

Impact Evaluation Report of Nutrition at the Center (N@C) Project

CARE Ethiopia

Prepared by Bahir Dar University

Hirut Assaye, Girma Nega, Degnet Teferi & Getnet Mekuria

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Acronyms

ANC	Antenatal Care
BMI	Body Mass Index
EDHS	Ethiopian Demographic Health Survey
IYCF	Infant Young Child Feeding
MDD	Minimum Dietary Diversity
MUAC	Mid Upper Arm Circumference
PNC	Postnatal Care
PPS	Probability Proportional to Size
WDDS	Women Dietary Diversity Score

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Executive summary

Introduction

Food insecurity, undernutrition, and hunger afflict millions of Ethiopians. For instance, the 2016 DHS estimated the national prevalence of stunting among under five children at 38%, the prevalence of underweight at 24% and wasting at 10%. Nutrition at the Center (N@C) was a project aimed in designing, implementing and evaluating an integrated multisectoral approach to improve maternal and child nutrition. The project targeted children under 2 years and women of reproductive age group (15-49years) in Simada and Ebinat woredas, Amhara regional state, Ethiopia. A key component of N@C was to document evidence for future nutrition programming. The overall approach of the project focused on addressing the multisectorial causes of malnutrition through strengthening infant and young child feeding (IYCF) and maternal nutrition practices; food security and access to nutritious foods; water, sanitation and hygiene (WASH) practices and women's empowerment.

Evaluation objectives

The primary objective of this impact evaluation was to assess the impact of N@C intervention on nutrition outcomes among women of reproductive age group (15-49years) and children under two years old.

In addition to this primary evaluation objective, this evaluation had other secondary objectives which include the following:

1. Assessing the impact of N@C interventions on food security and access to nutritious foods
2. Assessing the impact of N@C interventions on access to and utilization of health services
3. Assessing the impact of N@C interventions on core WHO infant and young child feeding (IYCF) indicators among children 0-23 months of age
4. Assessing the impact of N@C intervention on water, sanitation and hygiene practices, and
5. Assessing the impact of N@C intervention on women's empowerment

Methodology

To evaluate the impact of N@C activities, a cross-sectional observational method was employed in the intervention (Simada and Ebinat) and control (Tach Gaynt) woredas from 1-18 February 2018. The survey included interviewer administered questionnaire, on site observation, anthropometric measurements and hemoglobin level determination. The survey targets were women of reproductive age group (15-49 years) who gave birth in the last 36 months to their youngest babies. To be eligible for the survey, a woman should have resided in the area permanently (more than six months) and her youngest baby should have stayed during the survey time with her. For a child to be approached for anthropometric measurement he/she must have been aged between 6 to 35 months during the survey period and the child must have been 6-23 months to be included for anemia testing. A total of 1202 households were included in the survey.

Data analysis

Descriptive statistics (percentages and means) was used to present the findings of the study and student T test was used to compare the difference between baseline and endline within groups. Difference-in-difference (DID) analysis was used to look at changes between intervention and control woredas over time. The data analysis was undertaken by IBM SPSS Statistics Version 20 and WHO Anthro v 3.2.2.

Results

Demographic characteristics

Baseline and endline demographic characteristics of mothers were almost similar for both intervention and control woredas with most mothers in the age group of 20-39years, married and non-pregnant with 1-2 alive children. The majority (more than 30 percent) of women who participated in this endline survey had their first marriage at age below 15 years which was also the case at baseline.

Impact of N@C on access to food and agricultural extension

Accessing food through production and purchase has decreased and NGO food aid and burrowing food increased significantly in both intervention and control woredas at endline. In DID impact analysis, accessing food through food production, food purchase and government food aid were higher (9-29.7pp) and NGO food aid was lower (17.4pp) in the intervention woredas compared to the control woreda. Similarly, owning of home gardens has decreased significantly in both intervention and control woredas and more reduction (10.5pp) was noted for the control woreda compared to the intervention woredas. On the other hand, the control woreda had more visits by agriculture extension workers (9.7pp) compared to the intervention woredas.

Percentage of N@C beneficiaries who practiced fruit and vegetable preservation reduced nearly by 8% and practice of crop storage reduced by 20% at endline. Reductions in these practices were also significant in the control woreda. DID impact estimates were 7.4pp and 31pp higher for the intervention woredas for fruit and vegetable preservation and crop storage practices compared to the control woreda.

Mothers' perception of their household food security increased significantly over time in both intervention and control woredas as the majority of women (more than 97percent) reported little or absence of hunger in their household. The DID impact estimates show increment(1.7pp) in the perception of mothers who reported little or absence of hunger and reduction in moderate (1.3pp) and severe hunger(1.5pp) in the intervention woredas compared to the control woreda.

Impact of N@C on maternal nutrition and health

The percentage of ANC visits and intake of iron tablets increased significantly over time among women in both intervention and control woredas. DID impact estimates show pronounced increment for ANC visits (17pp) and iron intake (10.4pp) in the intervention woredas compared to the control woreda. Percentage of women who visited health facilities for postnatal care (PNC) also increased significantly overtime in both intervention and control woredas; but the DID impact estimate was higher by 18.6pp for the control woreda compared to the intervention woredas.

Mothers consumption of some food groups (legumes, nuts and seeds and vitamin A rich fruits and vegetables) increased significantly overtime in the intervention woredas. However, consumption of food groups such as other fruits and vegetables, meat and fish, milk and milk products decreased significantly. Similarly, at endline, consumption of various food groups reduced significantly in the control woreda except organ meat consumption. DID impact estimates show increment (0.3-15.4pp) in the consumption of various food groups by mothers in the intervention woredas compared to the control woreda except organ meat consumption which was higher by 5.5pp in the control woreda.

Overtime, percentage of women who were underweight ($BMI < 18.5 \text{ kg/m}^2$) decreased significantly in both intervention and control woredas. The DID impact estimates show more reduction in the percentage of women in the underweight category (1pp) and more increment (2.3pp) in the percentage of women in the normal weight category in the intervention woredas compared to the control woreda. Prevalence of severe malnutrition ($MUAC < 21.5 \text{ cm}$) among pregnant women decreased in both intervention and control woredas at endline. On the other hand, DID impact estimates showed more increment in the percentage of pregnant women who are severely (4.2pp) and moderately malnourished (2.2pp) in the intervention woredas compared to the control woreda.

At endline, nearly 90 % of women in the intervention woredas were non anemic but this was also observed at baseline. Only little improvement was noted in the prevalence of anemia among women in the intervention woredas as there were still 8.2% women who were experiencing either mild or moderate anemia. DID impact analysis shows significant reduction (7.2 pp) in the prevalence of anemia in the control woreda compared to the intervention woredas.

Impact of N@C on child nutrition and health

Overtime, practice of early initiation and exclusive breastfeeding increased significantly in both intervention and control woredas. DID impact estimates showed early initiation to be higher (4.9pp) and exclusive breastfeeding to be lower (3.8pp) in the intervention woredas compared to the control woreda. Complementary feeding indicators such as minimum diversity and minimum meal frequency increased significantly at endline in intervention woredas. DID impact

estimates show more improvement (4.2-5.5pp) in complementary feeding practices and consumption of iron rich in intervention woredas compared to the control woreda.

Overtime, the prevalence of stunting among children 6-35 months decreased in both intervention and control woredas. However, the DID impact estimation showed an increase in the prevalence of stunting (9.3pp) in the intervention woredas compared to the control woreda.

Levels of wasting increased in both intervention and control woredas and in DID impact analysis, more increment in the prevalence of wasting was noted in the intervention woredas compared to the control woreda.

The level of underweight was higher in the intervention woredas compared to the control woredas at baseline (32.3 vs 29.3percent). At endline, the prevalence of underweight decreased in both intervention and control woredas and in DID impact analysis the decrease was 5.1pp in favor of the control woreda.

Anemia prevalence decreased significantly in the control woreda but there was no significant difference between baseline and endline prevalence in the intervention woredas. The DID impact estimate also shows more reduction (5pp) in the percentage of children who are anemic in the control woreda compared to the intervention woredas.

Impact of N@C on Water, Sanitation and Hygiene

Percentage of households in the intervention woredas which access water from protected water sources such as piped water and public tap has increased significantly at endline. This was also the case in the control woreda as well. In DID impact analysis, more increment (4.4-15.3pp) in these water sources was noted in the intervention woredas compared to the control woreda. On the other hand, use of water from protected dug well and protected spring was higher in the control woreda by 18.1pp and 4.6pp compared to the intervention woredas.

Percentage of women in both intervention and control woredas who practice hand washing at critical times (before eating, before food preparation, before feeding the child, after toilet use and after changing diaper) increased significantly at endline. On the other hand, DID impact

estimates for hand washing before feeding the child, after toilet use and after changing diaper were higher (18.7-20.4pp) in the control woreda compared to the intervention woredas.

The percentage of households which have flush/pour flush to pit latrine and pit latrines with and without slabs has increased significantly in the intervention woredas over time. However, no improvement was observed in the intervention woredas in terms of open defecation as the percentage of households which practice open defecation remained as high as the baseline (37 percent). On the other hand, the DID impact estimate shows more increment (5.5pp) in the control woreda in the percentage of households which practice open defecation compared to intervention woredas.

Impact of N@C on women's empowerment

The impact of N@C intervention on women's empowerment was assessed by using three different domains of women empowerment; decision making power, perception on violence and participation in community programs. There was no significant difference between intervention and control woredas in the percentage of women who are empowered in household decisions. Our data showed that women are highly empowered in household decisions in both intervention and control woredas as on average 90 percent of women reported their involvement in household decisions. Similarly, the perception of women significantly improved at endline as only small percentage of women in both intervention and control woredas agreed on their husbands' act of violence. The DID impact estimate shows more improvement (2-15.4pp) in the perception of women against violence in the intervention woredas compared to the control woreda. Participation of women in community based programs such as mother to mother support group, VSLA and SAA meetings was significantly higher in the intervention woredas compared to the control woreda. However, percentage of women who always participate in these programs was significantly higher in the control woreda compared to the intervention woredas.

Conclusion

N@C was a project aimed in improving maternal and child nutrition outcomes through an integrated multisectoral approach. This endline report presents the impact of N@C interventions by comparing the results with a control woreda.

The majority of women who participated in this endline survey had their first marriage at age below 15 years which was also the case during the baseline survey. In this regard, noticeable changes were not observed especially in the intervention woredas in reducing early child marriage.

Overall, N@C had positive impact in improving household food security as measured by household hunger scale; positive impact in improving maternal health services utilization such as ANC visits and intake of iron tablets; a small positive impact in improving maternal dietary diversity especially consumption of legumes, seeds, and nuts and vitamin A rich fruits and vegetables and positive impact in improving the nutritional status of mothers. N@C had also positive impact on improving IYCF practices such as early initiation of breastfeeding, complementary feeding indicators especially minimum dietary diversity and minimum meal frequency and consumption of iron rich foods and good impact in improving access to protected water sources such as piped water and public tap. Besides, N@C had an impact on one domain of women's empowerment; gender, attitude and beliefs as measured in terms of perception of women against husbands' act of violence. However, N@C had no visible impacts on reducing the prevalence of stunting and anemia among children. It had also no impact in improving the nutritional status of pregnant women and reducing maternal anemia. In general, there were improvements in the intervention woredas during the project period on many aspects but the trends were similar with the control woreda and therefore attribution of positive program effects is difficult.

In general, the results from the N@C impact evaluation will add evidence to other evaluations of integrated multisectoral nutrition programs. There are important child, maternal and household level benefits of this program, which may be achieved in other similar programs, and lessons learnt can be used to scale-up the existing project.

The major limitation of this endline survey was the lack of supporting qualitative information to interpret the quantitative results. In the future, project monitoring and evaluation (M & E) plans should include an integrated final project evaluation design that includes both qualitative and quantitative components. Besides, a number of NGOs have been working in the control woreda (Tach Gaynt) on nutrition and health. For instance, FH international (FHE) has been working

since 2011 in Tach Gaynt on comprehensive essential nutrition actions, essential hygiene actions and community based maternal, neonatal and child care. The organization used mother to mother support group meetings to disseminate nutrition and health messages to the community. CARE FSF project has been also working in Tach Gaynt since 2013 and both SAA and VSLA approaches are functional in the woreda. The project follows standard VSLA (CARE VSLA Field operation manual) and SAA (CARE SAA minimum standard). Furthermore, our data showed that percentage of households which access their food from NGO food aid in the control woreda was much higher than households in the intervention woredas. We can therefore conclude that the control group was not functioning as a valid comparator to the intervention woredas and might overshadowed the impact of N@C in the intervention woredas. M&E design of future programming should include a representative comparison group to evaluate the effectiveness of project activities for project beneficiaries and non-beneficiaries.

1. Introduction

1.1 Overview of the nutrition situation in Ethiopia

Ethiopia is the second most populous country in Africa with total population of 100 million and population growth rate of 2.6 percent per annum (CSA, 2016). Rain-fed agriculture is the main stay of the economy, employing 85 percent of the workforce and accounting for 47 percent of the national GDP (CSA, 2007). Food insecurity, undernutrition, and hunger afflict millions of Ethiopians and rural Ethiopians are the ones who are subjected to all forms of food insecurity and undernutrition (Devereux, 2000). For instance, the 2016 DHS estimated the national prevalence of stunting among under five children at 38%, the prevalence of underweight at 24% and wasting at 10% (CSA, 2016). Moreover, this same survey indicated that children in rural areas are more likely to be stunted (40 percent) than those in urban areas (25 percent), and great regional variation exists, Amhara (46percent), Tigray (39percent), Oromiya (36percent), Afar (41percent), and Benishangul-Gumuz (42 percent), Addis Ababa (15 percent) and Gambela (23 percent). Anemia also affects more than half of Ethiopian children 6-59 months (56 percent) (CSA, 2016). Lack of dietary diversity and micronutrient-dense food consumption, and poor infant and young child feeding practices contribute to the high rates of child undernutrition in Ethiopia. According to CSA (2016), only 58percent infants are exclusively breastfed and introduced complementary foods at the appropriate time, and only 7 percent of young children are receiving a minimal acceptable diet. The 2011 DHS survey also revealed that the level of chronic malnutrition among women in Ethiopia is relatively high, with 27 percent of women either thin or undernourished (CSA, 2012). Similarly, about one-fourth of women of reproductive age (15-49 years) are anemic (CSA, 2016).

