food to eat, and half of these women were encouraged to be physically active.\(^{(26)}\)(\(^{(25)}\)) In Haiti, only 5% of counselling messages were received during the first ANC visits, and 50% of counseling messages (5 of 10 messages) were received at follow-up ANC visits.\(^{(27)}\)

Quality of content on maternal nutrition counselling

*Counseling on maternal dietary intake, weight gain and physical exercise during ANC and PNC*

Data from nine studies reveal that health providers gave no to little generalized information on maternal nutrition, based on women’s experiences of ANC and PNC.\(^{(26)}\)\(^{(27)}\),\(^{(28)}\),\(^{(29)}\),\(^{(30)}\),\(^{(31)}\)\(^{(32)}\)\(^{(33)}\) In Ethiopia, women who did not receive any dietary counseling were 3+ times more likely to have inadequate dietary diversity [AOR = 3.31, 95% CI (1.49–7.35)].\(^{(26)}\) Specific content of the maternal nutrition counseling provided during ANC and PNC was not reported - beyond breastfeeding counselling which was received by three-fourths of women during PNC.\(^{(27)}\) In Laos, a cross-sectional study revealed that while counselling materials were available in half of rural clinics, these materials were used in less than 10% of counselling sessions on diet during pregnancy (10%) and after childbirth (3%).\(^{(31)}\) Moreover, counselling was received by about one-third of rural women.\(^{(31)}\) In two studies, women described receipt of non-specific, dietary advice, which included “eat a variety of food,” “don’t restrict food” and “walk”, which was perceived as “confusing” and “difficult to interpret” in relation to their dietary intakes and levels of physical activity.\(^{(28)}\),\(^{(29)}\) In a singular study in Australia, receipt of advice on nutrition during pregnancy and physical activity was nearly 30 percentage points (ppts) higher than advice provided during the postnatal period.\(^{(33)}\)
In Tanzania, a program evaluation revealed that health provider knowledge on women’s nutrition was substantially greater (range + 23-70 ppts) than the provision of counselling messages on “important types of food to eat”, “eat a variety of foods at meals”, “take regular meals” during PNC. In contrast, in India, where pregnant women were “encouraged to eat well as an important part of a healthy pregnancy” Foods such as pulses, chapattis, milk, yogurt, green leafy vegetables, fruits, and kichidi (i.e. rice and lentils) were advised for consumption primarily by family members and health providers.

Fifteen studies revealed information gaps in counselling on weight gain during pregnancy from women’s and providers’ experiences. In India, some women stated they had no knowledge of gestational weight gain, while others reported that 4-10 kilograms (kg) was “adequate weight gain,” which differed from facility and community- health workers’ knowledge of optimal weight gain during pregnancy (i.e. 10-15 kg). Evidence reveals that in high-income countries, counselling on weight gain during pregnancy varies widely, with 16-67% of women receiving guidance. Women lack knowledge on how much weight to gain during pregnancy, and often receive incorrect and/or insufficient advice from health providers. In a few high-income countries, pregnant women were more likely to be advised on gestational weight gain, and physical activity if they were affected by overweight/ obesity in comparison to women of normal weight. Providers described not being comfortable discussing “delicate topics” (i.e. women affected by obesity were perceived to “gain too much weight or women are underweight”). Providers held views that they had “too little knowledge and/or training” for conducting dietary counselling, as diet is viewed as “hard to change.” From the perspective of pregnant women, information on weight gain during pregnancy, is often from experience in prior pregnancy, culture and habits advice from family or friends (i.e. “eating for two”).

**Delivery Platforms for maternal nutrition counselling**

Six studies showed that an integrated package of nutrition counseling interventions delivered through multiple delivery platforms – including group and interpersonal counselling, home visits and food demonstrations – improved maternal diet and/or weight gain during pregnancy. Three studies in Bangladesh showed that intensive and frequent counseling by both health facility workers and community volunteers, engagement with key influencers (i.e.
fathers), and provision of free-of-charge micronutrient supplements improved maternal, infant and young child nutrition outcomes, and reduced household food insecurity in nutrition-intensive vs. routine care groups.\(^{(20),(50),(51)}\) Significantly higher numbers of women visited by health workers early in pregnancy (6.0 vs. 3.7 times) and at home by health volunteers in the nutrition-focused MNCH, in comparison to the routine care group (8.1 vs 3.2 times).\(^{(20)}\) In addition, greater than 90% of women, who recently delivered, received counselling on nutrition during pregnancy and breastfeeding.\(^{(20)}\) A significantly greater proportion of mothers in the nutrition-intensive group vs. routine care group received messages on nutrition during pregnancy, including eat a variety of foods and measure weight, only feed breastmilk after birth, consume iron folic-acid (IFA) and calcium supplements, and consume a diversified maternal diet (see Table 2).\(^{(20)}\) Fathers reported significantly increased awareness and knowledge of dietary diversity (i.e. lentils, flesh foods and yellow/orange fruit). Fathers also had increased awareness of maternal diet during pregnancy, micronutrient supplementation, weight gain and rest during pregnancy, and supported food, IFA and calcium supplement consumption.\(^{(50)}\)

