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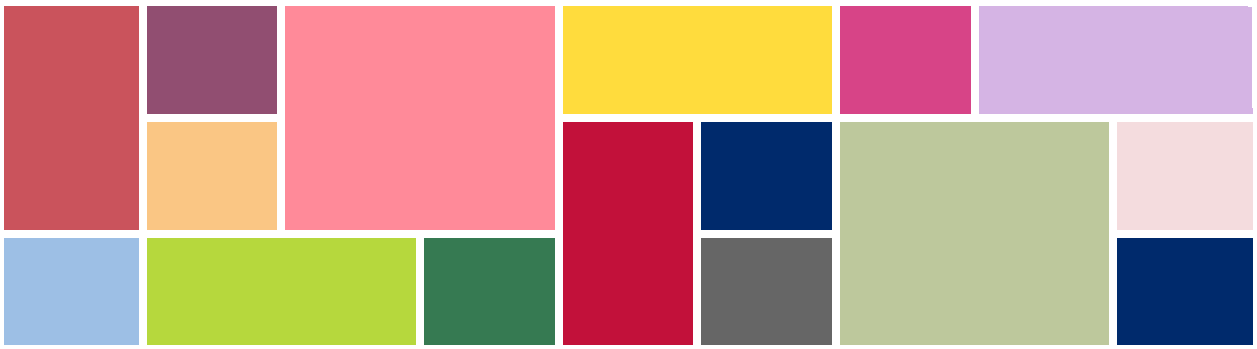
Maternal and Child Survival Program

MCSP Ethiopia Community Based Newborn Care (CBNC) Project

Endline Survey Report



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The Maternal and Child Survival Program (MCSP) is a global, $560 million, 5-year cooperative agreement funded by the United States Agency for International Development (USAID) to introduce and support scale-up of high-impact health interventions among USAID's 25 maternal and child health priority countries,* as well as other countries. MCSP is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

* USAID's 25 high-priority countries are Afghanistan, Bangladesh, Burma, Democratic Republic of Congo, Ethiopia, Ghana, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Yemen and Zambia.

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Acknowledgments

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Abbreviations

ANC	antenatal care
CBNC	Community-Based Newborn Care
EDHS	Ethiopian Demographic and Health Survey
FMOH	Federal Ministry of Health
HC	health center
HDA	Health Development Army
HEP	Health Extension Program
HEW	health extension worker
HP	health post
HW	health worker
IR	intermediate result
MCSP	Maternal and Child Survival Program
MNCH	maternal, newborn, and child health
MNH	maternal and newborn health
NEGA	Newborns in Ethiopia Gaining Attention
PHCU	primary health care unit
PNC	postnatal care
PPS	probability proportional to size
PWC	pregnant women's conference
RMNCH	reproductive, maternal, newborn, and child health
SNNPR	Southern Nations, Nationalities, and Peoples' Region
USAID	US Agency for International Development

Executive Summary

Background

USAID's global flagship Maternal and Child Survival Program (MCSP) introduces and supports high-impact sustainable reproductive, maternal, newborn, and child health interventions to prevent child and maternal deaths with a focus on 27 high-priority countries, one of which is Ethiopia. MCSP supported the rollout of the Government of Ethiopia's Community-Based Newborn Care (CBNC) program from October 2014-December 2017. Locally, the MCSP project was known as Newborns in Ethiopia Gaining Attention (NEGA).[1]

The project covered 12 zones (133 *woredas)* and two "special *woredas*" in four regional states of Ethiopia: Tigray, Amhara, Oromia, and Southern Nations, Nationalities, and Peoples' Region (SNNPR), representing 86% of the country's total population. The overall goal of the MCSP CBNC/NEGA project was to contribute to the reduction of newborn morbidity and mortality in Ethiopia through capacity-building to provide high-impact services at both the community and the primary health care unit (PHCU) level.

The MCSP NEGA program was designed to achieve its goal through three intermediate results (IRs):

- IR 1: Improved community maternal and newborn health (MNH) practices and care-seeking behaviors.
- IR 2: Increased provision of high-impact, quality newborn care services in the community.
- IR 3: Strengthened supportive systems for provision of newborn health care.

A baseline survey was carried out in 2015 to obtain the benchmarks for key MNH indicators, and an endline survey was completed 2 years later to determine progress against project objectives. The surveys collected information on knowledge of women ages 15–49 regarding MNH, MNH care-seeking behavior and practices, coverage of key MNH services—antenatal care (ANC), essential newborn care, delivery by skilled birth attendants, and postnatal care (PNC), among others—and capacity of the community for maternal, newborn, and child health (MNCH) collective action.

Methodology

A cross-sectional population-based research design was used to collect quantitative data from women of reproductive age who gave birth in the last 6 months before the surveys. A total of 1,906 women at baseline and 2,002 women at endline were interviewed using similarly structured questionnaires. During endline, key informant interviews were also conducted with selected health care managers and providers from project regions, zones, *woredas*, and PHCUs. Desk review of relevant project documents was also conducted and used to interpret the survey findings. A comparative analysis of baseline and endline findings was conducted on selected project indicators, as well as a multivariate logistic analysis to determine factors associated with care seeking at endline.

Key Findings and Results

The analysis was based on data from 1,884 at baseline and 1,953 women at endline, after 22 and 49 records, respectively, were excluded due to incompleteness.

[1] The NEGA acronym differentiates the project from the other UNICEF-funded CBNC project implemented by Save the Children. NEGA is also an Amharic word that translates to "it is dawning," which portrays the attention being given to newborns currently.

Characteristics of Respondents

The age distribution of the women interviewed was roughly the same at baseline and endline, with about 75% of respondents in the 20–34 age group. Teenage mothers made up 7.6% and 6.6% of those interviewed at baseline and endline, respectively. Over 96% of the women interviewed were married at the two data collection time points. The percentage of respondents with primary education or higher was slightly higher at endline (53.7%) compared to 48.4% at baseline. Close to half of the respondents were Orthodox Christian in both surveys (55% and 48% at baseline and endline, respectively), followed by Muslims (27% and 33% at baseline and endline, respectively).

Characteristics of the Households

At baseline and endline, data were collected on household characteristics as a proxy for economic well-being or wealth of each household. The variables on household utilities and housing characteristics were used to create a wealth index of socioeconomic status for each household using principal components analysis. Households were then divided into five equal groups (quintiles) according to the value of the index, with the first and fifth quintiles representing the most and least poor, respectively. The index was used to look into possible association between relative poverty and MNH service utilization.

The percentage of households using a protected water source (piped water into or outside of the compound, protected wells, or springs) increased from 63.2% at baseline to 76.7% at endline, mainly due to doubling of households that use protected wells or springs. Use of tube wells or boreholes significantly decreased, from 17% at baseline to 2% at endline. Toilet availability showed improvement, from 71% at baseline to 78% at endline. Percentage of households with an open pit or no toilet facility decreased from 24.6% to 17.6% between baseline and endline.

Availability of electricity remained the same at baseline and endline, at 30%. The percentage of households with a radio increased by 6%, with a TV increased by 3%, and with a mobile telephone increased by about 5% between baseline and endline.

Pregnancy Disclosure

A little over half of the women disclosed their pregnancy to a nonfamily member at both baseline and endline (53.3% versus 54.1%, respectively). The percentage of women who disclosed their pregnancy during the first trimester was similar at baseline and endline, at about 44%, while there was an unexpected doubling of the percentage of women who disclosed their pregnancy during the third trimester (8.7% at baseline versus 19.6% at endline; $p<0.001$).

Pregnancy Home Visit

About one-quarter of the women reported to have had a pregnancy home visit at both baseline and endline. At both baseline and endline, home visits were done primarily by health extension workers (about 90%) followed by Health Development Army members (about 30%). Home visit during early pregnancy (first 12 weeks) more than doubled at endline, from 23% to 52% ($p<.001$).

ANC

A large percentage of women at both baseline and endline had attended their first ANC visit (87.7% at baseline, 89.6% at endline; $p<0.05$). As during the baseline, a majority of the women at endline had their first ANC visit during the second trimester (58% at baseline and 59% at endline). A 3 percentage-point decrease was seen at endline in the percentage of women who had their first ANC visit during the third trimester ($p<0.01$).

Changes in knowledge of pregnancy danger signs were mixed, with improvement at endline for some danger signs, while others decreased. A notable difference between baseline and endline was seen in the percentage

of women who knew that blurred vision (21.7% at baseline versus 35.8% at endline; p <0.001) and high blood pressure (20.4% at baseline versus 24.5% at endline; p <0.001) were pregnancy dangers sign. There was improvement in attendance of pregnant women's conferences, from 23.5% at baseline to 26.5% at endline (p<0.05). Knowledge about severe headache remained the same, at 50%, at both baseline and endline. Knowledge about fever decreased from 47% at baseline to 39% at endline.

Delivery and Immediate Newborn Care

Facility delivery increased from 50.2% of pregnancies at baseline to 58.3% at endline (p<0.001). As the number of facility-based deliveries increased, the percentage of cesarean sections remained about the same (4.1% at baseline versus 4.6% at endline; p>0.05). Duration of facility stay after delivery also increased, with the percentage of women who stayed for more than 24 hours increasing from 41% at baseline to 47% at endline (p <0.001) and the percentage who stayed for less than 24 hours decreasing from 60% at baseline to 54% at endline (p <0.001).

In terms of immediate newborn care, there was a significant decrease in the percentage of women who reported that any substance was applied[2] to the cord after delivery at endline (17.8% at baseline versus 8.6% at endline; p<.01). The percentage of women who reported putting the baby to the breast immediately after birth decreased from 74% at baseline to 60.4% at endline (p <0.001). However, the percentage of women who reported putting the child to the breast between 1 and 12 hours after birth increased significantly from 19.4% at baseline to 26.5% at endline (p <0.001). At both baseline and endline, about 80% of women reported feeding their baby with colostrum.

Postnatal Care Home Visit

Although still very low, there was a significant increase in the percentage of mothers and/or babies who received PNC home visits within 48 hours, from 8.1% at baseline to 15.6% at endline (p <0.001).

Newborn Illness and Care Seeking

Less than 10% of newborns were reported to have been sick in their first month of life (7.6% at baseline compared to 9.4% at endline). A lower percentage of women reported seeking care outside of the home for newborn illness at endline (64.5%) compared with baseline (77.1%; p<0.001). The major reason for not seeking care outside of the home at both baseline and endline was expectation of self-resolution of the illness. At both baseline and endline, the majority of women reported hospitals and health centers as the first place they sought care for newborn illness (63% at baseline, 72% at endline).

Community Capacity

Women were asked about their perceptions of their own capacity and that of their community to solve MNCH-related problems. For a list of statements organized under themes, women rated their level of agreement on a Likert scale.[3] Responses were pooled to show agreement and disagreement with capacity-related statements organized into six domains: self-efficacy, collective efficacy, social cohesiveness, collective action, participation, and effective leadership. Statistically significant improvement was observed at endline in women's perception around self-efficacy (70% at baseline versus 77% at endline; p<.001), collective action (72% at baseline versus 75% at endline; p<0.05), effective leadership (55% at baseline versus 67% at endline; p<0.001), and participation (63% at baseline versus 71% at endline; p<.001). A two percentage-point reduction was observed in collective efficacy and in social cohesion (77% at baseline versus 79% at endline; p>0.05).

[2] Substance applied on the cord does not include chlorhexidine.
[3] Underwood C, Boulay M, Snetro-Plewman G, et al. 2012–2013. Community capacity as means to improved health practices and end in itself: evidence from a multi-stage study. Int Q Community Health Educ. 33(2):105-27. doi: 10.2190/IQ.33.2.b.

