

Factors associated with infant and young child feeding practices in Amhara region and nationally in Ethiopia

ANALYSIS OF ETHIOPIA DEMOGRAPHIC AND HEALTH SURVEYS
2005 AND 2011



September 2015

Alive & Thrive is an initiative to save lives, prevent illness, and ensure healthy growth and development through improved breastfeeding and complementary feeding practices. Good nutrition in the first 1,000 days, from conception to 2 years of age, is critical to enable all children to lead healthier and more productive lives. Alive & Thrive is scaling up nutrition through large-scale programs in several countries in Asia and Africa and through strategic technical support and the dissemination of innovations, tools, and lessons worldwide. Alive & Thrive is funded by the Bill & Melinda Gates Foundation and the governments of Canada and Ireland. The initiative is managed by FHI 360.

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Acronyms

| | |
|------|--|
| A&T | Alive & Thrive |
| ANC | antenatal care |
| ASF | animal-source foods |
| BCG | Bacille Calmette-Guérin |
| CF | complementary feeding |
| EBF | exclusive breastfeeding |
| EDHS | Ethiopia Demographic and Health Survey |
| IYCF | infant and young child feeding |
| RHB | (Amhara) Regional Health Bureau |
| SES | socioeconomic status |
| TBA | traditional birth attendant |
| WASH | safe water, sanitation, and hygiene |
| WHO | World Health Organization |

Executive summary

Malnutrition contributes to more than half of all child deaths in Ethiopia, and almost 44 percent of the country's six million children are stunted. Focusing on infant and young child feeding (IYCF) practices, such as exclusive breastfeeding from birth to 6 months and appropriate complementary feeding for children 6–23 months of age, is critical to prevent stunting and nutrition-related morbidity and mortality. Since 2008, there has been a considerable push by the government of Ethiopia and major donors to focus on IYCF issues. Nonetheless, competing priorities and challenges such as capacity and competing workloads of health and nutrition staff remain major barriers. Regional variations in religion, livelihood, topography, and local perceptions of health issues also affect IYCF practices in Ethiopia, making the practical aspects of delivering IYCF interventions a challenge.

Amhara, the second most populous region in Ethiopia, presents a troubling paradox. Despite the expansion of agriculture and food security programs, such as the Agriculture Growth Program and Agriculture Extension Program, as well as the scale-up of community-based nutrition programs, the region has seen only modest improvements in stunting rates in the last five years. Even though many zones and woredas (districts) in Amhara are considered food secure, the region has the highest rate of stunting in the country (52 percent versus the national average of 44 percent).

In its first five years (2009–2013), Alive & Thrive (A&T) demonstrated that innovative approaches to improving feeding practices could be delivered with impact and at scale within three contexts: Bangladesh, Ethiopia, and Vietnam. A&T is now supporting others to scale up nutrition by applying and adapting tested, proven approaches and tools within contexts such as Burkina Faso, India, and Southeast Asia.

In 2014, A&T transitioned to a new phase of activities in Ethiopia, with a focus on improving IYCF practices in Amhara Region.

Purpose and objectives of the study

The purpose of this study was to provide a better understanding of factors contributing to the suboptimal IYCF practices and stunting in Amhara Region and compare relevant indicators in the region with those at the national level over the last five years. Other objectives of the study were to increase awareness about the importance of IYCF among regional stakeholders and to share information on the determinants of various IYCF practices. It was hoped that this analysis will promote the development of a long-term, participatory process of cross-program and multisectoral coordination that will encourage more integrated program approaches and sharing of experiences and lessons learned to improve IYCF programming at the regional level.

Study design and methods

Data from the 2005 and 2011 Ethiopia Demographic and Health Surveys were analyzed to measure the changes in IYCF practices and stunting among children aged 0–23 months in Amhara Region and nationally. In 2005, age-specific stratification yielded very small sample sizes and limited any meaningful analysis of behavioral determinants. For this reason, bivariate and multivariate analyses of factors associated with IYCF indicators in Amhara and nationally were performed using only the 2011 survey. A

descriptive analysis of the stunting situation nationally and in Amhara was also conducted. Further analyses exploring factors influencing IYCF practices were conducted separately for Amhara and the national sample, to compare Amhara's IYCF status with the national average.

Summary of findings

Status of basic IYCF indicators in Amhara and nationally. National-level prevalences of recommended nutrition practices are low in Ethiopia, and the situation in Amhara is particularly serious. There were no major improvements in IYCF practices in the region between the 2005 and 2011 Ethiopia Demographic and Health Surveys. Exclusive breastfeeding rates did rise (from 69 percent to 74 percent), but the change was not significant. However, rates of early initiation dropped significantly, from 57 percent to 37 percent.

In 2011, IYCF indicators in Amhara were lower than those at the national level, with the exception of exclusive breastfeeding from 0–5 months of age, which was significantly higher in Amhara. Early initiation of breastfeeding was particularly striking (37 percent in Amhara versus 53 percent nationally). Timely introduction of complementary feeding was only 35 percent in Amhara compared to 46 percent nationally. The percentage of children with minimum dietary diversity was very low nationally, and even lower in Amhara (5 percent versus 2 percent, respectively). The percentage of children consuming an iron-rich diet was only 10 percent in Amhara and 12 percent nationally. Rates of consumption of animal-source foods (ASF) without milk or milk products were similar to those for iron-rich foods. Consumption of ASF with milk or milk products was somewhat better, at 24 percent in Amhara and 46 percent nationally.

These suboptimal practices have clearly had an impact on stunting rates, which are severe both nationally and especially in the region. In 2011, prevalence of stunting among children 0–23 months old was 40.3 percent in Amhara and 25 percent nationally. Stunting increased with age; for those in the 18–23 month age group, stunting prevalence was extraordinarily high, at 68 percent in Amhara and 50 percent nationally.

Demographic and household characteristics and relationship to indicators. Basic demographic and household characteristics contribute to the poor nutritional situation of children in Amhara and nationally. Multivariate analysis at the national level in 2011 showed that IYCF indicators were positively associated with higher rates of maternal education and wealth—factors that are challenging in Ethiopia. In the highest socioeconomic group, early initiation of breastfeeding was 54 percent, minimum dietary diversity was 13 percent, and consumption of iron-rich foods was 24 percent, compared to 52 percent, 2 percent, and 9 percent, respectively, for mothers in the lowest quintile.

Parental education was low in general in the study population, but even lower in Amhara. In 2011, 80 percent of mothers in Amhara reported having received no education, compared to 67 percent nationally.

The strength of association between IYCF indicators and place of residence as well as access to safe water, sanitation, and hygiene (WASH) facilities was not analyzed. However, the impact of WASH on nutritional status and the connection with diarrheal disease in particular is well documented. In 2011,

nearly half the population (both national and regional) did not have any toilet facilities and about another third used pit latrines without slabs. More than 50 percent of the population got their drinking water from unprotected open sources.

Cultural factors also play some role in nutrition practices. Multivariate analysis at the national level in 2011 found an association between families' religion and IYCF practices for three of the indicators, but the effect was mixed. Children in Orthodox Christian families were significantly less likely to be breastfed immediately after birth than those of other faiths, and were also less likely to consume ASF. However, they were more likely to consume an iron-rich diet. Religion may also be a factor at the regional level, although this was not specifically analyzed. In Amhara, an overwhelming 85 percent of respondents reported they belonged to the Orthodox Christian faith (in contrast to 31 percent of respondents nationally).

Exposure to media and contact with health workers. Multivariate analysis of the national sample in 2011 showed that listening to the radio at least once a week was positively associated with some IYCF practices. Women who listened to the radio were 87 percent more likely to provide their children with minimum dietary diversity and 39 percent more likely to feed ASF (without milk or milk products) compared to those who did not listen to the radio at all.

Construction of a proxy variable for exposure to nine basic maternal and child health services showed that at the national level in 2011, higher exposure to health workers was significantly associated with the adoption of IYCF practices even after adjusting for all other covariates.

In both Amhara and in the national population, parents' access to information is hindered by low media ownership/usage and low access to/demand for health services. Data in 2011 showed that overall, exposure to radio and contact with health workers during pregnancy, at the time of delivery, and after delivery were low both in Amhara and nationally. Around 15 percent of women reported listening to the radio at least once a week nationally and 13 percent in Amhara.

Utilization of antenatal care (ANC) was low, with only around 30 percent of women in Amhara and 40 percent nationally attending ANC two or more times during their last pregnancy. Delivery at a health facility was also low (9 percent in Amhara and 15 percent nationally). More than a quarter of respondents (27 percent in Amhara and 36 percent nationally) sought assistance during delivery from a traditional birth attendant, and more than half of births were assisted by a family member, neighbor, or other.

Attendance at community conversation sessions (within the last three months) was low in 2011, at only 8 percent in Amhara and 11 percent nationally.

Conclusion and program considerations

The data point to the need for further attention on recommended IYCF practices in Amhara. While prevalences of recommended IYCF practices are low nationally, practices in Amhara are an even greater cause for concern. In addition, formative research conducted by A&T during Phase I (2009–2013) found that some harmful practices (such as introducing prelacteals and discarding colostrum, and withholding

ASF from young children until 2 years of age) are common in rural Ethiopia. Suboptimal IYCF practices in Amhara have led to high levels of stunting in the region.

Complementary feeding practices, in particular dietary diversity, and consumption of iron-rich and animal-source foods should receive greater focus in the region. At the same time, it is clear that demographic and socioeconomic characteristics present major barriers to substantial improvements. The data show that high rates of poverty and low rates of maternal education are directly associated with poor nutrition practices in Ethiopia.

Low rates of access to/demand for maternal and child health services also undermine the potential for interactions with health workers to have a positive impact on nutrition. For example, low rates of ANC attendance mean mothers are not benefitting from an array of services as well as potential for communication and improvements in knowledge. Nevertheless, the positive association between health worker contacts as well as participation in community conversations and some nutrition practices is an indication that efforts should be made to utilize any contact between mothers and health workers to provide IYCF messages and counseling.

Public gatherings can also be utilized as platforms for delivering IYCF messages. These gatherings probably will be beneficial in reaching fathers or other male members in households as well. Given that the large majority of the population in Amhara Region is Orthodox, working with religious leaders and community influentials on addressing issues of dietary diversity within the context of local cultural norms and beliefs may be important in raising awareness of IYCF behaviors in households. Although coverage of radio is low, some kinds of mass media programs with IYCF messages also can be considered to reach mothers and those who influence them.