Moreover, three studies reinforced the potential of multiple delivery platforms to deliver maternal nutrition counselling interventions.\(^{(49,52,53)}\) In Bangladesh, one study revealed that the provision of a nutritious and easy-to prepare local food recipe (i.e. khichuri, comprised of two fistfuls of rice, one fistful of dal (lentils), one egg, five teaspoons of soya oil, and one fistful of leafy vegetables) combined with group counseling during pregnancy (i.e. adequate weight gain, frequency of food intake from 3 to 5 times daily, food hygiene, maternal rest, early initiation of and exclusive breastfeeding for breastfeeding) resulted in significantly increased pregnancy weight gain (+ 1.73 kg) and meal frequency (34% of women) in the intervention versus the control group.\(^{(53)}\) In India, a singular home counselling visit in conjunction with frequent participatory women’s group meetings (i.e. two to three meetings per month) during pregnancy resulted in significantly higher minimum dietary diversity in intervention versus comparison areas (adjusted odds ratio 1.40; 95% CI 1.03 to 1.90, p=0.0311).\(^{(49)}\) In Burkina Faso, a facility-based, 1:1 maternal counseling intervention, on portion size, meal frequency, and dietary diversification, resulted in a three-fold increase in women’s exposure to nutrition counselling in comparison to the control group.\(^{(52)}\) However, effects of this interventions were limited as only 9.4% of women improved food intake or dietary diversity due to late ANC attendance (2\(^{\text{nd}}\) or 3\(^{\text{rd}}\) trimester).\(^{(52)}\)
Discussion

This gap analyses examines key elements related to delivery of quality maternal nutrition counseling through country health systems. Our findings corroborate those documented in previous papers which showed that information on the type, quality and coverage of maternal nutrition counselling is limited in selected country contexts, such as Bangladesh, Burkina Faso, India, Nepal and Pakistan. Our analyses also confirms earlier findings that inadequate health provider training on maternal diet, weight gain during pregnancy, and/or physical activity, lack of counselling skills and time to counsel due to client load and/or insufficient use of existing health resources may contribute to gaps in maternal nutrition counseling content and frequency of delivery. Findings from this gap analyses further reveal that despite global recommendations on maternal nutrition counselling, counselling on adequate dietary intake, weight gain during pregnancy, and physical activity are not delivered with the desired content nor quality. When women do not receive specific dietary counselling with key actions or plans, they are less equipped with information to improve their own dietary intake and diversity. This is particularly salient given the glaring absence of maternal nutrition counselling tailored to the nutritional status of pregnant women- particularly those who suffer from overweight and obesity in low- and middle-income countries (LMICs)- who require continued nutritional guidance through the postnatal period. While recent compiled data reveal that pregnant women across North and Sub-Saharan Africa, Asia and the Middle East regions experience lower weight gain in comparison to Europe and Latin America, it is increasingly recognized and established that excessive weight gain is occurring with greater frequency in LMICs.

Our findings on gestational weight gain counselling also show that while weight is often recorded by health providers, it is often not disclosed or discussed with women, leading to confusion on the amount of weight to gain during pregnancy and “why “ this is important, regardless of pre-pregnancy BMI. Inadequate health provider knowledge or familiarity with gestational weight gain recommendations affected whether women were counseled, and specifically on “how” to achieve recommendations, a problem of global significance. Further, while United States-based Institute of Medicine guidelines are recommended as part of WHO ANC standards, there is a need for greater understanding and evidence to inform on the
development of global, and regional standards on weight gain during pregnancy which reflect the variation in populations.\(^{(15,57)}\)

Moreover, information and counselling on attaining adequate weight gain during pregnancy was a source of confusion for both health providers and women - a neglected, yet critical component of ANC. A recent global review of maternal weight gain policies in 53 countries showed that only half of countries were aware of country guidelines on weight gain during pregnancy.\(^{(58)}\) Moreover, only 13% of country policies included guidance on healthy postpartum weight.\(^{(58)}\) On a positive note, this analyses found that health providers in high-income countries tended to provide targeted counselling on gestational weight gain for pregnant women affected by overweight and obesity showing that context-specific and tailored counselling is feasible. However, such counselling was often not given to underweight or normal weight pregnant women. This sheds insight into the need to equip providers with counselling skills and supported peer-to-peer mentoring to provide culturally resonant, tailored advice to women. In addition, excessive energy intakes may reflect increased processed food consumption among pregnant and lactating women.\(^{(59)}\) Obesogenic consumption patterns, defined as eating ultra-processed foods, processed foods, and/or food groups rich in carbohydrates, fats and sugars, can comprise up to 37% of foods consumed during pregnancy.\(^{(59,60)}\) Yet, such food consumption patterns are often not routinely addressed with women during ANC and PNC, especially among overweight and obese women- a key gap in current health service provision globally.\(^{(59,60)}\)

Health provider capacity to counsel women during routine ANC and PNC health contacts is often hindered by lack of staff and time at health facilities. This situation is likely to be exacerbated by the predicted shortage of 18 million healthcare professionals in the workforce by 2030.\(^{(61,62)}\) Task shifting to community-level providers from nurses and physicians has been shown to enhance access, demand and use of health services at facility and community level, mitigate shortages in health personnel and limited time for counselling while building trust within communities.\(^{(63,64)}\) A singular study showed lay nurses provided significantly more maternal nutrition counselling than nurse midwives on the following key messages: “*eat more and varied foods*” (85.7% vs. 73.3%), “*at least 4 prenatal visits*” (85.2% vs. 65.5%) and “*take IFA supplements*” (90.1% vs 75.7%).\(^{(65)}\)

Other studies have shown that community health workers provided better care in comparison to medical personnel, in terms of child health outcomes (i.e. integrated management of childhood

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illness, malaria), improved key nutrition practices and support (i.e. breastfeeding promotion and support, micronutrient supplementation, identification and treatment of acute malnutrition) and were more likely to motivate mothers to complete four ANC visits (OR = 1.85, 95% C.I. = 1.14, 3.00, p = .012).\textsuperscript{(63,64)}\textsuperscript{(66,67)} Moving forward, it is critical that community-based providers (i.e. CHWs, community health volunteers) have clear roles and expectations with respect to maternal nutrition counselling, including renumeration within communities, health systems and non-governmental organizations.\textsuperscript{(7,63)} In addition, building community-based providers’ skillsets on the provision of communication on maternal nutrition via group counseling and/or home visits, with ongoing supportive supervision and mentoring from facility providers is an important step in task shifting.\textsuperscript{(7,63)}