Factors Associated with Care-Seeking Behavior

Key factors that predict women's use of MNH-related services identified through the multivariate logistic analysis based on the endline data include:

- Late disclosure of ANC to a nonfamily member is significantly associated with late initiation of ANC ($p<0.001$) and significantly less likelihood of attending ANC4+ ($p<0.001$).
- Women who initiated ANC in the second trimester were 38% more likely to complete ANC4+, and those who initiated in the third trimester were 88% less likely to complete ANC4+.
- Women with secondary education or higher were twice as likely to deliver in a health facility.
- Women who attended at least four ANC visits were twice as likely to deliver in a health facility.
- Women residing in Amhara were half as likely and, in SNNPR, 1.5 as times likely to have PNC home visits within 48 hours of birth compared to those in Tigray.

Conclusion

The endline survey provides information on women's key MNCH-related knowledge, perceptions, and practices that impacts MNH outcomes. Based on analysis of the findings, the study team concluded that encouraging improvement is seen in coverage for services across the MNCH continuum of care. Encouraging improvements were also achieved in MNCH-related community capacity domains. The findings also revealed that: (i) there is a need for more effort to reach a coverage level that can result in a reduction in mortality; (ii) there is still disproportionately significant knowledge, access, and utilization gaps in services related to newborn health; (iii) while facility delivery is improving, there is much to be desired in the care provided for newborns while in a facility; (iv) PNC home visits for both mothers and newborns continued to remain very low; and (v) care provided during the post-delivery facility stay is not in line with the recommended standard to meaningfully impact newborn care outcomes.

Introduction

Ethiopia is the second most populous country in Africa, with an estimated population of 100 million in 2017.[4] The majority of the population (80%) lives in rural areas. Ethiopia was once considered one of the least developed countries in the world, but recently, the country has made significant progress in the economic, education, and health sectors. Ethiopia has registered a double-digit economic growth rate over the last decade. Literacy rates among the population have more than doubled, and enrollment in primary, secondary, and tertiary education has increased substantially. The gender gap in education and labor force participation is narrowing. Likewise, significant progress has been made in improving the health status of the population, including Ethiopia's achievement of the primary target of Millennium Development Goal 5. Driving this were noteworthy improvements between 2000 and 2016 in: antenatal care (ANC) attendance, which rose from 27% to 62%; the percentage of women who had ANC during the first trimester increased from 6% to 20%; women who had at least four ANC visits increased from 10% to 32%; and facility-based deliveries, which increased from 5% to 26%.

Nevertheless, in 2016, three out of every four deliveries still occurred at home, newborn mortality stood at 29 per 1,000 live births, infant mortality was registered as 48 per 1,000 live births, and pregnancy-related deaths occurred in 412 per 100,000 live births.[5] ANC and rates of newborn care-seeking practices have not met national targets, which may contribute to the country's high levels of newborn, infant, and maternal deaths. Improving access to ANC to ensure maternal and newborn well-being, identifying and treating conditions that may threaten the health of the newborn and mother, and providing essential newborn care practices can improve maternal and newborn health (MNH) and reduce maternal, newborn, and infant morbidity and mortality.

In 2013, the Federal Ministry of Health (FMOH) made MNH one of the top priorities[6] and introduced community-based newborn care (CBNC) through the Health Extension Program (HEP). The goal of CBNC is to reduce newborn morbidity and mortality by strengthening the capacity of primary health care units (PHCUs) and HEP to deliver quality maternal, newborn, and child health (MNCH) services through efficient and effective linkages between health centers (HCs) and health posts (HPs).[7] In 2014, MCSP was given the mandate by USAID to assist the Government of Ethiopia in strengthening its CBNC program.

[4] Central Statistics Agency (CSA). 2007. Projection from 2007 national population and housing census.
5 CSA, ICF. 2016. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.
[6] Federal Ministry of Health (FMOH). 2010. *The Health Sector Development Program IV*. Addis Ababa: FMOH.
[7] FMOH. 2013. *National CBNC Implementation Plan*. Addis Ababa: FMOH.

Background and Survey Objectives

Background

The Maternal and Child Survival Program

The Maternal and Child Survival Program (MCSP) is a global, United States Agency for International Development (USAID)-funded program designed to introduce and support scale-up of high-impact health interventions among 25 maternal and child health priority countries, as well as other countries. MCSP is focused on ensuring that all women, newborns, and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn, and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

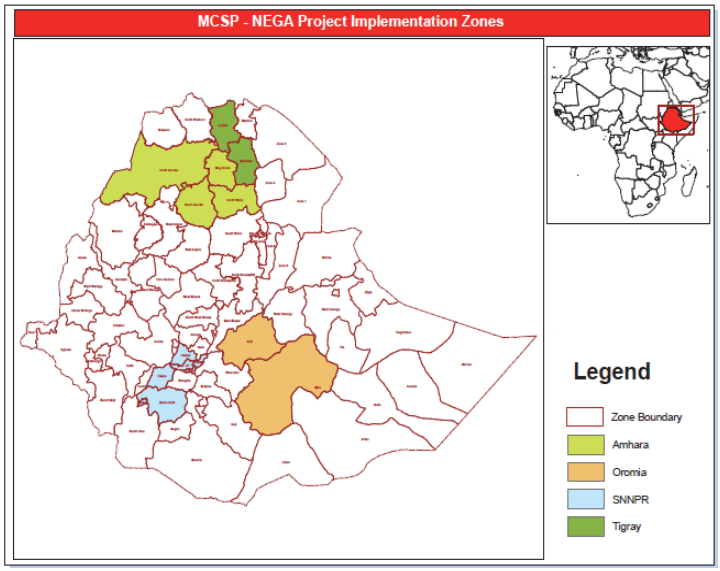
MCSP Newborns in Ethiopia Gaining Attention Objectives and Geographic Coverage

In response to the FMOH's focus on CBNC, USAID engaged MCSP to focus on newborn care in the community in line with the CBNC implementation plan. MCSP's Newborns in Ethiopia Gaining Attention (NEGA) project was designed to contribute to the reduction of newborn morbidity and mortality in Ethiopia through capacity-building for the provision of high-impact services both at the community and the PHCU levels over 3 years (October 2014 through December 2017). This goal was to be achieved through three intermediate results (IRs):

- IR 1: Improved community MNH practices and care-seeking behaviors.
    - IR 1.1. Enhanced capacity of the HEP to promote MNH.
    - IR 1.2. Improved community engagement through implementation of evidence-based and culturally sensitive social and behavior change communication interventions.
- IR 2: Increased provision of high-impact, quality newborn care services in the community.
    - IR 2.1. Increased availability of newborn care services at the community level.
    - IR 2.2. Improved quality of newborn care services both in the community and at health facilities.
    - IR 2.3. Strengthened linkages with existing MNH activities/interventions to ensure synergies and efficient use of resources.
- IR 3: Strengthened supportive systems for provision of newborn health care.
    - IR 3.1. Enhanced *woreda* capacity to coordinate, monitor, and evaluate community newborn care interventions.
    - IR 3.2. Enhanced project learning through operations research.
    - IR 3.3. Strengthened linkages with partners and other interventions to ensure uninterrupted supply of essential supplies for newborn care.

MCSP adopted several approaches and strategies to achieve these IRs, including: improving linkages between HCs and HCs and the performance of health extension workers (HEWs); scaling up community-based MNH services, including the introduction of newborn sepsis management; building the capacity of health centers to provide quality MNCH services; and strengthening logistics and information systems within the PHCU context. Moreover, the project also used community empowerment and demand creation strategies through the Health Development Army (HDA) and other existing community structures that focused on improving maternal and newborn care-seeking behaviors and practices.

Figure 1. Maternal and Child Survival Program Newborns in Ethiopia Gaining Attention project implementation zones



MCSP NEGA was implemented in 12 zones, covering 135 *woredas* across Tigray, Amhara, Oromia, and Southern Nations, Nationalities, and Peoples' Region (SNNPR) regions of Ethiopia (Figure 1). This covers 24% of the agrarian *woredas* in the country. These four regions are home to more than 80% of the country's population. Table 1 presents the coverage of project in terms of the number of zones, *woredas*,[8] *kebeles*,[9] HCs, and HPs, and the number of health workers (HWs) and HEWs by region.

Table 1. Number of zones, *woredas*, facilities, health workers (HWs), and health extension workers (HEWs) reached by project

Region	Total population in the target zones*	# zones/ special *woredas*	# *Woredas*	# *Kebeles*	# Health centers	# Health posts	# HWs	# HEWs
Tigray	2,172,501	2	14	321	81	319	325	790
Amhara	7,168,152	4	42	1,276	278	1,259	695	2,489
Oromia	4,670,614	2	42	903	183	864	549	1,575
Southern Nations, Nationalities, and Peoples' Region	5,040,307	6	37	1,262	188	1,163	878	2,245
Total	19,051,574	14	135	3,762	730	3,605	2,447	7,099

*Source: *Woreda* population census projected for 2016.

A baseline survey was conducted in June 2015 among women who had delivered within 6 months before the survey date in randomly selected *kebeles* from project zones in all four regions to develop benchmarks for key MNH indicators in project target areas. The survey collected information on existing knowledge, practices, and coverage on the following thematic areas: (i) knowledge among women ages 15–49 of MNH; (ii) behavior and practices in seeking health care for mothers and newborns; (iii) coverage of key MNH services

[8] *Woreda* is equivalent to district. A district has on average about 20 *kebeles* and five health centers.
[9] With an average population of 5,000, *kebele* is the lowest administrative structure in Ethiopia. Each *kebele* has one health post (the lowest service delivery unit) with two HEWs assigned to implement primarily disease prevention and health promotion activities.

(including ANC, essential newborn care, delivery by skilled birth attendants and postnatal care [PNC]); and (iv) community capacity for MNCH collective action.

Endline Survey

The endline survey was designed to measure MNCH-related coverage, knowledge, and practices among the project's target community and to highlight changes against the baseline figures. Specifically, the endline survey was designed to measure changes over the project period regarding women's knowledge about MNCH, MNCH-seeking behaviors and practices, coverage of key MNCH services, and community capacity for MNCH collective action. The same data collection tools were utilized at baseline and endline. In addition, the key informant interviews with health managers and providers were conducted at endline to assist in the interpretation of study findings. The consulting firm Birhan Research and Development Consultancy was contracted to complete the endline survey.

Methodology

Study Area and Scope

The endline survey was conducted in June 2017 in randomly selected *kebeles* from the project implementation zones. The survey collected information on project interventions/components, specifically MNCH knowledge, practices, and coverage indicators. Eligible study subjects included women who delivered in the last 6 months before the survey, heads of households, women of reproductive age, and frontline HWs and decision-makers.

Data Sources

Data were obtained from primary and secondary sources to capture information relevant to the study objectives. Information was collected from a sample of women who delivered in the last 6 months before the survey. In addition, selected HDA network leaders, HWs, HEWs, zonal and district health office officials/staff, and other relevant stakeholders from target areas in the project zones were interviewed. The baseline survey report, routine project reports, and other key documents were also reviewed.

Study Design

The endline survey employed both qualitative and quantitative research methods. A cross-sectional research design similar to what was done at baseline was used to collect quantitative data from women ages 15–49 who delivered in the 6 months before the survey and qualitative data through key informant interviews.