1. Background

The importance of appropriate infant and young child feeding (IYCF) practices in ensuring good nutrition and safeguarding child survival has been established in the global literature.¹ Nevertheless, high stunting rates persist in many countries and little progress has been made in increasing rates of exclusive breastfeeding (EBF) globally. The median share of young children with a minimum acceptable diet or minimum dietary diversity is also low in countries where data are available.²

Almost 44 percent of Ethiopia's children younger than 5 years are stunted, which is a clear sign they are deprived of adequate nutrition. Focusing on IYCF practices such as EBF from birth to 6 months of age and appropriate complementary feeding (CF) of children 6–23 months of age is critical to reducing child morbidity and mortality and improving nutrition outcomes such as stunting. In Ethiopia, breastfeeding is practiced nearly universally. However, age-appropriate breastfeeding is practiced by approximately half of all mothers. The timely introduction and quality of complementary foods for children 6 months and older is poor, and less than 10 percent of children are reported to have a minimally acceptable diet.^{3,4} Since 2008, there has been a considerable push by the government of Ethiopia, as well as major donors, to focus on IYCF issues. Nonetheless, competing priorities and challenges related to staff capacity and funding for appropriate and high-quality IYCF programs remain major barriers. Regional variations in religion, livelihoods, topography, and local perceptions of health issues also affect IYCF practices in Ethiopia, making the practical aspects of delivering IYCF interventions a challenge.

Alive & Thrive (A&T) was initiated in 2009 to demonstrate that innovative approaches to improving IYCF practices could be planned, delivered, and sustained at scale, and to provide rigorous documentation and learning. In its first five years of operation (2009–2014), A&T developed and scaled up delivery of three country-specific models, reaching approximately 10 million households with children 0–23 months of age through mass media and/or health facility and community interventions. In Ethiopia, A&T concentrated its efforts in Phase I on enhancing advocacy, interpersonal communication and community mobilization, mass communication, and the strategic use of data to support a multiple-component approach in four regions of the country. This process was guided by a framework of social and behavior change communication within the context of the government's National Nutrition Program.

In Phase II (2014–2017), A&T is focusing its implementation in Amhara, the second most populous region in the country, with more than two million children younger than 2 years. Strategies include supporting Health Extension Workers and the Health Development Army of volunteers to deliver high-quality IYCF counseling through capacity-building and bridging the gap (in knowledge, skills, and materials) between the Health Extension Workers and Health Development Army volunteers. IYCF practices will be strengthened at the community level through the use of various social and behavior change communication tools and counseling cards. In addition, A&T will build the capacity of Agriculture Extension Workers and other frontline workers to reach out to men and other community influentials and will use local radio to influence, inform, and motivate frontline workers and their supervisors as well as mothers and family members of children less than 2 years of age.

Amhara Region presents a troubling paradox. Despite the expansion of agriculture and food security programs, such as the Agriculture Growth Program and Agriculture Extension Program, as well as the

scale-up of community-based nutrition programs, the region has seen only modest improvements in stunting rates in the last five years. Even though many zones and woredas (districts) in Amhara are considered food secure, the region has the highest rate of stunting in the country among children younger than 5 years (52 percent versus the national average of 44 percent): an estimated 1.37 million children in this age group are stunted in the region.⁵ Evidence from the last two nationally representative surveys (the Ethiopia Demographic and Health Surveys of 2005 and 2011) show that in general, IYCF practices in Amhara are suboptimal.^{4,5}

A&T is working in close collaboration with the Amhara Regional Health Bureau (RHB). The regional nutrition case team has planned and implemented a number of nutrition-specific and nutrition-sensitive activities as part of the National Nutrition Program. In 2013–2014, the RHB carried out 58 percent of its planned activities of growth monitoring of children younger than 2 years, trained 70 percent of its targeted health workers via routine nutrition programs, and conducted trainings of trainers for its nutrition officers and teachers to launch school nutrition programs. While there was no specific focus on promoting optimal IYCF practices at the community level, 93 percent of children younger than 5 years and nearly 50 percent of pregnant and lactating mothers were screened for malnutrition. In addition to these nutrition-specific activities, nutrition-sensitive activities were implemented in 22 Agriculture Growth Program woredas through programs like homestead gardening, school gardening, and fortification of crops. Under the region’s multisectoral nutrition initiatives, Agriculture Extension Workers and farmers from selected woredas were also trained in nutrition.

The RHB acknowledged that it faces a number of challenges in tackling the high burden of malnutrition in the region with its multidimensional and multisectoral approach. These include issues around (1) mainstreaming nutrition activities in various sectors; (2) making nutrition a high priority for decision makers; (3) increasing clarity around the roles and responsibilities of different sectors; (4) filling vacant nutrition posts at the zonal and woreda levels; (5) strengthening coordination among sectors; and (6) gathering greater commitment from all parties. In 2015, the RHB plans to:

- Hire nutrition officials at all levels.
- Encourage all sectors to allocate some budget for nutrition.
- Seek clear direction from the federal level on ways to mainstream National Nutrition Program indicators within agriculture programs.
- Establish strong multisectoral coordination.
- Mobilize more resources for nutrition activities.

2. Purpose and objectives of the study

The purpose of this study was to better understand the factors contributing to the suboptimal IYCF practices and stunting in Amhara Region and compare relevant indicators in the region with those at the national level over the last five years.

The study aimed to examine possible underlying determinants of undernutrition in Amhara, including demographic and household characteristics, media usage, relative exposure of mothers and children to frontline health workers, and other factors that could influence personal practices at the household level. Other objectives of the study were to increase awareness about the importance of IYCF among regional stakeholders and to share information on the determinants of various IYCF practices. Further, it was hoped that this analysis will promote the development of a long-term, participatory process of cross-program and multisectoral coordination that will encourage more integrated program approaches and sharing of experiences and lessons learned to improve IYCF programming at the regional level.

The specific objectives of this study were to:

1. Look at changes in selected IYCF indicators between the 2005 and 2011 Demographic and Household Surveys in Amhara Region.
2. Identify factors associated with selected IYCF indicators in Amhara and nationally.
3. Look at factors associated with stunting in Amhara and nationally.

3. Methods and data analyses

3.1 Data sources and sample sizes

The study analyzed two rounds of Ethiopia Demographic and Health Survey (EDHS) data (2005 and 2011)^{4,5} to measure changes in IYCF practices in Amhara Region and compare practices with those at the national level. Sections of the surveys examined included those focused on nutrition practices, demographic and household characteristics, media usage, and use of health services (both child and maternal). Study of information about nutrition practices was limited to those involving children aged 0–23 months. Table 1 presents sample sizes from the two surveys, stratified by the age groups in which major IYCF indicators were measured.

Table 1. Sample distribution of children by age in Amhara Region and nationally (2005 EDHS and 2011 EDHS).

| Sample sizes by age | 2005 | 2011 |
|-------------------------|-------|-------|
| 0–23 months | | |
| <i>Total population</i> | 1,811 | 4,132 |
| <i>Amhara Region</i> | 252 | 451 |
| 0–5 months | | |
| <i>Total population</i> | 501 | 1,204 |
| <i>Amhara Region</i> | 79 | 119 |
| 6–8 months | | |
| <i>Total population</i> | 213 | 597 |
| <i>Amhara Region</i> | 28 | 52 |
| 6–23 months | | |
| <i>Total population</i> | 1,310 | 2,928 |
| <i>Amhara Region</i> | 179 | 332 |

The total sample size in Amhara (children 0–23 months) was only 252 in 2005, compared with a much larger sample of 451 children in 2011. In 2005, age-specific stratification yielded very small sample sizes and limited any meaningful analysis of behavioral determinants. For this reason, bivariate and multivariate analyses of factors associated with IYCF indicators in Amhara and nationally were performed using only the 2011 EDHS.

A descriptive analysis of the stunting situation nationally and in Amhara was also conducted. Further analyses exploring factors influencing IYCF practices were conducted separately for Amhara and the national sample, to compare Amhara’s IYCF status with the national average.

3.2 Indicators and behavioral determinants of interest

Major outcomes of interest included stunting and six IYCF behavioral indicators:

1. Early initiation of breastfeeding.
2. Timely introduction of CF (6–8 months).
3. Minimum dietary diversity.

4. Consumption of iron-rich foods.
5. Consumption of animal-source foods (ASF) with milk or milk products.
6. Consumption of ASF without milk or milk products.

EBF was not included in this analysis as almost three-quarters of children 6 months of age or younger in Amhara are exclusively breastfed—even more than the national average. The full range of CF-related indicators was considered pertinent from a programmatic perspective, as many interventions aimed at reducing undernutrition in Ethiopia focus on improving these practices.

IYCF indicators were reported in the 2005 EDHS and 2011 EDHS following World Health Organization (WHO) guidelines,⁶ and confidence intervals around the indicators were compared. Stunting* was also measured as part of the 2011 EDHS among children 0–23 months old, following WHO guidelines.⁷ The study looked at determinants associated with IYCF practices at the individual, household, and community levels.^{8,9} Demographic variables included child’s age and sex, mother’s education, religion, wealth, and several household characteristics. The study also looked at mothers’ exposure to media, health workers, and community conversations.

The media’s critical role in reaching mothers and other household members with IYCF messages was documented in A&T Phase I.¹⁰ In addition, exposure to IYCF messages through direct interactions with health workers was found to influence IYCF practices.¹⁰ The study aimed to give special emphasis to contact with health workers. However, the 2011 EDHS did not collect information on mothers’ or households’ exposure to nutrition-specific programs such as community-based nutrition or promotion of IYCF practices by health workers. To examine the association between contact with health workers and IYCF, an additive scale was constructed from nine proxy indicators that included measures of a mother’s contact with health workers at the time of pregnancy, delivery, and within two years of the last child’s birth.

3.3 Data analyses

Descriptive analysis was conducted to examine the distribution of outcomes (IYCF indicators and stunting) and proposed explanatory variables. Bivariate unadjusted analysis was conducted to assess the association between outcomes and explanatory variables, and chi-square statistics were estimated to evaluate the strength of the associations. Descriptive and bivariate analyses were conducted separately for the Amhara and national samples and then compared. Finally, logistic regression models adjusting for all covariates were run for each IYCF outcome variable only in the national sample to identify factors influencing IYCF practices in 2011. Odds ratios and confidence intervals of the logistic regressions are presented in this report. Some of the determinants of interest (such as mother’s education, access to health workers) were likely to be confounded by socioeconomic status (SES). Analysis therefore included two logistic regressions for each outcome—model 1, all variables except economic quintile; and model 2, all variables including economic quintile—to determine if the effects of covariates were independent of SES.