1.2 Description of N@C project

Nutrition at the Center (N@C) was a project aimed in designing, implementing and evaluating an integrated multisectoral approach to improve maternal and child nutrition. The project targeted children under 2 years and women of reproductive age group (15-49years). A key component of N@C was to document evidence for future nutrition

programming. The overall approach of the program focused on addressing the multisectorial causes of malnutrition through strengthening infant and young child feeding (IYCF) and maternal nutrition practices; food security and access to nutritious foods; water, sanitation and hygiene (WASH) practices and women's empowerment (Annex 3). The project was designed based on literatures which suggest that an integrated multisectoral approach can provide more effective and sustainable processes through which improved nutrition outcomes can be achieved.

1.3 Location of study areas

N@C was implemented for four years in two woredas, Simada and Ebinat which are located in South Gondar Zone, Amhara Regional State of Ethiopia. Specifically, these woredas are located in the northern highland part of Ethiopia known to be chronically food insecure and hence targeted by national social transfer from Productive Safety Net Program (PSNP) since 2005. Major livelihood activities in both woredas include crop production, livestock, and petty trade. Households in these woredas mostly face food shortage for more than 6 months. Amhara region in which these woredas are located in is known in sharing the highest burden of child malnutrition in the country (CSA, 2016).

Impact evaluation for Nutrition at the Center (N@C) Project was conducted in three woredas: the two intervention woredas (Ebinat and Simada) and one control woreda (Tach Gaynt) (Fig 1).



Figure 1. Map of N@C intervention woredas (Simada and Ebinat) and control woreda (Tach Gaynt)

1.4 Evaluation objectives

The primary objective of this impact evaluation was to assess the impact of N@C intervention on nutrition outcomes among women of reproductive age group (15-49years) and children under two years old.

In addition to this primary evaluation objective, this evaluation had other secondary objectives which include the following:

1. Assessing the impact of N@C interventions on food security and access to nutritious foods
2. Assessing the impact of N@C interventions on access to and utilization of health services
3. Assessing the impact of N@C interventions on core WHO infant and young child feeding (IYCF) indicators among children 0-23 months of age
4. Assessing the impact of N@C intervention on water, sanitation and hygiene practices, and
5. Assessing the impact of N@C intervention on women's empowerment

2. Methodology

2.1 Study design

To evaluate the impact of N@C activities, a cross-sectional observational method was employed. The survey included interviewer administered questionnaire, on site observation, anthropometric measurements and hemoglobin level determination.

The survey targets were women of reproductive age group (15-49 years) who gave birth in the last 36 months to their youngest babies. To be eligible for the survey, a woman should have resided in the area permanently (more than six months) and her youngest baby should have stayed during the survey time with her. For a child to be approached for anthropometric measurement he/she must have been aged between 6 to 35 months during

the survey period and the child must have been 6-23 months to be included for anemia testing.

2.2 Sampling

2.2.1 Sample size determination

The survey has followed a two-stage cluster sampling method whereby kebeles were the primary and households were the secondary sampling units. The sample size determination and sampling strategy was determined by CARE team. Probability proportional to size (PPS) which provides greater chance of selection for primary units having greater size of secondary unit, was applied in the selection of sample kebeles. In order to apply PPS procedure, a sample frame was constructed using kebele level population data within the selected intervention and control Woredas. CARE-Ethiopia collected the kebele level population data using government census, woreda and local office sources for Simada, Ebinat and Tach Gaynt woredas. As such, 22 intervention kebeles and 10 comparison group kebeles with a total population of 223,483 provided the sampling frame.

Sample size calculations were carried out for three key indicators of N@C by using the following statistical formula:

$$n = \frac{D * (Z_{1-a} + Z_{1-b})^2 * [p_1 (1 - p_1) + p_2 (1 - p_2)]}{(p_2 - p_1)^2}$$

Where

n = required sample size

D = design effect (assumed, D = 1.2);

p1 = estimated baseline prevalence rate of a condition p2 = planned target prevalence rate of a condition Z1-a = the z-score corresponding to the desired confidence level (typically, we set a = .05, thus Z0.95 = 1.645); and Z1-b = the z-score corresponding to the desired power level (typically, we set b = 0.80)

a) Sample size for anthropometry measurement

CARE's proposed intervention was estimated to improve stunting among participating children by 9 percentage points at end of the program. For sample size estimation, prevailing stunting baseline rate was set at $P_0 = 41\%$ and expected rate of change was set at $P_1 = 32\%$ (CSA, 2012). Using a significance level of 5%, power = 80%, difference between baseline and endline rates at 9 percentage points, with a design effect of 1.2, the study included a sample of 426 in 6-35 months age group to capture stunting in the peak age group in the intervention and comparison areas respectively.

b) Sample size for IYCF practices

For the IYCF indicators, exclusive breastfeeding (EBF) was used as the key indicator for sample size determination. For sample size estimation, prevailing baseline rate was set at $P_0 = 52\%$ and expected rate of change at $P_1 = 65\%$ (CSA, 2012). Using a significance level of 5%, power = 80%, difference between baseline and endline rates was at 13 percentage points, with a design effect of 1.2, the study included a sample of 213 children each in the *age* group (0-5), and 107 children in the *age* groups of (6-11), (12-17), (18-23) and (24-35.9) months of age. Thus, a sample of 641 ($107 \times 4 = 428 + 213$) children was required in each intervention and comparison areas. Thus, for both intervention and control the needed total sample size for this study was 1282 (641×2).

c) Sample size for iron deficiency anemia

In order to determine the sample size for determination of iron deficiency anemia, prevalence of anemia in children and mothers were used as key indicator. Anemia status in mothers was expected to be improved from the baseline prevalence of 17% to the end line prevalence of 4% (13 percentage point reduction) among participating mothers (15-49 years of age). Thus, for sample size estimation with $P_0 = 17\%$, $P_1 = 4\%$, significance level = 5%, power = 80% and the difference between baseline and endline = 13 percentage points with a design effect of 1.2, 157 mothers were required from each survey area to test the assumption. Thus, the total number of mothers required for assessing anemia was 314.

Anemia status in young children was expected to be improved from the baseline prevalence of 44% to the end line prevalence of 31% (13 percentage point reduction) among participating children (6-23) months of age. Thus, for sample size estimation with $P_0 = 44\%$, $P_1 = 31\%$, significance level = 5%, power = 80% and the difference between baseline and end line = 13 percentage points and considering a design effect of 1.2, 206 children were required in each survey area to test the assumption. Thus, the total number of young children required for assessing anemia was 412 (Table 1).

Table 1. Summary of sample population distribution in intervention and control woredas-Baseline Vs Endline

Target group	Intervention Baseline		Control Baseline		Intervention Endline		Control Endline	
	Anthropometry	Anemia	Anthropometry	Anemia	Anthropometry	Anemia	Anthropometry	Anemia
Children	1276	206	851	205	641	206	641	206
Women	1276	206	851	205	641	157	641	157

2.2.2 Selection of secondary sampling units

Bottle spinning method was used to select secondary sampling units or households in the first day of data collection. The bottle spinning was done in a central location of one kebele and the line along the bottle was used to determine the direction of the enumeration pairs movement. Two pairs of enumerators (one pair consisted of two interviewers, two note takers, one anemia tester and one supervisor) headed to the direction of the top of the bottle and the other two pairs of enumerators headed to the opposite direction. Two local guides were assigned to locate the households for each direction of data collection. However, this arrangement was found to be ineffective as it was not possible to collect the required data for the day and it was also found to be difficult for local guides as one local guide is supposed to carry two height boards and two weight scales for the two pairs of enumerators. The next day, the arrangement was modified in such a way that the four pairs of enumerators moved into four different directions of the kebele guided by four local guides. To facilitate data collection, local guides were contacted from each kebele preceding the date of data collection so that they could identify and locate eligible

households easily. When the enumeration team found eligible or appropriate woman, sought for consent, completed the interview, did anthropometric measurements and anemia testing.

2.3 Study team organization

The staff involved in this study is grouped into lead investigators, field logistic coordinators / survey leads and field team. The lead investigators consisted of one food science and nutrition specialist and one human nutrition specialist. The field team included two field coordinators/survey leads, enumeration team and supervisors. Field team was led by field coordinators. The field coordinator in overall the survey had four field supervisors. A field supervisor oversaw 4 enumerators and one anemia testing nurse.

2.4 Organization of the questionnaire

The survey questionnaire was designed by CARE and it contained questions organized into 10 categories and 19 modules ranging from A to S. Translation of the questions to Amharic was also done by CARE Ethiopia team. The following are the distinct categories of the questionnaire: A. Household identification B. Child information C. Mother's information D. Household characteristics E. Agriculture production and access to food F. Food preservation and storage G. Agriculture extension H. Household hunger scale I. Women's dietary diversity score J. Maternal health K. Infant and young child feeding practices L. Drinking water M. Hand washing, Sanitation and child stool disposal N. Women's empowerment O. program participation P. Mother anthropometry Q. Child anthropometry R. Mother's anemia S. Child's anemia. The last two modules (R and S) are not questionnaires by themselves rather they are meant to collect physical measurement and anemia test results (Annex 5).

2.5 Field team formation and training

Field supervisors and enumerators were recruited from the survey woredas, Debre Tabor town and Bahir Dar city. A total of 24 persons were brought on board for training in Bahir

Dar University, Bahir Dar. From these, 16 were enumerators, four anemia testers (blood sample collectors) and four were supervisors.

A schedule for training of supervisors, enumerators and anemia testers was developed by Bahir Dar University. The training was held for four days and started off with provision of background information on N@C program and objectives of the endline survey, spent two days discussing the household questionnaire line-by-line, one day on anthropometry measurement, half day on anemia testing and another half day on electronic data collection. Specifically, the training for the household survey questionnaire was undertaken using lecture. The training consisted of instructions regarding interviewing techniques and field procedures, a detailed review of modules and questions included on the questionnaires. In order to enhance enumerator's interviewing skills and to get them conversant with the questions, each participant took part in role play exercises. Training on anthropometric measurements consisted of how to measure weight and height of mothers and children, mid upper arm circumference (MUAC) of mothers and how to calibrate instruments (height board and weighing scale). The training for blood sample collectors focused on how to ask participants for consent, how to take blood sample, how to operate hemocue machine including fitting and disassembling the parts, calibration, cleaning and how to keep the machines and its parts safe. Training on electronic data collection focused on how to use ODK software for data collection, how to edit data and send data to the central server. All sessions were jointly facilitated by CARE and Bahir Dar University.

After the end of the training, field simulation exercise (pretest) took place in a kebele close to Bahir Dar town (Anbessame woreda/Hamusit kebele) whereby enumerators were split to small groups under supervisors, to take part in anthropometry measurements and field test of questionnaire. The field simulation exercise helped to identify enumerators' individual differences in anthropometric measurements and this was used as an input in setting up field teams and rearranging the teams/pairs for field data collection.

2.6 Data collection

In accordance with the field data collection arrangement and team movement plan which was developed by CARE and Bahir Dar University, the entire field team moved to Simada

woreda first and started the data collection on 01 February 2018. The data collection team was arranged in a way that one supervisor overseen 4 enumerators and one blood sample collector or anemia tester. There were 4 supervisors in total. The enumerators were organized to work in pairs accompanied by one anemia tester and one local field guide. The pairs were teamed up based on their performance in the pretest and participation in the class room discussion on the questionnaire so they can complement one another. The role of the field guide was to support the pair in locating households and assisting in transporting the height boards and weighing balance. When the pair went into a house, they first checked if the women and children in the households met inclusion criteria, then requested for consent, began with interview of the mother, preceded to anthropometry measurement of the mother and the child and finally perform anemia testing . Each pair was given one locally produced wooden height board of 2m tall usable for both the child and the mother as well, one digital weighing scale fitted with batteries to weigh both mothers and children, MUAC tapes of adult size and tablets.

During the data collection, supervisors moved from one team to another to check for compliance of the enumerators to inclusion criteria, interview techniques, and anthropometry measurement procedures and provided on spot feedback. At the end of the day, all enumerators and anemia testers met at a central place in a kebele mostly near where they will be picked up by a vehicle and handed over the tablets to their respective supervisor. The sample size and distribution of age of children per kebele is checked against the plan and the balance is discussed with enumerators and field coordinators.

2.7 Data entry and quality control

Data was collected electronically using Open Data Kit (ODK) platform. The software was uploaded to a central server in Bahir Dar University. Four supervisors, two field coordinators and one lead investigator and two CARE Ethiopia staff were on field to supervise the data collection closely. Each day, supervisors collect tablets from enumerators and check the quality of the data. Feedbacks were given to enumerators daily whenever available. The field team was moving together from one woreda to another and the team sends data whenever data collection is completed for the woreda. Each time the

data was downloaded from the central server by one of the lead investigators (stayed at Bahir Dar for this purpose), checked for its quality and timely feedback was given whenever available to improve the data quality.

2.8 Data analysis

Dummy tables were designed by CARE initially based on the study objectives, survey questions and possible sound relationships of the variables under study. Where there was no specific guidance or requirement stated from CARE, Bahir Dar University developed its own tables based on the requirements of each section or objective under consideration. Descriptive statistics (percentages and means) was used to present the findings of the study and student T test was used to compare the difference between baseline and endline within groups. Estimation of impact of N@C interventions compared to the control woreda overtime was conducted using difference-in-difference (DID) analysis. The data analysis was undertaken by IBM SPSS Statistics Version 20 and WHO Anthro v 3.2.2.