Sampling

The sample size for the endline survey was determined using the baseline survey methodology. The baseline study design provided an estimate of coverage levels at the beginning of the project so the effects of the interventions could be measured after project implementation. PNC home visit within 2 days after delivery, the most important indicator for the project, was used to determine the sample size for baseline. The same indicator was used for the endline survey to determine the sample size, with that assumption that there was a 30% relative increase in PNC home visit within 48 hours after delivery. The formula, assumptions, and key parameter inputs for determining the endline survey sample size (n) are presented below:

$$n = D * \frac{\left[Z_{\alpha} + Z_{\beta}\right]^{2}) * [P1(1-P1) + P2(1-P2)]}{(P2-P1)^{2}}$$

Where:

- n = the required sample size, expressed as number of women of reproductive age
- D = design effect (D=2)[10]
- P1 = the value of the key indicator at baseline
- P2 = the value of the key indicator at endline
- P2-P1 = the magnitude of change expected to be achieved
- $Z\ \alpha$ = the z-score corresponding to the probability with which it is desired to be able to conclude that an observed change of size (P2-P1) would not have occurred by chance; (α =0.05, $Z\ \alpha$ =1.645)
- $Z\ \beta$ = the z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (P2-P1), if one actually occurred (β=0.8; $Z\ \beta$=0.84)

The sample size calculation includes the following assumptions:

- Confidence level = 95%
- Study power = 80%
- Design effect set at two (2) for using cluster sampling instead of simple random sampling
- 30% absolute change (P2-P1) between baseline and endline

Using this formula, it was calculated that 1,905 women ages 15–49 who delivered in the last 6 months preceding the survey should be included in the study. When a 5% adjustment for nonresponse was made, the actual sample size for the endline survey was 2,005 women ages 15–49 who delivered in the last 6 months preceding the survey.

The total number of *kebeles* included in the endline survey was determined using the approach adopted for the baseline survey. At baseline, the number of expected deliveries per *kebele* each month was used to determine the number of *kebeles* to be sampled. For the baseline survey, the number of expected deliveries per month for any randomly selected *kebele* was assumed to vary between five and 10, ranging between 30 and 60 for the 6-month period before the survey. This yielded a total of 63 *kebeles* (factorial of 30 by 63) to be targeted to provide the estimated respondent sample size of 1,906 women who delivered in the 6 months preceding the survey.

For the endline, however, based on the baseline experiences of smaller number of deliveries per *kebele*, the expected deliveries per month per *kebele* was taken as two to five, giving 12–30 deliveries per *kebele* in the 6 months preceding the survey. Consequently, the number of *kebeles* increased from 63 at baseline to 73 at endline survey in order to arrive at the estimated sample size of 2,005 women who had delivered in the preceding 6 months before the survey. However, since the endline survey was conducted during the rainy season for contingency planning purposes (due to inaccessibility of *kebeles* from flooding, breakage of bridges, etc.), the number of *kebeles* was increased to 88. Table 2 below summarizes the estimated clusters and the corresponding sample sizes adopted for both the baseline and endline surveys. The number of women who gave birth in the 6 months preceding the survey at endline is slightly larger than that at baseline (1,906 at baseline versus 2,005 at endline) because of the change in design effect.

[10] The design effect was increased to two at endline because the levels of the indicators observed in the baseline survey were different from those expected when the sample size calculations were made prior to the survey (see USAID's 1997 Sampling Guide).

Table 2. Number of sampled zones, *woredas*, *kebeles*, and sample size by region

Region	No. of Zones		No. of *Woredas*		No. of *Kebeles*		Sample Size	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Tigray	1	1	1	1	7	10	181	200
Amhara	2	2	7	7	30	33	810	835
Oromia	2	2	4	4	16	21	420	435
Southern Nations, Nationalities and Peoples' Region	4	4	5	5	17	24	495	535
Total	9	9	17	17	80	88	1,906	2,005

Technique

Multistage cluster sampling techniques (selection of *kebeles* as the primary sampling unit and selection from villages in the selected *kebeles*) were applied for choosing the informants. *Kebeles* were selected using the probability proportional to size (PPS)[11] approach. The same method was applied to selected villages.[12] Household heads and women of reproductive age were first contacted and interviewed using modules 1 and 2 (detailed below) to identify women who delivered in the 6 months before the survey. All households in the selected villages were surveyed by the interviewers until the target sample size of recently delivered women for the *kebele* was reached.

Selection of Participants for Key Informant Interviews

Semi-structured key informant interview guides were used to collect qualitative information from health managers, MNCH experts, and providers to explore challenges and barriers to achieving project objectives. Data were triangulated with quantitative data to assess project performance.

At the first sampling stage, *woredas* in each of the seven zones included in the quantitative survey were listed alphabetically. HCs under each of the *woredas* were listed using the same approach. This allowed sorting *woredas* and HCs in each zone. The number of *woredas* and HCs in each region were determined using the PPS method. Seventeen *woredas* were selected for key informant interviews. Table 3 summarizes the number of key informant interviews conducted.

Table 1. Number of key informant interviews by type of respondent

Key Informant Interview Participants	No. of respondents
Maternal, newborn, and child health (MNCH) experts or heads from four regional health bureaus and seven zonal health bureaus	11
MNCH experts or heads from 10 *woreda* health offices	10
Primary health care unit staff /providers from 15 health centers	15
Health extension workers from 34 health posts (2 per *woredas*)	34
Total	70

[11] PPS sampling is a method of sampling from a finite population in which a size measure is available for each population unit before sampling and where the probability of selecting a unit is proportional to its size.
[12] Naming of villages differs from region to region. They are called as *Gere*, *Gasha*, *Gote*, etc.

Survey

Instruments

In order to compare the baseline with endline findings, quantitative information was collected using the same structured questionnaires used at the baseline. The three modules used during the baseline and endline surveys were:

- **Module 1:** This is used for household mapping. Through this module, all household members are listed, the location of each household is recorded, and a unique identification number is assigned to each household.
- **Module 2:** This questionnaire is used to collect information from all women ages 15–49 who were usual residents of the household. Information about all pregnancies and pregnancy outcomes (live births, stillbirths, and spontaneous or induced abortions) is collected, including the date of each outcome. The status of each live born baby is noted, and, if a baby is reported dead, the age at death is recorded. This module is also used to identify women who delivered in the 6 months before the survey.
- **Module 3:** This is a questionnaire for a recently delivered woman. All women whose pregnancy history included a live birth within the 6 months preceding the survey are asked to complete this questionnaire. It includes information on knowledge and practices regarding the antenatal period, delivery, postpartum period, and newborn care. It records levels of coverage for antenatal, delivery, postpartum, and newborn services during the women's last pregnancy.

Ethical Considerations

The study obtained ethical clearance from the Amhara, Oromia, SNNPR, and Tigray regional health bureau ethical clearance committees. The study also obtained ethical clearance from the Johns Hopkins Bloomberg School of Public Health (Institutional Review Board No: 00005931). Participants were asked whether they wanted to participate in the study using informed consent forms developed for this purpose. Participants were informed of all aspects of the research that may affect their willingness to participate and answer questions. They were informed of their freedom to choose to participate in the research or not and to choose to discontinue participation at any time in the interview process. Unique identifying numbers were assigned to the questionnaires in order to keep the information obtained from individual respondents confidential (names of household members were collected in module 1, and respondents for module 2 and 3 were linked to module 1 using the unique identifier). Interviewers, supervisors, and the entire survey team ensured that the responses were kept confidential. Anonymous data were stored securely on password-protected computers to which only the research team had access.

Implementation

Enumerators with experience in data collection and who knew the local language and culture were recruited from the survey regions. Experienced supervisors were hired based on their survey supervision experience and knowledge of the local language. Three days of intensive training was given to the field staff by the lead researchers of the consulting firm and MCSP NEGA staff members. The training provided the supervisors and interviewers with the general background and objectives of the project, objectives of the survey, and a description of the methods for sampling villages. Each question from each survey tool was also discussed in detail. In addition, the training covered techniques to ensure data quality and supervision methods.

Throughout the training, group discussions and role-plays were led by the supervisors, and at the end of the training, mock interviews were conducted by all teams.

Data Collection

Procedures

Upon completion of the training, the field staff were organized into six teams, each comprising one supervisor and five interviewers. The teams were then dispatched to their respective regions for data collection. Data were collected using paper-assisted personal interviews. During fieldwork, supervisors were responsible for contacting local authorities, acquiring permits, planning daily activities, monitoring performance, and conducting key informant interviews at the selected HCs and HPs. At the end of each day, supervisors carried out a preliminary check of the questionnaires completed by each enumerator for data completeness and accuracy. The fieldwork started on July 8 and was completed on August 5, 2017.

Data Management and Quality Control

To ensure that the standard procedures were followed and homogeneous data collection practices were used, four survey coordinators, one for each region, were assigned to provide supportive supervision. A team of experts from MCSP NEGA was closely involved in monitoring the data collection process in different regions. At the time of data collection, supervisors employed close supervision, spot checking, surprise visits, and re-interviewing randomly. Every day after the data collection was completed, the supervisors reviewed questionnaires so corrective measures could be taken on site.

Additional quality control was done through manual editing and coding of the questionnaire before data entry, double data entry, and data cleaning to ensure that the data were internally consistent and complete.

Data Editing, Coding, and Cleaning

The consulting firm hired a team for data management, which included one data manager, four data entry clerks, and two office editors. The two experienced data editors were trained on how to edit and code the collected questionnaires from the field. All questionnaires collected from the field were manually edited for coding open-ended responses (i.e., options for additional responses in the form of "others, specify" responses). Questionnaires were also checked to see if the skip rules were properly followed, if each question was filled in with the appropriate code, and, most important of all, if the responses were consistent.

Data were entered on an SPSS data entry template. The data entry template was pre-tested before the actual data entry began. In order to control data entry error, a 100% double entry of the data was completed. All discrepancies were checked against the hard copies and corrected as needed in the data set.

Once the data entry was completed and the data files were compiled, the data set was cleaned based on the edit specifications developed by the research leads. This helped identify errors and outliers, and check for internal consistencies among the variables in the questionnaire. The lead consultant and the data manager met on regular basis to assess the quality of the data and provided feedback to the data management team on a regular basis.

Data Analysis, Interpretation, and Report Writing

In order to simplify the analysis for the baseline and endline comparison, and adhere to the standards of the baseline quantitative data processing, the baseline data dictionary was verified against the endline questionnaire and adopted. Analysis included descriptive analysis (means and standard deviations, medians and ranges, frequencies, and cross-tabulations) and multivariate analysis to assess the relationships between variables of interest. Comparison between baseline and endline was done, and p-value level of significance was set at $p<0.05$.

The quantitative data were analyzed using SPSS V20, and the qualitative data were analyzed by content analysis, which included data reduction, data display and drawing, and verifying conclusions through

comparisons. The endline survey findings were compared with baseline results, and tests of significance were conducted for selected key indicators.

Results

This section presents progress toward project objectives by comparing findings of the endline survey to those of the baseline survey. A total of 1,906 and 2,002 women with a live birth 6 months before the surveys were interviewed at baseline and endline, respectively. The analysis presented in this section includes data from 1,884 and 1,953 women, after 22 and 49 records were excluded for baseline and endline, respectively, due to incompleteness. The number of records included in the multivariate analysis vary by outcome under investigation. Themes from the key informant interviews conducted at endline are used to assist in the interpretation of the findings and included in the discussion section as relevant.