* Stunting: The height/length of children was converted into height-for-age Z scores, and stunting was estimated as less than –2 Z scores for height-for-age.

3.4 Limitations

There were several limitations with the analyses:

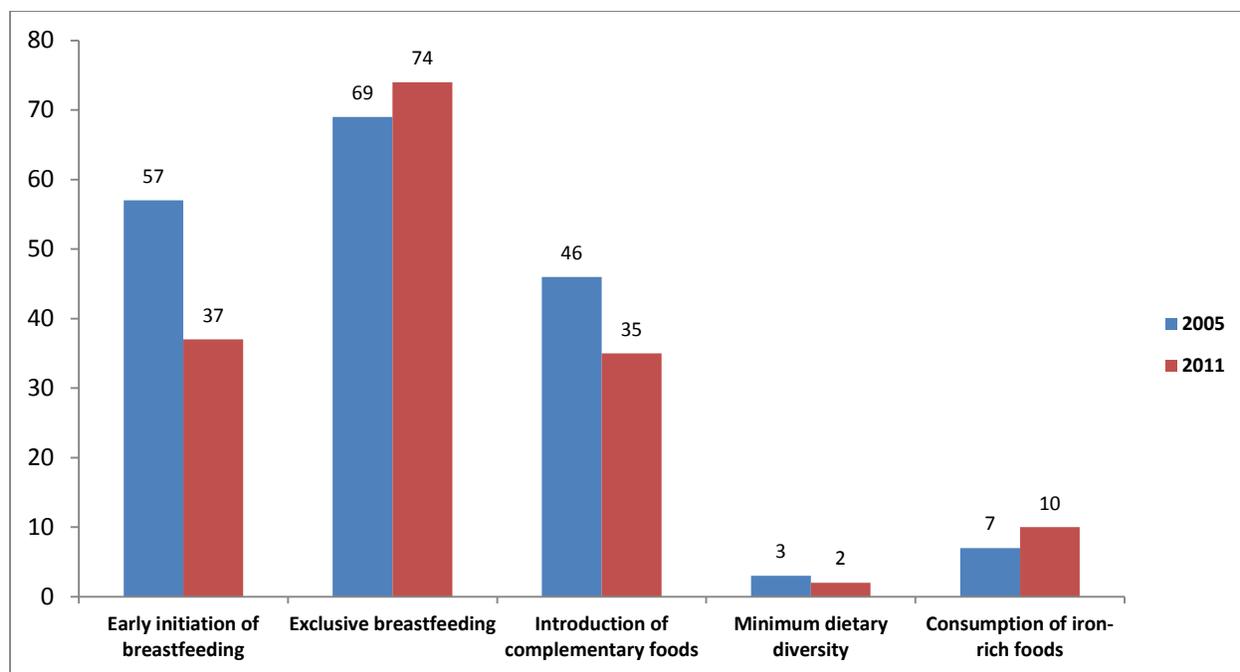
- The small sample size of children 0–23 months of age in Amhara, especially in the 2005 EDHS, restricted analysis of IYCF practices in the region.
- Some of the questions measuring IYCF indicators varied between the two rounds. For example, the questions asking which foods were fed within the last 24 hours, applied to measure dietary diversity, varied between the rounds. As such, the datasets were not merged.
- The surveys did not include exposure to specific programs such as community-based nutrition, so a proxy indicator was used to gauge the possible influence of nutrition messages delivered by health workers at different times. Some of the indicators in the proxy did not apply to the youngest children.
- The surveys did not include the full range of factors that might affect IYCF-related practices or child nutrition status as delineated in the United Nations Children’s Fund conceptual framework, modified by Black et al. in 2008.⁹ Thus, this analysis could not address some important issues, such as household food security.
- The surveys lacked information on important multisectoral nutrition-sensitive interventions that address the underlying determinants of malnutrition. For example, this analysis could not incorporate the effects that programs on agriculture; social protection; and safe water, sanitation, and hygiene (WASH) may have had on IYCF practices.
- Amhara data were not removed from the national data for the regional/national comparisons; therefore, care should be taken not to interpret these comparisons as “Amhara versus the rest of the country.”

4. Findings

4.1 Prevalence of IYCF indicators in Amhara over time

The study first compared indicators of interest in Amhara Region between 2005 and 2011. Definitions of the IYCF indicators are included in Appendix 1. Figure 1 shows that early initiation of breastfeeding dropped significantly between 2005 and 2011, from 57 percent to 37 percent, while EBF remained high, between 69 percent and 74 percent (no significant change). Timely introduction of CF fell by nearly 10 percentage points between 2005 and 2011, but the change was not significant. Almost no children aged 6–23 months received a minimally diverse diet (3 percent in 2005 and 2 percent in 2011). Consumption of iron-rich foods improved slightly, from 7 percent in 2005 to 10 percent in 2011, but the change was not significant. The prevalence of IYCF indicators with confidence intervals is presented in Appendix 2.

Figure 1. Prevalence of IYCF indicators in Amhara (2005 EDHS and 2011 EDHS).*



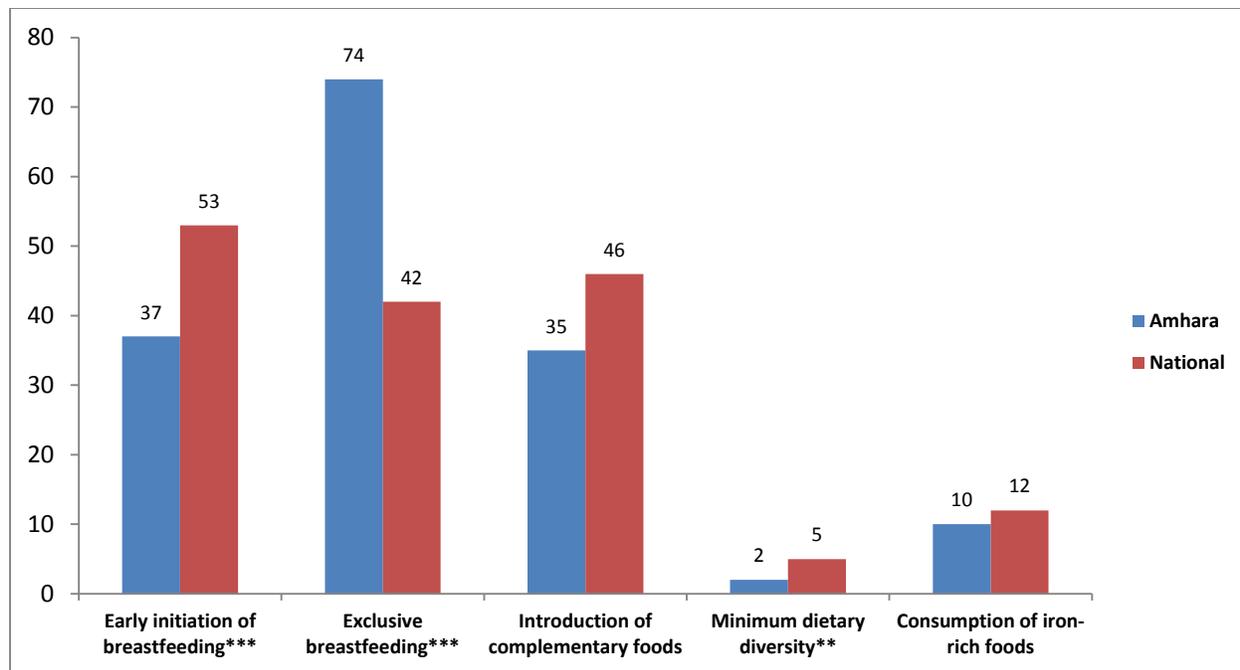
* Confidence intervals were compared around the point prevalences. Only the change in early initiation of breastfeeding was significant. See also Appendix 2 for confidence intervals.

4.2 Comparison of IYCF indicators in Amhara and nationally (2011 EDHS)

The study compared five of the IYCF indicators in 2011 (only) between Amhara Region and the national level. Figure 2 shows that all of the IYCF indicators were lower in Amhara than at the national level, except EBF, which was significantly higher in Amhara (74 percent) than nationally (42 percent). Early initiation of breastfeeding was significantly lower in Amhara (37 percent) than nationally (53 percent). Timely introduction of CF was only 35 percent in Amhara as compared to 46 percent nationally, but the difference was not significant. The percentage of children receiving minimum dietary diversity in Ethiopia generally was particularly low (5 percent) and even significantly lower in Amhara (2 percent). Mean of minimum dietary diversity was only 1.3 (1.5 nationally), way below the WHO-recommended

minimum dietary diversity of 4 (not shown). Consumption of iron-rich foods was low in Amhara and nationally, but the difference was not significant.

Figure 2. Prevalence of selected IYCF indicators in Amhara and nationally (2011 EDHS).



***P<0.001, **P<0.01, *P<0.05.

4.3 Individual, household, and communication characteristics of the Amhara and national samples (2011 EDHS)

The study compared individual, household, and communication characteristics (media and health worker contact) between Amhara Region and the national population in 2011.

4.3.1 Demographic and household characteristics

Tables 2, 3, and 4 provide information on demographic and household characteristics in the two samples. Mean household size in Amhara (6.1 people) was comparable to that at the national level and mean number of children was also similar (1.8 children in Amhara and 1.9 nationally). In Amhara, the percentage of female household heads (and therefore the percentage of respondents that were household heads) was lower than at the national level. The vast majority of respondents were rural (92.2 percent in Amhara and 82.9 percent nationally). However, in Amhara, the overwhelming majority of respondents (84.5 percent) was Orthodox Christian and the rest were Muslim, whereas at the national level, 46.5 percent were Muslim and only 31.1 percent were Orthodox (with an additional 19.4 percent Protestant and 2.9 percent practicing other faiths).

Table 2. Household characteristics, Amhara and national samples (2011 EDHS).

| Characteristic | Amhara (n=451) | | National (n=4,132) | |
|---|----------------|------|--------------------|------|
| | Mean | SD | Mean | SD |
| Age of household head (years) | 38.5 | 10.9 | 36.9 | 12.1 |
| Household size | 6.1 | 2.4 | 6.1 | 2.4 |
| Number of children younger than 5 years | 1.8 | 0.8 | 1.9 | 0.8 |
| | Percentage | | Percentage | |
| Sex of household head | | | | |
| <i>Male</i> | 89.6 | | 82.3 | |
| <i>Female</i> | 10.4 | | 17.7 | |
| <i>Respondent as household head</i> | 4.7 | | 13.1 | |
| Residence | | | | |
| <i>Urban</i> | 7.8 | | 17.1 | |
| <i>Rural</i> | 92.2 | | 82.9 | |
| Religion | | | | |
| <i>Orthodox</i> | 84.5 | | 31.1 | |
| <i>Muslim</i> | 15.3 | | 46.5 | |
| <i>Protestant</i> | 0 | | 19.4 | |
| <i>Other</i> | 0 | | 2.9 | |

SD: standard deviation.