2.9 Ethical considerations

The questionnaire was accompanied by a standard consent form which had separate versions for interview and anemia testing. The interview was preceded with reading out the consent statement and seeking verbal consent from the respondent mothers. Blood collectors secured consent by getting signatures from each woman who have allowed their and/or child's bloods to be drawn. Prior to the survey, ethical permission for the N@C project endline survey, was sought and approved from the Research Ethics Committee of Bahir Dar University for the project titled "Impact Evaluation of Nutrition at the Center (N@C) Project". Written authorization was also received from Amhara Regional State Health Bureau.

3. Results

3.1 Demographic characteristics

A total of 1202 mothers participated in this endline survey with a response rate of 94%. Baseline and endline demographic characteristics of mothers were almost similar for both intervention and control woredas with most mothers in the age group of 20-39years, married and non-pregnant with 1-2 alive children. There were also similarities at baseline and endline with regard to age at first marriage as in both cases the majority (more than 30%) of mothers get married when they were below 15 years old in all survey woredas. One difference noted at endline is the increase in the number of jointly headed households in both intervention and control woredas(Table 2).

Table 2. Demographic characteristics of mothers in N@C intervention and control woredas- Baseline Vs Endline

Characteristics		Intervention (%) Baseline (N= 1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)
Mothers' age	15-19	3.8	3.0	4.5	4.0
	20-24	21.8	18.1	22.2	20.4
	25-29	28.5	31.9	27.6	24.2
	30-34	24.4	23.1	22.7	29.0
	35-39	15.5	18.1	16.8	17.1
	40-44	5.3	5.3	5.4	4.9
	45-49	0.8	0.5	0.8	0.3
	Mean age	29.0	29.5	28.6	29.0
Marital status	Married (monogamous)	84.8	87.5	90.6	88.7
	Married (polygamous)	3.0	3.1	0.7	0.8
	Cohabiting with partner (monogamous)	9.2	7.6	0.6	0.2
	Divorced or separated	0.9	0.4	8.6	7.9
	Widowed	0.9	0.5	0.3	0.2
	Single	0.5	0.0	0.5	0.0
Age at first marriage	<15	37.2	28.7	38.5	34.5
	15	23.5	24.1	22.7	28.2
	16-17	15.5	17.8	14.3	12.4
	18	9.2	13.7	9.1	8.6
	19-21	8.8	9.8	8.1	9.1
	>=22	5.8	6.0	4.9	5.1
Formal Education	32.0	40.0	41.3	43.8	
Currently pregnant	4.0	3.1	2.9	2.5	

Head of household	Male headed	77.0	82.9	31.4	29.5
	Female headed	13.4	9.3	13.8	9.4
	Jointly headed	9.7	7.8	54.8	61.1
Number of Living children	1-2	40.6	37.4	47.1	47.6
	3-4	34.9	40.2	33.4	35.7
	5+	24.4	22.3	19.5	16.6

3.2 Access to food and agricultural extension

Similar to baseline, most households in both intervention and control woredas access their foods through production or purchasing food. However, these have declined significantly at endline in both intervention and control woredas and rather households which access their food through NGO food aid and burrowing food have significantly increased. In DID impact analysis, accessing food through food production, food purchase and government food aid were higher (9-29.7pp) and NGO food aid was lower (17.4pp) in the intervention woredas compared to the control woreda overtime (Table 3).

Home gardens are known for their contribution for food security, diet diversification and income generation for rural women. At baseline, about 20% of households in the intervention woredas reported to have home gardens. However, this percentage decreased by half at endline. Owning of home gardens was also reduced significantly at endline in the control woreda (Table 3). DID impact analysis shows more reduction (10.5pp) in owning of home gardens in the control woreda compared to the intervention woredas.

Three development agents are usually assigned by woreda agricultural offices in Ethiopia to give advice and follow up for households with regard to crop and livestock production and management of natural resources. The percentage of households visited by agricultural and livestock extension workers was almost similar among N@C beneficiaries at baseline and endline. DID impact analysis shows more visits by agricultural extension workers in the control woreda compared to intervention woredas overtime (Table 3).

Table 3. Source of household food, ownership of home garden and access to agriculture extension services- Baseline Vs Endline

Characteristics		Intervention(%) Baseline (N=1277)	Control(%) Baseline (N=855)	Intervention(%) Endline (N=595)	Control (%) Endline (N=607)	Difference- in- Difference
Source of household food	Produce own food	77.5	93.9	73.2*	79.1***	10.5
	Purchase food	67.7	84.4	57.3***	55.6***	18.4
	Food for work	5.1	34.0	3.0*	2.2***	29.7
	Government food aid	3.6	14.9	1.0**	3.3***	9
	NGO food aid	0.5	0.2	7.8***	24.9***	-17.4
	Trade/Borrow food	3.1	3.4	8.2***	7.8***	0.7
	Charity	0.9	1.8	0.0*	0.0***	0.9
Own home/kitchen garden	20.8	28.2	11.3***	8.2***	10.5	
Visited by agricultural extension worker	62.5	55.6	61.8	64.6***	-9.7	
Visited by livestock /fisheries extension worker	43.9	40.0	42.9	38.6	0.4	

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.3 Food preservation and storage

Food preservation using various techniques is one approach to improve dietary intake of micronutrients as it ensures a year-round availability of nutrient-dense foods. At baseline, 11.6% of households in intervention woredas were practicing fruit and vegetable preservation and about 60% of households practiced crop storage. At endline, percentage of N@C beneficiaries which practice fruit and vegetable preservation and crop storage reduced significantly. Reductions in the practice of fruit and vegetable preservation as well as crop storage were also significant in the control woreda. DID impact estimates were 7.4pp and 31pp higher for the intervention woredas for fruit and vegetable preservation and crop storage practices compared to the control woreda(Table 4).

Table 4. Practice of fruit and vegetable preservation and crop storage in intervention and control woredas- Baseline Vs Endline

Characteristics	Intervention (%) Baseline (N=1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)	Difference in Difference
Practice fruit and vegetable preservation	11.6	17.3	3.7***	2.0***	7.4
Practice of crop storage	60.1	86.9	39.3***	35.1***	31

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.4 Household hunger

Household perception of hunger was assessed using household hunger scale having three categories, little or no hunger, moderate hunger and severe hunger. Overall, mothers' perception of their household food security increased significantly over time in both intervention and control woredas as the majority of women (more than 97percent) reported little or absence of hunger in their household. DID impact estimates show increment(1.7pp) in the perception of mothers who reported little or absence of hunger and reduction in moderate (1.3pp) and severe hunger(1.5pp) in the intervention woredas compared to the control woreda overtime (Table 5).

Table 5. Household food security status of intervention and control woredas- Baseline Vs Endline

Household hunger categories	Intervention (%) Baseline (N=1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)	Difference –in- Difference
Little or no hunger (score 0-1)	91.2	92.4	97.5***	97.0***	1.7
Moderate hunger (score 2-3)	7.5	5.7	2.5***	2.8**	-1.3
Severe hunger (score 4-6)	1.3	0.0	0.0**	0.2	-1.5

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.5 Impact of N@C on Maternal Nutrition and Health

3.5.1 Maternal health service utilization

Health seeking behaviors such as antenatal care (ANC) visits, postnatal natal care (PNC) visits and intake of iron supplements were assessed as these behaviors have effects in the nutrition and health outcomes of mothers and their children. The percentage of ANC visits and intake of iron tablets increased significantly over time among women in both intervention and control woredas. DID impact estimates show pronounced increment for ANC visits (17pp) and iron intake (10.4pp) in the intervention woredas compared to the control woreda. On the other hand, there was no significant difference between women in the intervention and control woreda with respect to the duration of iron intake. Percentage of women who visited health facilities for postnatal care (PNC) increased significantly at endline in both intervention and control woredas; the DID impact estimate was higher by 18.6pp for the control woreda compared to the intervention woredas (Table 6).

Table 6. Health service utilization of mothers in intervention and control woredas-Baseline Vs Endline

Characteristics		Intervention (%) Baseline (N=1277)	Control(%) Baseline (N= 855)	Intervention(%) Endline (N=595)	Control(%) Endline (N=607)	Difference- in - Difference
ANC visits		57.5	72.4	95.0***	92.9***	17
Number of ANC visits	One time			2.1	2.0	
	Two times			9.2	7.5	
	Three times			29.4	27.6	
	Four times			58.9	62.5	
Took iron tablets	45.4	55.0	90.1***	89.3***	10.4	
Duration of taking iron tablets	Less than 30 Days			12.5	8.7	
	30 to 59 Days			21.1	15.9	
	60 to 89 Days			23.7	35.7	
	90 Days or more			42.4	38.4	
PNC visits	26.4	18.9	33.4**	44.5***	-18.6	

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.5.2 Maternal dietary diversity (Women's Dietary Diversity Score)

Mothers consumption of some food groups (legumes, nuts and seeds and vitamin A rich fruits and vegetables) increased significantly at endline in the intervention woredas (Table 7). However, consumption of other food groups such as other fruits and vegetables, meat and fish, milk and milk products decreased significantly. Similarly, at endline, consumption of various food groups reduced significantly in the control woreda except organ meat consumption. DID impact estimates show increment (0.3-15.4pp) in the consumption of various food groups by mothers in the intervention woredas except organ meat consumption which was 5.5pp higher in the control woreda. Percentage of women who consumed foods from 5 or more food groups or met minimum dietary diversity score (Arimon et al., 2008) increased overtime for both intervention and control woredas but the increment was significant for the intervention woredas.

Table 7. Maternal dietary diversity in intervention and control woredas- Baseline Vs Endline

Food groups	Intervention (%) Baseline (N=1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)	Difference-in-Difference
Starchy staples	99.3	100	98.0*	98.4***	0.3
Legumes, nuts and seeds	77.0	93.2	80.7	81.7***	15.2
Other fruits and vegetables	33.8	48.9	23.4***	23.1***	15.4
Meat and fish	11.4	12.0	3.9***	8.4*	-3.9
Other vitamin A rich vegetables and fruits	5.7	13.1	7.6	8.4**	6.6
Dark green leafy vegetables	3.5	9.1	3.5	4.3***	4.8
Eggs	3.9	9.0	6.6*	7.6	4.1
Milk and Milk products	7.7	8.3	4.4**	5.3*	-0.3
Organ meat	1.5	2.8	3.4**	10.4***	-5.7
WDDS: % women who ate 5 or more food groups during normal days	4.3	10.6	6.9*	11.2	2
WWD: % women who ate from 1 food group	12.6	3.4	3.5***	5.6*	-11.3
WWD: % women who ate from 2 food groups	49.1	38.0	18.5***	20.8***	-13.4
WWD: % women who ate from 3 food groups	26.1	33.7	50.8***	40.7**	17.7
WWD: % women who ate from 4 food groups	7.5	14.3	20.3***	21.7***	5.4

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.5.3 Nutritional status of mothers

The average BMI of mothers in both intervention and control woredas at baseline was around 20 kg/m² and this average was also recorded at endline. At endline, the percentage of women who were underweight (BMI<18.5kg/m²) decreased significantly in both intervention and control woredas. The DID impact estimates show more reduction in the percentage of women in the underweight category(1pp) and more increment (2.3pp) in the

percentage of women in the normal weight category in the intervention woredas compared to the control woreda (Table 8).

Table 8. Nutritional status of mothers in intervention and control woredas- Baseline Vs Endline

BMI(kg/m ²) category	Intervention (%) Baseline (N=1200)	Control (%) Baseline (N=727)	Intervention (%) Endline (N=578)	Control (%) Endline (N=592)	Difference- in- Difference
< 18.5 (Underweight)	27.5	23.9	20.2***	17.6**	-1
(18.5-24.9) (Normal)	70.1	74.8	75.8*	78.2	2.3
(> 25-29.9) (Overweight)	1.8	1.2	3.3*	4.1***	-1.4
> 30.0 (Obese)	0.7	0.1	0.7	0.2	-0.1
Mean BMI	19.86	19.89	20.5±2.4	20.6±2.3	-0.07

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Nutritional status of pregnant women was determined by measuring the circumference of the left arm at the midpoint between the tip of the shoulder and the tip of the elbow, mid upper arm circumference (MUAC). The prevalence of severe malnutrition (MUAC <21.5cm) among pregnant women decreased in both intervention and control woredas at endline. DID impact estimates showed more increment in the percentage of pregnant women who are severely (4.2pp) and moderately malnourished (2.2pp) and more reduction in the percentage of women in the normal weight category in the intervention woredas compared to the control woreda overtime (Table 9).

Table 9. Nutritional status of pregnant women in intervention and control woredas- Baseline Vs Endline

	Intervention (%) Baseline	Control (%) Baseline	Intervention (%) Endline (N=17)	Control (%) Endline (N=15)	Difference- in- Difference
Below 21.5cm (Severely malnourished)	15.2	14.3	11.8	6.7	4.2
21.5cm to 22.5cm (Moderately malnourished)	16.2	18.4	0	0	2.2
>22.5cm (Normal)	68.6	67.4	88.2	93.3	-6.3

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.5.4 Maternal anemia

Reduction of maternal anemia is one of the nutrition outcomes that N@C needs to impact in the intervention woredas. At endline, nearly 90 % of women in the intervention woredas were non-anemic but this was also observed at baseline. Only little improvement was noted in the prevalence of anemia among women in the intervention woredas as there were still 8.2% women who were experiencing either mild or moderate anemia. DID impact analysis showed significant reduction (7.2pp) in the prevalence of anemia in the control woreda compared to the intervention woredas (Table 10).