Background Characteristics

Characteristics of Women Interviewed

The background sociodemographic characteristics of women interviewed at baseline and endline are shown in Table 4. The age distribution of the women interviewed was roughly the same at baseline and endline, with about 75% in the 20–34 age group, with the modal age category representing about one-third of the respondents being age 25–29. Teenage mothers comprised 7.6% and 6.6% of respondents at baseline and endline, respectively. Over 96% of the women interviewed were married at the two data collection points. The percentage of respondents with primary education or higher was slightly higher at endline (53.7%) compared to baseline (47.4%), $p<0.05$. A majority of respondents were Orthodox Christian at both points (55% at baseline and 48% at endline), followed by Muslims (27% and 33% at baseline and endline, respectively).

Table 4. Characteristics of reproductive age women with a live birth in last 6 months

Characteristics	Time point				
	Baseline (N = 1,884)	Percentage	Endline (N = 1,953)	Percentage	p-value[a]
Age (years)					
15–19	144	7.6%	130	6.7%	0.103
20–24	466	24.7%	429	22.0%	
25–29	618	32.8%	615	31.5%	
30–34	341	18.1%	421	21.6%	
35–39	247	13.1%	286	14.6%	
40–44	62	3.3%	58	3.0%	
45+	6	0.3%	14	0.7%	
Marital status					
Married	1,814	96.3%	1,886	96.6%	0.899
Divorced, separated, or widowed	42	2.2%	43	2.2%	
Never married but living together	12	0.6%	9	0.5%	
Never married	16	0.8%	15	0.8%	
Education					
No education	972	51.6%	922	47.2%	0.026
Primary	689	36.6%	778	39.8%	
Secondary or higher	223	11.8%	252	12.9%	
Missing	0	0.0%	1	0.1%	

Characteristics	Time point				
	Baseline (N = 1,884)	Percentage	Endline (N = 1,953)	Percentage	p-value[a]
Religion					
Orthodox Christian	1,043	55.4%	936	47.9%	0.651
Catholic	9	0.5%	17	0.9%	
Protestant	303	16.1%	362	18.5%	
Muslim	511	27.1%	637	32.6%	
Other	18	1.0%	1	0.1%	
Region					
Amhara	807	42.8%	823	42.1%	0.989
Oromia	410	21.8%	402	20.6%	
Tigray	181	9.6%	196	10.0%	
Southern Nations, Nationalities, and Peoples' Region	486	25.8%	532	27.2%	

[a] *p-value from chi-square test with adjustment for clustering, Donner and Klar*, Cluster Randomization Trials in Health Services Research, 2000

Household Characteristics

Both at baseline and endline surveys, data were collected on household characteristics as a proxy for economic well-being or wealth of each household. Women were asked about the household's main source of drinking water and the availability and type of toilet facility. They were also asked about household possession (ownership of commodities), such as electricity, radio, television, nonmobile telephone, mobile phone, bed, and bicycle, as well as floor type and roofing of the house. Household characteristics data were then used to examine if there was a relationship between relative poverty and ANC service utilization, pregnancy home visits, pregnancy conference attendance, place of delivery, duration of stay after facility delivery, immediate newborn care, PNC home visits, and health care-seeking behavior (results are shown in the relevant sections of the report). Data on household utilities and housing characteristics are presented in Table 5.

Table 5. Economic well-being of households

Characteristics	Time point				
	Baseline (N = 1,884)	Percentage	Endline (N = 1,953)	% Percentage	p-value
Main source of drinking water					
Piped into dwelling or compound	125	6.6%	94	4.8%	<0.001
Piped outside compound	751	39.9%	766	39.2%	
Tube well or borehole	323	17.1%	39	2.0%	
Protected well or spring	315	16.7%	638	32.7%	
Unprotected well or spring	179	9.5%	192	9.8%	
Other water source[b]	191	10.1%	223	11.4%	
Missing	0	0.0%	1	0.1%	
Type of toilet facility					
Ventilated improved pit latrine or pit with slab	82	4.4%	91	4.7%	<0.001
Pit latrine with wood floor	1,339	71.1%	1,518	77.7%	
Open pit or other	132	7.0%	117	6.0%	
No facility (bush/field)	331	17.6%	227	11.6%	
Household share the toilet facility (from those who have some kind of toilet facility)					
Yes	315	21.2 %	401	27.3%	<0.001
No	1,174	78.8%	1,070	72.7%	
Household socioeconomic status characteristics					
Have electricity	561	29.8%	611	31.3%	
Have radio	685	36.4%	825	42.2%	
Have television	141	7.5%	211	10.8%	
Have mobile telephone	1,158	61.5%	1,292	66.2%	
Have nonmobile telephone	24	1.3%	35	1.8%	
Have a bed	1,043	55.4%	998	51.1%	
Have a bicycle	80	4.2%	67	3.4%	
Wood, the main source of energy[d]	--	--	1,785	91.40%	
Floor is made of cow dung[d]	--	--	1,711	87.60%	

[b] Other water sources mentioned included river, dam/lake/pond/stream/canal/irrigation channel/rain water/tanker
[c] Multiple responses allowed. Hypothesis testing was not performed for socioeconomic status variables due to missing data.
[d] Wood as source of energy and floor made of cow dung were not asked at baseline.

The percentage of households using a protected water source (piped water into or outside of the compound, protected wells or springs) increased from 63.2% at baseline to 76.7% at endline, mainly due to doubling of households that use protected wells or springs. Use of tube wells or boreholes significantly decreased from 17% at baseline to 2% at endline.

Concerning availability of toilet facility, less than 5% of households in the study area had a ventilated/improved pit latrine or pit with slab at both time periods. The majority of households had a pit

latrine with wood floor, which showed improvement from 71% at baseline to 78% at endline. The percentage of households with an open pit or no toilet facility decreased from 24.6% to 17.6% between baseline and endline.

Availability of electricity was reported to be 30% at baseline and 31% at endline, while the percentage of households with a radio increased by 6%, those with a TV increased by 3%, and those with a mobile telephone increased by about 5% between baseline and endline. Households' bicycle ownership showed a slight decline between baseline and endline. No data were collected on type of floor and roof of the housing unit at baseline. The endline data show that the floor in 90% of housing units was cow dung; 38.7% of the roofing was corrugated iron and about one-quarter was made from other materials.

Antenatal Period

Information related to pregnancy disclosure, facility ANC, pregnancy home visit, women's knowledge of complications related to pregnancy, pregnant women's conference (PWC), and birth preparedness were sought in both the baseline and endline surveys. In this section, the endline survey results are compared with the baseline results in order to assess changes in these variables.

Pregnancy Disclosure

Disclosure of pregnancy to nonfamily members is a probable indication that the woman is likely to seek care for the pregnancy outside her home, such as in a health facility. Disclosing pregnancy early is considered an important action to start early ANC services, which benefit both the mother and the newborn. The percentage of women who disclosed their pregnancy to a nonfamily member was about the same at baseline and endline (53.3% versus 54.1%, respectively). The percentage of women who disclosed their pregnancy during the first trimester was similar, at about 44%, while there was an unexpected doubling of the percentage of women who disclosed their pregnancy during the third trimester (8.7% at baseline versus 19.6% at endline; $p<0.001$), as shown in Table 6. There was slightly more than 10 percentage-point drop among those who disclosed their pregnancy in the second trimester.

Table 6. Timing of pregnancy disclosure to nonfamily member by gestational age

Gestational age at disclosure of pregnancy	Time period				
	Baseline (N = 1,004)	Percentage	Endline (N = 1,057)	Percentage	p-value
=<12 weeks	436	43.4%	466	44.1%	<0.001
>12–24 weeks	479	47.7%	384	36.3%	
More than 24 weeks	87	8.7%	207	19.6%	
Did not disclose	2	0.02%	0	0.00%	

Pregnancy Home Visit

One-quarter of the women reported to have had at least one pregnancy home visit at both baseline and endline. For those women who reported to have had home visits during pregnancy, visits were done primarily by HEWs (about 90% at baseline and endline) followed by HDAs (about 34%) at endline. Significant change was seen in terms of early pregnancy home visit, with visits in the first 12 weeks more than doubling at the endline (from 23% to 52%; p<.001).

Table 7. Pregnancy home visit by gestational age

Variables	Baseline		Endline		P-value[$]
	N = 1,884	Percentage	N=1,953	Percentage	
Received home visit during last pregnancy	474	25.2%	500	25.6%	0.807

Variables	Baseline		Endline		P-value[$]
	N = 1,884	Percentage	N=1,953	Percentage	
Person who conducted any home visit*					
Home visit done by health extension worker	438	92.4%	453	90.6%	0.498
Home visit done by Health Development Army	155	32.7%	170	34.0%	0.822
Home visit done by health worker	37	7.8%	68	13.6%	0.070
Other	0	0.0%	2	0.4%	--
Gestation age at first home visit by nonfamily member					
	n = 443	Percentage	n = 494	Percentage	P-value
=<12 weeks	103	23.1%	259	52.4%	<0.001
>12–24 weeks	216	48.6%	175	35.4%	
More than 24 weeks	126	28.3%	60	12.1%	

*Multiple responses allowed;
[$]Two-sample test of proportions p-value

Facility ANC, Knowledge of Pregnancy Danger Signs, and PWC Attendance

ANC and PWCs provide women valuable general information on pregnancy, including associated complications, birth preparedness, and services that are beneficial to both the mother and the baby. The women were asked about the number of ANC visits completed and their knowledge of common danger signs and symptoms of pregnancy-related complications. Moreover, they were asked whether or not they have attended PWCs. The percentage of women who had attended the first ANC visit increased by 2 percentage points, from 87.7% at baseline to 89.6% at endline ($p<0.05$). In terms of gestational age at first ANC visit, the majority of the women at both baseline and endline had their first ANC visit during the second trimester (58% at baseline and 59% at endline; Table 8). A 2.5 percentage-point increase was seen at endline in the percentage of women who had their first ANC visit during the first trimester, and a 3 percentage-point decrease was seen at endline in the percentage of women who had their first ANC visit during the third trimester ($p<0.001$; Table 8).