Table 3 shows that distribution of children in different age groups was similar in the Amhara and national samples. Table 4 shows that educational attainment for both mothers and fathers was substantially lower in Amhara than the national average. In Amhara, 80.3 percent of mothers reported having no formal education and only 3.1 percent had attained secondary or higher education, compared to 66.8 percent and 6 percent, respectively, nationally. Similarly, 72.4 percent of fathers in Amhara had never attended any formal education, compared to 49.2 percent nationally.

Female occupation also differed between the samples (Table 4). In Amhara, 42.1 percent reported that they worked in the agricultural sector, as opposed to only 18.9 percent nationally. In Amhara, 43.9 percent said they were “not working,” whereas 57.7 percent nationally said they were “not working.” Agriculture was also the major occupation of fathers in Amhara and nationally (87.6 percent and 71.8 percent, respectively).

Table 3. Child characteristics, Amhara and national samples (2011 EDHS).

| Characteristic | Amhara percentage (n=451) | National percentage (n=4,132) |
|-------------------------|---------------------------|-------------------------------|
| <i>Age</i> | | |
| 0–5 months | 26.4 | 29.1 |
| 6–8 months | 11.5 | 14.5 |
| 9–11 months | 12.6 | 10.7 |
| 12–17 months | 27.1 | 25.9 |
| 18–23 months | 22.4 | 19.9 |
| <i>Sex of the child</i> | | |
| Female | 49.9 | 49.5 |
| Male | 50.1 | 50.5 |

Table 4. Parental characteristics, Amhara and national samples (2011 EDHS).

| Characteristic | Amhara percentage (n=451) | National percentage (n=4,132) |
|------------------------------------|------------------------------|----------------------------------|
| <i>Mother's level of education</i> | | |
| No education | 80.3 | 66.8 |
| Primary | 16.6 | 27.3 |
| Secondary or higher | 3.1 | 6.0 |
| <i>Mother's age group</i> | | |
| 15–19 | 8.2 | 7.4 |
| 20–24 | 21.7 | 23.1 |
| 25–29 | 25.9 | 31.5 |
| 30–34 | 20.4 | 19.0 |
| 35–39 | 15.5 | 13.3 |
| 40–44 | 7.3 | 4.6 |
| 45–49 | 0.9 | 1.1 |
| <i>Mother's occupation</i> | | |
| Not working | 43.9 | 57.7 |
| Agriculture | 42.1 | 18.9 |
| Sales | 6.2 | 13.3 |
| Skilled manual | 4.4 | 6.3 |
| Other | 3.3 | 3.8 |
| <i>Father's level of education</i> | | |
| No education | 72.4 | 49.2 |
| Primary | 22.4 | 37.3 |
| Secondary or higher | 4.7 | 12.4 |
| <i>Father's occupation</i> | | |
| Not working | 0.7 | 2.0 |
| Professional/technical/managerial | 1.8 | 5.1 |
| Sales | 5.0 | 10.4 |
| Agricultural | 87.6 | 71.8 |
| Skilled manual | 3.8 | 6.2 |

Table 5 provides information about SES and WASH. In both Amhara and nationally, half of the population belonged to the lowest two wealth quintiles. However in Amhara, less than 10 percent of the population fell into the richest quintile, versus 20 percent nationally.

Sources of drinking water were comparable in the region and nationally, with more than 50 percent of respondents getting their drinking water from different unprotected open sources. Less than 8 percent of respondents reported having a source of water in their dwelling, which meant the majority traveled some distance to fetch water for drinking, cooking, and cleaning—a responsibility that fell primarily on adult women (86.1 percent in Amhara and 79 percent nationally). In Amhara, however, the mean time required to fetch water was 38.7 minutes, compared to 62.2 minutes at the national level.

Access to toilet facilities was also poor in both Amhara and nationally. Nearly half of the population did not have any toilet facilities and about another third used pit latrines without slabs (36.6 percent in Amhara and 31.8 percent nationally). Practices related to disposal of child feces differed somewhat, with less hygienic practices more common in Amhara; only 19.4 percent disposed of a child's feces in a latrine (versus 27.9 percent nationally) and 51.8 percent left them in the open (versus 38.3 percent nationally).

Table 5. Socioeconomic status and access to WASH facilities in Amhara and nationally (2011 EDHS).

| Characteristic | Amhara percentage (n=451) | National percentage (n=4,132) |
|---|------------------------------|----------------------------------|
| <i>Wealth index</i> | | |
| Poorest | 25.9 | 30.7 |
| Poorer | 25.5 | 18.2 |
| Middle | 24.6 | 16.8 |
| Richer | 15.5 | 15.3 |
| Richest | 8.4 | 19.0 |
| <i>Source of drinking water</i> | | |
| Piped to dwelling/yard/plot | 3.5 | 7.7 |
| Public tap/standpipe | 18.9 | 19.0 |
| Tube well or borehole | 2.3 | 5.9 |
| Protected well/spring | 22.4 | 16.7 |
| Unprotected well/spring | 31.2 | 26.4 |
| River/dam/lake/pond/stream/canal | 21.0 | 21.4 |
| Rainwater/tank/others | 0.7 | 2.9 |
| <i>Mean time (minutes) to fetch water (mean and standard deviation)</i> | 38.7 (36.9) | 62.2 (75.9) |
| <i>Person who fetches water</i> | | |
| Adult woman | 86.1 | 79.0 |
| Adult man | 2.1 | 6.1 |
| Female child | 11.1 | 11.0 |
| Male child | 0.5 | 3.0 |
| <i>Type of toilet facility used</i> | | |
| Pit latrine with slab | 2.6 | 9.1 |
| Pit latrine without slab | 36.6 | 31.8 |
| No facility/bush | 47.1 | 51.2 |
| Composting | 8.9 | 3.3 |
| Other | 4.9 | 4.7 |
| <i>Disposal of child's stool</i> | | |
| Used toilet/latrine | 0.7 | 0.7 |
| Put/rinsed into toilet/latrine | 19.4 | 27.9 |
| Put/rinsed into drain or ditch | 5.6 | 6.5 |
| Thrown into garbage | 16.2 | 17.5 |
| Buried | 0.7 | 3.6 |
| Left in the open | 51.8 | 38.3 |
| Other | 5.6 | 5.6 |

4.3.2 Exposure to media and contact with health workers

Table 6 presents respondents' exposure to different communication channels. In Amhara, fewer respondents owned a radio (only 28.2 percent versus 38.4 percent nationally), but frequency of listening was similar. Nearly 60 percent of respondents reported they never listened and less than one-fifth reported listening at least once a week (13.1 percent in Amhara and 15.5 percent nationally).

Participation in various maternal and child health services was low. More than 40 percent of respondents said their youngest child (within the 6–23 month range) had received vitamin A in the last six months. Only 11.4 percent of respondents in Amhara and 16.9 percent nationally received vitamin A

supplementation within two months of their last baby's birth. A total of 46 percent nationally and 40 percent in Amhara sought antenatal care (ANC) during their last pregnancy. Of those who sought care regionally and nationally, around 70–75 percent of respondents reported to have received ANC from a midwife, and another 21–25 percent from a Health Extension Worker, with a very small percentage going to a doctor. Facility-based delivery was low: 91.8 percent of deliveries in Amhara took place at home, and 84.9 percent nationally took place at home. About one-quarter of deliveries were assisted by an untrained traditional birth attendant (TBA), and more than half of births were assisted by a family member, neighbor, or other. Approximately half of respondents said their youngest child had received a Bacille Calmette-Guérin (BCG) vaccination for polio. Only one-tenth of the respondents mentioned ever attending a community conversation. The mean number of health worker contacts was around 2.4 in Amhara and 2.7 nationally.

Table 6. Exposure to media and contact with health services/health workers, Amhara and the national population (2011 EDHS).

| Characteristic | Amhara percentage (n=451) | National percentage (n=4,132) |
|--|------------------------------|----------------------------------|
| <i>Exposure to media</i> | | |
| Radio ownership | 28.2 | 38.4 |
| Frequency of listening to the radio | | |
| Not at all | 58.9 | 56.1 |
| Less than once a week | 28 | 28.4 |
| At least once a week | 13.1 | 15.5 |
| <i>Contact with health workers (for last delivery)</i> | | |
| Vitamin A in last six months for child 6–23 months of age | 46.9 | 41.4 |
| Vitamin A supplementation for mother within first two months of birth | 11.4 | 16.9 |
| Number of ANC visits | | |
| ANC visit (at least one visit) | 40 | 46 |
| Two or more visits | 28.9 | 39.0 |
| Mean ANC visits (standard deviation) | 1.1 (1.9) | 1.6 (2.3) |
| ANC visits with doctor* | 2.5 | 8.4 |
| ANC visits with midwife* | 75 | 70 |
| ANC visits with Health Extension Worker* | 25 | 21 |
| <i>Place of delivery (for last delivery)</i> | | |
| Home | 91.8 | 84.9 |
| Health center/hospital | 8.2 | 15.1 |
| <i>Assistance at delivery</i> | | |
| Delivery assisted by trained TBA | 5.5 | 11.1 |
| Delivery assisted by untrained TBA | 22.2 | 25.1 |
| Delivery assisted by midwife | 7.1 | 11.8 |
| Delivery assisted by family or other | 65.2 | 52.0 |
| <i>Immunization of youngest child</i> | | |
| BCG vaccination | 52.7 | 54.6 |
| <i>Ever attended community conversation</i> | | |
| | 8.6 | 10.6 |
| <i>Mean number of health worker contacts (standard deviation, range 0–9)</i> | | |
| | 2.4 (1.9) | 2.7 (2.2) |

* Denominator: Among those who attended any antenatal care.

4.4 Relationship between IYCF indicators and possible explanatory variables in Amhara and nationally (2011 EDHS)

The study looked at relationships between IYCF indicators and selected dependent variables in both Amhara and the national population datasets for the 2011 EDHS only. Level of significance for chi-square was calculated and is included in Tables 7 through 10.