Table 10. Prevalence of anemia among women in intervention and control woredas- Baseline Vs Endline

Anemia status	Intervention (%) Baseline (N=187)	Control (%) Baseline (N=191)	Intervention (%) Endline (N=134)	Control (%) Endline (N=168)	Difference -in -Difference
Not Anemic	90.9	90.1	91.8	98.2**	-7.2
Mild (11-11.99g/dl)	5.9	8.4	5.2	1.2**	6.5
Moderate (8-10.99g/dl)	3.2	1.6	3.0	0.6	0.8
Severe (< 8 g/dl)	0	0	0	0	0

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.6 Impact of N@C on child nutrition and health

3.6.1. Infant and young child feeding (IYCF) practices

The impact of N@C interventions on core infant and young child feeding (IYCF) practices among children 0-23 months of age was assessed and presented in table 11. At baseline, early initiation of breastfeeding was higher among women in the control woreda compared to the intervention woredas. This practice increased significantly in both intervention and control woredas at endline. Similarly, exclusive breastfeeding practice increased significantly in both intervention and control woredas. DID impact estimates showed early initiation to be higher (4.9pp) and exclusive breastfeeding to be lower (3.8pp) in the intervention woredas compared to the control woreda.

Timely introduction of solid and semi solid or soft foods for children 6-8 months was low in the intervention woredas at baseline compared to the control woreda. This practice increased slightly over time in the intervention woredas but decreased significantly in the control woreda; DID impact estimate was 39.7 pp higher for the intervention woredas compared to the control woreda.

It is recommended that a child continues to breastfeed until age 2. The proportion of children 12–15 months of age who were fed breast milk as part of continued breastfeeding was very high at baseline in both intervention and control woredas. In DID impact analysis, continued breastfeeding was higher (6.4pp) in the control woreda compared to intervention woredas.

Minimum dietary diversity refers to offering food from four or more food groups for children 6-23months of age. At baseline, the proportion of children 6-23 months in the intervention woredas who met the minimum dietary diversity was very low compared to the control woreda. DID impact estimate showed an increment by 5.5pp in minimum dietary diversity in the intervention woredas compared to the control woreda overtime.

Minimum meal frequency refers to the minimum number of meals breastfed and non-breastfed children received in the previous day or night. Minimum is defined as: two times for breastfed infants 6–8 months; three times for breastfed children 9–23 months; and four times for non-breastfed children 6–23 months in the previous day. Proportion of children who received the minimum meal frequency increased overtime in both intervention and control woredas but the magnitude of increment was higher (5.3pp) in the intervention woredas.

Table 11. Infant and young child feeding practices in intervention and control woredas- Baseline Vs Endline

Key IYCF Practices by indicator	Intervention				Control				Difference in Difference
	Baseline		Endline		Baseline		Endline		
	N	n (%)	N	n (%)	N	n(%)	N	n(%)	
Timely Initiation of Breast Feeding (0-23) months	744	536(72.0)	473	449(94.9)***	593	461(78.0)	476	458(96.2)***	4.9
Exclusive Breast Feeding (0-5) months	219	162(74.0)	167	143(85.6)**	191	149(78.0)	167	156(93.4)***	-3.8
Introduction of solid/semi-solid or soft food (6-8) months	52	11(21.2)	67	15(22.4)	50	31(62.0)	68	16(23.5)***	39.7
Continued BF at (12-15) months	68	68(100)	60	57(95.0)	73	71(97.3)	76	75(98.7)	-6.4
Minimum Dietary Diversity (6-23) months	525	11(2.1)	317	15(4.7)*	402	34(8.5)	320	18(5.6)	5.5
Minimum Meal Frequency (6-23) months	525	247(47.0)	317	184(58.1)**	402	244(60.7)	320	213(66.5)	5.3
Minimum Acceptable Diet (6-23) months	525	12(2.3)	317	13(4.2)	402	20(5.0)	320	14(4.5)	2.4
Iron Rich or Fortified Solid/Semi-solid Foods (6-23) months	525	32(6.1)	317	45(14.2)***	402	31(7.7)	320	37(11.6)	4.2
Bottle Feeding (0-23) months	744	164(22.0)	484	6(1.2)***	593	198(33.4)	487	4(0.8)***	11.8

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Minimum acceptable diet among breastfed and non-breastfed children is a composite of dietary diversity and meal frequency. It is an indicator showing the proportion of infants receiving both minimum meal frequency and minimum dietary diversity. Proportion of children who met the minimum acceptable diet increased overtime in the intervention woredas but the increment was not significant.

At endline, consumption of iron rich foods among children 6-23 months increased in both intervention and control woredas; the magnitude of increment was higher (4.2pp) in the intervention woredas compared to the control woreda.

Bottle feeding is a practice that is discouraged because of the risk of illness to the child. The proportion of children who were using a bottle with a nipple decreased significantly overtime in both intervention and control woredas. In DID impact analysis, the magnitude of reduction was higher (11.8pp) in the control woreda compared to intervention woredas.

3.6.2 Nutritional status of children

Weight and height measurements of children 6-35 months were used to determine the prevalence of stunting, wasting and underweight by comparing each child's anthropometric measurements to the 2006 WHO child growth standards reference. Height for age Z-score, weight for age Z-score and weight for height Z-score were the three indicators used in this survey. Percentages of malnourished children and mean z-scores by the different indicators were generated separately for N@C intervention woredas and the control woreda. Tables 12, 13 and 14 show the prevalence of stunting, wasting and underweight among children age 6-35 months in intervention and control woredas at baseline and endline.

At baseline, there was no significant difference between intervention and control woredas in the prevalence of stunting among children 6-35 months. At endline, prevalence of stunting among children 6-35 months decreased in both intervention and control woredas. The DID impact estimation for stunting showed an increase in the prevalence of stunting (9.3pp) in the intervention woredas compared to the control woreda overtime.

At baseline, prevalence of wasting among children 6-35 months was slightly higher in the control woreda compared to intervention woredas (12.4 vs 10.2 percent). At endline, the prevalence of wasting increased in both intervention and control woredas but the increment was not significant. In DID impact analysis, more increment in the prevalence of wasting was noted in the intervention woredas compared to the control woreda.

The level of underweight was higher in the intervention woredas compared to the control woredas at baseline (32.3 vs 29.3percent). At endline, the prevalence of underweight decreased in both intervention and control woredas and in DID impact analysis the decrease was 5.1pp in favor of the control woreda.

Table 12. Prevalence of stunting among children 6-35 months in intervention and control woredas- Baseline vs Endline

Height-for-age																	
Age in months	Intervention								Control								Difference – in- Difference
	Baseline				Endline				Baseline				Endline				
	N	% < -3 Z	% < -2 Z	Mean Z	N	% < -3 Z	% < -2 Z	Mean Z	N	% < -3 Z	% < -2 Z	Mean Z	N	% < -3 Z	% < -2 Z	Mean Z	
6-35	1062	27.1	50.4	-2.01	425	25.5	48.0	-1.89	668	26.3	51.5	-2.02	440	15.9***	39.8***	-1.48	9.3
6– 11	119	5.6	24.3	-0.8	124	14.8*	31.1	-1.09	107	18.5	34.5	-1.4	111	5.5**	26.4	-0.77	14.9
12-23	283	32.6	55.2	-0.75	188	28.3	52.8	-2.1	402	29.0	54.8	-2.21	206	19.9*	41.8**	-1.65	10.6
24-35	266	27.3	51.8	-2.08	110	26.5	56.9	-2.13	554	27.1	55.6	-2.09	120	15.8**	49.2	-1.83	11.5
6-35 Male		26.7	44.3	-1.95	225	27.7	50.9	-1.93		26.2	45.1	-2.12	223	20.5	42.5	-1.63	9.2
6-35 Female		18.1	39.3	-1.49	200	23.1	44.6	-1.85		15.2	35.8	-1.55	217	11.1	37.0	-1.33	4.1

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Table 13. Prevalence of wasting among children 6-35 months in intervention and control woredas– Baseline Vs Endline

Weight- for-height																					
Intervention											Control										
Age in month	Baseline					Endline					Baseline					Endline					Difference-in - Difference
	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	
6-35	1062	3.0	10.2	2.1	-0.62	425	5	13	6	-0.36	668	4.3	12.4	3.3	-0.63	440	5.1	13.3	7.7**	-0.29	1.9
6– 11	119	2.8	12.1	3.7	-0.4	124	8.3	18.3	5.8	-0.37	107	5.0	13.4	5.9	-0.63	111	3.7	14.0	13.1	0.03	5.6
12-23	283	3.5	12.4	1.0	-2.21	188	3.7	11.2	7.0	-0.29	402	5.3	13.8	3.2	-0.65	206	4.5	10.9	7.9*	-0.27	1.7
24-35	266	2.7	8.1	2.5	-0.57	110	3.7	10.1	4.6	-0.49	554	3.0	10.5	2.3	-0.59	120	7.6*	16.0	2.5	-0.6	-3.5
6-35 Male		3.0	9.4	1.5	-0.68	225	6.4	12.7	4.1	-0.4		4.0	13.1	4.2	-0.67	223	5.1	15.7	7.9	-0.36	0.7
6-35 Female		2.0	7.5	2.0	-0.56	200	3.6	13.3	8.2	-0.33		3.3	7.0	1.2	-0.61	217	5.2	10.8	7.5	-0.21	2

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Table 14. Prevalence of underweight among children 6-35 months in the intervention and control woredas– Baseline Vs Endline

Weight-for-age																				
Age in month	Intervention									Control										
	Baseline					Endline				Baseline					Endline					Difference-in-Difference
	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	N	% < -3 Z	% < -2 Z	Mean Z	N	% < -3 Z	% < -2 Z	% above +2 Z	Mean Z	N	% < -3 Z	% < -2 Z	Mean Z		
6-35	1062	9.6	32.3	0.6	-1.5	425	9.2	30.8	-1.32	668	9.3	29.3	0.3	-1.53	440	7.3	22.7*	-1.05	5.1	
6– 11	119	1.9	20.6	1.9	-0.84	124	8.1*	17.7	-0.93	107	9.2	23.5	0.0	-1.36	111	4.5	18.0	-0.49	2.6	
12-23	283	12.2	37.3	0.5	-1.6	188	8.0	33.0	-1.34	402	10.2	32.5	0.7	-1.5	206	7.3	21.4*	-1.06	6.8	
24-35	266	9.2	31.0	0.4	-1.54	110	10.0	39.1	-1.63	554	8.3	28.6	0.0	-1.55	120	7.5	29.2	-1.44	7.5	
6-35 Male		9.4	30.9	0.6	-1.6	225	11.1	35.1	-1.39		9.8	26.4	0.7	-1.64	223	8.5	25.6	-1.15	5	
6-35 Female		6.5	22.6	0.5	-1.4	200	7	26	-1.25		4.7	19.7	0.2	-1.36	217	6	19.8	-0.98	3.3	

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.6.3 Childhood anemia

Anemia status of children age 6-23months was determined using two hemoglobin level cut off points; 10.5g/dl as used in N@C baseline survey and 11.0g/dl as used in EDHS surveys (Table 15 and 16). At baseline, anemia prevalence among children 6-23 months was higher in the control woreda compared to the intervention woredas. At endline, anemia prevalence decreased significantly in the control woreda but there was no significant difference between baseline and endline prevalence in the intervention woredas. DID impact estimates show more reduction in the percentage of children who are anemic in the control woreda compared to the intervention woredas.

Table 15. Prevalence of anemia among children age 6-23 months in intervention and control woredas (Cut off <105g/L or 10.5g/dl)- Baseline Vs Endline

Anemia status	Intervention		Control		Difference- in- Difference
	Baseline	Endline	Baseline	Endline	
	(N=187) n(%)	(N=357) n(%)	(N=187) n(%)	(N=357) n(%)	
Anemic	67(35.8)	54(32.3)	71(38.0)	56(29.5) *	5
Not anemic	120(64.2)	112(67.1)	116(62.0)	134(70.5) *	-5.6

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Table 16. Prevalence of anemia among children age 6-23 months in intervention and control woredas (Cut off <110g/L or 11.0g/dl)-Baseline Vs Endline

Anemia status	Intervention		Control		Difference -in -Difference
	Baseline	Endline	Baseline	Endline	
	(N=187) n(%)	(N=357) n(%)	(N=187) n(%)	(N=357) n(%)	
Anemic	83(44.4)	68(40.7)	99(52.9)	77(40.5) **	8.7
Not anemic	104(55.6)	99(59.3)	88(47.1)	113(59.5) **	-8.7

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.7 Impact of N@C on Water, Sanitation and Hygiene

3.7.1 Access to water

At endline, percentage of households in the intervention woredas which access water from protected water sources such as piped water and public tap has increased significantly. This was also the case in the control woreda as well. In DID impact analysis, more increment (4.4-15.3pp) in these water sources was noted in the intervention woredas compared to the control woreda. On the other hand, use of water from protected dug well and protected spring was higher in the control woreda by 18.1pp and 4.6pp respectively compared to the intervention woredas. The time required to fetch water has reduced significantly compared to baseline for both intervention and control woredas. Use of water treatment methods increased overtime by the majority of households in both intervention and control woredas and the magnitude of treatment use was 10pp higher in the intervention woredas compared to the control woreda. In DID impact analysis, percentage of households which use addition of chlorine/bleach as a treatment method was higher(35pp) and use of other methods such as boiling water(7.3pp) and settling (10.5pp) were lower in the intervention woredas compared to the control woreda (Table 17).