Involvement of community and health facility providers to deliver both individual and group nutrition counselling interventions has demonstrated improvements in maternal dietary diversity and pregnancy weight gain, and engagement of key family members, as documented in this analyses. These findings are similar to a recent meta-analyses of clinical trials from high income countries which found that mixed and multi-pronged interventions (diet, lifestyle, gestational weight gain monitoring, and behavior change component) reduced risk of excessive weight gain for women with lower educational levels (OR 0.735; 95% CI 0.561 to 0.963, p=0.026) and reduced kilograms gained per week (B −0.053, p<0.001) among women with high educational levels.\textsuperscript{(68)} Yet, few studies have documented maternal nutrition counseling interventions and approaches within the context of health service delivery and programs, which remains a key gap in the evidence base.

**Considerations to strengthen delivery of maternal nutrition counselling** While there is less available evidence for a few elements (i.e. provider capacity building and frequency) described in this gap analyses, key insights into how to strengthen delivery of quality maternal nutrition counselling can be gleaned from available information and experience, as outlined in Table 2.\textsuperscript{(7,16,69–71)}

Moving forward, concerted efforts are needed to integrate maternal nutrition counselling into pre-and in-service curricula, while documenting effectiveness of standard health provider training, supportive supervision, and mentoring via MIYCN programming (i.e. nutrition-specific, and nutrition sensitive interventions). Development of global and/or regional weight gain standards alongside practical tools that can feasibly track weight gain for women and health
providers, alongside information on nutritional status, dietary intake and physical activity may be considered as part of future programming, as was recently explored in Brazil. \(^{(72)}\) Understanding how to feasibly estimate pre-pregnancy BMI via maternal recall is also a critical piece, as most women present mid to late in pregnancy for ANC.\(^{(73)}\)

Countries may also consider incorporating measures of quality maternal nutrition counselling, as a part of Quality of Care standards developed by the maternal and newborn health communities, (i.e. WHO Maternal Newborn Health Quality of Care standards) could be explored, as lack of standardized ANC and PNC quality improvement measures is a key gap highlighted in this analyses. \(^{(21)}\) Such quality measures may consider timing, frequency and duration of counselling, and health provider knowledge. In addition, the lack of standardized monitoring indicators for maternal, infant, and young child nutrition to guide, monitor and inform on programmatic efforts is a gap in routine data collection. There is global recognition for a need for standardized and updated maternal nutrition indicators, collected through surveys (i.e. Women’s Minimum Dietary Diversity – MDD-W) as well as through routine health systems to monitor programs, and to guide mid-course changes in country programming at national and subnational levels. \(^{(7,74)}\)

The development of standardized MIYCN indicators through the District Health Information System-2 (DHIS-2), (i.e. maternal nutrition counselling, maternal counselling on health and nutrition topics) will be crucial to ascertaining country progress. \(^{(75)}\)

Finally, from a programmatic perspective, attention is sorely needed to improve provider capacity to counsel, and in the attainment of quality health service delivery for maternal nutrition interventions. Efforts that link health systems strengthening to food systems interventions which widen the diversity of local food supplies, as well as the access, availability, and affordability of nutritious foods should be conjoined in the future for maximal impact.

**Limitations**

This gap analyses has several limitations. Information provided in this analyses has been extracted from studies which reveal information gaps on provider training (i.e., pre- and in-service content), supportive supervision, mentoring and quality improvement for maternal nutrition counselling. Lack of data on the extent, frequency and content on counselling on maternal dietary intake, weight gain during pregnancy, and/or physical activity, as well as information on counselling provided during PNC, are limitations to this gap analyses. We also
note that there may be unpublished program or project findings, used for internal project/program monitoring and use, that are not available on public domains, which may have been omitted from this analyses.

**Conclusion**

This gap analyses reveals that delivering maternal nutrition counselling via multiple platforms (individual, group, facility and community) has the potential for success and may be considered in the design of future programs. Evidence in this analyses also shows that women affected by overweight and obesity in high income countries receive targeted nutrition counselling, whereas tailored, context-specific counselling is often not carried out in low- and middle-income countries. This gap analyses highlights considerations for improving maternal nutrition counselling by addressing health providers’ time to counsel, cultivating interpersonal communication/counselling skills to contextualize counselling to respond to the changing face of malnutrition, as well as task shifting and engagement with and support from family and community members. Strengthening the enabling environment to support quality of ANC and PNC services can aid with better integration of maternal nutrition counselling (i.e. content, frequency, timing) into primary health services.

This gap analyses did not cover the important pre-conception period, which offers an opportunity to counsel adolescent girls, women, and their families on the importance of nutritious diets, physical activity and entering pregnancy at an adequate weight. Identifying and creating opportunities to improve the nutrition of adolescent girls and women before they are pregnant, while securing the increased nutritional needs of those who become pregnant and/or decide to breastfeed is crucial for all adolescent girls and women. For example, the development of a country-led and culturally informed approach focused on promoting healthy eating habits (i.e. eat locally available and diverse fruits and vegetables, physical activity, adequate weight) conjoined with multisectoral, nutrition-sensitive efforts, such as income generation schemes, agriculture (i.e. local gardening), social protection, and youth movements may empower women’s and girl’s agency and create greater sustainability long term. (76) In sum, the integrated delivery of maternal nutrition counselling as part of routine healthcare, can be emboldened by country identification of multiple delivery platforms- including linking community structures with social protection systems and food systems - to improve women’s access to nutritious diets and nutrition services.
**Figure 1** Conceptual Framework on Elements Related To Quality of Maternal Nutrition Counselling Delivered through Facility and Community Routine Health Contacts