4.4.1 Demographic and household characteristics

Table 7 shows there were very few significant associations between IYCF indicators and dependent variables in Amhara Region, even before adjusting for any covariates. However, the mother's education was significantly associated with early initiation of breastfeeding and consumption of iron-rich foods. Only 37.3 percent of mothers with no education initiated early, in contrast to 64.3 percent with a secondary education. Effect of education on consumption of iron-rich foods was especially striking, with 7.8 percent of mothers having no education giving such foods, as opposed to 13.2 percent with primary education and 44.4 percent with secondary education. In Amhara, wealth also had an effect on a child's consumption of iron-rich foods. Only 10.1 percent of children in the poorest quintile consumed such foods, in contrast to 24 percent in the richest quintile.

Table 7 shows that at the national level, a number of variables were significantly associated with IYCF practices before adjusting for any covariates. Mothers with higher levels of education were more likely to adopt better IYCF practices for all indicators except for early initiation of breastfeeding. The most striking effect was for dietary diversity: 20.9 percent of mothers with secondary education provided their children with minimum dietary diversity, versus only 8.9 percent with primary education and 2.5 percent of mothers with no education. Differences for consumption of iron-rich foods were also great; only 8.6 percent of mothers having no education reported feeding an iron-rich diet as opposed to 14.6 percent with primary education and 35.8 percent with secondary education.

Table 7. Demographic characteristics and IYCF indicators in Amhara and the national population (2011 EDHS).

| Characteristic | Early initiation of breastfeeding | | Minimum dietary diversity | | Iron-rich foods | | Animal-source foods with milk or milk products | | Animal-source foods without milk or milk products | |
|------------------------------------|-----------------------------------|----------------------|---------------------------|----------------------|------------------|----------------------|--|----------------------|---|----------------------|
| | Amhara % (n=451) | National % (n=4,132) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) |
| <i>Mother's level of education</i> | * | | | *** | ** | *** | | *** | | *** |
| No education | 37.3 | 52.9 | 1.9 | 2.5 | 7.8 | 8.6 | 22.2 | 42.9 | 9.6 | 10.7 |
| Primary | 29.3 | 52.7 | 3.8 | 8.9 | 13.2 | 14.6 | 24.5 | 50.2 | 9.4 | 19.9 |
| Secondary | 64.3 | 59.1 | | 20.9 | 44.4 | 35.8 | 55.6 | 64.8 | 33.3 | 26.7 |
| <i>Socioeconomic status</i> | | ** | | *** | * | *** | | *** | | *** |
| Poorest | 36.8 | 52.4 | 1.1 | 2.2 | 10.1 | 9.4 | 25 | 47.6 | 9 | 11 |
| Poorer | 35.7 | 49.5 | 2.5 | 3.7 | 3.7 | 7.3 | 18.5 | 41.4 | 7.4 | 10.8 |
| Middle | 33.3 | 50.6 | 2.3 | 3.6 | 13.1 | 7.4 | 21.4 | 41.4 | 11.9 | 11.6 |
| Richer | 37.1 | 53.3 | 3.8 | 4.6 | 5.7 | 10.8 | 26.4 | 43.7 | 7.6 | 16 |
| Richest | 50 | 58.6 | 0 | 13.3 | 24 | 24.1 | 32 | 54.3 | 24 | 22.3 |
| <i>Residence</i> | | ** | | *** | | *** | | *** | | *** |
| Urban | 48.6 | 57.9 | 0 | 14.3 | 17.4 | 24.8 | 26.1 | 56.7 | 21.7 | 21.4 |
| Rural | 35.8 | 51.8 | 2.3 | 3.4 | 9.1 | 9.1 | 23.3 | 43.9 | 9.4 | 12.6 |

| Characteristic | Early initiation of breastfeeding | | Minimum dietary diversity | | Iron-rich foods | | Animal-source foods with milk or milk products | | Animal-source foods without milk or milk products | |
|----------------|-----------------------------------|----------------------|---------------------------|----------------------|------------------|----------------------|--|----------------------|---|----------------------|
| | Amhara % (n=451) | National % (n=4,132) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) |
| Religion | | *** | | | | ** | * | *** | | |
| Other | 38.5 | 55.6 | 2 | 5.1 | 8.2 | 10.6 | 37.6 | 51.6 | 16.3 | 13.3 |
| Orthodox | 36.5 | 45.8 | 2.1 | 5.7 | 9.9 | 14.6 | 21.2 | 35 | 9.2 | 15.9 |

***P<0.001, **P<0.01, *P<0.05.

Whereas education was not a factor in breastfeeding initiation rates at the national level, wealth did affect this indicator but not substantially. Among those in the highest SES quintile, 58.6 percent of mothers initiated immediately, compared to 52.4 percent in the lowest quintile. Wealth was also strongly associated with all of the other practices. In particular, more than four times as many mothers in the richest quintile provided their children with minimum dietary diversity, three times as many gave their children iron-rich foods, and twice as many gave their children ASF with milk/milk products as those in the poorest quintiles.

At the national level, place of residence was also strongly associated with each of the indicators, with children in urban areas receiving better diets than those in rural areas.

Finally, there was an association between religion and IYCF practices at the national level for three of the indicators, but the effect was mixed. Children in Orthodox families were significantly less likely to be breastfed immediately after birth than those of other faiths (45.8 percent versus 55.6 percent) and were also less likely to consume ASF (35 percent versus 51.6 percent). However, they were somewhat more likely to receive an iron-rich diet (14.6 percent versus 10.6 percent).

4.4.2 Exposure to media and contact with health workers

Table 8 shows that in Amhara, there was some association between IYCF practices and frequency of listening to the radio (but not radio ownership *per se*). There were more and stronger associations with practices at the national level. In that population, minimum dietary diversity, consumption of iron-rich foods, and consumption of ASF were 11.9 percent, 19.5 percent, and 58.2 percent, respectively, among those who were exposed to radio at least once a week, compared to 3.3 percent, 10.4 percent, and 48.7 percent among those who had not listened to the radio at all.

Table 8. IYCF indicators by exposure to media, Amhara and the national population (2011 EDHS).

| Characteristic | Early initiation of breastfeeding | | Minimum dietary diversity | | Iron-rich foods | | Animal-source foods with milk or milk products | | Animal-source foods without milk or milk products | |
|------------------------|-----------------------------------|----------------------|---------------------------|----------------------|------------------|----------------------|--|----------------------|---|----------------------|
| | Amhara % (n=451) | National % (n=4,132) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) |
| Radio ownership | | | | | | *** | | ** | | *** |
| No | 36.4 | 51.8 | 1.2 | 3.3 | 10.3 | 9.7 | 23.5 | 44.5 | 9.4 | 11.5 |
| Yes | 41.3 | 53.8 | 4.7 | 8.3 | 8.2 | 15.5 | 25.8 | 49.6 | 12.9 | 18.1 |
| Frequency of listening | | | * | *** | | *** | * | ** | * | *** |
| Not at all | 33.5 | 52.6 | 1 | 3.3 | 10.1 | 10.4 | 20.9 | 48.7 | 8.6 | 12.7 |
| Less than once a week | 35.7 | 51.8 | 2.2 | 5.5 | 6.7 | 10.6 | 28.3 | 49.7 | 8.8 | 13.3 |
| At least once a week | 52.5 | 55.6 | 6.9 | 11.9 | 14 | 19.5 | 37.8 | 58.2 | 20.9 | 22.8 |

***P<0.001, **P<0.01, *P<0.05.

Table 9 presents IYCF practices by exposure to different health services. In Amhara, specific contacts with health workers (when not controlled for other factors) showed no association with initiation of breastfeeding or with consumption of ASF. There was a weak association with minimum dietary diversity for mothers who had attended ANC with a doctor. For those who had visited a midwife for ANC, there were improvements in iron-rich diet and consumption of ASF with milk/milk products. On the other hand, there was a strong association between attending a community conversation and early initiation of breastfeeding (65 percent among those who had attended versus 34.1 percent among those who had not).

For the national population, there were more and stronger associations between contact with different services and selected IYCF practices. Minimum dietary diversity was significantly higher for children whose mothers had attended two or more ANC visits, had received ANC from a trained health provider (doctor or midwife), whose delivery was assisted by a trained professional, and who had attended community conversations than for those in the respective reference populations. For the most part, these associations were similar for other IYCF practices, with the exception of initiation of breastfeeding. Only delivery assisted by a midwife was significantly associated with early initiation (57.7 percent of those who were assisted by a midwife versus 52.3 percent who did not have a midwife).

Table 9. IYCF indicators by contact with health services/health workers, Amhara and the national population (2011 EDHS).

| Characteristic | Early initiation of breastfeeding | | Minimum dietary diversity | | Iron-rich foods | | Animal-source foods with milk or milk products | | Animal-source foods without milk or milk products | |
|--|-----------------------------------|----------------------|---------------------------|----------------------|------------------|----------------------|--|----------------------|---|----------------------|
| | Amhara % (n=451) | National % (n=4,132) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) |
| <i>ANC visits</i> | | | | *** | | *** | | ** | | *** |
| 2 or more | 39.8 | 56.1 | 2.1 | 9.8 | 13.4 | 17.3 | 30 | 53.7 | 15.4 | 20.5 |
| <i>ANC visits with doctor</i> | | | * | *** | | *** | | *** | | *** |
| No | 37.4 | 54 | 1.9 | 4.2 | 10.1 | 10.1 | 24.7 | 49.3 | 10.4 | 13.6 |
| Yes | 36.4 | 56.8 | 12.5 | 18.6 | | 32.4 | 37.5 | 69.3 | 12.5 | 26.7 |
| <i>ANC visits with midwife</i> | | | | *** | ** | *** | | | * | *** |
| No | 37.2 | 53.8 | 1.3 | 3.8 | 6.9 | 10.4 | 22 | 50.5 | 8.1 | 12.7 |
| Yes | 37.9 | 55.2 | 4.3 | 9.2 | 17.4 | 15.7 | 32.3 | 51.3 | 16.3 | 19.3 |
| <i>ANC visits with Health Extension Worker</i> | | | | | | | | | | |
| No | 37.3 | 54 | 2.4 | 5.5 | 10.3 | 12.2 | 25.4 | 51 | 10.3 | 14.7 |
| Yes | 37.8 | 56.3 | | 4.8 | 5.6 | 11 | 21.6 | 48.6 | 11.4 | 15 |
| <i>Place of delivery</i> | | | | *** | | *** | | *** | | *** |
| Home | 36.7 | 52.4 | 2.3 | 3.6 | 8.9 | 9.2 | 24.4 | 49.2 | 10.2 | 12.8 |
| Health center | 37.8 | 56.3 | | 15 | 16.7 | 25.8 | 31.2 | 59.6 | 10 | 22.8 |
| <i>Delivery assisted by trained TBA</i> | | | | | | | | | | |
| No | 37.3 | 53.3 | 2.2 | 5.3 | 9.6 | 12.1 | 24.3 | 50.1 | 9.5 | 14.6 |
| Yes | 28 | 49.8 | | 5.4 | 11.1 | 8.5 | 38.9 | 53.5 | 22.2 | 12.7 |
| <i>Delivery assisted by untrained TBA</i> | | | | ** | * | *** | | | | *** |
| No | 37 | 52.2 | 3.4 | 6.1 | 11.4 | 13.3 | 23.3 | 49.4 | 9.9 | 15.9 |
| Yes | 36 | 54.9 | 4.4 | 3 | 2.9 | 7.4 | 51.5 | 53.7 | 11.6 | 9.9 |
| <i>Delivery assisted by midwife</i> | | * | | *** | | *** | | * | | ** |
| No | 37 | 52.3 | 2.3 | 4.1 | 8.9 | 10.4 | 24.8 | 49.7 | 10.5 | 13.7 |
| Yes | 34.4 | 57.7* | 0 | 14 | 17.9 | 22.4 | 27.5 | 56.2 | 7.1 | 19.9 |