Table 17. Source of drinking water and water treatment methods used in intervention and control woredas- Baseline Vs Endline

		Intervention Baseline (N=1277)	Control Baseline (N=855)	Intervention Endline (N=595)	Control Endline (N=607)	Difference –in- Difference
Primary source of drinking water	Piped water into dwelling	0	0	14.7***	4.7***	10
	Piped water into yard/plot	0.5	0.1	8.8***	4.0***	4.4
	Public tap/standpipe	43.1	67.4	57.6***	66.6	15.3
	Tube-well/borehole	0.3	0.1	1.0	0.5	0.3
	Protected dug well	10.0	0.8	11.8	20.7***	-18.1

	Protected spring	17.3	9.4	6.5***	3.2***	-4.6
	Bottled water	0	0	0.2	0	0.2
	Unprotected dug well	2.0	0.9	5.6***	2.3*	2.2
	Unprotected spring	11.0	11.3	4.1***	3.3***	1.1
	Surface water	6.7	5.5	0.8***	0.7***	-1.1
	Average time required to fetch water(in minutes)	40.2	38.8	21.1***	21.6***	-1.9
	Use of water treatment methods	14.7	17.7	37.6***	30.6***	10
	Type of water treatment method					
	Boil water	2.4	1.3	22.8***	29.0***	-7.3
	Add bleach/chlorine	5.6	15.0	77.2***	51.6***	35
	Strain it through a cloth	2.0	0.5	0.02***	0.02	-1.5
	Use water filter (ceramic/sand/composite/etc)	0.2	0.0	0.01	0.3	-0.49
	Solar disinfection	0.3	0	0	0	-0.3
	Let it stand and settle	0.0	0.0	66.9***	77.4***	-10.5
	Use purifying tablets	0.5	0.4	0	0	-0.1

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.7.2 Sanitation

At endline, women were asked about their hand washing practices especially hand washing at critical times (before eating, before food preparation, before feeding the child, after toilet use and after changing diaper). Percentage of women in both intervention and control woredas who practice hand washing at these critical times increased significantly at endline. DID impact estimates for hand washing before

feeding the child, after toilet use and after changing diaper were higher (18.7-20.4pp) in the control woreda compared to the intervention woredas (Table 18).

Table 18. Hand washing practice, use of detergents /local cleansing agents and availability of cleaning agents and water at a specific place for hand washing, Baseline Vs Endline

		Intervention (%) Baseline (N=1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)	Difference -in- Difference
Hand washing practices (*always)						
Before eating		96.1	97.3	99.7***	99.7***	1.2
Before preparing food		89.2	89.9	97.0***	96.5***	1.2
Before feeding the child		84.8	67.6	92.8***	95.2***	-19.6
After toilet use		46.5	31.0	84.7***	89.6***	-20.4
After changing a diaper		21.7	17.7	57.8***	72.5***	-18.7
Use of either detergent or local cleansing agents	Soap	32.8	41.2	33.3	44.0	-2.3
	Detergent	1.0	4.7	7.4***	9.3***	1.8
	Liquid soap	1.1	0.1	0.9	1.0*	-1.1
	Ash	5.6	9.2	1.3***	3.1***	1.8
Water availability at a specific place		13.2	22.8	56.0***	43.2***	22.4
Soap/local cleansing agents availability at a specific place		36.3	49.2	40.4	44.9	8.4

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

Women were also asked if they have specific places for hand washing and availability of water in that specific place and detergents or locally available cleansing agents in the house. Significant improvements were noticed at endline in the intervention woredas as higher percentage of households (22.4pp) had a specific place for hand washing compared to the control woreda. Similarly, more households (8.4pp) had soap/local cleaning agents at a specific place in the intervention woredas compared to the control woreda (Table 18).

The percentage of households which have flush/pour flush to pit latrine and pit latrines with and without slabs has increased significantly in the intervention woredas over time. However, no improvement was observed in the intervention woredas in terms of open defecation as the percentage of households which practice open defecation remained as high as the baseline (37 percent). DID impact estimate showed more increment (5.5pp) in the control woreda in the percentage of households which practice open defecation compared to intervention woredas (Table 19).

Although data were not reported at baseline, at endline, women were asked about child stool disposal practices. Significant differences were not observed between the intervention woredas and the control woreda in the various stool disposal practices. Furthermore, similarities were observed between intervention and control woredas as in both woredas higher percentage (more than 40 percent) of households practiced unhygienic stool disposal practices/open defecation.

Table 19. Type of toilet facility used and method of child stool disposal in intervention and control woredas- Baseline Vs Endline

		Intervention (%)	Control (%)	Intervention (%)	Control (%)	Difference –in Difference
		Baseline	Baseline	Endline	Endline	
		(N=1277)	(N=855)	(N=595)	(N=607)	
Toilet type	Flush/pour flush to pit latrine	0.7	0	5.2***	3.5	1
	Ventilated improved pit latrine (VIP)	2.0	0.3	1.3	0.8	-1.2
	Pit Latrine with slab	16.0	27.8	35.8***	40.9	6.7
	Composting toilet	21.4	7.6	0.2***	0.2	-13.8
	Flush/pour flush to elsewhere/DK	0.2	0.2	0.5	0.0	0.5
	Pit latrine without slab/open pit	14.4	42.1	18.5*	28.8	17.4
	No facilities/bush/field (open defecation)	37.7	20.3	37.6	25.7	-5.5

Child stool disposal	Used potty	7.7	5.6***
	Used washable diaper	17.1	13.8
	Used disposable diaper	0.8	2.1
	Used latrine	8.4	11.5
	Went in his/her clothes	23.2	20.4
	Went in house	0.7	2.0
	Went outside of house/yard	41.7	44.3

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.8. Impact of N@C on women’s empowerment

The impact of N@C intervention on women’s empowerment was assessed by using three different domains of women empowerment; decision making power, perception on violence and participation in community programs.

3.8.1 Decision making power

Although some data were available at baseline about women’s household decision making power, the questions sets were different at endline. About 12 questions were presented to women at endline to assess their involvement in household decisions. There was no significant difference between intervention and control woredas in the percentage of women who are empowered in household decisions. Generally, the data showed that women are highly empowered in household decisions in both intervention and control woredas as on average 90 percent of women reported their involvement in household decisions (Table 20).

Table 20. Women’s involvement in household decision making in intervention and control
woredas- Endline

Percent of women who can decide on their own or with their husbands the following	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)
Decisions about own (your) health care	92.6	94.7
Decisions about child’s health	95.5	96.7
Decisions about_large household purchases	87.1	88.0
Decisions about_household purchases for daily needs	94.5	94.4
Decisions about when you visit family/relatives or friends	92.1	93.4
Decisions about when the whole household will visit family/relatives/friends	93.6	95.6
Decisions about how to use money that you bring into the household	95.0	94.9
Decisions about how to use the money your husband brings into the household	93.1	94.7
Decisions about when your family will sell a large asset	88.2	89.1
Decisions about when your family will sell a small asset	96.6	96.2
Decisions about whether you can work to earn money	93.8	96.0
Decisions about how food is shared among family members when there is no enough food in the household	93.4	95.4

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.8.2 Gender, Attitudes & Beliefs

Women were asked five questions that potentially address different contexts that a husband could exercise violence and if they agree with the act of violence. The perception of women significantly improved at endline as only small percentage of women in both intervention and control woredas agreed on their husbands' act of violence. In most cases, DID impact estimates showed more improvement (2-15.4pp) in the perception of women on violence in the intervention woredas compared to the control woreda (Table 21).

Table 21. Percent of women who agree in their husband's act of violence- Baseline Vs Endline

Percent who agree with the following statements	Intervention (%) Baseline (N=1277)	Control (%) Baseline (N=855)	Intervention (%) Endline (N=595)	Control (%) Endline (N=607)	Difference- in- Difference
A husband is justified in hitting his wife, if she goes out without telling him	40.6	38.6	7.2***	8.4***	-3.2
A husband is justified in hitting his wife, if she neglects their children	39.9	43.2	6.6***	7.9***	2
A husband is justified in hitting his wife, if she argues with him	34.6	39.6	8.1***	10.4***	2.7
A husband is justified in hitting his wife, if she refuses to have sex with him	33.0	49.9	12.3***	13.8***	15.4
A husband is justified in hitting his wife, if she did not cook food properly	44.2	56.1	10.4***	14.7***	7.6

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

3.8.3 Program participation

Women's participation in community-based programs such as mother to mother support group, VSLA and SAA meetings was assessed and the result (Table 22) shows that participation of women in these programs was significantly higher in the intervention woredas compared to the control woreda. However, percentage of

women who always participate in these programs was significantly higher in the control woreda compared to the intervention woredas.

Table 22. Program participation among women in intervention and control woredas-
Endline

		Intervention (%) (N=595)	Control (%) (N=607)
Participate in Mother to Mother Support Group meetings		57.0	48.9**
Frequency of participation in Mother to Mother Support Group meetings	Sometimes	64.0	58.3*
	Frequently	9.1	7.8
	Always	26.8	33.9**
Participate in VSLA Group meetings		49.2	37.2***
Frequency of participation in VSLA Group meetings	Sometimes	60.1	50.4***
	Frequently	12.8	14.2
	Always	27.0	35.4**
Participate in SAA meetings		26.7	15.3***
Frequency of participation in SAA meetings	Sometimes	67.3	55.9***
	Frequently	10.7	5.4***
	Always	22.0	38.7***
Received Tippy tap or training on the use of Tippy Tap from N@C program		40.0	32.1**

Significant differences: *** p<0.001, ** p<0.01, * p<0.05

4. Conclusion

N@C was a project aimed in improving maternal and child nutrition outcomes through an integrated multisectoral approach. This endline report presents the impact of N@C interventions by comparing the results with a control woreda.

The majority of women who participated in this endline survey had their first marriage at age below 15 years which was also the case during the baseline survey. In this regard, noticeable changes were not observed especially in the intervention woredas in reducing early child marriage.

Overall, N@C had positive impact in improving household food security as measured by household hunger scale; positive impact in improving maternal health services utilization such as ANC visits and intake of iron tablets; a small positive impact in improving maternal dietary diversity especially consumption of legumes, seeds, and nuts and vitamin A rich fruits and vegetables and positive impact in improving the nutritional status of mothers. N@C had also positive impact on improving IYCF practices such as early initiation of breastfeeding, complementary feeding indicators especially minimum dietary diversity and minimum meal frequency and consumption of iron rich foods and good impact in improving access to protected water sources such as piped water and public tap. Besides, N@C had an impact on one domain of women's empowerment; gender, attitude and beliefs as measured in terms of perception of women against husbands' act of violence. However, N@C had no visible impacts on reducing the prevalence of stunting and anemia among children. It had also no impact in improving the nutritional status of pregnant women and reducing maternal anemia. Overall, there were improvements in the intervention woredas during the project period on many aspects but the trends were similar with the control woreda and therefore attribution of positive program effects is difficult.

In general, the results from the N@C impact evaluation will add evidence to other evaluations of integrated multisectoral nutrition programs. There were important child, maternal and household level benefits of this program, which may be achieved in other similar programs, and lessons learnt can be used to scale-up the existing project.

The major limitation of this endline survey was the lack of supporting qualitative information to interpret the quantitative results. In the future, project monitoring and evaluation (M & E) plans should include an integrated final project evaluation design that includes both qualitative and quantitative components. Besides, a number of NGOs have been working in the control woreda (Tach Gaynt) on nutrition and health. For instance, FH international (FHE) has been working since 2011 in Tach Gaynt on comprehensive essential nutrition actions, essential hygiene actions and community based maternal, neonatal and child care. The organization used mother to mother support group meetings to disseminate nutrition and health messages to the community. CARE FSF project has been also working in Tach Gaynt since 2013 and both SAA and VSLA approaches were functional in the woreda. The project follows standard VSLA (CARE VSLA Field operation manual) and SAA (CARE SAA minimum standard). Furthermore, our data showed that percentage of households which used to access their food from NGO food aid in the control woreda was much higher than households in the intervention woredas. We can therefore, conclude that the control group was not functioning as a valid comparator to the intervention woredas and might overshadowed the impact of N@C in the intervention woredas. M&E design of future programming should include a representative comparison group to evaluate the effectiveness of project activities for project beneficiaries and non-beneficiaries.

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Annexes

Annex 1. Sample size by age and woreda

Intervention Woreda	No of participants						
	(0-5)ms	(6-11)ms	(12-17)ms	(18-23)ms	(24-35)ms	Mother's Anemia	Child Anemia
Simada							
Achi Kidanemihret	10	5	5	5	5	7	10
Sergawit	8	4	4	4	4	6	8
Geda Eyesus	7	3	3	3	3	5	7
Dagala Godana	9	5	5	5	5	7	9
Kindo Meda	8	4	4	4	4	6	7
Kok Ber	6	3	3	3	3	5	6
Asefa Med	8	4	4	4	4	6	8
Sengola	10	5	5	5	5	7	10
Yeshenfo	7	4	4	4	4	5	7
Yekuas	12	6	6	6	6	9	11
Shasho Mariam	9	4	4	4	4	6	8
Ebinat							
Abajalie	9	4	4	4	4	6	8
Giman	13	7	7	7	7	10	13
Ankoha	9	4	4	4	4	6	8
Likuara	9	5	5	5	5	7	9
Gunaguna/Embachiko	13	6	6	6	6	10	12
Aje	12	6	6	6	6	9	12
Selamaya	13	6	6	6	6	9	12
shulugie	13	6	6	6	6	9	12
Tarsemba	9	4	4	4	4	7	9
Mechena	7	4	4	4	4	5	7
Bale Arb	13	6	6	6	6	9	12
Total	213	107	107	107	107	157	206
Control Woreda (Tach Gaynt)							
Anjet	15	8	8	8	8	11	15
Dajit	19	9	9	9	9	14	18
Bete Yohanis	20	10	10	10	10	15	19
Ansita	21	11	11	11	11	16	20
Akieto	19	9	9	9	9	14	18
Gedoda	20	10	10	10	10	15	19
Agat	34	17	17	17	17	25	33
Gomengie	19	10	10	10	10	14	19
Ephrata	21	11	11	11	11	16	20
Betelhem	25	13	13	13	13	19	24
	213	107	107	107	107	157	206

Annex 2. Definition of anthropometric measurements and hemoglobin cut-off points

a) WHZ: weight-for-height z-score measures body weight relative to height. It is normally used to indicate current nutritional status. Low WHZ helps identify “wasting” in children, an indicator of moderate to severe malnutrition resulting from actual weight loss or failure to gain weight. WHZ is also useful as a measure when ages are difficult to determine (Cogill, 2003).

b) HAZ: height-for-age z-score measures height relative to age. Low HAZ relative to a child of the same sex and age in the reference population is referred to as “stunting” (Cogill, 2003).

c) WAZ: weight-for-age z-score measures body weight relative to age. It is commonly used for growth monitoring and assessment of change in magnitude of malnutrition over time. Low WAZ relative to a child of the same sex and age in the reference population is referred to as “underweight” (Cogill, 2003).