*Indicates elements explored in this gap analyses
Table 1. List of studies include in the maternal nutrition counselling gap analyses

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Country</th>
<th>Sample size and respondent group</th>
<th>Study Methods</th>
<th>Key Findings</th>
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</thead>
<tbody>
<tr>
<td>Jennings et al, 2011</td>
<td>Benin</td>
<td>N= 409 pregnant women: 206 women who counseled by nurse-midwives and 203 women counseled by lay nurse aides</td>
<td>Non-inferiority quasi-experimental design, substudy of Jennings et al, 2010</td>
<td>Lay nurse aides vs. nurse midwives for provision of any ANC message</td>
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<td></td>
<td></td>
<td>N= 48 health care provider, including 21 nurse midwives and 27 lay nurse aides</td>
<td>Task shifting intervention: nurse midwives and lay nurse aides were trained for three days (separately) on similar curricula, included a description of task delegation, peer and group role playing, interpersonal communication, and quality of care.</td>
<td>• +19.7 ppt (12.9-26.5) in providing message on “at least four prenatal visits”</td>
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<td></td>
<td>• +13.4 ppt (7.0-19.8) in providing message on “eat more and varied” on maternal nutrition</td>
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<tr>
<td>Malta et al., 2016</td>
<td>Brazil</td>
<td>N = 42 doctors</td>
<td>Controlled, non-randomized</td>
<td>Intervention vs Control Group:</td>
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<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Joseph et al., 2020</td>
<td>Malawi</td>
<td>N = 24230 women</td>
<td>2013-2014 Malawi Multiple Indicator Cluster Survey, 2013 Malawi Service Protection Provision Assessment Survey, Direct observations of ANC visits and interviews with women following ANC</td>
<td>Nutrition counseling during pregnancy observed in 44% of first ANC visits and 32% of fourth or later ANC visits, 1 instance of counseling on diet during pregnancy, 5.7% of women received counseling on early and exclusive breastfeeding, 0.06 instances of counseling on proper breastfeeding practices, Receipt of 1.6 interventions on IFA (interventions defined as prescriptions for supplements or counseling on IFA adherence and side effects with and without IFA)</td>
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<tr>
<td>Authors</td>
<td>Country</td>
<td>Sample Size</td>
<td>Data Collection Methods</td>
<td>Findings</td>
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<td>Mirkovic et al., 2017</td>
<td>Haiti</td>
<td>N = 931 pregnant and postpartum women, N = 1411 antenatal charts, N = 38 healthcare providers</td>
<td>Client through exit interviews, antenatal chart abstraction, and provider knowledge assessment questionnaires</td>
<td>Among pregnant women, 5% received all 10 counseling messages (included nutrition counseling, estimated due date, growth of baby, birth plan, delivery danger signs, postpartum family planning, and birth interval), and 42% received at least 5 messages. No specific information on the type and content of nutrition counselling provided.</td>
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<tr>
<td>Yenebat et al., 2019</td>
<td>Ethiopia</td>
<td>N = 759 respondents</td>
<td>Community-based cross-sectional study, Quantitative data was collected on women’s dietary diversity and food security</td>
<td>Prevalence of inadequate dietary diversity was 55.7%. Pregnant women who had not received dietary counseling were more than 3 times more likely to have inadequate dietary diversity. Non-educated pregnant women were ~7.3 times more likely to have inadequate dietary diversity, compared to women who completed college. Women who were poorest, poorer,</td>
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poor, and richer were more likely to have inadequate dietary diversity compared to those in the richest wealth index.

### Quality of content on maternal nutrition counselling

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
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<tbody>
<tr>
<td>Chang et al., 2013</td>
<td>United States</td>
<td>N = 10 prenatal care providers</td>
<td>• Semi-structured qualitative interviews that included ranking of important prenatal issues and open-ended questions addressing general perceptions; approach with patients; and clinical care challenges</td>
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<td>• No provider knowledge of IOM guidelines on weight gain, action only taken for excessive weight gain</td>
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<td>• Lack of resources for patients, especially nutritional education/counseling</td>
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<td></td>
<td>• Lack of provider belief in behavior change</td>
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<td>de Jersey et al., 2013</td>
<td>Australia</td>
<td>N = 664 pregnant women</td>
<td>• Self-completed questionnaires assessed pre-pregnancy weight, eating and physical activity behavior, knowledge,</td>
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<td>• 4% of participants achieved the maximum knowledge score for pregnancy specific nutrition knowledge and 5 servings/day of vegetables</td>
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<td>• 44% of participants met guidelines for</td>
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<tr>
<td>Study</td>
<td>Country</td>
<td>Sample Size</td>
<td>Data Source</td>
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| Deputy et al., 2018           | United States| N = 7125    | Data from the 2010-2011 Pregnancy Risk Assessment Monitoring System (PRAMS) | • 26.3% of women reported receiving healthcare provider advice consistent with the 2009 IOM recommendations  
• 26.0% did not receive advice  
• 31.5% of women had appropriate weight gain; 22.6% had inadequate weight gain; and 45.9% had excessive weight gain |
| Emery et al., 2018            | United States| N = 191     | Prenatal and 6 months postpartum questionnaires: on knowledge of gestational weight gain (GWG) - baseline, height and weight (both timepoints) | • 46% of all women reported knowing how much gestational weight to gain during pregnancy.  
• 39% of women reported GWG advice from a healthcare provider, 11% did not receive specific amount for GWG |
<p>| Ferrari et al., 2013          | United States| N = 58      | Two focus groups per race/ethnicity and BMI grouping barriers and | • African American and Caucasian women: reported dietary advice was overwhelming, confusing or frequently |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Ferrari et al., 2013 | United States | N = 1454 pregnant women | Data came from the Pregnancy, Infection, and Nutrition Study 3 (PIN), a longitudinal cohort study of risk elements for preterm birth  
Data collected via clinic visits, in-depth phone interviews, and self-administered questionnaires | - Advice on physical activity was perceived as vague, told “to walk”  
- Less than 25% of the population gained within IOM recommendations, while 10% gained less and 2/3 gained more  
- Of the 52% of women who received weight gain advice, 75% reported was from a doctor, 8% from a nurse, and 18% from “other health professional”  
- 91% of women reported following advice that was given |
| Hui et al., 2014 | Canada | N = 113 women | Participants were randomized into intervention and control groups  
Intervention included community-based weekly exercise program and one-on-one private dietary consultation at baseline and two months after | Intervention vs Control  
- Amount of GWG was ~20% lower  
- Rate of excessive GWG (EGWG) was 27 percentage points lower  
- Daily intakes among normal pre-pregnancy BMI were lower in total calories: 2016±496 kcal vs 2551±1044 kcal; carbohydrates: fat: saturated fat: and cholesterol:  
- Participants with pre-pregnancy BMI |
Jennings et al., 2010 | Benin | N= 686 pregnant women N= 55 health providers | • Pre-post randomized group design • Fourteen health facilities randomized to intervention (i.e. health providers had 3-day training on job aids with role playing, and support for communication skills/challenges) vs. control group. Pictorial job aids targeted women on care during and after pregnancy • Observations of ANC visits • Client exit Interviews (baseline and endline) • Provider interviews on perceptions of tools | Intervention vs. control arm – provision of any ANC message • +10.9 vs +6.2 ppt women given message on “eat more and varied” • +33.9 vs +8.6 ppt had at least 4 prenatal visits • +37.6 vs +5.6 ppt for early initiation of breastfeeding • +45.8 vs +4.4 ppt for avoid prelacteal feeding/exclusive breastfeeding