| Characteristic | Early initiation of breastfeeding | | Minimum dietary diversity | | Iron-rich foods | | Animal-source foods with milk or milk products | | Animal-source foods without milk or milk products | |
|--|-----------------------------------|----------------------|---------------------------|----------------------|------------------|----------------------|--|----------------------|---|----------------------|
| | Amhara % (n=451) | National % (n=4,132) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) | Amhara % (n=332) | National % (n=2,928) |
| <i>BCG vaccination</i> | | | | *** | | *** | | * | | |
| No | | | 2.5 | 3.1 | 6.7 | 8.1 | 22.6 | 53.6 | 10 | 10.7 |
| Yes | | | 1.9 | 6.5 | 11.3 | 14 | 26.6 | 48.6 | 10.3 | 16.5 |
| <i>Measles vaccination</i> | | | | *** | | *** | | * | | |
| No | | | 1.2 | 2.8 | 7.9 | 8.4 | 25.7 | 52.4 | 9.7 | 10 |
| Yes | | | 3 | 8.3 | 11.6 | 16.4 | 25 | 48.1 | 10.8 | 19 |
| <i>Attended community conversation</i> | *** | | | *** | | ** | | | | *** |
| Never | 34.1 | 52.8 | 1.9 | 4.6 | 9.8 | 11.2 | 23.2 | 45.9 | 9.8 | 13.5 |
| Yes | 65 | 53.6 | 3.8 | 11.2 | 7.7 | 16.7 | 23.1 | 48.3 | 15.3 | 21.9 |

***P<0.001, **P<0.01, *P<0.05.

Table 10 shows bivariate association between IYCF practices and contact with health workers as an aggregate scale (unadjusted for other covariates). The table shows that at the national level, all IYCF indicators increased significantly with higher aggregate contact with health workers. Minimum dietary diversity increased by 50 percent, consumption of iron-rich foods increased by 30 percent, and consumption of ASF (without milk/milk products) increased by 20 percent with a unit increase in contact with health workers. In Amhara, there was a weak association between increased contact with health workers and three of the indicators: consumption of iron-rich foods and consumption of ASF (both with milk/milk products and without milk/milk products). There was no association between contact with health workers and early initiation of breastfeeding or consumption of a diverse diet.

Table 10. Unadjusted relationship between IYCF indicators and contact with health workers (aggregate scale) in Amhara and the national population (2011 EDHS).

| Indicator | Amhara | | National | |
|--|------------|---------|------------|----------|
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| Early initiation of breastfeeding | 1.0 | 0.9–1.2 | 1.1** | 1.0, 1.1 |
| Dietary diversity | 1.2 | 0.8–1.8 | 1.5*** | 1.4, 1.6 |
| Consumption of iron-rich foods | 1.22* | 1.0–1.5 | 1.3*** | 1.2, 1.3 |
| Consumption of animal-source foods (with milk or milk products) | 1.2* | 1.0–1.3 | 1.1** | 1.0, 1.1 |
| Consumption of animal-source foods (without milk or milk products) | 1.2* | 1.0–1.4 | 1.24*** | 1.2, 1.3 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

4.5 Multivariate analysis of the national sample only (2011 EDHS)

This section presents findings of multivariate models (logistic regression) conducted on the national sample in 2011, adjusting for individual, household, and communication covariates. Odds ratios and confidence intervals around the odds ratios are presented to show the magnitude and strength of associations between IYCF indicators and explanatory variables. Model 1 presents results adjusting for all covariates excluding SES quintile. Model 2 presents results for all covariates (including SES). The reason for running the regressions with and without SES was to explore if effects on other covariates were independent of the household's economic condition.

Table 11 shows that, nationally, a male child was 20 percent less likely to begin breastfeeding immediately after birth compared to a female child. Orthodox children were 40 percent less likely to begin immediate breastfeeding compared to non-Orthodox children. There was a 10 percent increase in early initiation of breastfeeding with a one unit increase in contact with health workers. All these effects held after adjusting for household wealth. There was no association between breastfeeding initiation and mother's level of education or frequency of listening to the radio.

Table 11. Adjusted models: Early initiation of breastfeeding (0–23 months) in the national population (2011 EDHS).

| Characteristic | National level (N=4,129) | | | |
|---|--------------------------|----------|------------------------|----------|
| | Model 1 | | Model 2 (includes SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.0 | 0.9, 1.0 | 1.0 | 0.9, 1.0 |
| <i>Child's sex (ref: Female)</i> | 0.8* | 0.8, 1.0 | 0.8* | 0.8, 1.0 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 1.0. | 0.8, 1.1 | 0.9 | 0.8, 1.1 |
| Secondary or higher | 1.2 | 0.9, 1.6 | 1.1 | 0.8, 1.5 |
| <i>Religion (ref: Other)</i> | | | | |
| Orthodox | 0.6*** | 0.6, 0.7 | 0.6*** | 0.6, 0.7 |
| <i>Contact with health workers (continuous)</i> | 1.0*** | 1.0, 1.1 | 1.1* | 1.0, 1.1 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 1.0 | 0.8, 1.1 | 0.9 | 0.8, 1.1 |
| At least once a week | 1.1 | 0.9, 1.3 | 1.0 | 0.9, 1.3 |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 0.9 | 0.7, 1.1 |
| Middle | | | 0.9 | 0.8, 1.1 |
| Richer | | | 1.0 | 0.8, 1.2 |
| Richest | | | 1.2 | 0.9, 1.5 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

The difference between nutrition practices for male and female children did not hold for the remaining IYCF practices.

Table 12 shows that introduction of CF increased as the child's age increased (from 6 to 8 months of age). Higher maternal education was positively associated with timely introduction of CF, even when adjusting for SES. With a one unit increase in contact with health workers, there was a 10 percent greater likelihood of timely introduction of CF (both models). When adjusting for SES quintile, there was no association between timely introduction of CF and either religion or listening to the radio.

Table 12. Adjusted models: Timely introduction of complementary feeding (6–8 months) in the national population (2011 EDHS).

| Characteristic | National level (N=597) | | | |
|---|------------------------|----------|------------------------|----------|
| | Model 1 | | Model 2 (includes SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.8*** | 1.5, 2.3 | 1.8*** | 1.5, 2.3 |
| <i>Child's sex (ref: Female)</i> | 1.0 | 0.7, 1.4 | 0.9 | 0.7, 1.4 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 2.4*** | 1.6, 3.6 | 2.4*** | 1.6, 3.7 |
| Secondary or higher | 3.8** | 1.6, 8.9 | 3.9*** | 1.6, 9.7 |
| <i>Religion (ref: Other)</i> | | | | |
| Orthodox | 0.9 | 0.7, 1.5 | 0.9 | 0.6, 1.5 |
| <i>Contact with health workers (continuous)</i> | 1.1* | 0.9, 1.2 | 1.1* | 0.9, 1.2 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 1.5* | 1.0, 2.3 | 1.5 | 1.0, 2.3 |
| At least once a week | 1.4 | 0.8, 2.3 | 1.4 | 0.8, 2.4 |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 0.9 | 0.5, 1.7 |
| Middle | | | 0.9 | 0.5, 1.6 |
| Richer | | | 0.8 | 0.5, 1.5 |
| Richest | | | 0.8 | 0.4, 1.6 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

Table 13 shows that minimum dietary diversity increased with the child's age. Maternal education held significantly large effects on child dietary diversity practices even after adjusting for household wealth. Orthodox children were 40 percent less likely to receive minimum dietary diversity than non-Orthodox children. Children were 20 percent more likely to receive minimum dietary diversity with one increase in contact with health workers. Listening to radio at least once a week also increased the practice by 90 percent compared to those who did not listen at all.

Table 13. Adjusted models: Minimum dietary diversity (6–23 months) in the national population (2011 EDHS).

| Characteristic | National level (N=2,926) | | | |
|---|--------------------------|----------|------------------------|----------|
| | Model 1 | | Model 2 (includes SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.1*** | 1.1, 1.1 | 1.1*** | 1.1, 1.1 |
| <i>Child's sex (ref: Female)</i> | 0.9 | 0.6, 1.2 | 0.9 | 0.6, 1.2 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 2.6*** | 1.8, 3.9 | 2.5*** | 1.7, 3.7 |
| Secondary or higher | 4.1*** | 2.8, 7.2 | 3.4*** | 1.9, 6.2 |
| <i>Religion (ref: Other)</i> | | | | |
| Orthodox | 0.6** | 0.4, 0.9 | 0.6* | 0.4, 0.9 |
| <i>Contact with health workers (continuous)</i> | 1.3*** | 1.2, 1.4 | 1.2*** | 1.1, 1.4 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 1.3 | 0.8, 1.9 | 1.2 | 0.8, 1.9 |
| At least once a week | 2.0** | 1.3, 3.1 | 1.9** | 1.2, 3.0 |

| Characteristic | National level (N=2,926) | | | |
|---------------------------------------|--------------------------|--------|------------------------|----------|
| | Model 1 | | Model 2 (includes SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 1.4 | 0.7, 2.8 |
| Middle | | | 1.1 | 0.6, 2.2 |
| Richer | | | 1.1 | 0.6, 2.2 |
| Richest | | | 1.8 | 1.0, 3.1 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

Tables 14, 15, and 16 present multivariate analyses of associations between different variables and consumption of iron-rich foods and ASF. The mother's education and higher contact with health workers were positively and significantly associated with consumption of iron-rich foods and ASF. Listening to the radio at least once a week was significantly associated with consumption of ASF but not iron-rich foods. Orthodox children were 50 percent less likely to receive ASF compared to non-Orthodox children, but there was no association between religion and consumption of iron-rich foods. With a one unit increase in contact with health workers, consumption of ASF (without milk or milk products) increased by 10 percent. There was no association between contact with health workers and consumption of ASF with milk or milk products.

