

**Nutrition at the Center (N@C) Project in Chadiza and Lundazi Districts of Eastern
Province**

Care International in Zambia

Endline Evaluation Report

Draft 1.1

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DECLARATION

We have taken care to faithfully reflect the views and perceptions of the evaluation as shared by the respondents and to ensure that the information is accurately reported. We, however, take full responsibility for any errors or omissions. The analysis and conclusions in this report are those of the evaluation team and should not be taken to represent the official positions of CARE Zambia or any other stakeholders.

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EXECUTIVE SUMMARY

From 2013 to 2017 CARE International in Zambia implemented the Nutrition at the Center (N@C) Project in 22 health facilities of Lundazi and Chadiza Districts of Eastern Zambia (15 in Lundazi and 7 in Chadiza district). The impact indicator of the N@C Project was pegged at improving the nutritional status of women (15-49 years) and children whose age was below 3 years old with a focus on reducing stunting generally. During the 4 years of project implementation, a number of activities were successfully implemented; as a result, CARE Zambia decided to institute an endline evaluation whose focus was to assess achievements on several nutrition and general indicators including infant and young child feeding (IYCF), maternal health and nutrition, food security, women empowerment, water, sanitation and hygiene (WASH), and program participation. The current evaluation also aimed at determining perceived or actual weaknesses and strengths of the N@C project as well as document lessons learned to inform future nutrition programming.

Data was collected from 41 health facilities out of the 46 targeted in Chadiza and Lundazi districts. A structured household questionnaire was used to collect data from women who had children below the age of 3 years in both intervention and non-intervention areas. Of the targeted 1266 women, 1195 were successfully interviewed representing a response rate of 94.4 percent. Four focus group discussions and 12 key informant interviews were also conducted.

Findings and discussion

Most households (84 percent) in intervention sites produced their own food. The N@C project did not only introduce women to growing new crops but also assisted in diversifying diets and enabled women on planning for crop storage and preservation of fruits and vegetables. The N@C project led to a paradigm shift where household nutrition status preceded the desire to earn income. In intervention sites, preservation of fruits and vegetables increased by 9.7 percent, while storage of food crops reduced by 6.8 percent. There was a reduction in the percentage of women who owned home/kitchen gardens in both the control and intervention sites (-20.3 percent and -15.1 percent respectively) largely due to lack of access to water sources for irrigation. Results also indicate a reduction in the percentage of food secure households (little or no hunger in households) at endline evaluation compared to baseline evaluation (8.6 percent). This could be associated with the lean period “hunger months”, December until March in which the endline evaluation was conducted compared to the baseline evaluation conducted in June to July (harvest period).

Findings further show that most women in both intervention and control sites were not consuming foods from five or more groups, implying that women were generally not meeting their micronutrient needs. However, there were more women consuming foods from five or more groups in the intervention sites compared to women in the control sites (D-in-D=6.9 percent).

The nutritional status of mothers was part of the evaluation indicators measured under this process and, overall there was an improvement in the mean BMI for both intervention and control sites, although the increase was higher in intervention sites. However, there was a reduction in the percentage of women with normal BMI at endline evaluation in both the intervention and control sites. In addition, more women in the control sites became more overweight (D-in-D=-4.1 percent) while those in intervention sites became more obese (D-in-D=2.4 percent). IYCF indicators show a reduction in the percentage of children who were fed according to the World Health Organisation (WHO) IYCF practices such as the minimum dietary diversity score (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD) in both control and intervention sites. On child nutritional status, results show an 11.7 percentage points reduction in stunting among children aged 6-35 months in the intervention sites. However, more children were underweight at endline compared to baseline evaluation for both intervention and control sites. On the other hand, wasting was also higher among children in intervention sites compared to children in control sites. The prevalence of weight-for-height z-scores (WHZ) was 4.4 percent and 4.2 percent at endline evaluation for intervention and control sites respectively compared to 4.1 percent and 3.9 percent at baseline.

More than 90 percent of women attended ANC at endline evaluation in both intervention (98.7 percent) and control sites (99 percent). More than half of women in the intervention (52.8 percent) and control sites (54.4 percent) had their first antenatal care (ANC) during the first trimester. These findings were higher compared to the 2013-14 Zambia Demographic and Health Survey (ZDHS) where only 1.4 percent of women attended their first ANC in the first trimester. However, results also show a reduction in women attending 4 or more ANC visits compared to the baseline evaluation. Further, the evaluation found that almost all women (96.8 percent) took iron tablets; these results are similar to the 2013-14 ZDHS results where 95.4 percent of women took iron tablets or syrup during pregnancy.

There was a 22.8 percentage point increase in households in intervention sites with access to protected water sources at endline compared to the baseline (from 59.2 percent to 82 percent). This increase could be attributed to the N@C project sensitization activities. There was also an increase in the percentage of households who treated drinking water in intervention sites at endline (35.1 percent) compared to the baseline evaluation (18 percent). Boiling water and use of chlorine were the most common methods applied to make water safe to drink. In addition, more than half of women in intervention sites indicated that they washed their hands at critical times such as before eating, before preparing food, before feeding the baby, after changing baby clothes including diapers and after using the toilet. The N@C project interventions had great effect in the use of toilets or pit latrines; where a 16.3 percentage point reduction in households that practice open defecation in intervention sites was achieved.

Women empowerment issues were also part of this exercise; results show a reduction in the percentage of women who participated in decision making regarding health care, child's health, spending own money and how food is shared in the household in both control and intervention sites (compared to the baseline). However, in terms of program participation, findings indicate that few women attended meetings for the Nutrition Support Groups (NSG) (36.1 percent), Village Savings and Lending Association (VSLA) (14 percent) and Tippy Tap (WASH) (30.8 percent). Further, Social Action Analysis (SAA) meetings was also lowly attended (7 percent).

Conclusion

The goal of N@C project was to improve the nutritional status for women (15-49) and children less than 3 years of age in identified resource poor geographical areas of Lundazi and Chadiza districts of Zambia. The project collaborated and worked with other structures especially government in the fight against stunting among children below the age of 3 years. Although there were disparities in achievements, the N@C contributed quite significantly towards achievement of the goal and objectives of the intervention. Evidence presented in this report suggests that women's nutritional status has improved although with room for more improvement; nutrition related behavior also exhibited change although some IYCF indicators under performed. Findings have also shown improvement in the use of maternal and child health and nutrition services as well as an increase in households adopting appropriate water, and sanitation practices. Most importantly, the project contributed intensely to the impact indicator of reducing stunting among children aged 3 years and below.

This endline evaluation was designed to collect quantitative information on nutrition-related topics and to measure achievement/impact of the program. It was designed to measure nutrition-and related topics including: infant and young child feeding practices, food security, child nutritional status, maternal nutrition, WASH, and women's empowerment. This purpose has been achieved by this process. In addition, the current evaluation had two major objectives namely; 1. To provide an objective assessment of the achievements and results, weaknesses and strengths of the project and; 2. To document evidence, lessons learned and good practices to inform future nutrition programming. In view of the depth and detail of results and findings as well as discussions highlighted in this report, it is fair to state that the two objectives set for this evaluation have generally been achieved. It should be noted also that nutrition programs are a complex phenomenon in most of the rural areas of Zambia and require not only a concerted effort as exhibited through the N@C, but also ensure targeting includes both genders even when it is known that women are the real custodians of positive health outcomes at household level.

Recommendations

Based on the findings and lessons learnt from this evaluation, the following are the recommendations to guide future nutrition programming:

1. *IYCF practices and current nutritional status among children 0-36 months of age and among women of the reproductive age (WRA):* Despite having a reduction in stunting, findings have shown that stunting increased with increasing age of a child and that more males than females were stunted. Therefore, approaches to reducing stunting for children should focus on the first 1000 most critical days by: encouraging early initiation and exclusive breastfeeding and timely introduction of complementary feeding with appropriate MDD, MMF and MAD irrespective of child's sex, through promotion and consumption of cheap, easily accessible locally available foods.
2. *Household food security status:* The N@C project incorporated agricultural activities as a means to improve food availability and accessibility for diverse diets in households. Nevertheless, some households were food insecure, which calls for a need to promote not only dietary diversity but also higher productivity. This is because higher productivity will enable households store and preserve enough food, which will not only ensure food availability but also diversity throughout the year.
3. *Household WASH practices:* Increased access to improved drinking water, sanitary facilities and better hygiene practices is cardinal to reduce vector infectious diseases (such as diarrhea) that may cause children to be malnourished again if not well managed. As part of an exit strategy, CARE should liaise with the local authorities (councils) and leaders in these communities to ensure Community Led Total Sanitation (CLTS) Programs are scaled up so that intervention and control sites remain open defecation free zones if gains made by the N@C project are to be sustained. Further, EHTs should work with traditional leaders because they have a high level of legitimacy and command influence among their people and can institute punitive measures in cases where households default on WASH facilities and practices.
4. *Women's empowerment:* Discussions on women empowerment still attract misinterpretations among people especially in rural areas where women are taught to be submissive to their husbands. It is imperative for projects like N@C to deliberately involve men in selected discussions on women empowerment so that they are also able to understand the importance of joint decision making on household needs and its influence on child health and nutrition status as well as all household members.
5. *Evaluations:*
 - i. In future assessments, the timing of the evaluations (baseline and endline) need to be done during similar times as this will allow for effective comparisons of the changes that may have taken place as a result of the interventions. This is so because; nutritional indicators such as underweight are sensitive to slight changes in food availability and nutritional value of foods available at that particular time to both the mother and children. The increase in underweight children at endline evaluation may have been affected by the timing of the evaluation (December) which is a lean period when in essence, the baseline was conducted in (June/July) when people have quite a lot of food supplies.
 - ii. In future evaluations, the process needs to be sequential where qualitative data is preceded by quantitative data collection. After quantitative data is analysed, qualitative questions to give meaning to the findings should be generated. This approach will give a detailed account of what the actual practices might have been; what weaknesses were observed; what best practices can be adopted and what lessons can be carried forward.