1. Z-score

Z-scores express an anthropometric value as a number of standard deviation (SD) below or above the reference median value.

$$Z - score (or SD - score) = \frac{\text{observed value} - \text{median value of the reference population}}{\text{standard deviation value of reference population}}$$

2. Cut-off points

To assess anthropometric characteristics of a population, we need to set cut-off points for reported Z-scores. Z-score < -2SD is used to classify low weight-for-height (W/Z), low height-for-age (H/A), and low weight-for-age (W/A) as moderate to severe undernutrition. Similarly, the cut-off point of < -3SD is used to classify severe or chronic malnutrition.

3. Hemoglobin level determination

According to WHO, the cut-off value for anemia among pregnant women is 110 g/L (11.0 g/dl). Among non-pregnant women over 15 years of age, the cutoff value is 120 g/L (12.0 g/dl).

	Mild	Moderate	Severe
Pregnant	10-10.9	7-9.9	< 7.0
Non-Pregnant	11-11.9	8-10.9	< 8.0

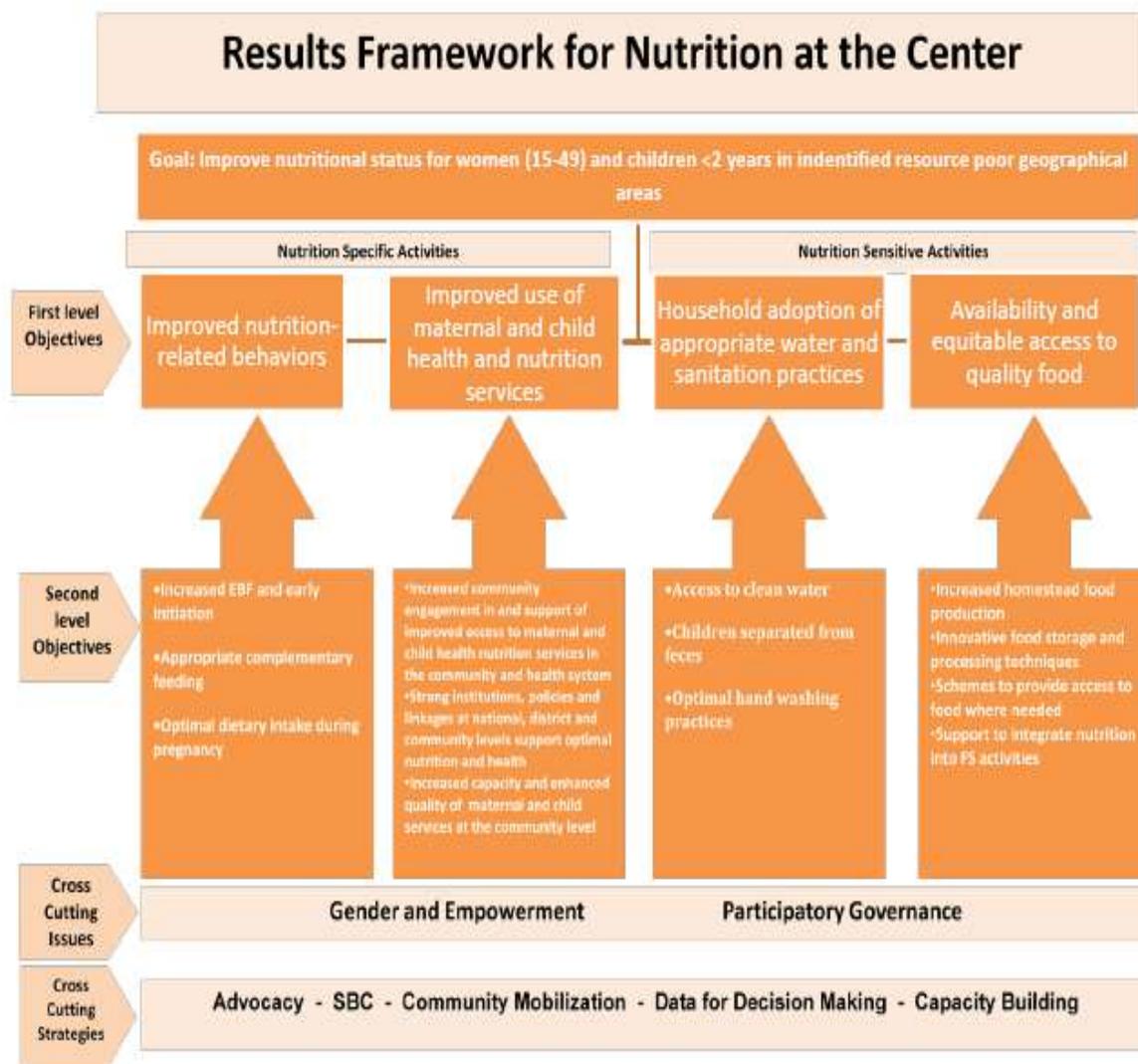
*The level of anemia termed “Mild” is still a serious condition given iron deficiency is already advanced by the time anemia is detected and deficiency have functional consequences even when anemia is not clinically apparent (WHO, 2001).

There is no WHO cut-off value for anemia among children younger than 6 months of age. For children between 6 and 59 months, children who have hemoglobin levels less than 110 g/L or (11.0 g/dl) are considered anemic. This value is based on data from older children and therefore may not accurately reflect appropriate hemoglobin levels in infants . Cut-off values of <105 g/L or (10.5 g/dl) at 4 and 6 months of age were used by a study of iron-replete breastfed infants (WHO. 2001).

4. Body Mass Index (BMI)

BMI is an index computed through a ratio of weight-for-height, and is often used to classify underweight, normal, and overweight. Underweight is defined as a BMI <18.50; normal is defined as a BMI of 18.50 - 24.99. BMI of 25-29.99 or above is classified as overweight, while BMI of 30 or higher is defined as obese (WHO, 2006)

Annex 3. Results framework for Nutrition at the Center(N@C)



Annex 4: Endline survey work schedule

No	Activities	Responsible person/body	Time Period, 2018							March 17-22	April 22-23
			Jan 15-19	Jan 21- 24	Jan 25-28	Feb 01- Feb 18	Feb 21- March 3	March 15-16			
1.	Contractual agreement	Consultant team and CARE-Ethiopia	X								
2.	Training of enumerators and supervisors	Consultant team		X							
3.	Pre-testing	Consultant team, Supervisors, enumerators			X						
4.	Data collection	Consultant team Supervisors enumerators				X					
5.	Data analysis and report writing	Consultant team					X				
6.	First draft report	Consultant team						X			
7.	Feedback on the report	CARE							X		
8.	Final report submission	Consultant team									X

Annex 5: Endline survey questionnaire

A. Household identification and summary

	AREA	CODE		RESPONSE
A1	Country	01=Benin 02=Ethiopia	03=Bangladesh 04=Zambia	_ _
A2	Region name: _____			CODE: _ _
A3	District name: _____			CODE: _ _
A4	Sub District name: _____			CODE: _ _
A6	Village name: _____			CODE: _ _
A7	Household number (1-XX)			_ _

Interview Information

A8	Date of interview	_ _	_ _	20 _ _
		dd	mm	yy

		INITIALS	STAFF CODE OR DATE
A9	Name of lead interviewer (3 Initials & code)		_ _
A10	Field supervisor review (3 initials & code)		_ _
A11	Survey Completed	01 = Yes 02 = No	

SCREENING QUESTION AND CONSENT

CONSENT	<p>Hello. My name is ___ and I work with LOCAL FIRM and a non-government organization. What is your name? Nice to meet you.</p> <p>Our team is in your village today and we would like to ask you questions from our survey. The information we collect will be used for planning, implementation and evaluation of a program. We are interviewing the mothers who have children less than 3 years of age. Do you have any children 3</p>
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	years of age or less?	
	SELECTED CHILD AGE	<input type="checkbox"/> 0 to <6 <input type="checkbox"/> 6 to <12 <input type="checkbox"/> 12 to <18 <input type="checkbox"/> 18 to <24 <input type="checkbox"/> 24 to <36

Record <u>time</u> the interview started in 24-hour format	HOUR	_ _
	MINUTES	_ _

CONSENT	<p>You have been selected at random to participate in this survey. We will be working with the Federal Ministry of Health to improve your health and well-being of as well as the health and well-being of your children and household. To do so, we would like to ask you questions about your household, agricultural practices, the types of food you have, food diversity gender and group participation. We would like to take height, weight and upper arm measurements from you; and length and weight measurement of one of the selected child (NAME THE CHILD) less than three years of age.</p> <p>[IF ANEMIA TESTING: We will also test you and children less than three years of age for anemia, or low iron in the blood by taking a small sample of blood (prick from finger or heel) and will conduct the test immediately in front of you and share the results. I will describe this more in-depth later.]</p> <p>Your answers will be kept confidential. We will not record any personal information which will be able to identify you with your responses. Please know, your participation is completely voluntary and you may choose not to participate at any time and to stop the survey at any time.</p> <p>Do you have any questions for me?</p>		
A12	Do you agree to participate in the survey? Enumerator: Is the respondent a mother of a child between the age of 0 and 36 months of age, AND does the respondent agree to participate in the survey?	01 = Yes 02 = No	If 02 → thank them for their time and END survey

B. Child Information

The information below is collected for the living child of the women being interviewed. This child should be less than three years of age: between 0 and 36 months of age.

NO.	QUESTIONS AND FILTERS	RESPONSE CODE	SKIP TO
B0	What is the name of your child? <i>Enumerator instruction: Identify the target child and write name</i>	_____	
B1	Is (child's name) male or female?	01=Male 02=Female	
B2	Does (child's name) have a health passport/child card/immunization card?	01= Yes 02=No	
B3	When is the child's birthdate (actual age of child)	Write birthdate 98 98 98 = don't know	_ _ _ _ 20 _ _ DD MM YY
B5	<i>Enumerator: VERIFY DO NOT READ</i> <i>How was (child's name) age verified?</i>	01=Yes, Health passport (or health card, other document) 02= Yes, Mother's recall 03 = Other document 04= N/A, Not verified, not applicable	
B4	How old is (child's name)? <i>NOTE: Write actual age of child</i> <i>(Refer to month conversion/seasonal or event calendar)</i>	Write age in <u>completed</u> months 00= Less than 30 days 98= Don't know	_ _

C. Mother's Information

INSTRUCTIONS: Ensure that this is administered to the biological mother of the target child identified (less than 36 months of age). If this mother was not the respondent to a previous module, re-introduce the survey and obtain verbal consent.

Read: I would like to start by asking you a couple questions about you and your children.

NO.	QUESTIONS AND FILTERS	RESPONSE CODE		SKIP TO
C1	What is your date of birth? <i>Respondent is not eligible if birthdate is before 1968 or after 2002</i>	Write birthdate 98 98 98 = don't know	_ _ _ _ 19 _ _ dd mm yy	
C2	How old are you? <i>ENUMERATOR: Verify the age at last birthday. Verify with C1</i>	Write age in years	_ _	If age <15 or >49 END SURVEY
C3	What is your current marital status?	01= Married (monogamous) 02= Married (polygamous) 03= Divorced or separated 04= Widowed 05= Single (Never married) 06= Cohabiting with partner (monogamous) 07= Cohabiting with partner (polygamous)		If 05, 06 or 07 → C5
C4	How old were you at the time of your first marriage?	Write age in years 98 for DK	_ _	
C5	Who is the head of your household?	01 = Male-headed household 02 = Female-headed household 03 = Joint (male and female) headed household		
C6	Have you ever received formal education (attend school)?	01= Yes 02= No		If 02→ C9
C7	Can you read this sentence to me? <i>Enumerator: Show respondent card with sentence on it. "I like to go to the</i>	01 = Cannot read at all 02 = Able to read only parts of sentence 03 = Able to read whole sentence		

	market.” <i>Circle response describing their reading ability</i>	04 = Not available in language 05 = Blind/visually impaired	
C8	Are you currently pregnant?	01= Yes 02= No 08 = Don't know	
C9	How many living children do you have?	Write in response 98= Don't know	_ _

D. Basic information of household characteristics

Read: Now I would like to ask you a few questions about your household and the type of things your household owns.

NO.	QUESTIONS AND FILTERS	RESPONSE CODE		SKIP TO
D1	In the last 3-years did your household participate or is currently participating in the productive safety net program (PSNP)?	01=Yes 02= No		
D2	Does your household own any farmland ?	01 = Yes 02 = No		
D3	Do you own your house?	01 = Yes 02 = No		
D4	Now, I'm going to ask you about farm animals . Does your household own any of the following?	a. Cattle b. Goat c. Sheep d. Chickens e. Pigs	Yes 1 1 1 1 1	No 2 2 2 2 2

		f. Horse	1	2	
		g. Donkey	1	2	
		h. Mule	1	2	
		i. Other	1	2	

D5	Do you keep any animals inside the house at night where you sleep (including pets)?	01= Yes 02=No			

Instructions: If you are not inside the household; ask the mother to visit the house (and see the interior and exterior).