Table 14. Adjusted models: Consumption of iron-rich foods (6–23 months) in the national population (2011 EDHS).

| Characteristic | National level (N=2,926) | | | |
|---|--------------------------|----------|------------|----------|
| | Model 1 | | Model 2 | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.0* | 1.0, 1.1 | 1.0** | 1.0, 1.1 |
| <i>Child's sex (ref: Female)</i> | 1.2 | 1.0, 1.5 | 1.2 | 0.9, 1.5 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 1.5* | 1.1, 1.9 | 1.4* | 1.0, 1.8 |
| Secondary or higher | 3.3*** | 2.2, 5.0 | 2.6*** | 1.7, 3.9 |
| <i>Religion (ref: Other)</i> | | | | |
| Orthodox | 1.0 | 0.8, 1.3 | 1.0 | 0.8, 1.3 |
| <i>Contact with health workers (continuous)</i> | 1.7** | 1.1, 1.2 | 1.1*** | 0.1, 0.2 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 0.8 | 0.6, 1.1 | 0.8 | 0.6, 1.1 |
| At least once a week | 1.2 | 0.9, 1.7 | 1.1 | 0.8, 1.6 |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 0.7 | 0.5, 1.0 |
| Middle | | | 0.7 | 0.4, 1.0 |
| Richer | | | 0.9 | 0.6, 1.4 |
| Richest | | | 1.5 | 1.0, 2.2 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

Table 15. Adjusted models: Consumption of animal-source foods (6–23 months) in the national population (2011 EDHS).

| Characteristic | National level (N=2,926) | | | |
|---|--------------------------|------------|-------------------------|----------|
| | Model 1 | | Model 2 (considers SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.0** | 1.0, 1.03 | 1.2** | 1.0, 1.0 |
| <i>Child's sex (ref: Female)</i> | 1.1 | 1.0., 1.34 | 1.1 | 1.0, 1.3 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 1.3** | 1.1, 1.5 | 1.3** | 1.1, 1.6 |
| Secondary or higher | 2.6*** | 1.8, 3.7 | 2.4*** | 1.6, 3.5 |
| <i>Religion (ref: Other)</i> | 0.4*** | 0.4, 0.5 | 0.5*** | 0.4, 0.5 |
| <i>Contact with health workers (continuous)</i> | 1.0 | 1.0, 1.1 | 1.0 | 1.0, 1.1 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 1.1 | 0.9, 1.3 | 1.1 | 0.9, 1.3 |
| At least once a week | 1.4** | 1.2, 1.8 | 1.5*** | 1.2, 1.9 |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 0.8 | 0.6, 0.9 |
| Middle | | | 0.7 | 0.6, 0.9 |
| Richer | | | 0.7 | 0.6, 0.9 |
| Richest | | | 0.9 | 0.7, 1.2 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

Table 16. Adjusted models: Consumption of animal-source foods (without milk or milk products) (6–23 months) in the national population (2011 EDHS).

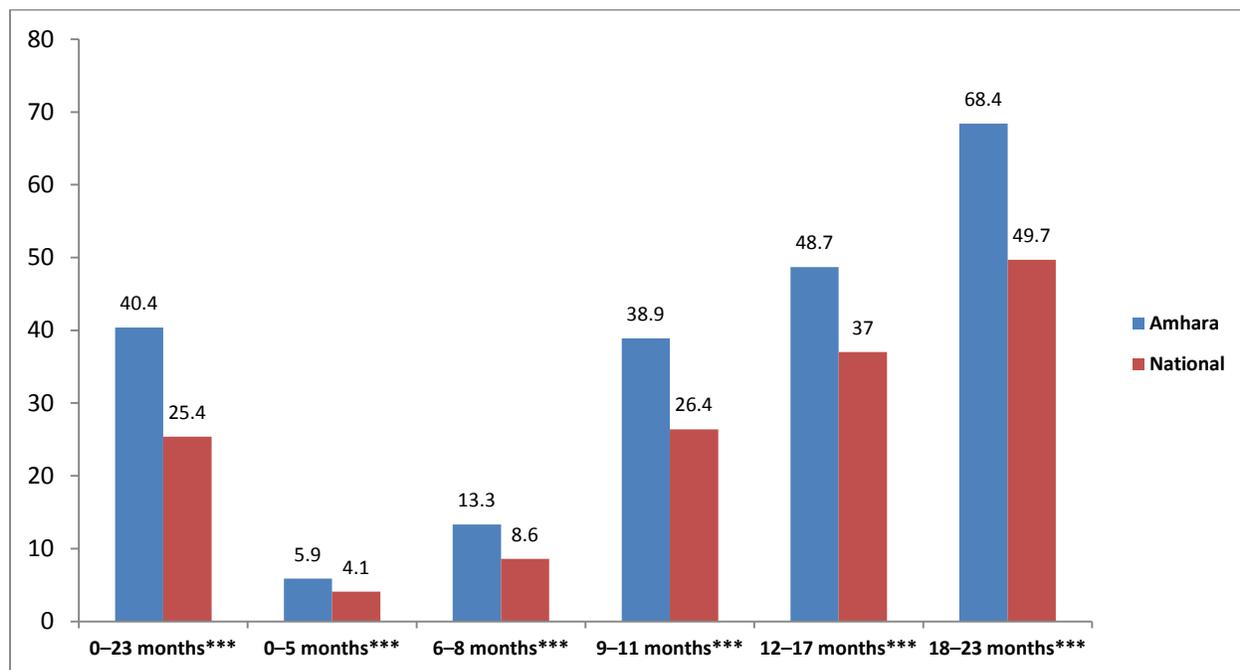
| Characteristic | National level (N=2,926) | | | |
|---|--------------------------|----------|-------------------------|----------|
| | Model 1 | | Model 2 (considers SES) | |
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| <i>Child's age (continuous)</i> | 1.1*** | 1.0, 1.1 | 1.1*** | 1.0, 1.1 |
| <i>Child's sex (ref: Female)</i> | 1.1 | 0.8, 1.3 | 1.1 | 0.8, 1.3 |
| <i>Mother's education (ref: No education)</i> | | | | |
| Primary | 1.7*** | 1.3, 2.1 | 1.6*** | 1.3, 2.1 |
| Secondary or higher | 1.6* | 1.1, 2.5 | 1.5 | 1.1, 2.4 |
| <i>Religion (ref: Other)</i> | 0.9 | 0.7, 1.2 | 0.9 | 0.7, 1.2 |
| <i>Contact with health workers (continuous)</i> | 1.2*** | 1.1, 1.2 | 1.1*** | 1.0, 1.2 |
| <i>Frequency of listening to the radio (ref: Never)</i> | | | | |
| Less than once a week | 0.9 | 0.7, 1.2 | 0.9 | 0.7, 1.1 |
| At least once a week | 1.4* | 1.1, 1.9 | 1.4* | 1.0, 1.9 |
| <i>Wealth quintile (ref: Poorest)</i> | | | | |
| Poorer | | | 0.9 | 0.6, 1.2 |
| Middle | | | 0.9 | 0.6, 1.2 |
| Richer | | | 1.1 | 0.8, 1.6 |
| Richest | | | 1.1 | 0.7, 1.5 |

***P<0.001, **P<0.01, *P<0.05. CI: confidence interval.

4.6 Stunting in Amhara and the national population (2011 EDHS)

Finally, the study looked at rates of stunting in both Amhara Region and at the national level in 2011. Figure 3 shows that stunting prevalence among children 0–23 months of age was significantly higher in Amhara (40.4 percent) compared to the national level (25.4 percent). As expected, stunting increased with age and according to similar patterns at the regional and national levels. Stunting rates in both Amhara and at the national level tripled for children between 6–8 months and 9–11 months (from 13.3 percent to 38.9 percent in Amhara and from 8.6 percent to 26.4 percent nationally). Stunting rates were highest among the oldest children (18–23 months). 68.4 percent of children 18–23 months were stunted in Amhara compared to 50 percent nationally.

Figure 3. Distribution of stunting by age group, Amhara and the national population (2011 EDHS).



***P<0.001, **P<0.01, *P<0.05.

Table 17 presents an analysis of stunting status by selected household-level indicators. Associations were only significant for the national population. The prevalence of stunting was lower in the highest SES quintile. In Amhara, stunting was almost double (44 percent) in the lowest quintile compared to the highest quintile (26 percent), but the difference was not significant. Nationally, there was a significant 12 percentage point difference between the lowest and highest quintiles (28.7 percent stunting versus 15.8 percent). At the national level, stunting was also significantly lower in households where mothers had secondary or higher education, and in female children. Both in Amhara and nationally, stunting was higher among Orthodox children compared to non-Orthodox (32 percent versus 22 percent nationally), but the association was only significant at the national level.

Table 17. Stunting among children 0–23 months by selected household factors, Amhara and the national population (2011 EDHS).

| Characteristic | Amhara percentage (N=451) | National percentage (N=4,132) |
|---------------------------|------------------------------|----------------------------------|
| <i>Wealth index</i> | | |
| Poorest | 43.6 | 28.7 |
| Poorer | 40.2 | 28.8 |
| Middle | 44.7 | 26.7 |
| Richer | 36.2 | 25.8 |
| Richest | 25.8 | 15.8*** |
| <i>Mother's education</i> | | |
| No education | 40.8 | 28.3 |
| Primary education | 41.7 | 21.6 |
| Secondary education | 25.0 | 14.3*** |
| <i>Religion</i> | | |
| Other | 35.6 | 22.5 |
| Orthodox | 41.3 | 32.3*** |
| <i>Child's sex</i> | | |
| Female | 39.3 | 23.3 |
| Male | 41.6 | 27.7*** |

***P<0.001, **P<0.01, *P<0.05.

5. Summary of findings

National-level prevalences of recommended nutrition practices are low in Ethiopia and the situation in Amhara is particularly serious. There were no major improvements in IYCF practices in the region between the 2005 and 2011 Ethiopia Demographic and Health Surveys. EBF rates did rise (from 69 percent to 74 percent), but the change was not significant. However, rates of early initiation dropped significantly, from 57 percent to 37 percent. Timely introduction of CF also dropped (from 46 percent to 35 percent), but the change was not significant.