LIST OF ACRONYMS

ANC	Antenatal Care
BL	Baseline evaluation
BMI	Body Mass Index
CLTS	Community Led Total Sanitation
CSO	Central Statistical Office
D-in-D	Difference-in-Differences
EHT	Environmental Health Technician
EL	Endline evaluation
FGD	Focus Group Discussion
FIES	Food Insecurity Experience Scale
IYCF	Infant and Young Child Feeding
IPT	Intermittent Preventive Treatment
N@C	Nutrition at the Center
HAZ	Height-for-Age
KI	Key Informant
KII	Key Informant Interview
PNC	Postnatal Care
PPI	Progress out of Poverty Index
LCMS	Living Conditions Monitoring Survey
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MDDS	Minimum Dietary Diversity Score
MMF	Minimum Meal Frequency
MNCH	Maternal and Child Health
MUAC	Middle Upper Arm Circumference
N@C	Nutrition at the Center
NFNC	National Food and Nutrition Commission
NSG	Nutrition Support Group
NSGL	Nutrition Support Group Leader
ODK	Open Data Kit
SAA	Social Action Analysis
SMAG	Safe Motherhood Action Group
SUN	Scaling Up Nutrition
VSLA	Village Savings and Loan Association
WASH	Water, Sanitation and Hygiene
WAZ	Weight-for-Age
WDDS	Women's Dietary Diversity Score
WHO	World Health Organisation
WHZ	Weight-for Height
WRA	Women of the Reproductive Age
ZDHS	Zambia Demographic and Health Survey

1. INTRODUCTION

Maternal and child malnutrition are global health problems, and continue to be leading causes of morbidity and mortality in developing countries like Zambia. Stunting and malnutrition affect young children and women, with most nutritionally vulnerable being pregnant and lactating women. Chronically malnourished children may face lifelong consequences such as reduced mental capacity, lower retention in school and reduced lifetime earnings.¹ Stunting, wasting and undernutrition amongst children and women are quite prominent in Zambia. Results of the 2013-14 Zambia Demographic and Health Survey (ZDHS) show that 40 percent of children below the age of five are stunted, while about 10 percent of women aged 15-49 are undernourished (Body Mass Index<18.5). The 2013-14 ZDHS also found that 82 percent of children aged 6-8 months (breastfed and non-breastfed) were introduced to complementary foods at an appropriate time, however; only 11 percent of these children are reported to be fed appropriately by Infant and Young Child Feeding (IYCF) practices. At the provincial level, the 2013-14 ZDHS report shows that in Eastern Province, 14.6 percent of children aged 6-23 months (breastfed and non-breastfed) have access to 4 and more food groups; 46.2 percent have access to the Minimum Meal Frequency (MMF), and only about 9 percent had access to three IYCF standard practices. In the same vein, it has been found that not only are there inappropriate feeding practices, but also that these practices deprive children of the much needed micronutrient and mineral requirements for healthy growth.

Malnutrition among women and children in Zambia is further exacerbated by high prevalence of poverty manifested through hunger. It is a known fact that poor people are neither able to grow enough food for household consumption nor have resources to enable them buy enough food for their families (NFSNP 2011-2015). In an effort to curb malnutrition, Zambia has put in place policies and programmes aiming, not only to contribute to food security, but also quality provision of nutritious food and availability for children and mothers. Among such policies and programmes include; the National Food and Nutrition Policy (NFNP) of 2006, the National Food and Nutrition Strategic Plan (NFNSP) 2011-2015 and the First 1000 Most Critical Days Programme (FMCDP).

In order to strengthen further these efforts, Zambia also joined the Global initiative to Scale Up Nutrition (SUN) movement (SUN Movement Compendium 2014-Zambia). Priorities to support the SUN movement in Zambia include, among others addressing reducing stunting levels holistically and in a multi-sectorial approach, nutrition-sensitive programs have been highlighted as novel and promising for delivering nutrition-specific interventions, aimed at addressing more immediate determinants of nutrition². Building on this evidence, the Scaling-Up Nutrition program (under the United Nations) was designed to deal with nutrition specific interventions with heightened complementary strategies addressing issues on gender inequality, food and nutrition security, social protection, and access to safe water³.

In line with the forgoing, CARE International in Zambia implemented the Nutrition at the Center (N@C) Project in Chadiza and Lundazi districts of Eastern Province aimed at improving the nutritional status of women (15-49 years) and children below the age of 3 years. The N@C project was a recent addition to the many nutrition intervention programs undertaken by CARE. This program was spearheaded through a funding opportunity from the Sall Family Foundation. CARE therefore implemented a 4 country, 5 year integrated Nutrition program dubbed “Nutrition at the Center” (N@C) since April 2013, and Zambia was privileged to be one of the recipient countries. The N@C project combined best practices together with specific needs to implement and evaluate an integrated approach to maternal and child nutrition. Using health facilities as entrants in Chadiza and Lundazi districts, the N@C project had been working in 22 health

¹ World Health Organization, Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition. 2013

² Robert Black, Maternal and child undernutrition: global and regional exposures and health consequences. Lancet, 2008

³ Noreen Mucha, Implementing Nutrition-Sensitive Development: Reaching Consensus. November 2012

facilities (15 in Lundazi and 7 in Chadiza district). The following activities were implemented during the project life: IYCF and maternal nutrition practices; food security; water, sanitation and hygiene (WASH) practices; women's empowerment and maternal health. These activities were theorised to yield significant sustainable impact for families and communities and validate the effectiveness of CARE's women and community-centred programmatic approach in nutrition and specifically that of women and children.

1.1. N@C Project Goals and Objectives

The goal of N@C project was to improve the nutritional status for women (15-49) and children less than 3 years of age in Chadiza and Lundazi districts, identified as resource poor geographical areas. The N@C project therefore aimed at achieving the following objectives:

- i. Improve nutrition-related behaviors
- ii. Improve use of maternal and child health and nutrition services
- iii. Increase household adoption of appropriate water and sanitation practices
- iv. Increase availability and equitable access to quality food

The impact indicator N@C project aimed at achieving was: ***reduction of stunting among children under age 3 in Chadiza and Lundazi districts of Eastern Province of Zambia***

1.2. Goal and Objectives of the Endline Evaluation

The endline evaluation was designed to collect quantitative information on nutrition-related topics so as to measure achievements/impact of the program interventions.

1.2.1. General objectives

- i. To provide an objective assessment of the achievements and results, weaknesses and strengths of the project; and
- ii. To document evidence, lessons learned and good practices to inform future nutrition programming.

In order to address the general objectives of the N@C Project endline evaluation, the specific objectives of the assignment were;

- i. To assess the nutrition status and nutrition-related behaviors of mothers (15-49 years old) and children (< 3 years);
- ii. To investigate the utilization of maternal and child health and nutrition services among women of reproductive age in the two districts;
- iii. To investigate availability and (equitable) access to quality food among women and children in the two districts;
- iv. To investigate water usage and sanitation practices in households in the two districts;
- v. To explore the capacity of the Ministry of Agriculture (MoA) and Ministry of Health (MoH) in implementing nutrition programmes in Chadiza and Lundazi districts, and
- vi. To document lessons learned to inform future nutrition programming.

2. EVALUATION METHODOLOGY

2.1. Study Design

The evaluation adopted a pre-post study design. A pre-post study design is an experimental study design where the researcher intervenes at some point throughout the study. It aimed at measuring the occurrence of an outcome before, and again after a particular intervention has been implemented. The adopted pre-post study design used multiple arms approach where there was a comparison among groups. As such, one arm was the intervention group and the other is or was the non-intervention (control group). In perspective therefore, the N@C Project operated only in specific selected areas/communities of Chadiza and Lundazi districts. As a result, areas/communities where the N@C implemented interventions were classified as the “intervention arm” while areas/communities with no intervention were classified as the non-intervention arm (control group) which served as “*counterfactual*”; that is what would have happened in the absence of a program.

2.2. Study Population

The study population included women aged (15-49 years) with a biological child aged less than three years and were permanent residents in households of Chadiza and Lundazi districts. In addition, in both intervention and control areas, only the target population falling under a particular health facility catchment population site were interviewed. The evaluation therefore simultaneously targeted the mother and the child. Twenty-two (22) intervention health facility (HF) Catchment areas and 24 comparison HF Catchment areas with a total population of 462,690 formed the frame for the current endline evaluation.

Other target populations for the evaluation were key informants (KIs) such as district nutritionists, health facility-in charges, district agricultural officers, agricultural extension officers, community health volunteers (CHVs), environmental health technologists (EHTs), nutrition support group leaders (NSGLs) as well as N@C project staff. Information collected from these individuals helped in providing data to harness understanding of the project’s interventions, participation and effectiveness.

2.2.1. Sample inclusion and exclusion criteria for women and children

The endline evaluation included women aged 15-49 years who are not pregnant and have at least one biological child aged less or equal to 3 years, and are permanent residents in the two districts. The endline evaluation excluded women who were 15-49 years of age living in the districts for less than 6 months; women younger than 15 years or older than 49 years of age; pregnant women and with no child less or equal to 36 months. Other excluded women included women with any known or suspected chronic or congenital disease; women with foster children, or children visiting the household, or who are not permanent residents; and women with child with any known or suspected chronic/congenital diseases/physical deformity (including oedema) that is associated with growth problems.

2.3. Sample size and sampling method

2.3.1. Probability Sampling

Probability sampling was used to select households with women who had a child aged 3 years and below. The sample required the needed sample numbers in (0-5), (6-11), (12-17), (18-23 and (24-36) age groups for IYCF, and anthropometric indicators. The sample size was calculated using prevalence of key infant and young child feeding (IYCF) practices, and target percent point changes expected to take place at the end of proposed intervention. CARE’s proposed intervention was estimated to **improve stunting** among participating children by **9 percentage points** at end of the N@C project. For sample size estimation, the prevailing baseline rate was set at $P_0 = 45$ percent and expected rate of change at $P_1 = 36$ percent (DHS 2011). Using a significance level of 5 percent, power = 80 percent, difference between baseline and endline rates was at 9 percentage points, and a design effect of 1.2, the study required to yield a sample size of 440 children in (6-

35.9) months age group to capture stunting in the peak age groups in the intervention and comparison areas respectively.

For the **IYCF** indicators, **exclusive breastfeeding (EBF)** was used as the key indicator for sample size determination. For IYCF sample size estimation, prevailing baseline rate was set at $P_0 = 61$ percent and expected rate of change at $P_1 = 74$ percent (DHS 2011). Using a significance level of 5 percent, power = 80 percent, difference between baseline and endline rates was set at **13 percentage points**, with a design effect of 1.2, the study required to yield a sample of 193 children each in age groups (0-5), and 110 children in the age groups of (6-11), (12-17), (18-23) and (24-35.9) months of age. Thus, a sample of 633 ($110 \times 4 = 440 + 193$) children each was required in intervention and comparison areas respectively. Thus, for both intervention and control, the needed total sample size for the N@C project endline evaluation was 1266 (633×2).

Table 2.3-1 represents the actual samples in both intervention and control sites. Overall, a 94.4 percent response rate was achieved during the evaluation with the highest rate of 120.9 percent (24-35 months) and the lowest being 78.6 percent (those aged 18-23 months).