LeFevre et al., 2018 | Tanzania | N = 41 postpartum care | • Non-randomized program assessment | Program health centers vs. comparison health centers - provider knowledge vs.
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<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
<th>Findings</th>
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<tr>
<td>McDonald et al., 2015</td>
<td>Canada</td>
<td>N = 131 pregnant women</td>
<td>Prospective cohort study comparing women receiving a knowledge translation (KT) tool to historical controls in a non-randomized comparison (from the same clinics from one year prior to the present study)</td>
<td>KT Group vs Control Group</td>
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<td>• Intervention included a website (“Me and My Baby”) that included</td>
<td>• 60.5% vs 29.2% reported receiving GWG counseling from their healthcare provider to gain a specific amount or range</td>
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<td>• Provider interviews</td>
<td>• 85.7% vs 47.2% reported their healthcare provider discussing GWG-related topics, such as nutrition/health eating, appropriate weight gain, risks of gaining too much weight and/or exercise</td>
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<td>• Direct observations</td>
<td>• 34.4% vs 21.3% believed there were</td>
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<td>• Client exit interviews</td>
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| Mercado et al., 2017 | United States | N = 355 women | inputting a woman’s pre-pregnancy height and weight to output a graph that shows the women’s specific upper and lower limits for recommender weight gain according to the IOM guidelines
- Self-administered surveys by participants to evaluate knowledge of tool | risks to excess GWG
- 62.4% vs 37.8% believed there was a risk with inadequate GWG
- 24.0% vs 17.9% reported being counseled to consume a specific amount or range of additional calories each day by their healthcare provider
- 51.6% vs. 48.4% of women recommended to gain within the IOM guidelines | Sub study on prenatal sources of information
- Participants enrolled in “Fit for Delivery” clinical trial - prenatal lifestyle intervention (vs. standard care) could reduce excessive GWG in normal weight
- Questionnaires at 6-weeks postpartum
- Anthropometric measures | Receipt of advice was 55.6%, 48.2%, and 33.9% of physicians, dieticians, or nurses, respectively
- 48% of women reported receiving information from a physician, yet experienced excessive weight gain during pregnancy
- 60.6% women reported receiving diet, physical activity, and weight control information from a book, and also from the internet (58.3%) |
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<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Mirkovic et al., 2017</td>
<td>Haiti</td>
<td>N = 931 pregnant and postpartum women, N = 1411 antenatal charts, N = 38 healthcare providers</td>
<td>Client through exit interviews, antenatal chart abstraction, and provider knowledge assessment questionnaires</td>
<td>Among pregnant women, 5% received all 10 counseling messages (included nutrition counseling, estimated due date, growth of baby, birth plan, delivery danger signs, postpartum family planning, and birth interval), and 42% received at least 5 messages. No specific information on the type and content of nutrition counselling provided.</td>
</tr>
<tr>
<td>Morris et al., 2017</td>
<td>Canada</td>
<td>N = 508 general practitioners, obstetricians, midwives, nurse practitioners</td>
<td>Concurrent mixed methods design, online survey and semi-structured qualitative interviews on practices, knowledge, and attitudes</td>
<td>21% of health providers reported routinely providing women with a GWG target based on pre-pregnancy BMI. 76% of providers weighed women at study entry, 35 weeks’ gestation (during pregnancy).</td>
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</table>
| Nikolopoulos et al., 2017 | Canada | N = 26 women, pregnant and postpartum | • 5 focus group discussions on weight gain during pregnancy and weight loss postpartum, and counseling from healthcare providers (HPCs) on weight gain during and after pregnancy | • Reported beliefs that weight gain is 25-35 pounds, confusion on weight gain range and access to online resources to learn about weight gain  
• Some women stated non-receipt of information about appropriate weight gain from health providers  
• Health providers communicated when too much weight was gained, many did not offer strategies to help support women, nor create plans/actions, nor discuss expectations  
• Nearly all women recalled lack of discussion on weight loss after giving birth |