D6	<u>Main</u> material of the floor. <i>Enumerator:</i> <i>Observe and record one response</i>	01= Earth/Sand/Animal dung 02= Bamboo 03= Stone/Brick 04= Cement 05= Tile 06= Vinyl strip 07= Other (specify)_____	
D7	<u>Main</u> material of the roof. <i>Enumerator:</i> <i>Observe and record one response</i>	01= Grass roof 02= Metal roof 03= Stone or tile roof 04= Plastic alone 05= Plastic plus grass 06= Asbestos 07= Other (specify)_____	
D8	<u>Main</u> material of the exterior walls.	01= Earth/Sand/Mud/Clay	

	<p><i>Enumerator:</i></p> <p><i>Observe and record one response</i></p>	<p>02= Bamboo, corn stalks</p> <p>03= Stone/ Fired Brick</p> <p>04= Cement</p> <p>05= Tile</p> <p>06= Vinyl strip</p> <p>07= Mud brick or wattle</p> <p>08= Other (specify)_____</p>		
D9	Where is cooking usually done?	<p>01= In a room used for living or sleeping</p> <p>02 = In a separate room in the same building used as a kitchen</p> <p>03= In a separate building used as kitchen</p> <p>04 = Outdoors</p> <p>05 = Other (specify): _____</p>		
D10	Do you have electricity, solar power or generator in your home?	<p>01 = Yes</p> <p>02 = No</p>		
			Yes	No

D11	Does your household own any of the following: <i>Read all responses, circle all that apply</i>	a. Bicycle	1	2	
		b. Radio	1	2	
		c. Bed	1	2	
		d. Mobile/other Telephone	1	2	
		e. Television	1	2	
		f. Refrigerator	1	2	
		g. Cart pulled by animal	1	2	
		h. Watch/Clock	1	2	
		i. Sewing Machine	1	2	
		j. Motorcycle	1	2	
		k. Car/Truck	1	2	
		l. Tractor	1	2	
		m. Small generator (for irrigation)	1	2	
		n. Other (specify)_____			

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP TO
E1	What are the main sources of household food that you consume? <i>Read all responses, circle all that apply</i>	a. Produce own food b. Purchase food c. Food for work d. Government food aid e. NGO food aid f. Trade/Borrow food g. Charity h. Other(specify):_____	

E2	Do you have a home/kitchen garden that you use to grow food for family or personal consumption?	01 = Yes 02 = No	
E3	What are the main uses of foods you PRODUCE in your home/kitchen garden? <i>Read all answers, circle all that apply</i>	a. Personal/Family Consumption b. Sale c. Barter trade d. Other (specify): _____	

E. Agriculture production, access to food

Read: This section asks about the household's production of food, access to land, and where you get the food you eat.

F. Food preservation and storage

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP TO
F1	In the last 12 months, did the household preserve any fruits and/or vegetables for use later in the year?	01= Yes 02= No	
F2	During the last post-harvest period, did the household store any food crops (cereals, legumes) that you grew?	01= Yes 02= No	If 02 →Module G
F3	What is the purpose of the crop(s) being stored? <i>Read all answers, circle all that apply</i>	a. Food for household consumption b. To sell for higher price c. Seed for planting d. Other (specify): _____	

G. Agriculture Extension

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP TO
G1	In the past 12 months, have you ever met, or been visited by an agricultural extension worker	01= Yes	

		02= No	
G2	In the past 12 months, have you ever met, or been visited by a livestock/fisheries extension worker	01= Yes 02= No	

H. Household Hunger Scale

NO.	QUESTION	RESPONSE CODES	SKIP TO
H1	In the past 4 weeks/30 days was there ever no food to eat of any kind in your house because of lack of resources to get food?	01 =Yes 02= No	If 02→I3
I2	How often did this happen in the past [4 weeks/30 days]?	01= Rarely (1-2 times) 02= Sometimes (3-10 times) 03= Often (more than 10 times)	
I3	In the past [4 weeks/30 days] did you or any household member (including children) go to sleep at night hungry because there was not enough food ?	01 =Yes 02= No	If 02→I5
I4	How often did this happen in the past [4 weeks/30 days]?	01= Rarely (1-2 times) 02= Sometimes (3-10 times) 03= Often (more than 10 times)	
I5	In the past [4 weeks/30 days] did you or any household member (including children) go a whole day without eating anything at all because there was not enough food ?	01 =Yes 02= No	If 02 →Module J
I6	How often did this happen in the past [4 weeks/30 days]?	01= Rarely (1-2 times) 02= Sometimes (3-10 times) 03= Often (more than 10 times)	

I. Women's Diet Diversity Score

READ: Now I would like to know about the kind of food you consume during a normal/typical day.

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP
J1	Was yesterday a special day of celebration or fasting? <i>Clarification special day includes: celebration, or feast day</i>	01 = Yes	If 02→J3

	<i>where you ate special foods or more food than normal. It also includes fasting day where you ate less than usual</i>	02 = No	
J2	How many days ago was a “normal” day where special kinds of foods were not eaten, or no one in the household ate more or less than usual or did not eat because of fasting?	Write number of days	__ __

READ: Please describe the foods (meals and snacks) and drinks that you took yesterday (or last “normal” day), both during the day and night, whether at home or outside the home. Let’s begin with the first thing you took in the morning and continue up to the late evening.

Enumerator instructions: When composite dishes (soup, stew) are mentioned, asked for the list of ingredients. When the respondent has finished, probe for meals and snacks not mentioned.

NO.	FOOD GROUP	EXAMPLES	RESPONSE CODES	
			Yes	No
J3	a. CEREALS	Corn/maize, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products...) (Injera (flat bread), Kolo (roasted cereals), bread	1	2
	b. VITAMIN A RICH VEGETABLES AND TUBERS	Pumpkin, carrot, squash or sweet potatoes that are orange inside. (e.g. kale, cabbage, sweet pepper)	1	2
	c. WHITE ROOTS AND TUBERS	White potatoes, white cassava, other foods made from roots (e.g. other options)	1	2
	d. DARK GREEN LEAFY VEGETABLES	Dark green/leafy vegetables including wild ones + locally available vitamin A rich leaves such as cassava leaves, local cabbage, kale, spinach	1	2
	e. OTHER VEGETABLES	Other vegetables (e.g. tomato, onion), including wild vegetables	1	2
	f. VITAMIN A RICH FRUITS	Ripe mangoes, apricots (fresh or dried), ripe papaya, dried peaches, other locally available vitamin A rich fruits	1	2
	g. OTHER FRUITS	Other fruits, including wild fruits	1	2
	h. ORGAN MEAT	Liver, kidney, heart or other organ meats or blood-based foods	1	2
	i. FLESH MEATS	Beef, pork, lamb, goat, wild game, chicken, or other birds	1	2
	j. EGGS	Chicken, duck, guinea fowl or any other egg	1	2

	k. FISH	Fresh, dried fish, shellfish or small, dried fish	1	2
	l. PULSES (beans, peas lentils etc)	Beans, peas, chick peas, lentils, soybean cowpea etc or foods made from these	1	2
	m. NUTS & SEEDS	Nuts, seeds or foods made from these	1	2
	n. MILK AND MILK PRODUCTS	Milk, cheese, yogurt, skimmed milk or other milk products	1	2
	o. OILS AND FATS	Oil, fats or butter added to food or used for cooking	1	2
	p. SUGARY Foods or SWEETENED BEVERAGES	Sugar, honey, sweetened soda, sweetened juice or sugary foods such as chocolates, candies, cookies, pastries, cakes and biscuits		2
	q. Ready-made Snacks	High fat, pre-packaged foods, typically eaten between meals	1	2
	r. SPICES, CONDIMENTS & SEASONINGS	Spices (black pepper, salt), condiments (soy sauce, hot sauce), fish powder etc	1	2
	s. OTHER BEVERAGES & FOODS	Coffee, tea, alcohol beverages, areke (local alcohol), local beer (<i>Tela</i> or <i>Korefe</i>) clear broth, foods such as pickles and olives etc or any other local examples	1	2

J. Maternal health/pregnancy

Read: Now, I have several questions about your last (most recent) pregnancy.

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP TO
K1	During your last pregnancy, did you attend antenatal care (ANC) or pre-baby care?	01= Yes 02= No	If 02→K4
K2	How many times did you attend ANC?	01= One time 02= Two times 03= Three times 04= Four times (or more) 08= Don't know, don't remember	

K3	During your last pregnancy, did you take any iron tablets? (list the local brand name, show example of iron tablet)	01= Yes 02= No 08= Don't Know	If 02→K5
K4	During your last pregnancy, how long did you take iron tablets?(describe local name, show example of iron tablet)	01= Less than 30 Days 02= 30 to 59 Days 03= 60 to 89 04= 90 Days or more 08= Don't know	
K5	After your last <u>delivery</u> , did you attend post-natal care (PNC) (after baby care)?	01= Yes 02= No	If 02→ Module L
K6	How many days <u>after your last delivery</u> did you attend PNC care?	Write number of days _ _ 98 = Don't know	

K. Infant and Young Child Feeding Practices (IYCF)

<i>Instructions and verification: Copy the child's name. Verify the date of birth from Module B.</i>		
NO.	QUESTIONS AND FILTERS	RESPONSE CODES
L1	Copy the name of child from Module B	
L2	Age of child in months (copy from B4)	_ _

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	RESPONSE	SKIP TO
L3	Did you ever breastfeed CHILD'S NAME?	01= Yes 02= No		If 02→L5
L4	How soon after birth did you first put (CHILD'S NAME) to your breast?	01= Immediately 02= In less than one hour		

		03= One hour to less than 24 hours 04= One day (24 hours or more) 08= Don't know	
L5	Yesterday , did you breastfeed CHILD'S NAME during the day and night?	01= Yes 02= No 08= Don't Know	

Read: I would like to ask you some questions about how you have been feeding CHILD'S NAME from birth until now.

NO.	QUESTION	CODING CATEGORY	RESPONSE	SKIP TO
L10	During the last 24 hours (day or at night), did (CHILD'S NAME) receive any of the following? <i>Ask about every liquid. If the mother responds 'yes' circle '1'. If the child did not take the item, circle '2'. For questions b, c or g; if the mother says 'yes' write number of times the infant was given the liquid in the last 24 hours</i>	Yes No	If 01=Yes, write number of times 98= Don't know	
	a. plain water	1 2		
	b. infant formula (NIDO, S26, NAN (WRITE LOCAL BRAND NAME) (if yes, write number of times)	1 2		
	c. Cow's/goat's/sheep's milk, tinned, or powdered milk, fresh milk, ultra high temperature (UHT)(WRITE LOCAL BRAND NAME – like mama, family) (if yes, write number of times)	1 2		
	d. Fruit juice or juice drinks	1 2		
	e. Broth (chicken soup, vegetable soup bean soup etc)	1		

		2		
f.	Other water-based liquids (e.g. Soft drinks like Pepsi, Coca Cola, Sprite, Fanta)	1 2		
g.	Sour milk or yogurt or skimmed milk, curd <i>(if yes, write number of times)</i>	1 2		
h.	Thin porridge (cannot pick with hands)	1 2		
i.	Any other liquid (write liquid below)	1 2		

L10. Read: I would like to ask you about **liquids** that CHILD'S NAME may have had yesterday during the day and at night.

L11: Read: Now I would like to ask you about any **foods** CHILD'S NAME had yesterday (24 hours). I am interested in whether your child had the item even if it was combined with other foods, any snacks whether at home or outside the home. Please begin when (CHILD NAME) first woke up yesterday. Did (CHILD NAME) eat anything at that time?

Interviewer instructions: This is free recall from the first food item. Please underline the food name that has been consumed, and tally after the mother has finished listing the food. If there are columns with no underlines check question L12

a. Think about when (CHILD NAME) first woke up yesterday. Did (CHILD NAME) eat anything at that time?

If yes: Please tell me everything (CHILD NAME) ate at that time. Underline each food group
Probe: anything else? Until respondent says nothing else

If no: continue to Question b).

b. What did (CHILD NAME) do after that? Did (CHILD NAME) eat anything at that time?

If yes: Please tell me everything (CHILD NAME) ate at that time. *Probe:* Anything else? Until respondent says nothing else.

Repeat Question b) above until respondent says the child went to sleep until the next day

If respondent mentions mixed dishes (e.g. porridge, sauce or stew) *Probe:* What ingredients were in

that (Mixed dish)? Probe: anything else? until respondent says nothing else.

As the respondent recalls foods, underline the corresponding food and write “1” in the column next to the food group. If the food is not listed in any of the food groups below, write the food in the box labeled ‘other foods’. If foods are used in small amounts for seasoning or as a condiment, include them under the condiments food group.