Table 2.3-1: Number of children by age in months

Age in months	Intervention	Control	Actual Sample Size (Overall)	Required Sample (Overall)	Deficit sample	Response rate
0 to <6	170	143	313	386	73	81.1
6 to <12	120	116	236	220	-16	107.3
12 to <18	120	87	207	220	13	94.1
18 to <24	103	70	173	220	47	78.6
24 to <36	146	120	266	220	-46	120.9
Total	659	536	1,195	1,266	71	94.4

Table 2.3-2: Number of endline evaluation women and children by health facility

District	Intervention HF	Number of mothers	Number of children
Lundazi	Chanyalubwe Health Post	16	16
Lundazi	Egichikeni Health Centre	19	19
Lundazi	Lukwizizi Health Post	21	21
Lundazi	Lundazi Urban Health	125	125
Lundazi	Lusuntha Health Centre	48	48
Lundazi	Mtwalo Health Centre	26	26
Lundazi	Mwase Lundazi RHC	52	52
Lundazi	Mwase-mphangwe Zonal	50	50
Lundazi	Mwimba Health Post	17	17
Lundazi	Ng'onga Health Centre	30	30
Lundazi	Phikamalaza Health Centre	24	24
Lundazi	ZASP Health Centre	23	23
Lundazi	Zumwanda Health Centre	30	30
Chadiza	Bwanunkha	32	32
Chadiza	Chadiza Urban	40	40
Chadiza	Madzaela	24	24
Chadiza	Miti	33	33
Chadiza	Mkumbudzi	16	16
Chadiza	Sinalo	18	18
Chadiza	Taferansoni	15	15
	Total	659	659
District	Control HF	Number of mothers	Number of children
Lundazi	Chasefu Health Centre	21	21
Lundazi	Chijemu Health Post	8	8
Lundazi	Hoya Health Post	14	14
Lundazi	Nyangwe Health Centre	23	23
Lundazi	Umi Health Post	19	19
Lundazi	Kamilenje Health Post	21	21

Lundazi	Kanyanga Health Centre	47	47
Lundazi	Khuli-kuli Health Post	19	19
Lundazi	Lumezi Health Centre	95	95
Lundazi	Lunzi Health Centre	36	36
Lundazi	Mchereka Health Post	19	19
Lundazi	Mkomba Health Post	17	17
Lundazi	Mwase Mpangwe Scheme	20	20
Lundazi	Ndaiwala Health Post	22	22
Lundazi	Nkhanganga Health Centre	36	36
Chadiza	Chanida	26	26
Chadiza	John RHC	19	19
Chadiza	Kabvumo	15	15
Chadiza	Nsadzu	24	24
Chadiza	Zemba	35	35
	Total	536	536

2.3.2. Non Probability Sampling

Using non-probability sampling method, stakeholders from MoH and MoA such as district nutritionist/s, agricultural extension officers and the community health volunteers (CHVs) and NSGLs were purposively sampled in the two districts. Convenient sampling method was used to sample women for the FGDs. Four FGDs (two in Chadiza and two in Lundazi) were conducted.

2.4. Evaluation tools

Quantitative data were collected through a structured household schedule (questionnaire) while qualitative data were collected through Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) using interview guides structured specifically for each cadre of staff.

The assessment used five data collection tools namely; the household questionnaire for household interviews with women, three KII guides designed for each stakeholder (agricultural staff, health staff (EHT and/or facility in-charge or Maternal Newborn and Child Health (MNCH) Coordinator)) and NSGLs and CHVs interviews guides and a FGD guide for women who had children 35 months and below.

2.5. Training of Enumerators

Training took place at the same time for both districts; it was conducted from the 7th to 8th of December, 2017 and attended by all recruited enumerators, CARE staff and the field supervisors. Training included sessions on; research ethics, guidelines in identifying respondents, and also how to ask questions and record responses. On 9th of December, 2017, a pilot was conducted and was aimed at pretesting the endline evaluation tools and to enable enumerators to familiarize with the tools. Further, feedback from the pilot enabled to clarify unclear questions and to finalize the tools.

2.6. Data Collection and Management

Each evaluation field team was assigned specific facilities and the starting point for field work was the HF and then outwards toward the edges of the catchment. Before interviewing potential interviewees, teams ensured mother's eligibility based on the inclusion criteria and after obtaining consent interviews were instituted and data was captured electronically using Open Data Kit Platform (ODK) on Android powered tablets. After completing structured interviews, with women, Anthropometric measurements for both women and children were then taken using (SECA) scale for weight and a standometer for length/height. The KII and FGDs on the other hand were audio-taped and transcribed.

2.7. Data Analysis

All data collected from secondary (document reviews) and primary sources such as household survey, FGDs and KIIs were compiled appropriately. Quantitative data (entered at data collection stage using the ODK Android Platform) was transferred to SPSS; after thorough cleaning and programming, it was then transferred again to STATA 14.2 software for analysis. Descriptive statistics were produced from structured interviews. Data collected through FGDs and KIIs was analyzed by theme assignments. Verbatim from FGDs and KIIs were also incorporated into the endline evaluation report to contextualize quantitative findings.

2.7.1. Difference in Differences (D-in-D) method

In order to determine whether women and children (project beneficiaries) have had a change in their livelihood with respect to the N@C project focus areas compared to women in control sites, a Difference-in-Differences (D-in-D)⁴ design method was applied. (See footnote below and check Appendix B for application of D-in-D for the N@C)

2.8. Ethical Considerations

Ethical clearance: Permission to conduct the evaluation study was sought from ERES CONVEGE while permission to visit health facilities and interview staff was sought from MoH.

Training: The consultant recruited RAs and Supervisors with experience in data collection. However, training was conducted for the field team and included: a session on research ethics, identifying and selecting potential respondents, obtaining informed and ongoing consent for household interviews, KIIs and FGDs, ensuring privacy and protection of identity of interviewees and avoiding negative blow back to interviewees. In addition, RAs and Supervisors were educated on ensuring that interviews were conducted in a safe and secure environment, i.e. ensuring physical safety of interviewees and FGD participants as well as data safety.

Participant's information: A comprehensive participant's information sheet was read to all potential participants informing them about all facets of the study including risks and benefits. Participants were informed about the objectives of the evaluation and reasons for their selection to be interviewed explained. Potential participants were made aware of the voluntary nature of taking part in the evaluation and refusal did not warrant any penalty. Participants were free to stop the interview without giving a reason and were also free not to answer any question they did not feel comfortable answering. Potential participants were informed about confidentiality of data and non-collection of identifiers such as names, addresses, etc. The evaluation did not offer any finances or materials to participants for taking part in the assessment other than refreshments for the FGD participants.

Consent and assent: Consent to take part in the study was sought from all potential participants individually after they had understood all elements of the study. For women below the age of 18, consent was sought from guardians/parents before assent was sought from them. Further, mothers consented on behalf of children aged below 3 years to enable the interviewer to obtain information on a child and also take anthropometric measurements.

Data storage: Tablets used in data collection were encrypted with passwords not to be shared with any other persons apart from the one assigned with a specific gadget. All data collected were submitted and stored with limited access only to the Consultants and CARE International. The data will not be accessed by anyone unless with permission from CARE International.

⁴ A D-in-D method measures change in the N@C project beneficiaries that can be associated with the interventions of the C project. This method uses the difference in differences of the indicator values in the intervention health facility catchment areas (treatment group) and comparison areas (control group) in an experiment to estimate the causal effects. With this method, a counterfactual group was needed since we did not observe the outcome of the intervention health facility catchment group when they were not treated.

FGD Moderation: Moderators of FGDs were trained and required to inform all participants about the confidential nature of the discussion with emphasis not to be tempted to divulge information generated from these discussions.

3. FINDINGS

3.1. Characteristics of women with children <36 months

3.1.1. Demographic and social characteristics of women

Table 3.1-1 presents percentage distribution of women at baseline and endline evaluation. Most women were aged 20-24 years; with majority being married. Over 90 percent of the households visited in both the intervention and control sites were male headed. About 83 percent of women in the intervention (and 83.3 percent in the control sites) have attended school. Of these women, 45.1 percent in the intervention sites and 47.9 percent in the control site were able to read. Slightly over half of women in both the intervention and control sites had attained some primary education (56.1 percent and 48.8 percent respectively).

Table 3.1-1: Percent distribution of women by demographic and social characteristics

	Endline		Baseline		Differences	
	Intervention % (n=659)	Control % (n=536)	Intervention % (n=973)	Control % (n=1072)	EL-BL %(Intervention)	EL-BL %(Control)
Age						
<19	14.9	13.8	10.0	8.5	4.9	5.3
20-24	32.5	31.9	28.4	32.8	4.1	-0.9
25-29	22.2	25.6	24.2	22.8	-2.0	2.8
30-34	15.9	15.9	21.9	18.3	-6.0	-2.4
35-39	9.4	8.6	9.7	11.1	-0.3	-2.5
40-44	4.1	3.9	4.7	5.5	-0.6	-1.6
45-49	1.1	0.4	1.2	1.0	-0.1	-0.6
Marital status						
Married (monogamous)	72.4	72.9	78.4	76.8	-6.0	-3.9
Married (polygamous)	15.9	14.6	13.6	16.6	2.3	-2.0
Divorced or separated	2.6	3.9	3.0	2.3	-0.4	1.6
Widowed	0.5	0.4	0.3	0.0	0.2	0.4
Single (Never married)	8.4	7.9	0.0	0.1	8.4	7.8
Cohabiting with partner	0.3	0.4	4.7	4.2	-4.4	-3.8
Age at first marriage						
<15	4.2	4.5	2.5	2.1	1.7	2.4
15	7.2	6.9	5.8	7.3	1.4	-0.4
16-17	23.7	23.2	31.7	31.5	-8.0	-8.3
18	21.4	17.5	24.5	23.1	-3.1	-5.6
19-21	28.7	27.5	27.7	28.9	1.0	-1.4
22+	10.7	15.7	7.9	7.2	2.8	8.5
Don't know	4.2	4.7	0.0	0.0	4.2	4.7
Head of household						
Male-headed household	92.1	89.0	92.8	93.0	-0.7	-4.0
Female-headed household	7.2	9.7	7.2	7.0	0.0	2.7
Joint (male and female) headed household	0.8	1.3	0.0	0.0	0.8	1.3
Ever attended formal school	83.1	83.2	76.5	79.8	6.6	3.4
Able to read	45.0	47.9	36.1	38.5	8.9	9.4
Highest level of education attained						
Some Primary	56.1	48.8	92.8	93.9	-36.7	-45.1
Completed Primary	12.5	12.4	4.1	2.7	8.4	9.7
Some Secondary	23.1	23.8	2.3	2.3	20.8	21.5
Completed Secondary	5.5	9.9	0.0	0.7	5.5	9.2
Some Higher Education	1.3	1.6	0.5	0.2	0.8	1.4
Completed Higher Education	1.5	2.0	0.3	0.2	1.2	1.8
Number of living children						
1-2	51.7	52.7	40.7	41.5	11.0	11.2
3-4	29.6	31.0	33.5	34.4	-3.9	-3.4
5+	18.8	16.3	25.7	24.1	-6.9	-7.8

3.1.2. Housing Characteristics and Household Possessions

Housing characteristics are a measure of the socio-economic status of a household. Table 3.1-2 shows findings on land and animal ownership, house ownership, animals kept inside the house, type of flooring material, material for exterior walls, material for roofing, a place where cooking is done and possession of durable goods. Most households in both the intervention and the control sites owned agricultural land (87.9 percent and 87.3 percent respectively). Majority of women reported owning the housing unit they lived in (83.6 percent in intervention and 84.5 percent in control sites) and 57.7 percent and 64 percent of households in the intervention and control sites respectively reared chickens.