Status of basic IYCF indicators in Amhara and nationally

In 2011, IYCF indicators in Amhara were lower than those at the national level, with the exception of EBF from 0–5 months of age, which was significantly higher in Amhara. Early initiation of breastfeeding was particularly striking (37 percent in Amhara versus 53 percent nationally). Timely introduction of CF was only 35 percent in Amhara compared to 46 percent nationally. The percentage of children with minimum dietary diversity was very low nationally, and even lower in Amhara (5 percent versus 2 percent, respectively). The percentage of children consuming an iron-rich diet was only 10 percent in Amhara and 12 percent nationally. Rates of consumption of ASF without milk or milk products were similar to those for iron-rich foods. Consumption of ASF with milk or milk products was somewhat better, at 24 percent in Amhara and 46 percent nationally.

These suboptimal practices have clearly had an impact on stunting rates, which are severe both nationally and especially in the region. In 2011, prevalence of stunting among children 0–23 months old was 40.3 percent in Amhara and 25 percent nationally. Stunting increased with age; for those in the 18–23 month age group, stunting prevalence was extraordinarily high, at 68 percent in Amhara and 50 percent nationally.

Demographic and household characteristics and relationship to indicators

Basic demographic and household characteristics contribute to the poor nutritional situation of children in Amhara and nationally. Multivariate analysis at the national level in 2011 showed that IYCF indicators were positively associated with higher rates of maternal education and wealth—factors that are challenging in Ethiopia. In the highest SES group, early initiation of breastfeeding was 54 percent, minimum dietary diversity was 13 percent, and consumption of iron-rich foods was 24 percent, compared to 52 percent, 2 percent, and 9 percent, respectively, for mothers in the lowest quintile. It is noteworthy that in 2011, half of the population fell into the lowest two SES quintiles, in both Amhara and nationally.

Parental education was low in general in the study population, but even lower in Amhara. In 2011, 80 percent of mothers in Amhara reported having received no education, compared to 67 percent nationally.

The strength of association between IYCF indicators and place of residence as well as access to WASH facilities was not analyzed. However, the impact of WASH on nutritional status and the connection with diarrheal disease in particular is well documented. Ethiopia's population is primarily rural (82.9 percent nationally and 92.2 percent in Amhara), and access to safe water and sanitation is poor. In 2011, nearly half the population (both national and regional) did not have any toilet facilities and about another third

used pit latrines without slabs. More than 50 percent of the population got their drinking water from unprotected open sources.

Cultural factors also play some role in nutrition practices. Multivariate analysis at the national level in 2011 found an association between families' religion and IYCF practices for three of the indicators, but the effect was mixed. Children in Orthodox families were significantly less likely to be breastfed immediately after birth than those of other faiths, and were also less likely to consume ASF. However, they were more likely to consume an iron-rich diet. Religion may also be a factor at the regional level, although this was not specifically analyzed. In Amhara, an overwhelming 85 percent of respondents reported they belonged to the Orthodox Christian faith (in contrast to 31 percent of respondents nationally).

Exposure to media and contact with health workers

Multivariate analysis of the national sample in 2011 showed that listening to the radio at least once a week was positively associated with some IYCF practices. Women who listened to the radio were 87 percent more likely to provide their children with minimum dietary diversity and 39 percent more likely to feed ASF (without milk or milk products) compared to those who did not listen to the radio at all.

Construction of a proxy variable for exposure to nine basic maternal and child health services showed that at the national level in 2011, higher contact with health workers was significantly associated with the adoption of IYCF practices even after adjusting for all other covariates. For a one unit increase in the scale of a mother's contact with health workers, there was a 24 percent increase in providing minimum dietary diversity and a 12 percent increase in giving iron-rich foods.

Importantly, however, in both Amhara and in the national population, parents' access to information is hindered by low media ownership/usage and low access to/demand for health services. Data in 2011 showed that overall, exposure to radio and contact with health workers during pregnancy, at the time of delivery, and after delivery were low both in Amhara and nationally. Around 15 percent of women reported listening to the radio at least once a week nationally and 13 percent in Amhara.

Utilization of ANC was low, with only around 30 percent of women in Amhara and 40 percent nationally attending ANC two or more times during their last pregnancy. Of those who sought care regionally and nationally, around 70–75 percent of respondents reported to have received ANC from a midwife, and another 21–25 percent had received it from a Health Extension Worker. Delivery at a health facility was low (9 percent in Amhara and 15 percent nationally). More than a quarter of respondents (27 percent in Amhara and 36 percent nationally) sought assistance during delivery from a TBA, and more than half of births were assisted by a family member, neighbor, or other.

Bivariate analysis of IYCF practices and ANC exposure at the national level showed that 10 percent of mothers who had attended two or more ANC visits reported feeding their children a minimally diverse diet compared to 2 percent among those who had none or one visit. Similarly at the national level, 11 percent of mothers who attended community conversations reported providing their children with

minimum dietary diversity compared to 5 percent among those who did not attend. (However, these data were not controlled for possibly confounding variables.)

Attendance at community conversation sessions (within the last three months) was low in 2011, at only 8 percent in Amhara and 11 percent nationally.

6. Conclusion and program considerations

The need for further attention on recommended IYCF practices in Amhara Region is made clear by the data; the prevalence of recommended IYCF practices—especially those related to CF—were low and did not improve between the 2005 and 2011 Ethiopia Demographic and Health Surveys. While prevalences of recommended IYCF practices are low nationally, practices in Amhara are an even greater cause for concern. In addition, formative research conducted by A&T during Phase I (2009–2013) found that some harmful practices (such as introducing prelacteals and discarding colostrum, and withholding ASF from young children until 2 years of age) are common in rural Ethiopia.¹⁰ Suboptimal IYCF practices in Amhara have led to high levels of stunting in the region.

Complementary feeding practices, in particular dietary diversity, and consumption of iron-rich and animal-source foods should receive greater focus in the region. At the same time, it is clear that demographic and SES characteristics present major barriers to substantial improvements. The data show that high rates of poverty and low rates of maternal education are directly associated with poor nutrition practices in Ethiopia.

Low rates of access to/demand for maternal and child health services also undermine the potential for interactions with health workers to have a positive impact on nutrition. For example, low rates of ANC attendance mean mothers are not benefitting from an array of services as well as potential for communication and improvements in knowledge. Nevertheless, the positive association between health worker contacts as well as participation in community conversations and some nutrition practices is an indication that efforts should be made to utilize any contact between mothers and health workers to provide IYCF messages and counseling.

Social or community gatherings such as community conversations hold potential as an avenue to provide IYCF messages. Increasing attendance at community conversations and training community leaders/health workers who facilitate these groups on IYCF messages will be useful in raising overall awareness of IYCF. Other public gatherings can also be utilized as platforms for delivering IYCF messages. These gatherings probably will be beneficial in reaching fathers or other male members in households as well.

Given that the large majority of the population in Amhara Region is Orthodox, working with religious leaders and community influentials on addressing issues of dietary diversity within the context of local cultural norms and beliefs may be important to raising awareness of IYCF behaviors in households.

Although coverage of radio is low, some kinds of mass media programs with IYCF messages also can be considered to reach mothers and those who influence them.

7. References

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Appendix 1. Definitions of infant and young child feeding indicators

1. Early initiation of breastfeeding

Proportion of children born in the last 23 months who were put to the breast within one hour of birth.

2. Exclusive breastfeeding at less than 6 months of age

Proportion of infants 0–5 months at the time of the survey who received only breastmilk within the last 24 hours.

3. Introduction of solid, semi-solid, or soft foods

Proportion of infants 6–8 months of age at the time of the survey who received solid, semi-solid, or soft foods within the last 24 hours.

4. Minimum dietary diversity

Proportion of children 6–23 months of age at the time of the survey who received at least one serving from four or more of the following seven food groups:

- Grains, roots, and tubers
- Legumes and nuts
- Dairy products (milk, yogurt, cheese)
- Flesh foods (meat, fish, poultry, and liver/organ meats)
- Eggs
- Vitamin A-rich fruits and vegetables
- Other fruits and vegetables

5. Consumption of iron-rich or iron-fortified foods

Proportion of children 6–23 months of age who received at least one serving of an iron-rich food or iron-fortified food within the last 24 hours that was specially designed for infants and young children, or that was fortified in the home.

6. Consumption of animal-source foods

Proportion of children 6–23 months of age at the time of the survey who received at least one serving of animal-source food within the last 24 hours. Animal-source foods imply dairy products (milk, yogurt, cheese), flesh foods (meat, fish, poultry, and liver/organ meats), and eggs.

Appendix 2. Prevalence of and confidence intervals around Amhara infant and young child feeding indicators (2005 and 2011 Ethiopia Demographic and Health Surveys)

| Indicator | 2005 | | 2011 | |
|--|------|------------------|------|------------------|
| | n | Percentage (CI) | n | Percentage (CI) |
| Early initiation of breastfeeding (0–23 months) | 252 | 57.4 (51.1–63.7) | 451 | 36.8 (32.3–42.4) |
| Exclusive breastfeeding (0–5 months) | 79 | 69.2 (58.2–79.5) | 119 | 73.9 (65.1–81.5) |
| Introduction of complementary feeding (6–8 months) | 28 | 46.4 (27.5–66.1) | 52 | 34.6 (21.9–49.0) |
| Minimum dietary diversity (6–23 months) | 179 | 2.9 (1.0–6.6) | 332 | 2.1 (1.0–4.3) |
| Consumption of iron-rich foods (6–23 months) | 173 | 6.9 (3.6–11.8) | 332 | 9.6 (6.7– 3.3) |

CI: confidence interval.

Note: The point prevalence of infant and young child feeding indicators in 2005 and 2011 are compared. Confidence intervals were calculated around the point prevalence. An overlapping confidence interval indicates that the change over the years was not significant. Hence, only early initiation of breastfeeding changed significantly between 2005 and 2011. (See also Figure 1 in the main body of the report.)

Appendix 3. Distribution of consumption of different animal-source foods among children 0-23 months (2011 Ethiopia Demographic and Health Survey)

| Foods | Amhara percentage (n=332) | National percentage (n=2,928) |
|--|--------------------------------------|--|
| Eggs | 4.5 | 8.3 |
| Tinned or powdered milk or fresh milk | 11.8 | 32.0 |
| Cheese, yogurt, or other milk products | 2.7 | 6.3 |
| Beef, pork, lamb, chicken | 3.3 | 5.1 |
| Liver, hearts, organs | 1.2 | 1.9 |
| Fish | 1.2 | 1.7 |
| Yogurt | 3.3 | 3.8 |