Figure 2. Antenatal care (ANC) visits: percentage **of women attending ANC1 and ANC4+**

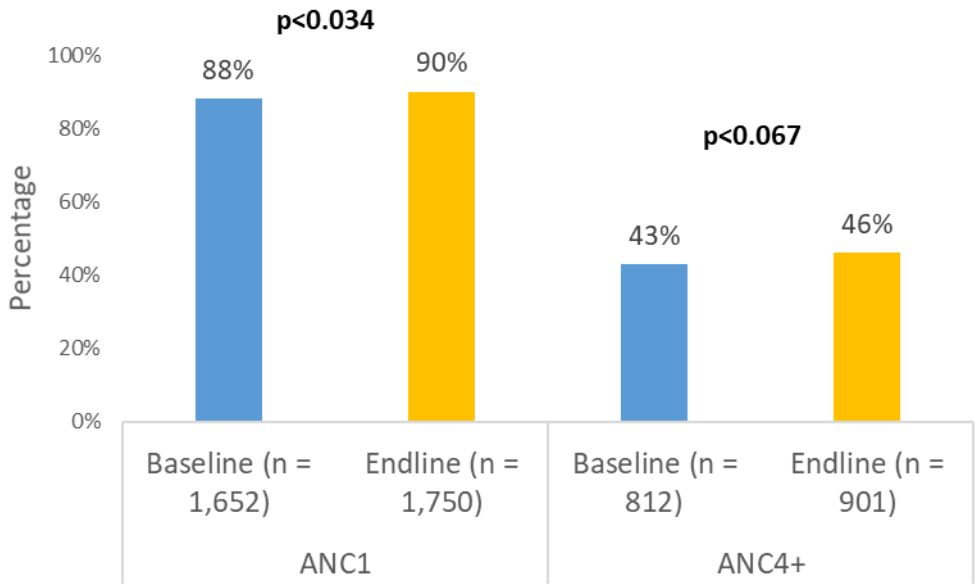
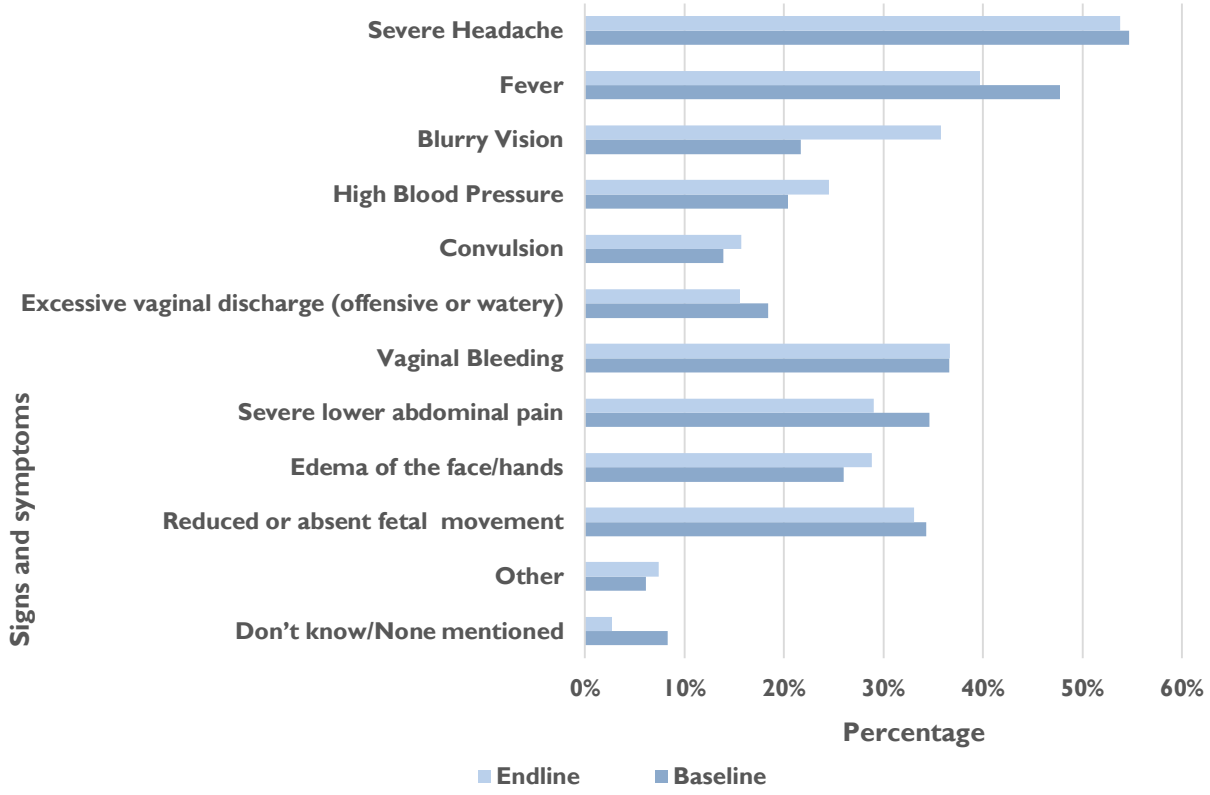


Table 8. Timing of first antenatal care visit by gestational age

Gestation age at first antenatal care visit	Time period				
	Baseline (N = 1,652)	Percentage	Endline (N = 1,750)	Percentage	p-value
=<12 weeks	464	28.1%	537	30.7%	0.009
>12–24 weeks	959	58.1%	1,034	59.1%	
>24–40 weeks	182	11.0%	141	8.1%	
Missing	47	2.8%	38	2.2%	

Figure 3 presents knowledge of pregnancy danger signs at baseline and endline. The most notable difference between baseline and endline was that a higher percentage of women knew that blurred vision was a sign of pregnancy complications, thus an important danger sign (21.7% at baseline versus 35.8% at endline; p <0.001). High blood pressure was another danger sign where a significant difference was noticeable (20.4% at baseline versus 24.50% at endline; p <0.001). Knowledge about severe headache remained at about 50% during both assessment periods.

Figure 3. Women's knowledge of pregnancy danger signs



Overall, there was improvement in attendance of PWCs from 23.5% at baseline to 26.5% at endline ($p<0.05$).

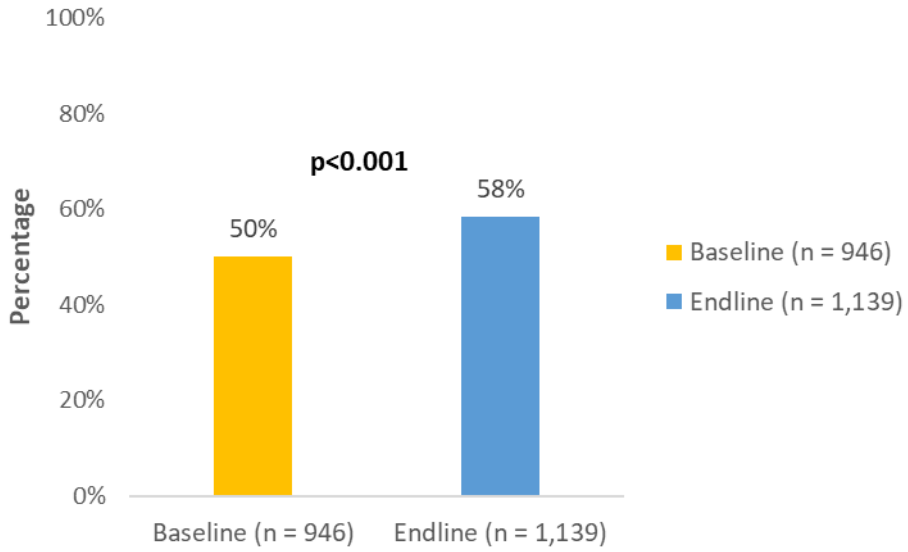
Delivery and Postnatal Period

Both baseline and endline surveys collected information related to delivery and the postnatal period, such as place of delivery, immediate newborn care, PNC, newborn illness, and care seeking. This section assesses the endline findings in comparison to baseline with regards to delivery and the postnatal period.

Place of Delivery

Increasing deliveries under skilled birth attendants was one of the expected outcomes from the project's activities. The percentage of women who delivered their last baby in a health facility increased by 8 percentage points, from 50.2% at baseline to 58.3% at endline, $p<0.001$ (Figure 4). While the percentage of facility-based deliveries increased, the percentage of cesarean sections remained about the same (4.1% at baseline versus 4.6% at endline).

Figure 4. Percentage of women who had a facility delivery



The duration of stay in the facility varied from a few hours to 24 days. This is the period wherein immediate care for the newborn and mother starts predischarge. Data on duration of stay in a health facility after delivery showed that the percentage of women who stayed in the hospital for less than 24 hours decreased from 60% at baseline to 54% at endline, while the percentage who stayed for more than 24 hours increased from 41% to 47%. The distribution of the duration of stay in the health facility after delivery is shown in Table 9.

Table 9. Duration of stay in the health facility after delivery

Duration of stay (hours)	Time period				P-value
	Baseline[e] (N = 946)	Percentage	Endline[e] (N = 1,139)	Percentage	
<6 hours	175	18.5%	170	14.9%	0.001
6–12 hours	306	32.3%	368	32.3%	
>12 to <24 hours	71	7.5%	67	5.9%	
24+ hours	387	40.9%	534	46.9%	

[e] Includes only women who delivered in a health facility; those who delivered on transit were included in the nonfacility deliveries.

Immediate Newborn Care

Cord care

Women were asked about the care given to the newborn immediately after birth. Immediate cord care practices were assessed, and the findings are presented in Table 10. For around 40% of births at both baseline and endline, scissors were the item most commonly used to cut the cord, followed by a new razor blade (36.1% at baseline versus 34.8% at endline). A string was used to tie the cord in about half of the cases at both baseline and endline. There was a significant decrease in the percentage of women who reported that any substance (excluding chlorhexidine) was applied to the cord after delivery (17.8% at baseline versus 8.6% at endline; $p<0.01$).

Table 10. Immediate postnatal cord care practices

Cord care practice	Time period				P-value
	Baseline[e] (N = 1,884)	Percentage	Endline[e] (N = 1,953)	Percentage	
Item used to cut the cord					
New razor blade	680	36.1%	679	34.8%	0.292
Razor blade	231	12.3%	138	7.1%	
Scissors	746	39.6%	796	40.8%	
Other	2	0.1%	0	0.0%	
Do not know/cannot remember	225	11.9%	340	17.4%	
Item used to tie cord					
New string or thread	953	50.6%	1,068	54.7%	0.487
String or thread	454	24.1%	420	21.5%	
Not tied	76	4.0%	67	3.4%	
Other	38	2.0%	63	3.2%	
Do not know	363	19.3%	335	17.2%	
Something was applied to the cord of the baby immediately after tying and cutting the cord					
Yes	336	17.8%	167	8.6%	0.008
No	1,213	64.4%	1,309	67.0%	
Do not know	335	17.8%	472	24.2%	
Missing	0	0.0%	5	0.3%	

Feeding

Nutrition in the first 1,000 days of life (from conception through the second year) influences the survival, growth, and development of a child. Immediate breastfeeding, within the first 1 hour of life, is a proven high-impact intervention that contributes to positive newborn health outcomes. About three-quarters of the women at baseline reported putting the baby on the breast immediately after birth compared to 60.4% at endline ($p<.001$). However, the percentage of women who reported putting the child to the breast between 1 and 12 hours after birth increased from 19.4% at baseline to 26.5% at endline ($p<.001$). At both baseline and endline, about 80% of the women reported feeding their baby with colostrum. Table 11 summarizes newborn feeding practices.

Table 11. Newborn feeding after birth

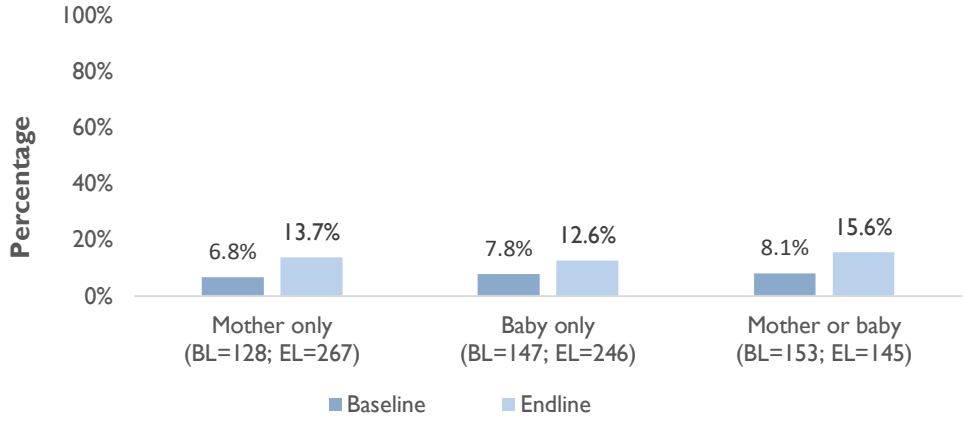
Variables	Time period				P-value
	Baseline[e] (N = 1,884)	Percentage	Endline[e] (N = 1,953)	Percentage	
Time to putting baby on the breast after birth					
Immediately after birth (within 1 hour)	1,402	74.4%	1,179	60.4%	<0.001
>1 hour to =<12 hours	365	19.4%	517	26.5%	
>12–24 hours	7	0.4%	15	0.8%	
Within 2 days	17	0.9%	14	0.7%	
Within 3 days or more	34	0.5%	21	1.1%	
No response	59	3.1%	217	11.1%	
Baby was given the first milk (colostrum)					
Yes, baby was given colostrum	1,504	79.8%	1,549	79.3%	0.691
No, milk was squeezed and thrown away	368	19.5%	372	19.0%	
Do not remember	12	0.6%	32	1.6%	
Baby was given something to drink other than breast milk within the first 3 days of birth					
Yes	106	5.6%	134	6.9%	0.114
No	1,778	94.4%	1,819	93.1%	

[e] Multiple responses allowed

Early PNC Home Visit

To assess the extent of care during the early postnatal period, women were asked about services they and their babies received in the first week after delivery, including counseling. Early initiation of PNC is important for the well-being of the mother and baby. Provision of early PNC through home visits by HEWs was done for only a small subset of the mother-baby dyad. There was significant increase (almost double) in the percentage of mothers or babies who received PNC home visits within 48 hours from baseline 8.1% to endline 15.6% ($p < 0.001$). See Figure 5.