Mud was a common flooring material used by households in both the intervention and the control sites (39.2 percent and 41 percent respectively). Slightly over half of households in the intervention and control sites have grass-thatched roofs (51.7 percent and 56.3 percent respectively). Regarding household possessions, a hoe and axe were the most common possessions owned by most households: 88.9 percent and 90.7 percent; as well as 81.8 percent and 83.2 percent of the households in the intervention and control sites have a hoe and an axe respectively. More than half of households in both the intervention and control sites own a mobile phone (63 percent and 61.6 percent respectively).

Table 3.1-2: Housing characteristics and household possessions/goods

	Intervention	Control	Both
	%	%	%
Ownership of agricultural land	87.9	87.3	87.6
Own your house	83.6	84.5	84.0
Ownership of animals			
Cattle	29.3	26.1	27.9
Goat	21.9	15.7	19.1
Sheep	1.5	1.5	1.5
Chickens	57.7	64.0	60.5
Pigs	16.5	18.7	17.5
Horse	0.8	0.7	0.8
Donkey	1.7	1.3	1.5
Mule	1.4	0.9	1.2
Duck	8.7	6.2	7.6
Guinea fowl	4.5	4.1	4.3
Other specify	5.0	4.9	4.9
Animals kept inside the house	8.2	6.2	7.3
Main material for house's floor			
Earth/Sand	26.1	29.9	27.8
Stone/Brick	2.1	0.9	1.6
Cement	32.5	28.2	30.5
Tile	0.2	0.0	0.1
Mud	39.2	41.0	40.0
Main material of the roof			
Grass roof	51.7	56.3	53.8
Metal/iron sheet roof	47.8	43.5	45.9
Stone or tile roof	0.2	0.0	0.1
Asbestos	0.3	0.2	0.3
Main material of the exterior wall			
Earth/Sand/Mud/Clay	35.2	40.9	37.7
Bamboo, corn stalks	0.3	0.6	0.4
Stone/ Burnt Bricks	32.0	30.8	31.5
Cement	15.5	13.4	14.6
Mud brick or wattle	17.0	14.4	15.8
Where cooking is usually done			
Room used for living or sleeping	1.7	0.6	1.2
Separate room in the same building used as kitchen	15.0	14.0	14.6
Separate building used as kitchen	60.1	65.7	62.6
Outdoors	22.9	19.6	21.4
Other	0.3	0.2	0.3
Household Possessions			

Electricity/solar power/ generator in the home	45.8	42.2	44.2
Bicycle	59.8	52.6	56.6
Radio	45.1	37.7	41.8
Bed	34.3	28.7	31.8
Mobile/ other telephones	63.0	61.6	62.3
Television	17.8	17.0	17.4
Refrigerator	1.8	3.9	2.8
Cart pulled by animal	12.4	10.6	11.6
Watch/clock	9.1	8.0	8.6
Sewing machine	0.8	1.1	0.9
Motorcycle	2.7	3.0	2.8
Car/truck	1.7	3.2	2.3
Tractor	0.2	0.6	0.3
Hoe	88.9	90.7	89.7
Axe	81.8	83.2	82.4
Hammer mill	1.4	3.2	2.2
Sofa	16.4	14.4	15.5
Solar panel	39.2	33.8	36.7
Mattress	40.5	38.1	39.4
Charcoal pressing iron	29.7	29.5	29.6
Wheelbarrow	3.5	4.3	3.8
Small generator for irrigation	0.8	0.2	0.5
Other specify	1.1	0.4	0.8

3.1.3. Progress out of Poverty Index (PPI)

Progress out of Poverty Index (PPI) is a simple poverty scorecard used to estimate the likelihood that a household has expenditure below a given poverty line and to measure groups' poverty rates at a point in time. Although scoring can also be used to measure net movement across a poverty line over time, the N@C Project had not collected any data on PPI prior to the endline evaluation; this evaluation therefore could not determine net movement across a poverty line. However, the intervention had an indirect spiral outcome of fighting poverty amongst target communities

The PPI for the N@C project evaluation was computed by summing up the scores for each household in the intervention and control sites and then dividing it by the total sampled households by site. Figure 3.1-1 shows the mean household scores and table 3.1-4 shows their poverty likelihood using the Zambia Göttingen national line. The PPI score for the N@C project intervention sites was 26.7 percent, which falls in the range 25 to 29 in the look-up table for Zambia. This finding indicates that on average, households in the N@C project intervention sites had an 81.7 percent likelihood of being below the poverty line.

Figure 3.1-1: PPI Mean Score of Households

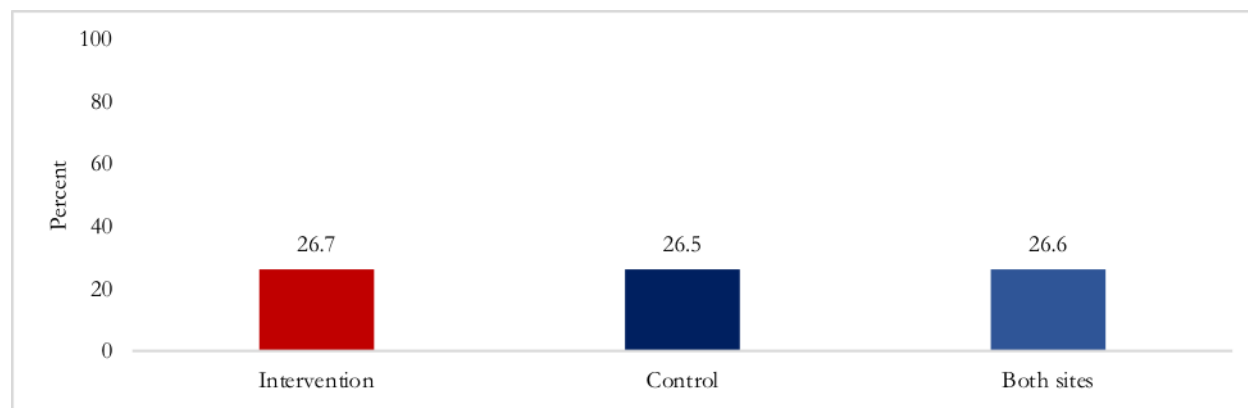


Table 3.1-3: Percent distribution of household's Progress out of Poverty Index

Range	Score % (Intervention)	Score % (Control)	Göttingen National Line
0-4	3.5	3.4	98.3
5-9	5.3	7.1	96.8
10-14	7.6	9.7	94.3
15-19	13.8	13.2	92.2
20-24	17.5	11.9	88.1
25-29	14.1	16.6	81.7
30-34	12.3	13.6	71.0
35-39	11.1	8.8	60.0
40-44	5.0	5.4	48.7
45-49	4.7	3.5	32.8
50-54	1.7	2.6	19.3
55-59	1.7	2.1	10.6
60-64	1.4	0.7	5.3
65-69	0.2	0.6	3.4
70+	0.3	0.7	1.4

3.2. ACCESS TO FOOD AND EXTENSION SERVICES

Highlights

- Slightly over 83 percent of households in intervention sites and control sites produced their own food.
- Ownership of home/kitchen gardens reduced by 20.3 percent in the intervention sites.
- Preservation of fruits and vegetables increased by 9.7 percent, however, storage of food crops reduced by 6.8 percent in intervention sites.
- Agricultural extension visits reduced by 11 percent.

This section presents findings on agricultural production with regards to households' source of food, ownership of home/kitchen gardens, fruit and vegetable preservation, storage of food crops and visitation by agricultural and livestock/fisheries extension officers.

3.2.1. Agricultural Production

In order to assess agricultural production, the endline evaluation collected data on the main source of food consumed by the households (table 3.2-1). Majority of women in both the intervention site (83.8 percent) and control sites (85.6 percent) produced their own food.

Table 3.2-1: Percent distribution of household's main source of food

	Intervention %	Control %	Both %
Household's main source of food			
Produce own food	83.8	85.6	84.6
Purchase food	15.3	13.1	14.3
Food for work	0.6	0.7	0.7
Trade/Borrow food	0.3	0.2	0.3
Charity/Beg	0	0.2	0.1
Other	0	0.2	0.1

3.2.2. Ownership of home/kitchen gardens

Table 3.2-2 shows a reduction in the percentage of women that owned a home/kitchen garden in both the intervention and control sites at endline compared to the baseline. Findings, however, show that the reduction was higher in intervention sites compared to the control sites (D-in-D= -5.2 percent).

Some of the reasons affecting women’s ownership of a home/kitchen garden included; limited land in the backyard (especially in densely populated villages) and limited access to water for irrigation. Preferably, women were of the view that gardens needed to be located where there was access to water. The following citations illustrate these sentiments:

KI (Lundazi) said that, *“Some women don’t have space or land to make a garden and plant these crops...others say the sources of water are not adequate enough to sustain their gardens; so they have decided not to have gardens.”* Another KI (Chadiza) stated that, *“things like irrigation did not work because of lack of water.”*

Table 3.2-2: Percent distribution of women with home/kitchen gardens

	Endline		Baseline		Differences		
	Intervention	Control	Intervention	Control	EL - BL	EL - BL	D-in-D
	%	%	%	%	(Intervention)	(Control)	
Ownership of Home Gardens	29.6	34.0	49.9	49.1	-20.3	-15.1	-5.2

In Figure 3.2-1 data shows that food produced from home/kitchen gardens was mostly used for consumption, (96.9 percent in the intervention sites and 94.5 percent in the control sites). Further, some women not only consumed but also sold part of their produce, (50.8 percent in the intervention sites and 52.7 percent in the control sites). Women mostly kept foods that they produced in the gardens for household consumption. However, selling of garden produce enabled some women acquire household goods or meet needs that they could not without this process. Some responses from FGD participant and KI are shown below:

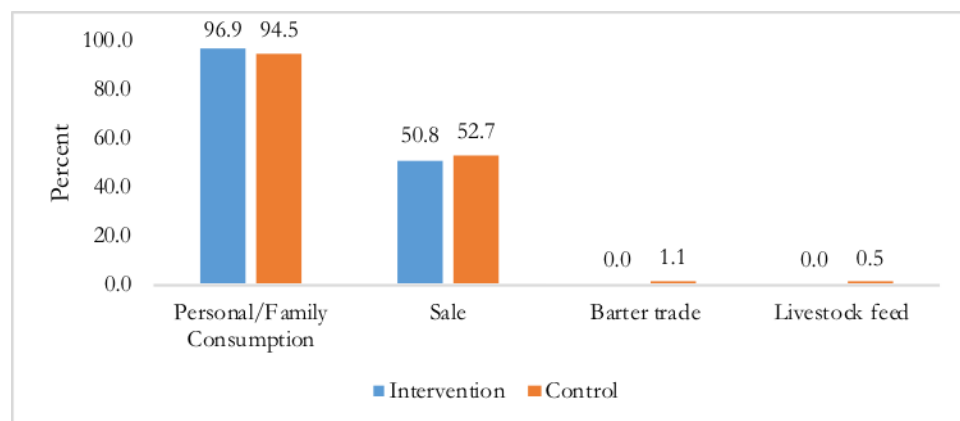
A FGD participant (Chadiza) said; *“We sale the crops we produce and consume some of it.”* A NSG leader (Chadiza) stated that; *“Most of the time it is for sale...we need money... but we also keep some to ensure that we have food.”*

A NSG leader (Lundazi) said that; *“The women also sell the vegetables they grow in order to have an income which helps them to solve their problems at home.”*

The promotion of home/kitchen gardens during the N@C Project contributed to diversification of crops in the intervention sites. Women reported having ventured into producing crops such as carrots and eggplants, which traditionally were nearly non-existent in the area. FGDs and KII responses below show this link to the N@C:

A NSG leader (Lundazi) said that; *“Crops like carrots, eggplants, impwa (garden egg), bondve (Amaranthus) are the crops that we started growing as a result of this project. Before this project, these crops were not planted at all.”*

Figure 3.2-1: Responses on use of produce from home/kitchen gardens



3.2.3. Food Preservation and Storage

To establish the practice of preservation and storage, women were asked on whether they had preserved any vegetables and/or fruits and stored any crops that they had produced in the past 12 months. Findings in table 3.2-4 show that, there has been an increase in the percentage of women preserving fruits and vegetables in both intervention and control sites. More women in control sites preserved fruits and vegetables compared to those in intervention sites (D-in-D= -2.8 percent). On the contrary, there was a decrease in the percentage of women storing crops in both intervention and control sites. However, more women in intervention sites stored food crops than those in control sites (D-in-D= 2.7 percent). The increase in fruits and vegetables preservation was attributed to N@C intervention, which provided fruit and vegetable dryers such as Solar Driers and Raised Platforms and trained women on better methods of food preservation. The following excerpts illustrate these results:

A FGD participant (Lundazi) said that, “*we were taught how to grow different crops, preserve food*” while A FGD participant (Chadiza) stated that “*we also preserve the vegetables we grow through drying them so that we can have food all year round e.g. mukwanyanya (pumpkin leaves).*”

A KI (Lundazi) stated that, “*There is a difference in food preservations too.... we now preserve a variety of foods such as chibwabwa (pumpkin leaves), kandolo (sweet potatoes), cassava and mangos unlike before the program came on board.*”

Table 3.2-3: Percent distribution of households that practiced preservation and storage

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL	EL-BL	
	%	%	%	%	(Intervention)	(Control)	
Preservation of fruits and/or vegetables	78.5	76.3	68.8	63.8	9.7	12.5	-2.8
Storing of food crops	87.4	85.6	94.2	95.1	-6.8	-9.5	2.7

3.2.4. Agricultural and Livestock/Fisheries Extension Visits

Findings in table 3.2-5 show that, there has been a decrease in the percentage of women that were visited by agricultural and livestock/fisheries extension officers in both the control and intervention sites. However, more women in intervention sites received visitations from agricultural extension officers compared to those in the control site (D-in-D= 3.6 percent). Again, more women in intervention sites received visitations from livestock/fisheries extension officers than those in control sites (D-in-D=5.2 percent). Low outcomes on

visits by agricultural extension officers may have been associated with non-provision of certain logistics such as fuel and the like. A KI transcript attest to these challenges:

A KI (Lundazi) stated that, “*We had challenges in terms of fuel. The project was designed in such a way that we were supposed to be visiting the target groups every month to make follow ups on what they were doing. But due to minimum resources available we couldn’t manage to visit them every month.*”

Table 3.2-4: Percent distribution of women visited by extension officers

Visit by:	Endline		Baseline		Differences		D-in-D %
	Intervention %	Control %	Intervention %	Control %	EL-BL	EL-BL	
					(Intervention) %	(Control) %	
Agricultural Extension Officer	16.5	8.8	27.4	23.3	-10.9	-14.5	3.6
Livestock/Fisheries Extension Officer	6.7	2.6	7.5	8.6	-0.8	-6.0	5.2

Through a qualitative question, women were asked on what the purpose of the visit by the agricultural and Livestock/Fisheries Extension Officers was about. Table 3.2-6 shows that reasons for visit by the agricultural extension officer were; lessons on farming such as conservation method and crop rotation, food storage, fruit and vegetable preservation. Further, visits by agricultural extension officer was for monitoring of farming fields and/or gardens and also distribution of farming inputs. With regard to purpose of visit by Livestock/Fisheries Extension Officer cited were mostly for vaccination of animals such as chickens, cattle and pigs; and provision of lessons on importance of animal vaccination.

Table 3.2-5: Percent distribution of women visited by extension officers

Purposes of the visit by agricultural officer
1. Agricultural lessons
Conservation farming and crop rotation
Food security and farming
Storage of food crops such as maize
Preservation such as how to dry vegetables
How to grow maize and/or plant different vegetable or fruit seeds
How to make ridges and also how to plant (i.e. distance between seeds or seedlings)
How to use weed killer and also how to apply fertilizer
On use of chicken manure to ensure the soil is not destroyed
2. Monitoring and provision of farming inputs
Inspecting fields and/or gardens, including seeds and crops grown
Seed distribution (e.g. maize)
Brought the foot pump
3. Other purposes of visit
Registration of people for E-voucher
Spraying insecticide
Taking a survey, e.g. came to ask about the crops that are grown by households
Purpose of visit by the Livestock/Fisheries Officer
1. Animal vaccination
To give injections to animals such as dogs, cattle
To treat and inject chickens
Sprayed animals
2. Animal survey
To count the number of livestock
3. Lessons on animal feeding and vaccination
Taught on how to keep animals such as pigs and chicken
Taught on the importance of animal vaccination and how to use vaccines
Taught people on deworming of animals

3.3. FOOD SECURITY

Highlights

- More households in intervention sites were food secure (little or no hunger in households) compared to control sites (D-in-D=6.6 percent).
- Using the Food Insecurity Experience Scale (FIES) analysis, there were more households who were food secure in intervention sites (49.7 percent) than in the control sites (44 percent).
- More households in control sites (33.7 percent) were severely food insecure compared to intervention sites (28.8 percent).
- There were more women consuming foods from five or more groups in intervention sites compared to control sites (D-in-D=6.9 percent).

This section highlights findings on food security, with details in terms of household hunger scale, Food Insecurity Experience Scale (FIES) and women’s dietary diversity score (WDDS).

3.3.1. Household Hunger Scale

Table 3.3-1 shows percentage distribution of households by food deprivation scale (hunger scale). More households in intervention sites were food secure (little or no hunger in households) compared to control sites (D-in-D= 6.6 percent). However, and generally, there is an increase in food deprivation between baseline and endline evaluations. This disparity is more related to the timing of the study period rather than the design of either studies or indeed the N@C project. The endline evaluation was conducted during the lean period “hunger months”, which start in December till March, while the baseline was conducted during a period (June/July) when people were from harvesting their crop and still had food from their harvest (Tembo, 1993). Further, in comparison to the baseline survey, table 3.3-1 also shows an increase in the percentage of households that were faced with moderate to severe hunger at endline evaluation compared to the baseline.

Table 3.3-1: Percent distribution of households by hunger scale

	Endline		Baseline		Differences		
	Intervention	Control	Intervention	Control	EL-BL	EL-BL	D-in-D
	%	%	%	%	(Intervention)	(Control)	
Food deprivation scale in households							
Food secure (little or no hunger)	78.0	72.6	86.6	87.8	-8.6	-15.2	6.6
Moderate hunger	17.1	22.4	11.4	9.6	5.7	12.8	-7.1
Severe hunger	4.9	5.0	2.0	2.6	2.9	2.4	0.5

3.3.2. Food Insecurity Experience Scale (FIES)

Food insecurity can affect the health and well-being of mothers and children in many ways, with potentially negative consequences for the mental and social wellbeing in addition to the physical well-being. FIES is an experience-based food insecurity scale representing a simple, timely and less costly method for measuring the access dimension of food insecurity based on data collected at the household or individual level. It focuses more broadly on reported food-related behaviors associated with the experience of food insecurity due to limited access to food (Ballard et al, 2013).

In order to contribute to household food security, the N@C project embarked on sensitizations on food storage, preservation and the use of home gardens to grow food. The N@C project provided some communities with solar dryers to help with drying of vegetables thereby enhancing food preservation and storage. Additionally, the N@C imparted communities with knowledge on the appropriate methods of food

preservation using local methods. Ideally, therefore, these efforts were aimed at improving not only nutrition but also aspects of the FIES.

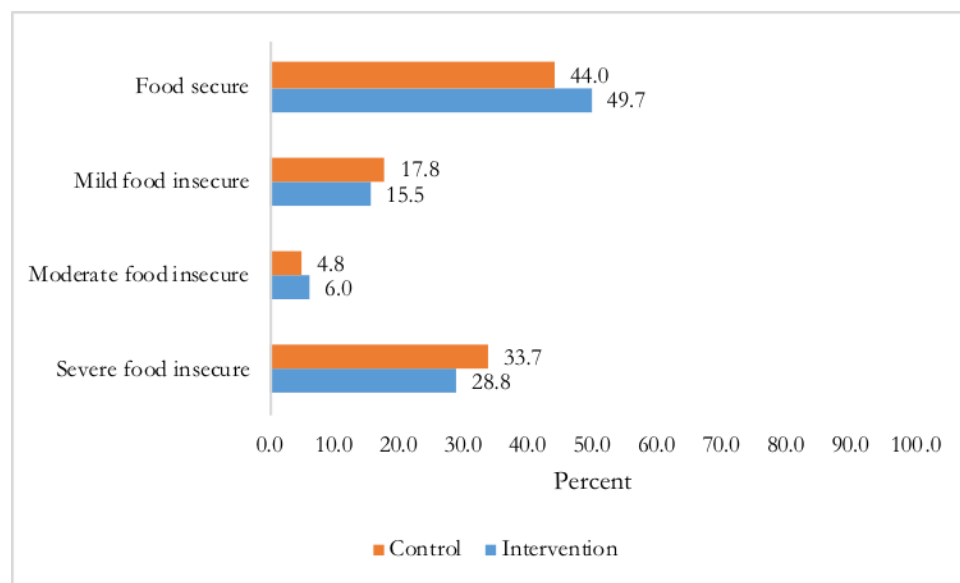
Figure 3.3-1 shows that fewer households in intervention sites compared to control sites were in severe food insecurity category. Intervention sites showed more likelihood of being food secure than households in control sites. KIs and FGD excerpts below show responses on household food security:

A NSG leader (Lundazi) said; *“for us to have sustainable food availability there was an NGO called CARE, this NGO is the one that taught us about food storage for sustainability so that we do not suffer in our homes. Because in the past we would work and we would find food, but we would usually sale, we didn’t know that the food would be useful even to our families.”*

In a FGD (Lundazi) a participant said; *“... we were taught that we need to keep food from one farming season that can last us up to June or July of the other year. By the time, you are harvesting crops of the next farming season that is when your storage should be depleting. There should not be a case that by the time you are reaching January or February and your storage is depleting... You need to store enough food up to June or July.”*

A number of factors could be associated with observed differences in food insecurity between the intervention and control sites. Women in intervention sites may have had knowledge on planning and choice of crops to farm. The N@C project provided different seed varieties to women in intervention sites that influenced food availability. This may have contributed to higher levels of food security comparing with control sites. However, other organizations were promoting nutrition related programs and hence, differences in these communities were not widespread.