| and registered nurses | related to GWG, nutrition and physical activity | every visit, while half routinely relayed GWG information every women were weighed  
• 46% of health providers routinely discussed physical activity, 28% routinely discussed appropriate extra food requirements |
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<th>Study</th>
<th>Country</th>
<th>Sample Description</th>
<th>Findings</th>
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<tr>
<td>Phommachanh et al., 2019</td>
<td>Lao PDR</td>
<td>N = 77 ANC providers&lt;br&gt;N = 421 observation sessions with 421 pregnant women&lt;br&gt;N = 50 participants (couples with pregnant women and mothers with children under one year of age, and health providers and policy makers)</td>
<td>• A health facility based, cross-sectional observational study in 16 public health facilities&lt;br&gt;• Qualitative study with semi-structured interviews&lt;br&gt;• Only 4% of the observed ANC session took privacy into consideration. Less than 10% of available information materials were used during each ANC session.&lt;br&gt;• None of the health providers in both rural and urban areas performed specific counseling.</td>
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<td>Pligt, 2016</td>
<td>Australia</td>
<td>N= 448, first time mothers</td>
<td>• Enrolled in Melbourne InFANT Extend trial, food&lt;br&gt;• Receipt of healthy eating advice during pregnancy compared with postpartum</td>
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</tbody>
</table>
| Power et al., 2017 | United States | N = 317 practicing obstetrician-gynecologists | **Questionnaires sent to participants on knowledge, practice, and opinions regarding weight gain during pregnancy** | **91.2% counsel their patients about weight gain**  
**81.8% were aware of the 2009 IOM guidelines and those that were aware**  
**If aware, was associated with using BMI and counseling on weight gain during pregnancy often or always (81.3 w/awareness vs. 61.4% no awareness); 55% confident in their ability to affect patient’s weight gain**  
**85.8% of providers counsel on exercise during pregnancy often/always**  

|   |   |   | Frequency questionnaire at three-four months postpartum, Active Advice Survey administered | Period (87.1% vs. 47.5%, p<0.01)  
**Receipt of physical activity advice during pregnancy (82.8%) vs. during postpartum period (51.9%) p <0.01**  
**No significant association between nutrition / physical activity advice and increased fruit/vegetable/soft drink intake nor time spent walking or total physical activity time or meeting nutrition or physical activity recommendations** |
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<th>Study</th>
<th>Country</th>
<th>Sample Size and Description</th>
<th>Findings</th>
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</table>
| Ramakrishnan et al., 2012 | India   | N = 31 key informant policy and decision makers (ANM), local doctors, Accredited Social Health Activists (ASHA), and local leaders. N = 15 Auxiliary Nurse Midwives (ANM), local doctors. N = 35 Community health workers and women of | • No mention of type or content of nutrition counselling, with a few referring patients  
  • Data from interviews and focus group discussions  
  • Health workers (nurses and doctors) advised consumption of papaya does not cause abortion  
  • Anganwadi officials reported that an 10-14 kg is “adequate weight gain”  
  • Whereas women in Tamil Nadu and Uttar Pradesh estimated adequate weight gain as 4 to 10 kg, while women in Uttar Pradesh reported no knowledge of how much a pregnant woman should gain |
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>N</th>
<th>Population Details</th>
<th>Intervention Details</th>
<th>Comparison Details</th>
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<tbody>
<tr>
<td>Kunath et al., 2019</td>
<td>Germany</td>
<td>250 pregnant women</td>
<td>Cluster-randomized controlled trial. Intervention program included 2 individual counseling sessions focused on diet, physical activity, and weight monitoring.</td>
<td>Lower proportion of women exceeding IOM guidelines: 38% vs 60%. 17% vs 31% of postpartum women showed substantial weight retention of &gt; 5 kg. Women maintained a stable intake of energy, while women in control group increased daily energy intake from an average 2110 kcal at baseline to 2328 kcal at end of pregnancy.</td>
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<tr>
<td>Santo et al., 2017</td>
<td>United States</td>
<td>2669 (N=1584 is data on physical activity during pregnancy)</td>
<td>Secondary data from 2008 Pregnancy Risk Assessment Monitoring System analyzed on physical activity frequency during 3rd trimester, and also provider advice on physical activity during pregnancy.</td>
<td>Overweight women were more likely than normal weight women to receive advice about physical activity during pregnancy (aOR 3.1, 95% CI 1.2, 7.7) but obese women were less likely to receive advice (a OR 0.65, 95% CI 0.4, 1.2). Receipt of advice on gestational weight gain was strongly associated with receiving advice about physical activity.</td>
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All associations were not attenuated by adjustment by sociodemographic and pregnancy elements