Figure 5. Postnatal care received by mother and/or baby within 48 hours



Newborn Illness and Care Seeking

Illness among newborns can be managed through a number of immediate actions. Early identification of signs of sickness are very important for managing the illness. Women were asked about sickness of their newborns during the first 4 weeks after birth. At baseline, 144 newborns (7.6%) were reported ill compared to 183 (9.4%) at endline. The differences in care for the ill newborns were not statistically significant between baseline and endline. Data on management of illness of the newborn were limited since there were few sick newborns.

Table 12 shows the variation in care for sick newborns and newborn feeding practices during the two assessment periods. Care seeking for newborn illness outside of the home was significantly lower at endline (64.5%) compared with baseline (77.1%), $p<0.001$. The major reason for not seeking care outside of the home at both baseline and endline was expectation of self-resolution of the illness.

For the majority of the neonates, hospitals and HCs were the first places care was sought outside of the home (63% at baseline, 72% at endline), with those seeking care from hospitals almost doubling at endline (11% versus 22%). Feeding practices during illness remained more or less the same between baseline and endline, with close to 50% of the mothers reporting less than usual feeding and about 40% reporting same as usual feeding ($p<0.45$).

Table 12. Management of newborn illness

Variables	Time period				P-value
	Baseline[e] (N = 144)	Percentage	Endline[e] (N = 183)	Percentage	
Age of baby when the illness started as it relates to the date of birth					
Within 1 day	7	4.9%	18	9.8%	0.075
Within 1 week	25	17.4%	45	24.6%	
Within 2 weeks	29	20.1%	30	16.4%	
Within a month	66	45.8%	77	42.1%	
Missing	17	11.8%	13	7.7%	
FIRST place to seek advice or treatment for sick baby outside home					
Government hospital	16	11.1%	40	21.9%	0.062
Government health center	75	52.1%	92	50.3%	
health post	16	11.1%	14	7.7%	
Private hospital/clinic	11	7.6%	11	6.0%	
Private pharmacy	18	12.5%	11	6.0%	
Others	6	4.2%	9	4.9%	
Missing	2	1.4%	6	3.2%	
Baby's frequency of feeding during illness					
Less than usual	70	48.6%	87	47.5%	0.453[f]
same as usual	62	43.1%	73	39.9%	
More than usual	7	4.9%	14	7.7%	
not breastfed	2	1.4%	8	4.4%	
Do not know	1	0.7%	1	0.5%	
Missing	2	1.4%	0	0.0%	

[f] Fisher's exact p-value computed

Community Capacity

Women were asked about their perceptions of their own capacity and that of their community to solve MNCH problems, their level of participation in communitywide activities related to MNCH, and their overall sense of community cohesiveness around MNCH-related issues. For a list of statements organized under themes, women rated their level of agreement on a Likert scale.[13] Responses were pooled to show agreement and disagreement for capacity-related statements.

The statements were organized into six capacity domains: self-efficacy, collective efficacy, social cohesiveness, collective action, participation, and effective leadership. A 2 percentage-point reduction is observed in collective efficacy (statements about commitment to the same goal, solving MNCH problems by working together, confidence in ability to solve MNCH problems jointly) at endline compared to baseline (77% endline versus 79% baseline; p>0.05). Slight reduction is also seen in social cohesion (statements related to neighbors supporting each other for MNCH problems) from 83% at baseline to 82% at endline (p>0.05).

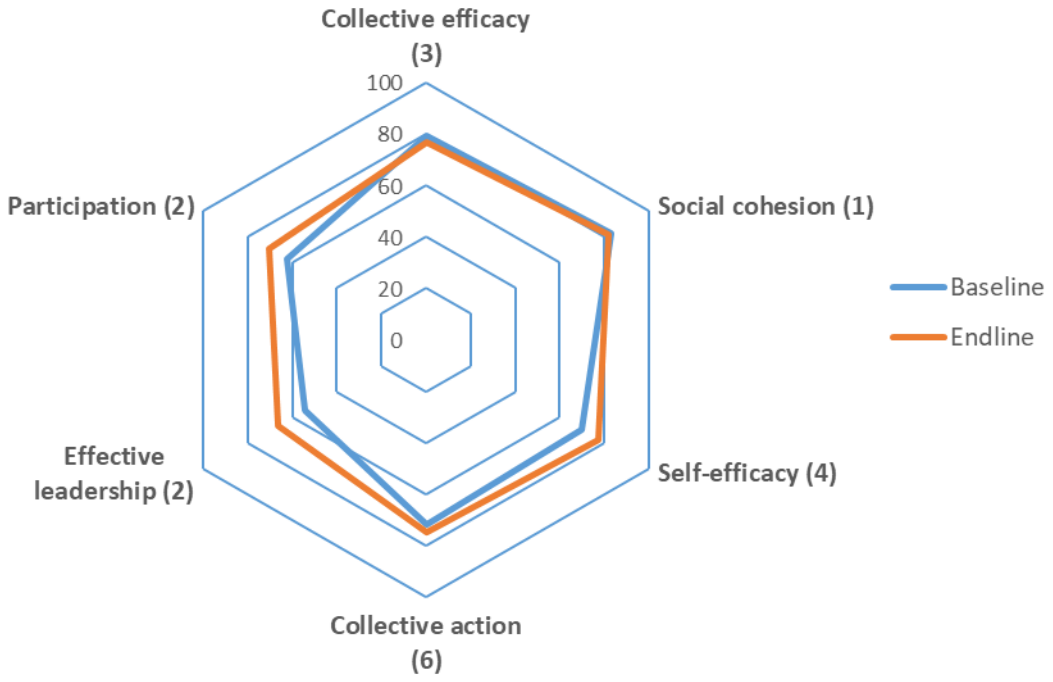
[13] Underwood C, Boulay M, Snetro-Plewman G, et al. 2012–2013. Community capacity as means to improved health practices and end in itself: evidence from a multi-stage study. *Int Q Community Health Educ.* 33(2):105-27. doi: 10.2190/IQ.33.2.b.

However, significant increases in the other domains of self-efficacy, collective action, effective leadership, and participation were achieved at endline (Figure 6). The percentage of women who agree with statements related to self-efficacy (perceptions on self-capacity, knowledge, skills, and confidence to contribute to solving MNCH problems that may arise in the community) increased from 70% at baseline to 77% at endline ($p<0.001$).

To assess the collective actions being undertaken by the communities, women were asked about what their community is doing on MNCH, including availability of emergency transport systems for pregnant or laboring women and encouraging women to disclose pregnancies early, seek ANC, deliver at health facilities, or practice exclusive breastfeeding. Seventy-five percent of women agree with statements on collective action at endline compared to 72% at baseline, a 3 percentage-point increase ($p>0.05$).

On the participation domain of community capacity, significantly more women at endline (71%) compared with baseline (63%) agree that men participate in activities to improve MNCH and that they belong to one or more community groups that address MNCH in their communities ($p<0.001$). Sixty-seven percent of the women at endline considered themselves as leaders in improving MNCH in their community compared with 55% at baseline ($p<0.001$). Figure 6 summarizes findings of the community capacity domains.

Figure 6. Respondents' perception of community capacity measures organized under six capacity domains



Factors Associated with Care-Seeking Behavior in Endline Survey

Multivariate logistic analysis was conducted exclusively on endline data to identify factors related to care-seeking behavior for the mother and the newborn. The findings are presented in Table 13–17 by thematic area. The variables of interest included in each model vary by outcome of interest, although some variables, including region and woman's age, are in all models.

Table 13 shows that women who disclosed their pregnancy late are unlikely to start ANC early ($p <0.001$).

Table 13. Probability of attending the first antenatal care visit during the first trimester among women who disclosed pregnancy late, N = 967

Category	*Adjusted Odds ratio [95% CI]	P-value
Region		
Tigray	Reference	
Amhara	0.752 [0.584, 0.967]	0.026
Oromia	0.614 [0.366, 1.031]	0.065
Southern Nations, Nationalities, and Peoples' Region	0.462 [0.299, 0.714]	0.001
Woman's age (per 1 year)	0.981 [0.949, 1.014]	0.250
Education		
No education	Reference	
Primary	1.084 [0.779, 1.510]	0.632
Secondary or higher	1.443 [0.936, 2.223]	0.097
Wealth index[$] (per additional score)	1.093 [1.007, 1.186]	0.033
Gestation age at pregnancy disclosure		
=<12 weeks	Reference	
>12–24 weeks	0.042 [0.023, 0.079]	*<0.001*
>24 weeks	0.349 [0.234, 0.521]	*<0.001*

[$] Wealth index defined as a sum of positive responses to questions regarding household possessions.
* All variables (region, education, age of mother, age of baby, gestation age at disclosure of pregnancy) were adjusted against each other in the analysis.

Further analysis on continuation of ANC attendance (ANC4+) is presented in Table 14. Women who started ANC during the second trimester are 38% less likely to complete ANC4+ visits (p<.01), and those who start ANC during the third trimester are 88% less likely to complete ANC4+ visits (p <0.001), as compared to women who initiated ANC in the first trimester.

Table 14. Probability of at least four antenatal care visits in the last pregnancy among women who disclosed pregnancy, N = 938

Category	*Adjusted Odds ratio [95% CI]	P-value
Region		
Tigray	Reference	
Amhara	1.529 [1.213, 1.928]	<0.001
Oromia	0.593 [0.379, 0.929]	0.023
Southern Nations, Nationalities, and Peoples' Region	2.308 [1.585, 3.360]	<0.001
Woman's age (per 1 year)	1.018 [0.994, 1.042]	0.144
Education		
No education	Reference	
Primary	0.962 [0.644, 1.439]	0.851
Secondary or higher	1.180 [0.759, 1.835]	0.461
Wealth index[$] (per additional score)	1.074 [0.984, 1.173]	0.109

Category	*Adjusted Odds ratio [95% CI]	P-value
Gestation age at first antenatal care visit		
=<12 weeks	Reference	
>12–24 weeks	0.616 [0.431, 0.881]	0.008
>24 weeks	0.123 [0.061, 0.248]	<0.001

[$]Wealth index defined as a sum of positive responses to questions regarding household possessions.
*All variables (region, education, age of mother, age of baby, wealth index) were adjusted against each other in the analysis.