Figure 3.3-1: Percent distribution of the Food Insecurity Experience Scale



3.3.3. Women’s Dietary Diversity Score

Table 3.3-3 shows percentage distribution of women’s dietary diversity score where results indicate a reduction in the percentage of women consuming foods from five or more groups in both the intervention and control sites at endline compared to the baseline evaluation. However, there were more women consuming foods from five or more groups in intervention sites compared to control sites at the endline in

general (D-in-D= 6.9 percent). In all, women’s dietary diversity mean score was slightly higher in intervention sites compared to control sites (2.6 percent and 2.4 percent respectively).

Table 3.3-2: Women's dietary diversity score

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
	%	%	%	%	%	%	
Food groups and WDDS							
1. Cereals/grains and tubers	73.3	72.4	98.9	99.3	-25.6	-26.9	1.3
2. Vitamin A rich fruits and vegetables	35.7	27.4	32.9	33.1	2.8	-5.7	8.5
3. Other fruits and vegetables	44.0	42.5	77.2	73.4	-33.2	-30.9	-2.3
4. Dark green leafy vegetables	48.8	44.3	79.0	82.6	-30.2	-38.3	8.1
5. Organ meat	2.8	1.9	0.9	0.8	1.9	1.1	0.8
6. Flesh foods	8.3	9.1	25	25.2	-16.7	-16.1	-0.6
7. Eggs	6.3	5.3	4.4	4.0	1.9	1.3	0.6
8. Legumes, nuts and seeds	-34.9	30.0	44.0	45.0	-9.1	-15.0	5.9
9. Milk and milk products	7.4	4.7	4.6	3.8	2.8	0.9	1.9
WDDS 5 or more food groups	19.1	13.0	20.9	21.7	-1.8	-8.7	6.9
WDDS 4 or more food groups	37.2	29.9	56.0	55.2	-18.8	-25.3	6.5
WDD: percent of women who ate from 1 food group	6.5	7.9	0.7	0.6	5.8	7.3	-1.5
WDD: percent of women who ate from 2 food groups	13.5	13.4	12.9	12.4	0.6	1.0	-0.4
WDD: percent of women who ate from 3 food groups	17.7	22.4	30.0	31.7	-12.3	-9.3	-3.0
WDD: percent of women who ate from 4 food groups	18.1	16.9	35.5	33.5	-17.5	-16.6	-0.9
Mean diversity score	2.6	2.4	3.9	3.8	-1.3	-1.4	0.1

3.4. MATERNAL HEALTH AND NUTRITIONAL STATUS

Highlights

- There was a reduction in the percentage of women with normal BMI in both the intervention and control sites (-6.3 percent and -8.4 percent respectively).
- In both sites, there was an increase in the percentage of women that were overweight (1.4 percent and 5.5 percent respectively).
- There was an increase in obesity in both sites. The increase in obesity was higher among women in intervention sites compared to control sites (D-in-D=2.4 percent).
- There were more women attending antenatal care in the control sites compared to intervention sites (D-in-D = -0.2 percent)
- More than half of the women in intervention sites had their first antenatal visit in the first trimester of pregnancy.
- There was an increase in women taking iron tablets for 90 days or more at endline compared to baseline in both intervention and control sites (10.5 percent and 14.9 percent respectively).
- Most women in both sites took IPT drugs (92.9 percent and 94 percent respectively).
- There was an increase of women delivering from health facilities in both intervention and control sites at endline compared to baseline (8.8 percent and 11.8 percent respectively).
- There were more women in control sites attending postnatal care compared to the intervention sites (D-in-D= -2.7 percent).

This section presents findings on maternal nutritional status based on two major anthropometric measurements namely: body mass index (BMI) and middle upper arm circumference (MUAC) for women. The section also presents findings on maternal health including; antenatal care (ANC), uptake of iron tablets and Intermittent Preventive Treatment for Malaria (IPT's) drugs, place of delivery and postnatal care (PNC).

3.4.1. Body Mass Index (BMI)

In order to determine the nutrition status of surveyed mothers, body mass index (BMI) was used. BMI is categorized into four groups and these are; (BMI < 18.5=underweight, 18.5-24.9=normal, 25.0-29.9=overweight and ≥ 30.0 =obese).

Overall, results in table 3.4-1 show that, there were increases in the mean BMIs for mothers in both the intervention and control sites, although the increase was slightly higher in intervention sites than control sites (D-in-D=0.3 percent). Comparing baseline BMI to endline BMI, there was a reduction in the percentage of mothers falling in the normal BMI category in both the intervention and control sites (80.8 percent vs. 74.5 percent and 83.4 percent vs. 75.0 percent respectively). However, women with normal BMI was slightly higher in the intervention sites compared to the control sites (D-in-D=2.1 percent).

Findings in table 3.4-1 further show that there was a notable increase in overweight and obesity among women in both intervention and control sites. Nonetheless, the increase in overweight was higher among mothers in control sites compared to women in intervention sites (D-in-D=-4.1 percent), while obesity was higher among women in the intervention sites compared to control sites (D-in-D=2.4 percent).

Table 3.4-1: Percent distribution of women by BMI

		Mean BMI	Under weight ^a	Normal weight ^b	Over weight ^c	Obese weight ^d	n
			%	%	%	%	
Endline	Intervention	23.1	5.5	74.5	14.4	5.6	568
	Control	22.9	4.7	75.0	17.7	2.6	464
Baseline	Intervention	22.3	4.5	80.8	13.0	1.6	912
	Control	22.4	3.4	83.4	12.2	1.0	1006
Differences	EL-BL (Intervention)	0.8	1.0	-6.3	1.4	4.0	-
	EL-BL (Control)	0.5	1.3	-8.4	5.5	1.6	-
	D-in-D	0.3	-0.3	2.1	-4.1	2.4	-

Note: a= (< 18.5), b= (18.5-24.9), c= (25-29.9), d= (≥ 30.0)

3.4.2. Mothers Mid-Upper Arm Circumference (MUAC)

Mid-Upper Arm Circumference (MUAC) is categorized into three: severely malnourished (below 21.5cm), moderately malnourished (21.5-22.5cm) and normal (above 22.5cm). Findings in table 3.4-2 show that slightly over 2.0 percent of mothers in intervention sites were moderately malnourished at baseline and evaluation. With regard to normal MUAC (>22.5cm), findings show that there was a slight reduction in the percentage of women falling under this category in the intervention sites. Findings, however show that there was an increase in the percentage of women falling under normal MUAC (>22.5cm) in the control sites (D-in-D=-1.2 percent).

Table 3.4-2: Distribution of Mothers MUAC

		Below 21.5cm	21.5-22.5cm	Above 22.5cm	n
		%	%	%	
Endline	Intervention	0.4	2.8	96.8	570
	Control	0.4	1.8	97.8	450
Baseline	Intervention	0.7	2.3	97.0	1,005
	Control	1.2	2.0	96.8	911
Differences	EL-BL (Intervention)	-0.3	0.5	-0.2	-
	EL-BL (Control)	-0.8	-0.2	1.0	-
	D-in-D	0.5	0.7	-1.2	-

3.4.3. Antenatal Care (ANC)

Table 3.4-3 shows the percentage distribution of women aged 15-49 who accessed ANC during their last most recent pregnancy. There was reduction in the number of women attending ANC in the intervention sites at endline compared to the baseline (-0.9 percent). However, there were more women attending ANC in the control sites compared to women in the intervention sites. Further, there was a 6.2 percent reduction in women attending four or more ANC visits in intervention sites at endline compared to baseline evaluation. More women in the control sites attended four or more ANC visits compared to intervention sites (D-in-D=-2.4 percent). This reduction could be attributed to a number of reasons of which the presence of a husband at any ANC visit is required or the pregnancy may have been outside wedlock or simply that some women may have missed their dates. The following excerpts of narratives illustrate these points:

A KI (Chadiza) said that “we encourage them that both husband and wife should go for ANC to register, if no husband, then these women won’t be registered...unless in an event that it was a damage...but this also requires a letter (to support claim) from the headman that the man who impregnated the woman is not there and so on...”

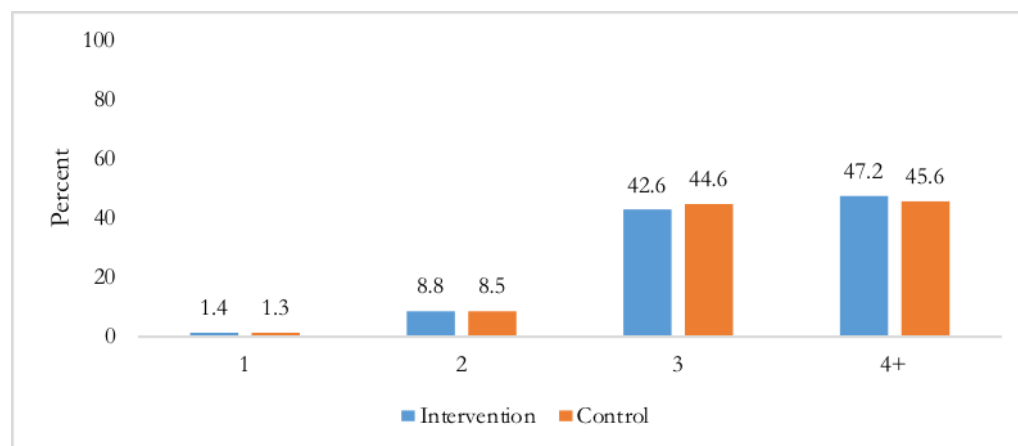
Another KI (Chadiza) reported to say, “they go to the clinic...those that may forget date, I follow them up to remind them...others even come here for help.....so that I read for them (those who are unable to read) the date for the ANC visit.”