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<th>Study</th>
<th>Country</th>
<th>N</th>
<th>Description</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Stotland et al., 2012</td>
<td>United States</td>
<td>311</td>
<td>Secondary data analysis on Keep Fit, a secondary arm of Health in Pregnancy randomized controlled trial</td>
<td>• 67.4% of women reported receipt of ANC counseling on weight gain during pregnancy. 68.2% on nutrition, and 65.3% on exercise during pregnancy</td>
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<td>Participants asked if ‘healthy eating’, exercise (‘keeping active’), or weight gain during pregnancy had been discussed with health provider</td>
<td>• Overweight and obese women were significantly more likely to be counseled on exercise (p&lt;0.05), though not nutrition nor weight gain during pregnancy</td>
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<tr>
<td>Swift et al., 2016</td>
<td>England</td>
<td>193</td>
<td>Participants completed a questionnaire on weight monitoring behavior and advice; awareness of guidance and sources of information</td>
<td>• 15.8% of women reported receipt of specific advice about their weight</td>
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<td>Anthropometric measurements of weight and height taken</td>
<td>• Women classified as obese were significantly more likely to receive specific advice about their weight compared to women classified as “recommended” weight (X² = 9.04, p&lt;0.01)</td>
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<td>• 39.4% of women being aware of</td>
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<td>Study</td>
<td>Country</td>
<td>N or Details</td>
<td>Methods</td>
<td>Findings</td>
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| Vinturache, 2019 | Canada | N= 2909, pregnant women at least 24 weeks gestational age | - Data from the All Our Families - prospective, community-based pregnancy cohort study  
- Questionnaires explored aspects of prenatal counselling and linked to electronic medical records | - Two thirds of women received advice on nutrition, exercise and active living, and appropriate weight gain, which did not differ whether weight gain was adequate, inadequate or excessive |
| Wennberg et al., 2015 | Sweden | N = 17 midwives | - Telephone interviews regarding when, what, and how dietary advice was given; challenges experienced in dietary counselling;  
- Face-to-face interviews included more in-depth conversation with providers | - Obese women or those who put on too much weight, as well as underweight women who were underweight were described as “challenging for counselling on nutrition”, with weight described as “delicate” subject  
- Midwives felt their advice had an uncertain impact on the women’s behavior  
- Most midwives did not rely on specific counselling methods and used common sense and had no solutions for diet- |
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<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Methods</th>
<th>Related Issues</th>
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<tbody>
<tr>
<td>Whitaker et al., 2016</td>
<td>United States</td>
<td>N = 188 pregnant women</td>
<td>Mixed-methods study design, Internet-based survey to assess provider advice on weight gain, physical activity and nutrition</td>
<td>~52% of women reported receipt of provider advice on pregnancy weight gain, 63% on physical activity, and 56% on nutrition. 79% of women reported provider recommendations within the IOM guidelines, 9% below the guidelines, and 11% above the guidelines. 45% of women reported receipt of advice to eat plenty of fruits and vegetables, 34% reported increase protein intake, and 34% reported consume a well-balanced or healthy diet.</td>
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<td>Yamamoto et al., 2014</td>
<td>United States</td>
<td>N = 33,187 preventive care visits for women of childbearing age</td>
<td>Combined the 2005-2010 National Ambulatory Medical Care Survey (NAMSC) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) to obtain</td>
<td>17.9% of visits for pregnant women included diet/exercise counseling. Lean pregnant and non-pregnant women received less counseling than their overweight counterparts: 20.0% vs 26.0% and 19.4% and 36.2%,</td>
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</table>
estimates of outpatient preventive care visits for women of childbearing age

- Compared proportions of preventive visits that included diet/exercise counseling for pregnant women vs non-pregnant women

Delivery Platforms

| Akter et al., 2012 | Bangladesh | N = 115 women, attended Maternal and Child Health Training Institute in Dhaka, which provides maternity care for nominal fee or free of charge |

- Experimental study with a 3-month providing group nutrition education (i.e. intervention) to women on: increasing frequency of food intake from three times to five times daily during pregnancy, food hygiene, rest during the daytime, avoidance of prelacteal feeds, early initiation (1 hour) of breastfeeding and exclusive breastfeeding one-month post-delivery |

- Intervention vs Comparison Group
  - + 34% increased meal frequency from 3 to 5 times a day
  - + 27 percentage point in exclusive breastfeeding one-month post-delivery
  - + 45% had greater pregnancy weight gain (5.61 vs. 3.88 kg, p = 0.001).
| Frongillo et al., 2019 | Bangladesh | N = 2000 recently delivered women with children < 6 months  
N = 600 pregnant women in the second and third trimester | - Women were in 7th month of pregnancy  
- Education emphasized home preparation of *khichuri*, local recipe with lentils, eggs, soya oil and leafy vegetables  
- Comparison group – did not receive nutrition education intervention | Nutrition-Focused MNCH Group vs. Standard MNCH Group  
- Prevalence of any food insecurity was 22.3 and 19.7 percentage points lower for recently delivered and pregnant women, respectively, in the nutrition-focused MNCH group compared to the standard MNCH group at endline (P < 0.01) |
|----------------------|------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
|                      |            | Clustering-randomized, nonblinded design, cross-sectional baseline and endline surveys  
Intervention: interpersonal communication (on increase diet quality, breastfeeding, and monitoring of weight gain)  
Frontline workers and health volunteers were trained to counsel pregnant and recently delivered | | |