Several variables were found to be significantly associated with facility delivery, including region of residence, woman's age and level of education, wealth index, attending PWC, and having attended ANC at least four times during the pregnancy (Table 15). A notable finding is that women with secondary education or higher were nearly two times (1.738 [1.029, 2.937]), more likely to deliver in a health facility compared to those with no education ($p<0.05$). Similarly, women who attended ANC 4+ visits were nearly two times (1.809 [1.350, 2.424]) more likely to deliver in a health facility compared to those who had less than four visits ($p<0.001$).

Table 15. Probability of facility delivery (Hospital, Health Center and private facilities) among women who disclosed pregnancy, N = 948

Category	*Adjusted Odds ratio [95% CI]	P-value
Region		
Tigray	Reference	
Amhara	0.414 [0.340, 0.504]	<0.001
Oromia	0.560 [0.360, 0.869]	0.010
SNNPR	0.737 [0.552, 0.985]	0.039
Woman's age (per 1 year)	0.970 [0.947, 0.993]	0.011
Education		
No education	Reference	
Primary	1.006 [0.754, 1.344]	0.436
Secondary or higher	1.738 [1.029, 2.937]	0.039
Wealth index[$] (per additional score)	1.231 [1.125, 1.348]	<0.001
Attended pregnant women's conference	1.525 [1.049, 2.217]	0.027
At least four antenatal care visits	1.809 [1.350, 2.424]	<0.001

[$] Wealth index defined as a sum of positive responses to questions regarding household possessions.
* All variables (region, education, age of mother, age of baby, wealth index, attended pregnant women's conference, attended for or more antenatal care visits) were adjusted against each other in the analysis.

Table 16 presents probability of early PNC. The place of residence was found to affect the probability of initiating early PNC home visits, with women residing in Amhara being half as likely to have a PNC home visit within 48 hours compared to those residing in Tigray (0.50 [0.346, 0.714], $p<0.001$). However, those residing in SNNPR were 1.5 times more likely to have PNC home visits within 48 hours compared to those residing in Tigray (1.522 [1.057, 2.193], $p<0.05$). Analysis of factors associated with seeking care for the sick newborn outside the home did not show any significant findings (Table 17).

Table 16. Probability of PNC visit within 2 days (48 hours), N = 948

Category	Adjusted odds ratio [95% CI]	P-value
Region		
Tigray	Reference	
Amhara	0.497 [0.346, 0.714]	<0.001
Oromia	0.930 [0.526, 1.643]	0.802
Southern Nations, Nationalities, and Peoples' Region	1.522 [1.057, 2.193]	0.024
Woman's age (per 1 year)	1.006 [0.974, 1.039]	0.717
Education		
No education	Reference	
Primary	1.170 [0.755, 1.812]	0.482
Secondary or higher	1.548 [0.974, 2.459]	0.064
Wealth index$ (per additional score)	1.046 [0.931, 1.176]	0.450
Attended pregnant women's conference	1.249 [0.867, 1.800]	0.233
At least four antenatal care visits	1.062 [0.751, 1.503]	0.733

$ Wealth index defined as a sum of positive responses to questions regarding household possessions.
* All variables (region, education, age of mother, age of baby, wealth index, attended pregnant women's conference, attended four or more antenatal care visits) were adjusted against each other in the analysis.

Table 17. Probability of care sought for sick baby outside home, N = 183

Category	*Adjusted Odds ratio [95% CI]	P-value
Region		
Tigray	Reference	
Amhara	1.167 [0.438, 3.112]	0.758
Oromia	1.602 [0.466, 5.502]	0.454
Southern Nations, Nationalities, and Peoples' Region	0.752 [0.292, 1.937]	0.555
Woman's age (per 1 year)	0.973 [0903, 1.049]	0.478
Education		
No education	Reference	
Primary	1.735 [0.639, 4.713]	0.280
Secondary or higher	7.290 [0.733, 72.520]	0.147
Wealth index$ (per additional score)	0.962 [0.767, 1.207]	0.739
Attended pregnant women's conference	0.802 [0.295, 2.181]	0.666
Attended four or more antenatal care visits	1.006 [0.311, 3.254]	0.992

$ Wealth index defined as a sum of positive responses to questions regarding household possessions.
* All variables (region, education, age of mother, age of baby, wealth index) were adjusted against each other in the analysis.

Findings from In-Depth Interviews

In addition to baseline and endline knowledge, practice, and coverage surveys, MCSP collected qualitative data at endline through key informant interviews from selected health managers and providers based in the project regions, zones, *woredas*, and health facilities. As the project implementation period overlapped with the time Ethiopia faced the worst drought in 50 years and serious civil unrest broke out in many parts of Oromia

and Amhara regions, the key informant interviews were designed to provide contextual basis for the interpretation of the endline findings where appropriate. Major themes reported by informants as achievements:

- Improved access through availing newborn health care services at the HP level and created a favorable perception of the project within the community.
- Improved HEWs' confidence, as they have now better competency in treating major childhood illnesses at their level.
- Improved community awareness and improved MNCH service uptake (including facility delivery and early care seeking for newborn illness).
- Improved participation of pregnant women and their spouses in the monthly PWCs.
- The strengthened *kebele* command posts as part of the demand creation strategy were instrumental in making newborn health a regular conversation agenda in the communities.

Major challenges reported:

- Lack of motivation, ownership, and high turnover of HWs in facilities, as well as management position negatively impacting quality of services
- Lack of means of transportation for HEWs, limiting their ability to do early PNC within the first 48–72 hours
- Newborn health indicator not among the indicators used to evaluate HEWs' performance, which may affect accountability and needs to be looked at.

Discussion

Based on the findings of the endline survey and reports of key informants from regional, zonal, and *woreda* health offices, MCSP NEGA contributed to the government's effort to improve MNCH outcomes in the four regions where the project was implemented. The results of the survey indicate that statistically significant change was observed at the end of the project compared to baseline in coverage of selected MNH indicators, such as attended ANC4+ visits, attended PWC, facility delivery (hospital, HC, and private facilities), duration of stay at facility after delivery (< 12 hours), PNC home visit within 2 days, and care sought for a sick baby outside the home.

Respondents' Demographic and Household Characteristics

There was not much difference in the demographic characteristics of the women interviewed in both surveys. The findings show that marriage is universal, childbearing outside marriage is uncommon, close to half of the respondents had no or only primary education, and close to half of the respondents practiced Ethiopian Orthodox Christianity, followed by Islam and Protestantism.

The proportion of households using a protected water source significantly increased from baseline to endline, as did availability of latrines. The significant changes in the use of a protected water source and availability of latrines may be due to stepped-up water and sanitation interventions, including behavior change communication activities, as part of the response to an acute watery diarrhea outbreak that affected many parts of the country in 2016 and 2017.

Pregnancy Knowledge and Care

Early disclosure of pregnancy to an HW is key to starting ANC services early in the pregnancy, which increases the likelihood of attending ANC4+ visits and receiving most of the services that contribute to positive MNH outcomes. However, only about half of the women (54%) disclosed their pregnancy to a nonfamily member, and no change was observed between baseline and endline. Again, no change was observed between baseline and endline in terms of early disclosure (in the first trimester of the pregnancy), which remained at about 44%. There was, however, a significant increase in the percentage of women who disclosed their pregnancy to a nonfamily member during their third trimester, from 8.7% at baseline to 19.6% at endline. As seen from the findings of a qualitative study done by MCSP NEGA in Amhara Region to assess barriers and facilitators for early pregnancy disclosure, the low rates of disclosure for nonfamily members and early in the pregnancy are associated with long-standing cultural and traditional norms that take time to change, including the widespread belief that something bad will happen to the pregnancy if one starts talking about it before it shows.

About one-quarter of the women reported to have had a pregnancy home visit by health care providers or HDA members during their last pregnancy, with no change between baseline and endline; over 90% reported to have been visited by HEWs. While a pregnancy home visit by an HEW is considered an important strategy that brings together key family members (including spouse and in-laws) to discuss the care and support that the pregnant women needs and to develop a birth preparedness and complication readiness plan,[14] coverage continued to be low. The multiple tasks HEWs are expected to perform, distance to households, and the difficult topography are among the reasons HEWs mention for the low pregnancy home visit coverage. For those women who had pregnancy home visits, over half of the visits at endline (53%) happened in the first trimester compared to baseline (23%). This is an important change, as initiating early family-based discussion of the pregnancy has a high probability of improved MNH-related service uptake and outcomes.

[14] FMOH. 2013. *National CBNC Implementation Plan.* Addis Ababa: FMOH.

ANC and PWC Attendance

The current FMOH policy is for all women to attend at least four ANC visits during each pregnancy, with at least one at an HC with a laboratory facility to ensure key tests are done. The new World Health Organization recommendation is for pregnant women to attend at least eight ANC visits during each pregnancy, which is yet to be adopted by Ethiopia. The findings of this study indicate that a large percentage of women (close to 90%) start ANC, and nearly half (46%) complete the recommended ANC4+ visits at health facilities. While this is considerably higher than the coverage reported in the 2016 Ethiopian Demographic and Health Survey (EDHS; 32%), the findings show large percentages of women missing key ANC-related services by not completing the recommended visits. One reason for the large dropout between the first and fourth ANC visits is the late initiation of ANC, with two-thirds of women starting their prenatal care after the 12th week of pregnancy. Other reasons include the belief that pregnancy and its outcome are the will of God so there is no need for prenatal care, lack of awareness of benefits of regular ANC visits, lack of transportation, and indirect costs.

The FMOH identified monthly *kebele*-level PWCs as one of the key strategies to improve MNCH-related behaviors and practices. It is a forum where pregnant women (sometimes spouses as well) meet at least on a monthly basis to discuss issues related to pregnancy, delivery, and newborn care. The discussion is facilitated by a midwife or an HEW with support from the HDA members in the locality. It is among the key strategies included in the National CBNC Implementation Plan to help improve MNCH behavior and practices of pregnant women and their families. Support for PWCs was also a key element of MCSP NEGA's MNCH-CBNC demand creation strategy and was advanced by the project in the target *kebeles*, including efforts to improve topics covered in the meetings. The endline survey showed that one-quarter of the women attend monthly PWCs, representing a 3 percentage-point improvement over baseline. Consistent and sustained implementation of such a "peer support" strategy requires strong a monitoring and accountability mechanism, which appears to be missing in this case. Review of the integrated supportive supervision tools and national health management information system indicators (including the CBNC-specific national monitoring tools used by partners) showed that PWC-related indicators are lacking.

Knowledge of Pregnancy Danger Signs

Pregnancy danger symptoms may signal danger to a pregnant woman or her fetus and require immediate attention. Since pregnancy-related complications cannot be reliably predicted, it is important that a pregnant woman knows about pregnancy danger symptoms so that she can seek immediate care when they occur. Knowledge of some pregnancy danger symptoms improved at endline compared to baseline, but comprehensive knowledge is still very low. For example, severe headache was the most recognized pregnancy complication, by only half of the women at endline. Key informant interviews revealed that pregnant women often consider these symptoms as normal, pregnancy-related occurrences and do not consider them as danger symptoms. This warrants robust and tailored behavior change communication and health promotion activities that target men and women in the reproductive age group, as well as those who could influence individual and household behaviors.