Table 3.4-3: Percent distribution of women by ANC attendance

	Endline		Baseline		Differences		
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	D-in-D
	%	%	%	%	%	%	%
ANC attendance	98.7	99.0	99.6	99.7	-0.9	-0.7	-0.2
Number of ANC visits							
One time	1.1	0.8	0.3	0.4	0.8	0.4	0.4
Two times	4.6	4.7	2.7	2.8	1.9	1.9	0.0
Three times	25.5	24.1	24.0	23.9	1.5	0.2	1.3
Four times (or more)	66.8	69.1	73.0	72.9	-6.2	-3.8	-2.4
Don't know/don't remember	2.0	1.3	0.0	0.0	2.0	1.3	0.7

Figure 3.4-1 shows the percentage distribution of women by number of months pregnant at the time of first ANC visit. Findings show that, in both the intervention sites and control sites, women attended their first antenatal visit when four or more months pregnant (47.2 percent and 45.6 percent respectively). Therefore, more than half of women in both the intervention and control sites had their first antenatal visit in the first trimester of pregnancy (before the 4th month).

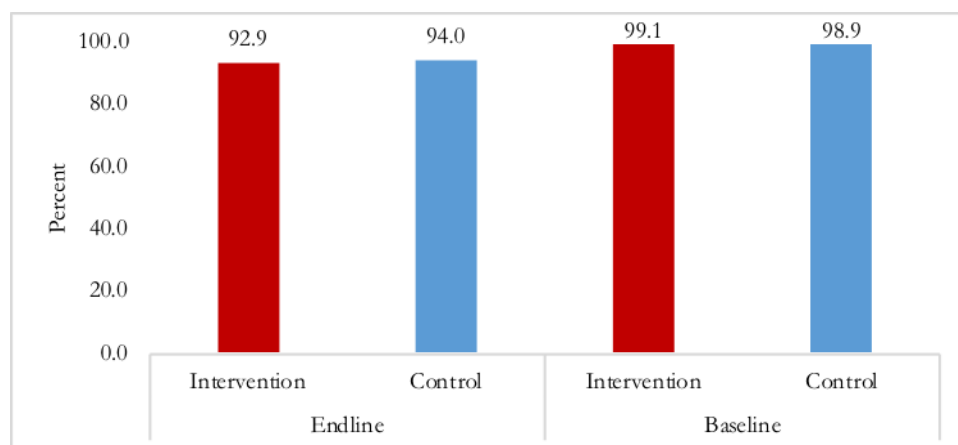
Figure 3.4-1: Percent distribution of women by number of months pregnant at first ANC visit



3.4.4. Uptake of IPT Drugs and Iron Tablets

Figure 3.4-2 shows the percentage distribution of women who took IPT drugs during their last pregnancy. Findings show that most women in intervention and control sites took IPT drugs (92.9 percent and 94 percent respectively). This shows a reduction in the percentage of women that took IPT drugs at endline because taking IPT drugs was almost universal at baseline. The reduction could be attributed to recall bias and reduction in the number of women that attended four or more ANC visits.

Figure 3.4-2: Percent distribution of women who took IPT drugs during last pregnancy



Findings in table 3.4-4 also show that, there were more women in the control sites who took iron tablets compared to women in intervention sites (D-in-D=-1.2 percent). Furthermore, there was an increase in women taking iron tablets for 90 days or more at endline evaluation compared to baseline in both intervention and control sites (10.5 percent and 14.9 percent respectively). Despite this increase, there were more women in control sites taking iron tablets for 90 days or more compared to the intervention sites (D-in-D=-4.4 percent).

Table 3.4-4: Percent distribution of uptake of iron tablets by women

	Endline		Baseline		Differences		D-in-D %
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
	%	%	%	%	%	%	
Took iron tablets	96.8	98.5	98.7	99.2	-1.9	-0.7	-1.2
Duration of taking iron tablets							
Less than 30 days	10.2	7.4	26.1	23.1	-15.9	-15.7	-0.2
30 to 59 days	21.0	20.1	17.7	20.1	3.3	0.0	3.3
60 to 89	21.8	21.6	23.1	23.7	-1.3	-2.1	0.8
90 days or more	43.6	47.7	33.1	32.8	10.5	14.9	-4.4
Don't know	3.4	3.2	0.0	0.4	3.4	2.8	0.6

Table 3.4-5 shows the percent distribution of place of delivery for women during birth of last child. Results show an increase in women delivering from a health facility (8.8 percent and 11.8 percent respectively). However, more women in control sites delivered from health facility compared to intervention sites (-3.0 percent). In some of the control sites, it was established that deliberate measures had been put up by health facilities working together with chiefs aimed at curbing home deliveries. Such measures included paying fines (such as chicken, goats) to the chief and monetary contribution to Safe Motherhood Action Group (SMAG) if women delivered at home. KI excerpt below highlight this point;

A KI (Chadiza) stated that; “Most women deliver from the clinic, if they deliver from home, they are required to give a goat to the chief and K20 to SMAG...this K20 has been increased to K50.”

Table 3.4-5: Percent distribution of places of delivery for women during birth of last child

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL	EL-BL	
	%	%	%	%	(Intervention)	(Control)	
Place of delivery							
Home	2.6	1.9	9.2	10.4	-6.6	-8.5	1.9
Government hospital	29.4	31.3	5.1	2.9	24.3	28.4	-4.1
Government health center	45.5	43.5	60.6	63.7	-15.1	-20.2	5.1
Government health post	16.7	15.9	22.0	18	-5.3	-2.1	-3.2
Private hospital/clinic	5.0	5.8	0.1	0.1	4.9	5.7	-0.8
Parent's home	0.5	0.7	0.5	0.2	0.0	0.5	-0.5
Other	0.3	0.9	2.5	4.7	-2.2	-3.8	1.6
Health facility*	96.6	96.5	87.8	84.7	8.8	11.8	-3.0
Home	3.4	3.5	12.2	15.3	-8.8	-11.8	3.0

*health facility includes both public and private clinics and hospitals

Table 3.4-6 shows the percentage distribution of persons providing assistance to women during delivery of last child. Findings show that more than 9 in 10 women were assisted by a skilled health personnel in both intervention and control sites. There were slightly more women being assisted by a skilled personal in intervention sites compared to control sites (D-in-D= 1.1 percent). Results further show reductions in women being attended to by a non-skilled personnel during delivery in both intervention and control sites (-8.6 percent and -9.1 percent).

Table 3.4-6: Percent distribution of persons who provided assistance during delivery

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL	EL-BL	
	%	%	%	%	(Intervention)	(Control)	
Traditional Birth Attendant	1.8	2.2	9.0	9.3	-7.2	-7.1	-0.1
Skilled Birth Attendant	4.7	5.8	6.8	13.5	-2.1	-7.7	5.6
Traditional Doctor	1.5	1.9	0.0	0.1	1.5	1.8	-0.3
Midwife	16.5	22	10.8	9.1	5.7	12.9	-7.2
Medical Nurse	59.5	56.9	65.3	60.7	-5.8	-3.8	-2.0
Medical Doctor	13.1	8.4	1.2	1.2	11.9	7.2	4.7
Family Member	2.3	1.7	5.2	5.5	-2.9	-3.8	0.9
Skilled birth delivery	93.8	93.1	84.1	84.5	9.7	8.6	1.1
Non-skilled birth delivery	5.6	5.8	14.2	14.9	-8.6	-9.1	0.5

In table 3.4-7, percentage distribution of women who attended postnatal care (PNC) after delivery of last child are shown. There was a reduction in the percentage of women attending postnatal care in intervention and control sites at endline compared to the baseline (14.4 percent and 11.7 percent respectively). However, there were more women in the control sites attending postnatal care compared to women in intervention sites (D-in-D=-2.7 percent).

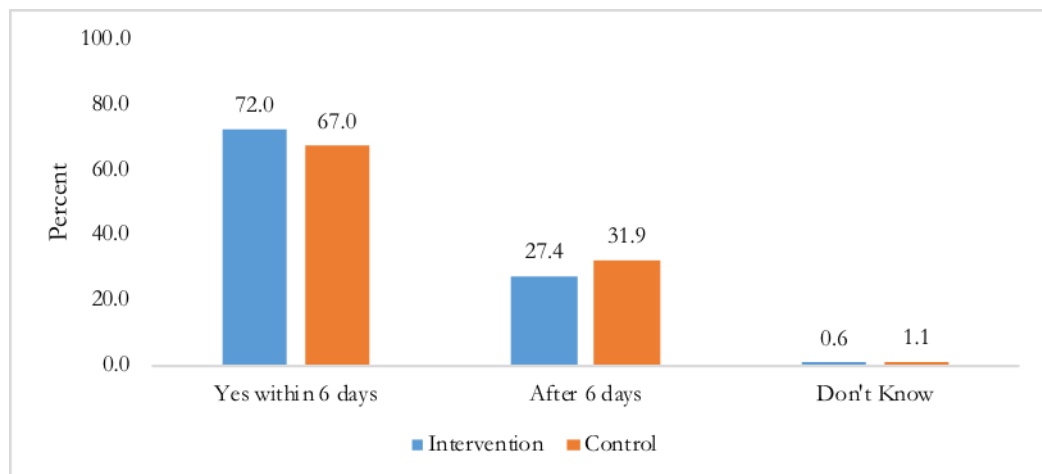
Table 3.4-7: Percent distribution of women with PNC attendance

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL	EL-BL	
					(Intervention)	(Control)	
PNC attendance	80.3	84.2	93.7	95.3	-13.4	-11.1	-2.3

Figure 3.4-3 shows the percentage distribution of timing of postnatal check-up for women after delivery of last child. More women in intervention sites (72 percent) compared in control sites (67 percent) attended their

first postnatal check-up within 6 days. It was learnt through KIIs that most women attend PNC within the first 6 days after delivery due to the fact that some health facilities are only able to issue an under-five card when a mother goes for PNC at 6 days. Further, women are also followed-up to ensure that they attend PNC. However, PNC at 6 weeks and especially at 6 months still remained a challenge.