When the mother has completed recalling what the child ate yesterday, review the food groups listed below. If there is a food group with no food underlined, say to the mother: ‘I know you have told me everything that [NAME] ate yesterday, but just to be certain we haven’t missed anything, I’d like to read you a list of foods. Please tell me if [NAME] had any of the foods I’ll mention

L11	Food Group	Example	Yes	No	DK
	a.CEREALS (GRAINS)	bread, rice, biscuits, or other foods made from millet, sorghum, maize, rice, wheat or grain (Injera (flat bread), Kolo (roasted cereals),	1	2	8
	b.VITAMIN A RICH VEG & TUBERS	pumpkin, carrots, sweet potatoes, squash and other locally available vitamin-A rich vegetables that are yellow or orange inside	1	2	8
	c.WHITE TUBERS & ROOTS	White potatoes, cassava or foods made from roots	1	2	8
	d.DARK GREEN LEAFY VEG	dark green/leafy vegetables locally available vitamin-A rich leaves, for example pumpkin leaves, kale etc.	1	2	8
	e.OTHER VEGETABLES	other vegetables (e.g. tomatoes, cabbage etc.)	1	2	8
	f.VITAMIN A RICH FRUITS	fruits rich in vitamin A (e.g. ripe mangoes, papaya)	1	2	8
	g.OTHER FRUITS	other fruits including guava, pineapple, watermelon, melon, orange, apple, grape, banana, jackfruit or other local fruits	1	2	8
	h.ORGAN MEAT (IRON-RICH)	liver, kidney, heart or other organ meats	1	2	8
	i.FLESH MEATS	Beef, pork, lamb (mutton), goat, wild game, chicken, or other birds	1	2	8
	j.EGGS	Egg	1	2	8
	k.FISH	fresh or dried fish or shellfish	1	2	8
	l.PULSES (beans, peas	Beans, peas, chick peas lentils, cowpea, soybean or	1	2	8

	lentils etc)	foods made from these			
	m. NUTS & SEEDS	Nuts, seeds or foods made from these			
	n.MILK PRODUCTS	Milk (animal milk, tinned or powdered milk), cheese, yogurt or skimmed milk or other milk products	1	2	8
	o.OILS AND FATS	Oil, fats or butter or foods made with any of these	1	2	8
	p. SUGAR SWEETENED BEVERAGES	Sugar, honey, sweetened soda, sweetened juice or sugary foods such as chocolates, candies, cookies, pastries, cakes and biscuits	1	2	8
	q.READY-MADE SNACKS	High fat, salty, pre-packaged foods, typically eaten between meals as convenience	1	2	8
	r.OTHER FORTIFIED FOODS	Specially fortified foods (e.g. Corn soya blend (CSB) foods fortified with micronutrient powder , plumpy nut, other Ready-to-Use Therapeutic Foods or lipid-based nutrient supplements?	1	2	8
	s.SPICES, CONDIMENTS, & SEASONINGS	Spices (black pepper, salt), condiments (soy sauce, hot sauce) fish powder or any other local examples	1	2	8
	t. Other foods and Beverages	Coffee, tea, alcohol beverages, areke (local alcohol), local beer (<i>Tela</i> or <i>Korefe</i>) clear broth, foods such as pickles and olives etc or any other local examples	1	2	8
	Check categories a-r		IF ALL 'NO' → L12 IF AT <u>LEAST</u> ONE 'YES' or ALL 'DK' → L13		

NO.	QUESTION	CODING CATEGORY	RESPONSE	SKIP TO
L12	CHECKER FOR L11, if MOTHER SAID ALL '02' = NO	01= Yes <i>If yes repeat L11 and underline food</i>		If 02 or 08 → L14

	<p>Did CHILD'S NAME eat any solid, semi-solid, or soft foods yesterday during the day or night?</p> <p>By that I mean were any of these foods thick enough that you could have picked them up with your fingers and fed them by hand?</p>	<p><i>groups in L11. Continue to L13.</i></p> <p>02= No</p> <p>08 = Don't know</p>		
L13	<p>How many times did CHILD'S NAME eat solid, semi-solid or soft foods other than liquids yesterday during the day or night?</p>	<p>Write number of times</p> <p>98 = Don't know</p>	_ _	
L14	<p>Did CHILD'S NAME drink anything from a bottle or nipple yesterday during the day or night?</p>	<p>01= Yes</p> <p>02= No</p> <p>08= Don't know</p>		
L15	<p>Yesterday, during the day or night, did CHILD'S NAME eat any iron fortified formula? (<i>example: locally available fortified formula</i>)</p>	<p>01= Yes</p> <p>02= No</p> <p>08= Don't know</p>		
L16	<p>Yesterday, during the day or night, did CHILD'S NAME eat any iron fortified food baby foods (<i>example local baby foods</i>)</p>	<p>01= Yes</p> <p>02= No</p> <p>08= Don't know</p>		

L. Drinking water

Read: Great, thank you. I have some questions about your household water sources and sanitation.

NO.	QUESTIONS AND FILTERS	CODE	RESPONSE	SKIP
O1	<p>What is the primary source of drinking water for members of your household?</p> <p>Do not Read</p> <p>Circle all that apply</p>	<p>01 = Piped water into dwelling</p> <p>02 = Piped water into yard/plot</p> <p>03 = Public tap/standpipe</p> <p>04 = Tube-well/borehole</p> <p>05 = Protected dug well</p> <p>06 = Protected spring</p> <p>07 = Bottled water</p> <p>08 = Unprotected dug well</p> <p>09 = Unprotected spring</p> <p>10 = Cart with small tank/drum</p> <p>11 = Tanker truck</p> <p>12 = Surface water (river, dam, lake, pond, stream, canal, irrigation channels)</p> <p>13 = Rainwater collection</p> <p>14 = Other (specify)_____</p>		If 01 → O2
O2	<p>How long does it take to go there, get water and come back?</p> <p>Enumerator instructions: Only include time to get to water source and back. Do not include socializing or other errands</p>	<p>Write number of minutes</p> <p>480= 480 minutes or more (8+ hours)</p> <p>98= Don't know</p>	<p> _ _ _ </p>	
O3	<p>Do you treat your water in any way to make it safer to drink?</p>	<p>01= Yes</p> <p>02= No</p> <p>08= Don't know</p>		
O4	<p>What do you usually do to the water</p>	<p>a. Boil water</p>		

	<p>to make it safer to drink?</p> <p>Do not read</p> <p>circle all that apply</p>	<p>b. Add bleach/chlorine</p> <p>c. Strain it through a cloth</p> <p>d. Use water filter (ceramic/sand/composite/etc)</p> <p>e. Solar disinfection</p> <p>f. Let it stand and settle</p> <p>g. Use purifying tablets</p> <p>h. Other (Specify) _____</p> <p>i. Don't know</p>	
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M. Hand washing, sanitation and disposal of child's feces

Hand Washing

NO.	QUESTIONS AND FILTERS	CODE RESPONSE	SKIP
P1	<p>When do you usually wash your hands?</p> <p><i>(Do not read responses. Allow respondent to answer first, and then ask how often by probing, with never, always or sometimes. If respondent does not mention an activity, such as "before eating", circle 01 for Never.)</i></p>		
	a. before eating	<p>01= Never</p> <p>02= Always</p> <p>03= Sometimes</p>	
	b. before preparing food	<p>01= Never</p> <p>02= Always</p> <p>03= Sometimes</p>	
	c. before feeding the child	<p>01= Never</p> <p>02= Always</p> <p>03= Sometimes</p>	
	d. after toilet use	<p>01= Never</p> <p>02= Always</p>	

		03= Sometimes	
	e. after changing a baby	01= Never 02= Always 03= Sometimes	
	f. other	01= Never 02= Always 03= Sometimes	

Observation section:

Read: I'd like you to please show me where you store your drinking water, and also where you most often wash your hands.

NO.	QUESTIONS AND FILTERS	CODE/RESPONSE	SKIP TO
P2	<p>Thanks, can you show me where you most often wash your hands?</p> <p><i>(Ask to see and observe. Record only one hand washing place. This is the hand washing place that is used most often by the respondent or household.)</i></p>	<p>01 = Inside/within 10 paces of the toilet facility</p> <p>02= Inside/within 10 paces of the kitchen/cooking place</p> <p>03= Elsewhere in home or yard</p> <p>04= Outside yard</p> <p>05= No specific place</p> <p>06= No permission to see</p>	If 5 or 6 → P8
P3	<p>OBSERVE: <i>Is water present at the specific place for hand washing?</i></p> <p><i>Enumerator: If there is a tap or pump present at the specific place for hand washing, open the tap or operate the pump to see if water is coming out. If there is a bucket, basin, or other type of water container, examine it to see whether water is present in the container. Record observation.</i></p>	<p>01 = Yes (Water is available)</p> <p>02 = No (Water is not available)</p>	

P4	OBSERVE: Is soap or detergent present at the specific place for hand washing? <i>Enumerator: record observation. Circle all that apply.</i>	a. Bar soap b. Detergent (powder/liquid/paste) c. Liquid soap (including shampoo) d. None	If 'a, b, c' → P8
P5	OBSERVE: Is locally sourced cleansing agent present at the specific place for hand washing? <i>Enumerator: Record observation. Circle all that apply.</i>	a. Ash b. Mud/sand c. None d. Other (specify)_____	If 'a, b, c' → P8
P6	Do you have soap/local sourced cleansing agent in your house?	01= Yes 02= No 08= Don't know; N/A	If 02 or 08 →P8
P7	Can I please see your soap/locally sourced cleansing agent? <i>Circle all that apply.</i>	a. Soap/detergent present b. Ash present c. Mud/sand d. None available	

P8	What kind of toilet facility do members of your household <u>usually</u> use? Do not Read	= Flush/pour flush to piped sewer system = Flush/pour flush to septic tank = Flush/pour flush to pit latrine = Ventilated improved pit latrine (VIP) = Pit Latrine with slab = Composting toilet = Flush/pour flush to elsewhere/DK = Pit latrine without slab/open pit = Bucket 10 = Hanging toilet/hanging latrine	
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		11 = No facilities/bush/field (open defecation) 12 = Other (specify) _____	
P9	The last time (child name) passed stool, where did he/she defecate?	01= Used potty 02= Used washable diaper 03= Used disposable diaper 04= Used latrine 05= Went in his/her clothes 06= Went in house 07= Went outside of house/yard 08 =Don't know	If 07, →Module Q

NO.	QUESTIONS AND FILTERS	RESPONSE CODES	SKIP TO
Q1	In your household who usually makes decisions about own <u>health care</u> ?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
Q2	In your household who usually makes decisions about <u>your child's health</u> ?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	

Q3	<p>In your household who usually makes decisions about <u>large household purchases</u>?</p> <p><i>Probe: (give local examples of large purchases)</i></p>	<p>01= You (respondent)</p> <p>02= Your husband</p> <p>03= Both you & your husband</p> <p>04= Mother/Father In-law</p> <p>05= Mother/Father</p> <p>06= Other (specify)_____</p>	
Q4	<p>In your household who usually makes decisions about <u>household purchases for daily needs</u>?</p>	<p>01= You (respondent)</p> <p>02= Your husband</p> <p>03= Both you and your husband</p> <p>04= Mother/Father In-law</p> <p>05= Mother/Father</p> <p>06= Other (specify)_____</p>	
Q5	<p>In your household who usually decides <u>when you visit family/relatives or friends</u>?</p>	<p>01= You (respondent)</p> <p>02= Your husband</p> <p>03= Both you & your husband</p> <p>04= Mother/Father In-law</p> <p>05= Mother/Father</p> <p>06= Other (specify)_____</p>	
Q6	<p>In your household who usually decides <u>when your whole household will visit family/relatives/friends</u></p>	<p>01= You (respondent)</p> <p>02= Your husband</p> <p>03= Both you & your husband</p> <p>04= Mother/Father In-law</p> <p>05= Mother/Father</p> <p>06= Other (specify)_____</p>	
Q7	<p>In your household who usually decides <u>how to use money that you</u> bring into the household?</p>	<p>01= You (respondent)</p> <p>02= Your husband</p>	

		03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
Q8	In your household who usually decides how to use the <u>money your husband</u> brings into the household?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
Q9	In your household who usually decides when your family will sell a <u>large asset</u> (like a cow, sheep, goat)?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
Q10	In your household who usually decides when your family will sell a <u>small asset</u> (like a chicken)?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
Q11	In your household, who usually decides <u>whether you can work to earn money?</u>	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law	

		05= Mother/Father 06= Other (specify)_____	
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N.Women's Empowerment

Household Decision-making

Read: Now, I would now like to ask you about who usually makes decisions in your household.

Q12	If there is not enough food in the household, who decides <u>how food is shared</u> among family members?	01= You (respondent) 02= Your husband 03= Both you & your husband 04= Mother/Father In-law 05= Mother/Father 06= Other (specify)_____	
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Gender Attitude and Belief: Tolerance of Intimate Partner Violence

Read: Sometimes a husband is angry with his wife. In your opinion, is a husband justified in hitting his wife in the following situations

No.	QUESTIONS AND FILTERS	RESPONSE CODES		SKIP
		Yes	No	
Q30	Is he justified in hitting his wife, if she goes out without telling him?	1	2	
Q31	Is he justified in hitting his wife, if she neglects their children?	1	2	
Q32	Is he justified in hitting his wife, if she argues with him?	1	2	
Q33	Is he justified in hitting his wife, if she refuses to have sex with him?	1	2	
Q34	Is he justified in hitting his wife, if she did not cook the food properly?	1	2	

O. Program participation

No.	QUESTIONS AND FILTERS	RESPONSE CODES		SKIP
		Yes	No	
R1	Have you participated in Mother to Mother Support Group meetings?	1	2	
R2	If yes how frequently	Sometimes1	Frequently2	Always3
R3	Have you participated in VSLA Group meetings?	1	2	
R4	If yes how frequently	Sometimes1	Frequently2	Always3
R5	Have you participated in SAA meetings?	1	2	
R6	If yes how frequently	Sometimes1	Frequently2	Always3
R7	Have you received Tippy tap or training on the use of Tippy Tap from N@C program?	1	2	

Record <u>time</u> the interview ended in 24 hour format	HOUR	_ _
	MINUTES	_ _

READ: Thank you for your time and participation. This concludes the household survey part. Next, we will take the height, weight and arm measurements of your and child under three.

MEASUREMENTS FOR MOTHER				
NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	RESPONSE	SKIP TO
S1	Mother's Age	Copy from Page 5 C1	_ _	
S2	Pregnancy status	01= Pregnant 02= Not pregnant <i>but</i> lactating 03= Pregnant <i>and</i> Lactating 03= Not Pregnant and <i>not</i> lactating		If 01 → S5
S3	Mother's height in centimeters	Write in measurement (centimeters) 988.8 = Don't know	_ _ _ . _ cm	
S4	Weight of Mother	Write in measurement (kilograms) 988.8 = Don't know	_ _ _ _ . _ kg	
S5	MUAC Measurement	Write in measurement (centimeters) 98.8 = Don't know	_ _ . _ cm	

P. Mothers' Anthropometry (Part I)

Read: Now I would like to take your height and weight measurements.

Q. Child's Anthropometry (6-35) months (Part I)

Read: Now I would now like to take length and weight of child's name.

NO.	QUESTIONS	CODING CATEGORIES	RESPONSE	SKIP TO
Z1a.	Child's Date of Birth	Copy from Module B 98 98 98 = don't know	_ _ _ _ _ _ 20 _ _ _ dd mm yy	
Z2	Childs age in Months	Copy from Module B	_ _ _ months	

				survey
Z8	Hemoglobin (Finger prick sample)	Record reading 98.8= DK/Test error	_ _ . _ g/dL	
<p>READ: Thank you for participation. Do you have any final questions? Have a good day.</p>				