- Women were in 7th month of pregnancy.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Country</th>
<th>Study Design</th>
<th>Interventions</th>
<th>Problems Prioritized</th>
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<tbody>
<tr>
<td>Nair et al., 2017</td>
<td>India</td>
<td>Cluster-randomized controlled trial</td>
<td>- Community mobilization included husbands’ forums (importance of proper nutrition during pregnancy and postpartum, encourage purchase diversified foods, supporting wives in quantity of diversified foods, taking iron and folic acid/calcium tablets)</td>
<td>- Food restrictions during pregnancy (61%), anemia (48%), and malaria during pregnancy (40%) were prioritized problems</td>
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<td>N = 5781 pregnant women</td>
<td>- In the intervention clusters, community-based workers counseled women on maternal nutrition and growth promotion for</td>
<td>Intervention vs Control Groups</td>
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</table>
| Nguyen et al., 2017 | Bangladesh | N = 600 pregnant women  
N = 2000 recently delivered women with children less than 6 months of age | - Cluster-randomized, nonblinded design  
- Baseline & endline household surveys (content of intervention/comparison same as Nguyen et al, 2018) | - No difference on average maternal mid-upper arm circumference in the third trimester of pregnancy, or on maternal BMI 9 months post-partum was detected  
- Pregnant women were slightly more likely to achieve minimum dietary diversity: 37% vs 32%  
- 82.3% vs 22.9% reported receipt of nutrition information  
- 97.8% vs 89.1% reported receipt of messages on breastfeeding practices  
- +9.8 pp consumed IFA (nutrition-focused vs. routine care)  
- +12.8 ppt consumed calcium (nutrition-focused vs. routine care)  
- Consumed 6.5 ± 1.6 food groups vs. 5.1 ± 1.3 food groups  
- + 23.7 ppt consumed ≥5 food groups |
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<tr>
<td>Nguyen et al., Bangladesh</td>
<td>N = 2000</td>
<td>- Cluster-randomized,</td>
<td>Nutrition-focused MNCH intervention vs</td>
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<tr>
<td>Year</td>
<td>Women with children less than 6 months of age</td>
<td>N = 1307 husbands</td>
<td>Nonblinded, impact evaluation design</td>
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<td>- Cross-sectional household surveys at baseline and endline</td>
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<td>- Intervention group: 1. specific diet plan, 2. Providing free supplements and advice on using them, 3. Measuring weight and explaining optimal weight-gain patterns, 4. Counseling on adequate rest, and 5. Engaging husbands and other family members to ensure enough varied foods and supplements being available</td>
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<td>Community mobilization in the nutrition-focused MNCH group included 2 husbands’ forums on maternal nutrition</td>
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<td>Routine care MNCH at Endline, husbands reported:</td>
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<td>+2.74% greater improvement in awareness scores of proper diet during pregnancy, messages on iron folic acid and calcium supplements, weight gain, and rest during pregnancy</td>
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<td>+34.6 ppt Obtained 5 varieties-food</td>
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<td>+33.9 ppt Obtained IFA and calcium supplements</td>
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<td>+23.7 ppt in aiding to consume adequate amount of food and +37.5 ppt for supporting wives to take IFA and calcium supplements points higher, respectively</td>
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<td>+6.8 ppt – ensuring availability of diversified foods</td>
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<tr>
<td>Study</td>
<td>Location</td>
<td>N and Description</td>
<td>Intervention Details</td>
<td>Control Group Details</td>
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<tr>
<td>Nikiêma et al., 2017</td>
<td>Burkina Faso</td>
<td>N = 2,293 pregnant women, N = 2,253 children born to pregnant women</td>
<td>Routine care MNCH group - No community mobilization or husband engagement</td>
<td>Cluster randomized trial - All healthcare providers in intervention arm: a training on communication/counselling skills and maternal and child nutrition, focused on pregnant women’s diet, breastfeeding, complementary feeding practices</td>
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</table>

[1](https://doi.org/10.1017/S1368980022002129) Published online by Cambridge University Press
Table 2. Program considerations for strengthening quality of maternal nutrition counselling delivered via antenatal and postnatal care health contacts, based on gap analyses findings

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<th>Capacity Building</th>
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<td>• Train and mentor local health workforce to implement quality nutrition counselling, which includes culturally tailored, locally relevant messages</td>
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<td>• Address incorrect information or beliefs that health providers may hold regarding maternal dietary intake and weight gain during pregnancy, perceptions or beliefs</td>
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<td>• Encourage use of evidence-informed counselling materials on maternal nutrition, based on global recommendations</td>
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<tr>
<td>• Train health providers on counseling skills, in addition on “how to” and “what” to counsel on maternal nutrition, tailoring to women’s needs</td>
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<thead>
<tr>
<th>Content</th>
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<tbody>
<tr>
<td>• Provide culturally appropriate and tailored counseling on maternal nutrition, micronutrient supplementation, weight gain (total weight gain, how much should be gained at each month and progress achieved), maternal rest and physical activity, early in pregnancy in tandem with healthy eating postpartum, based on formative research/assessments</td>
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<tr>
<td>• Ensure counselling materials are updated according to local context as well as global recommendations emanating from World Health Organization</td>
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<tr>
<th>Frequency</th>
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<tbody>
<tr>
<td>• Encourage early and frequent ANC visits</td>
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<tr>
<td>• Provide consistent and frequent information on healthy, nutritious diets to sustain adequate weight during pregnancy and postnatal period, tailored to local context</td>
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<td>• Ensure sufficient workforce and the adequate amount of time to counsel at various health contact points.</td>
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[65]
- Build interpersonal and counselling skills to equip health providers’ with skillsets to relay information to women with higher frequency and quality

- Discuss and develop strategies to maximize providers’ time and reach of women/adolescents (i.e., managing client flow at clinics, task shifting to community providers)

- Consider task shifting for maternal nutrition counseling* to reach eight ANC contacts. Ensure WHO’s recommendations for healthy eating, exclusive breastfeeding, physical activity alongside iron folic acid / multiple micronutrient supplementation, intermittent preventative treatment in pregnancy for malaria prevention and anthelminthics (i.e. deworming) are provided via a broad range of cadres (i.e. lay health workers, auxiliary nurses, nurses, midwives, and doctors) and health contacts

**Delivery platforms**

- Deliver maternal nutrition counselling content through multiple platforms, such as participatory group counseling, 1:1 counseling complemented by home visits to improve frequency/intensity of counselling

- Involve family and community members through community forums and/or media, which can provide broader support for breastfeeding, while improving food consumption, dietary diversity, and intrahousehold allocation of food during critical stages of women’s life stages – inclusive of adolescence, pregnancy and lactation.

- Document the implementation of nutrition counselling via delivery platform(s) – ‘who’ engages, frequency, intensity, interventions provided, and successes/challenges. Collect this information with routine program monitoring and evaluation that ascertains intervention coverage, maternal nutritional status and associated nutrition and health outcomes

- Conduct routine supportive supervision and mentoring to ensure quality

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* According to WHO, task-shifting is defined as “the redistribution of tasks among health workers” (WHO 2008)
References


75. UNICEF. District Health Information Software (DHIS)- 2, Standardized Nutrition Modules and Indicators. Under Development; 2022.