Delivery

A significant increase in facility deliveries, from 50% of pregnant women at baseline to 58% at endline, was reported. This is much higher than the findings of the EDHS 2016, which found an average facility delivery rate of 26% at the national level and of 32% in the four study regions. While this is an encouraging improvement over the project period, four in 10 women still deliver at home without the assistance of a skilled birth attendant. Several studies and findings of the key informant interviews indicate that traditional and familial influences, distance to the facility and lack of means of transportation, women's perceived low quality of care at health facilities, and fear of discrimination during facility-based delivery are among the

factors that do not encourage pregnant women to deliver in a facility.[15, 16] Understanding the facilitators and barriers for facility delivery will help develop tailored strategies to improve delivery by skilled birth attendants.

Moreover, 47% of women stayed for more than 24 hours in the facilities after delivery at endline (a 6 percentage-point increase over baseline). This is higher than the national average of 31% facility stay for more than 24 hours reported in the EDHS 2016. Given that the majority of maternal and newborn deaths occur within the first 24 hours of birth, this is an important strategy that has the potential to significantly contribute toward mortality reduction. While the FMOH has recommended a post-delivery facility stay of more than 24 hours as a key strategy for consideration by the regions at the introduction of the CBNC project, logistics challenges in the facilities, including lack of space, inadequate human resources, and poor enforcement mechanisms, were mentioned by key informants as reasons for low coverage.

Immediate Newborn Care

With regards to cord care, the majority of the mothers reported having used clean scissors or a blade to cut the cord at both baseline and endline. Although chlorohexidine use for cord care was among the components of CBNC and was included in the HEWs' CBNC training, the intervention was not scaled up due to significant delays in production of the gel. As such, dry cord care continued to be promoted in MCSP NEGA target areas as one of the strategies to reduce infection in neonates—one of the three major causes of newborn morality. There was a significant reduction in the percentage of women who had applied any substance to the cord (from 17.8% at baseline to 8.6% at endline). During both baseline and endline, butter was the predominantly used substance (by over two-thirds of women), followed by petroleum jelly and ash. Butter, Vaseline, and hair lotion were reported as the most common substances applied to the cord from an exploratory qualitative study conducted in selected *woredas* of the four regions in 2013; they were meant to "moisturize and soften it" and "aid dropping-off."[17] The endline finding is much lower than what is reported in the EDHS 2016, where 15% of the women reported having applied something to the cord.

The percentage of women who reported to have breastfed within 1 hour of delivery decreased from 74% at baseline to 60% at endline. This is lower than the EDHS 2016 finding, which reported early initiation of breastfeeding (within 1 hour) at 73% nationally and at 70% among the four study regions. Data quality issues appear to be the possible reason for the finding, with misclassification during interview and/or data entry by interchanging hours and days. Nonresponse may also have played a role to result in these discrepancies.

Postnatal Home Visits

A large percentage of maternal and newborn deaths occur during the first 48 hours after delivery. Close monitoring during these first 2 days is critical for both the mother and baby not only for timely identification and treatment of complications but also to provide women with important information on how to care for themselves and their babies. Early PNC is among the key components of CBNC. Early postnatal home visits for the baby with a specific focus on the first 48 hours was a key project indicator, as this contact between HEWs and households was considered a critical entry point for identification of neonates with danger signs. Postnatal home visit by HEWs in the first 2 days significantly increased from 8% at baseline to 15.6% at endline. Although doubling the coverage of early postnatal home visits is a significant achievement, this is too low to enable contact and identification of as many of the neonates with danger signs as possible. The reasons mentioned for low rates of early PNC home visits by HEWs are similar to that of pregnancy home visits: competing tasks HEWs have, long distance to the households, difficult topography, late notification of the delivery by families and/or HDA members, and others.

[15] CSA, ICF. 2016. *Ethiopia Demographic and Health Survey* 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.
[16] MCSP. 2017. *Barriers and Facilitators for Early Pregnancy Identification, Birth Notification, and Antenatal and Postnatal Visits in Amhara Regional State, Ethiopia.* Unpublished report.
[17] MCSP. 2013. *Acceptability of Chlorohexidine for Application on Umbilical Cord by Mothers in Ethiopia.* Unpublished document.

Newborn Illness and Care Seeking

Though most newborns are born healthy, they are particularly at risk of some diseases because their immune systems are not developed enough to fight the bacteria, viruses, and parasites that cause these infections. Immediate diagnosis and management of newborn illness can prevent deaths in neonates. Less than 10% of babies included in this study were reported to have been ill in the first month of life (7.6% at baseline and 9.4% at endline). Care seeking outside of the home for newborn illness has shown reduction at endline compared to baseline. While a number of factors may be at play that resulted in this reduction, one possible explanation is the limited access to health facilities (due to closure of facilities, closure of roads, or fear of running into insecure areas) due to widespread civil unrest and violence in the country during the reference period for this study. Most women waited for over 24 hours before seeking care outside of the home at both baseline and endline. Based on a thorough understanding of the driver of caregiver behavior, more intensive demand creation activities at the *kebele* level could address this delay.

The study also showed that hospitals and HCs remained the first point of care for newborn illnesses, with more than half of caretakers seeking care for their sick babies at this level. Less than 10% of caretakers sought care from the HPs. This finding supports the routine data at HPs collected as part of the CBNC project that show very few sick neonates are taken to the HP. Given the investment Ethiopia has made to bring newborn services to community (HP) level, it is important to understand caretakers' reasons for not using HPs as a first point of care for newborn illnesses to enable evidence-informed decision.

Close to half of women whose babies were sick during the newborn period had less than usual breastfeeding during the illness period at both baseline and endline. The findings clearly indicate the need for strengthened efforts to improve community awareness on the importance of frequent breastfeeding (more than usual or at least same as usual) when babies are sick for improved newborn survival.

Factors Associated with Care-Seeking Behavior at Endline

The multivariate logistic analysis on the endline data identified key factors that predict women's use of key MNH-related services.

Late disclosure of ANC to a nonfamily member was found to be significantly associated with late initiation of ANC and significantly less likelihood of attending ANC4+ visits compared to those who disclosed their pregnancy early. Studies done to understand barriers and facilitators to early pregnancy notification by Save the Children in Ethiopia indicated that women generally feel culturally inhibited to disclose pregnancy early or believe that "something bad will happen if one starts talking about a pregnancy before it starts to show."[18] Other studies also documented women's tendency to wait until after the 12th week, where the rate of miscarriage significantly drops, and until they have missed several periods to be sure they are really pregnant to avoid unwanted religious and cultural complications.[19, 20] The strong association between early disclosure of pregnancy to a nonfamily member and ANC initiation, as well as completion of the recommended ANC4+ visits, warrant further studies to understand reasons for late disclosure that can inform the design of strategies to address barriers.

Maternal age, residence, education, wealth, attending PWC, and completion of ANC4+ are all found to be associated with facility delivery. This is in line with the findings of the EDHS 2016, where strong association was reported among facility delivery and maternal education, place of residence, attendance of ANC4, and wealth.

[18] MCSP. 2017. *Barriers and Facilitators for Early Pregnancy Identification, Birth Notification, and Antenatal and Postnatal Visits in Amhara Regional State, Ethiopia*. Unpublished report.

[19] Lou S, Frumer M, Schlutter MM, Peterson OB, Vogel I, Nielsen CP. 2017. Experiences and expectations in the first trimester of pregnancy: a qualitative study. *Health Expect*. 20(6):1320–9. doi: 10.1111/hex.12572.

[20] Finlayson K, Downe S. 2013. Why Do Women Not Use Antenatal Services in Low- and Middle-Income Countries? A Meta-Synthesis of Qualitative Studies. *PLoS Med*. 10(1):e1001373. doi: 10.1371/journal.pmed.1001373.

Place of residence was found to have significant association with early PNC home visits, with women living in Amhara 0.5 times less likely and SNNPR 1.5 times more likely to have PNC home visits within the first 48 hours compared to Tigray. The low PNC home visit rate in Amhara may be associated with the extended civil unrest in most of the project zones in 2016 and 2017 that may have negatively impacted HEWs' mobility within the *kebeles*.

Community Capacity to Engage in MNCH Issues

Perceived community capacity to address MNCH varied by capacity domains. The endline data showed considerable improvement in perceived community capacity for four of the six capacity domains. This is very encouraging and likely a result of the community empowerment/demand creation strategy that used existing multisectoral platform at the community level to engage communities around MNCH-CBNC so that households are empowered to seek health care as soon as problems arise and are empowered to be responsible for their own health. A high proportion of women perceived to have self-efficacy on MNCH may be a reflection of changing power dynamics within the household, with women increasingly having a say in MNCH-related issues. The increased perception that communities can act collectively to solve MNCH problems likely indicates improving confidence in the community's capacity and commitment to act collectively. Perceived participation (for both men and women) and leadership in MNCH-related issues is another area that showed improvement over the project period.

While there may be different explanations for these change over the project period—one of which is likely to be the project's community empowerment/demand creation strategy that systematically engaged communities to identify and act on priority MNCH issues within their localities—the fact that MNH is a top priority for the Government of Ethiopia and that communities are generally expected to be ready to promote and support facility delivery may have also contributed to the positive perception in these various capacity domains.

Conclusion

This survey provides information on women's key MNCH-related knowledge, perceptions, and practices that impact MNH outcomes. It compares data collected at baseline in June 2015 to those collected at endline in June 2017 at the end of project implementation. Based on analysis of the findings, the study team concludes that:

- While improvements were achieved in the coverage of some services across the MNCH continuum of care, findings indicate the need for more effort to reach a coverage level that can result in a reduction in mortality.
- There is still disproportionately significant knowledge, access, and utilization gaps in services related to newborn health.
- Facility delivery and post-delivery facility stay are increasing. However, care provided during the post-delivery facility stay is not in line with the recommended standard to meaningfully impact newborn care outcomes.
- Although improvement as seen over the 2-year period, early PNC home visit within 2 days after delivery is still very low for both mothers and newborns.
- Discrepancies in early initiation of ANC, ANC4+ visits, facility delivery, and PNC home visit in the first 2 days after delivery were seen along maternal age, place of residence, educational level attained, and wealth levels, indicating the need for targeted, equity-focused strategies to address the gaps.
- Encouraging improvements were achieved in MNCH-related community capacity and perceived self-efficacy, collective action, participation, and leadership.

Recommendations

This endline survey of recently delivered women provides coverage information for key MNCH indicators in MCSP NEGA geographic areas. While this report presented highlights of progress made on key project indicators over the 2-year implementation period, the recommendations are based on findings of the endline survey. Below are the overall key recommendations:

- There is a need to increase knowledge and uptake of available MNCH services along the continuum of care, including early pregnancy identification, early ANC, facility delivery, early PNC, and early care seeking for maternal and newborn danger signs at HCs and HPs. This could be achieved through strengthening the collaboration between HEWs and HDA members, and enhancing the capacity of HDA members to use home visit opportunities for tailored counseling.
- Given the importance of early pregnancy identification for early initiation of ANC and completing the recommended four ANC visits, PHCUs need to develop locally relevant strategies that support early pregnancy identification by HDA members and HEWs.
- Synthesize available information or conduct formative assessments to understand the barriers preventing HDA members and HEWs from undertaking pregnancy and postnatal home visits. Based on findings, develop strategies for removing these barriers to increase home visits by HDA members and HEWs.
- Improve attendance at PWCs by pregnant women (and spouses whenever appropriate), as they serve as an important platform for knowledge sharing, peer support, enhanced birth preparedness, and a regular communication mechanism between HWs and pregnant women. They also offer opportunities for ANC counseling and services.
- Enhance the implementation of the community empowerment/demand creation strategy using the multisectoral community platform to maintain gains in increased community capacity around MNCH and CBNC, and further work toward the HEP goal of families taking responsibility for their own health.