Figure 3.4-3: Timing of postnatal check-up after delivery of last child



3.5. INFANT AND YOUNG CHILD FEEDING (IYCF) PRACTICES

Highlights

- About three quarters of infants were currently breastfeeding (74.8 percent in the control site and 74.5 percent in the intervention site).
- In both control and intervention sites, slightly over 70.0 percent of children consumed food made from grains or cereals.
- There was reduction in the percentage of children who were fed according to the WHO IYCF practices such as the MDD, MMF and MAD in both control and intervention sites.
- More children in intervention sites were fed appropriately by IYCF practices.
- There was an 11.7 percentage point reduction in stunting among children aged 6-35 months in intervention sites.
- Prevalence of weight-for-height z-scores (WHZ) was 4.4 percent and 4.2 percent at endline evaluation in intervention and control sites respectively compared to 4.1 percent and 3.9 percent at baseline.

Feeding practices play a critical role in child development. Poor feeding practices can adversely impact the health and nutritional status of children, which in turn may deter their mental and physical development. The duration and intensity of breastfeeding also affects a mother's period of postpartum infertility thereby affecting the length of birth intervals and fertility levels. This section highlights these aspects as captured through the N@C Project endline evaluation.

3.5.1. Breastfeeding

Exclusive breastfeeding is an important source of required food during the first six months of life (NFNC, 2009). Literature further shows that, optimal breastfeeding of children below the age of two years has the greatest potential on ensuring child survival (UNICEF, Index 24824). Findings in both the intervention and control sites show that breastfeeding is almost universal (99.6 percent and 99.2 percent respectively). However, there was reduction in the percentage of babies who were ever breastfed at endline compared to the baseline. Table 3.5-1 also shows that in both the intervention and control sites, there was an increase in the percentage of babies who were currently breastfeeding (25.6 percent and 29.6 percent respectively)

Table 3.5-1: Percent distribution of children born in the last 24 months by breastfeeding status

Breastfeeding status	Endline		Baseline		Differences		D-in-D
	Intervention %	Control %	Intervention %	Control %	EL-BL (Intervention)	EL-BL (Control)	
Ever breastfed	99.6	99.2	99.8	99.4	-0.2	-0.2	0.0
Currently breastfeeding	90.9	91.7	65.3	62.1	25.6	29.6	-4.0
Breastfed during the day and/or night before the survey	89.6	90.9	99.7	99.0	-10.1	-8.1	-2.0

3.5.2. Types of complementary foods

Ideally, complementary foods (solid or semisolid foods fed to infants in addition to breast milk) should be started at age 6 months, since at this age, breast milk alone is no longer sufficient to maintain a child's recommended daily allowances of nutritional requirements to enhance growth. Children are fed small quantities of solid and semisolid foods while continuing to breastfeed up to age 2 or beyond. The amount of food is increased gradually from 6 to 23 months onwards, which is the period of transition to eating regular diet.

Table 3.5-2 shows the percentage of children (aged below 36 months) by types of foods consumed in the day or night preceding the evaluation. Results show that, in both control and intervention sites, most of the children consumed foods mostly made from grains or cereals (71.1 percent and 73.7 percent respectively). Other foods included dark green leafy vegetables, other vegetables, vitamin A rich fruits, nuts and seeds.

Table 3.5-2: Foods consumed by children in the day and/or night preceding evaluation day

Food Group	Endline		Baseline		Differences	
	Intervention (%)	Control %	Intervention (%)	Control %	EL-BL (Intervention)	EL-BL (Control)
Cereals (Grains)	71.1	73.7	80.9	86.6	-9.8	-12.9
Vitamin A Rich Vegetables and Tubers	5.6	3.6	24.8	24.7	-19.2	-21.1
White Tubers and Roots	2.8	1.9	3.1	2.4	-0.3	-0.5
Dark Green Leafy vegetables	47.0	44.5	64.0	66.7	-17.0	-22.2
Other Vegetables	41.4	39.9	58.4	59.8	-17.0	-19.9
Vitamin A Rich Fruits	34.4	25.5	0.6	0.4	33.8	25.1
Other Fruits	7.9	8.8	8.8	8.6	-0.9	0.2
Organ Meat (Iron-Rich)	2.9	1.2	1.2	0.5	1.7	0.7
Flesh Meat	9.3	7.1	11.4	10.1	-2.1	-3.0
Eggs	6.9	2.9	4.6	5.2	2.3	-2.3
Fish	10.6	7.5	6.2	7.6	4.4	-0.1
Legumes, nuts & seeds	39.4	35.0	30.4	35.9	9.0	-0.9
Milk & Milk Products	5.7	4.6	6.6	4.0	-0.9	0.6
Oils & Fats	34.8	27.3	56.9	60.2	-22.1	-32.9
Sugar Sweetened Beverages	23.9	17.0	4.2	4.6	19.7	12.4
Ready-Made Snacks	6.6	3.9	2.5	0.9	4.1	3.0
Other Fortified Foods	1.6	1.9	0.2	0.5	1.4	1.4
Spices, Condiments & Seasonings	48.0	50.1	70.5	77.6	-22.5	-27.5

3.5.3. IYCF Indicators

In table 3.5-3 findings show that there was a reduction in the percentage of babies who were put to the breast within one hour of birth in both control and interventions sites (3.8 percent and 19.7 percent respectively). However, more babies in the control sites were put to the breast within one hour of birth compared to intervention sites. In addition, in both control and intervention sites, there was an increase in the percentage of babies who were put to the breast immediately after birth (15.8 percent and 13.7 percent respectively). More babies in the intervention sites were breastfed immediately after birth compared to control sites (D-in-D= 1.9 percent). With regard to exclusive breastfeeding among infants (0-5 months), there were significant increases for children in both the intervention and control sites by 40.4 and 41.4 percentage points at endline evaluation respectively; with the D-in-D showing minor differences between the intervention and control sites (1.0 percent). Table 3.5-3 shows that, in both intervention (63.6 percent) and control sites (67.3 percent), there was a reduction in the percentage of children aged 6-8 months who received complementary foods at evaluation compared to baseline (96.1 percent vs 69.2 percent and 92.8 percent). However, the increase in the percentage of children receiving complementary feeds was more in intervention sites than control sites (D-in-D = 5.4 percent).

At endline evaluation, only 18.1 percent and 13.9 percent of the children in intervention and control sites had the minimum dietary diversity score (MDDS) compared to 39.8 percent and 34.5 percent at baseline. In addition, the proportion of breastfed and non-breastfed children who consumed a minimum of two meals and four meals per day (semi-solid and solid foods) was 49.9 percent and 50.4 percent at endline compared to 66.9 percent and 68.5 percent at baseline evaluation respectively.

With regard to MAD, only about (two and one) in every ten children (breastfed and non-breastfed) in intervention and control sites received a MAD in the 24 hours' prior to the evaluation compared to two in

every 10 at baseline. In addition, only 2.9 percent and 2.3 percent of children aged 6-23 months in intervention and control sites received an iron-rich food or iron-fortified food compared to 13.6 percent and 11.4 percent at baseline respectively. These disparities between baseline and endline are indicative of timing at which these two studies took place as already alluded. Extracts from KIs indicated this fact:

A KI in (Chadiza) said “*Some women are busy in the field (hence do not have time to prepare food and feed children). They (women) do not have enough food to give children...young children have to wait and eat the same food as adults.... There are usually no meals in between given main meals*”.

Besides, the results in Table 3.5-3 further show that, among bottle fed infants, significant increases were observed for children in both the intervention and control sites by 33.5 and 43.5 percentage points at endline evaluation. However, more babies in the control sites were bottle fed compared to those in the intervention sites (D-in-D=-10.0 percent).

Table 3.5-3: Infant and Young Child Feeding Practices Indicators

Indicators	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
	%	%	%	%	%	%	
IYCF1: Timely Initiation of breastfeeding (0-23)							
Immediately	37.5	39.5	18.3	25.8	19.2	13.7	5.5
In less than one hour	27.6	31.4	63.1	51.3	-35.5	-19.9	-15.6
In less than 24 hours	26.0	20.4	17.6	21.1	8.4	-0.7	9.1
One day (24 hours or more)	2.9	4.5	0.9	1.8	2.0	2.7	-0.7
IYCF2: Exclusive breastfeeding (0-5) months	92.4	84.4	52.0	43.0	40.4	41.4	-1.0
IYCF3: Introduction of Solid/Semi-solid or soft food (6-8) months	69.2	60.5	96.1	92.8	-26.9	-32.3	5.4
IYCF4: Continued Breast feeding at (12-15) months	46.2	49	93.6	98.4	-47.4	-49.4	2
IYCF5: Minimum Dietary Diversity (6-23) months	18.4	11.3	39.8	34.5	-21.4	-23.2	1.8
IYCF6: Minimum Meal Frequency (6-23) months	52.8	45.2	66.9	68.5	-14.1	-23.3	9.2
IYCF7: Minimum Acceptable Diet (6-23) months	22.7	7.4	23.6	22.8	-0.9	-15.4	14.5
IYCF8: Iron Rich or fortified Solid/Semi-solid Foods (6-23) months	2.1	1.4	13.6	11.4	-11.5	-10	-1.5
IYCF9: Bottle feeding (0-23) months	53.5	59.5	20.0	16.0	33.5	43.5	-10.0

3.5.4. Children’s anthropometric

Anthropometric measurements (child’s height/length and weight) were also collected to situate children’s nutritional status in intervention and control sites. Presented in table 3.5-4 are standard deviation (SD) Z-score values for Height-for-Age (stunting), Weight-for-Age (underweight) and Weight-for-Height (wasting) for each age group of children disaggregated by gender.

Overall, table 3.5-4 shows that, three (3) in every ten (10) children aged 6-35 months are stunted in the intervention and control sites respectively. The aforementioned findings were an improvement over readings on stunting at baseline (five (5) in every ten (10) children). However, the D-in-D indicates that the highest reduction was observed in the intervention group (D-in-D = 0.1 percent). Moreover, based on the HAZ, it can also be observed that stunting increased with child’s increasing age (in months) in both intervention and control sites. Male children were more likely to be stunted than girls in both intervention and control sites (45.1 percent vs. 28.2 percent and 39.8 percent vs. 28.8 percent). Besides, results further indicate that, there was an improvement in the mean HAZ z-scores for both intervention and control sites from (-1.9 percent

and -1.8 percent) to (-1.5 percent (in both sites)) respectively. The mean HAZ z-scores were slightly worse for male children than females at both evaluation and baseline, although the mean HAZ z-scores (as disaggregated by gender) were slightly better off in control sites compared to intervention sites.

Results for the WAZ show that overall, 11.7 percent and 11.9 percent of the children were underweight at evaluation compared to 10.8 percent and 9.2 percent at baseline in the intervention and control sites. However, the D-in-D indicates a higher increase in WAZ in control sites compared to intervention sites (D-in-D = -0.5 percent). Similar to HAZ, WAZ increased with increasing age of children in both intervention and control sites for both evaluations. Disaggregated by gender, results indicate that, although there was a decline in the number of female children who were underweight from (10.8 percent and 9.0 percent) at baseline to (8.4 percent and 8.6 percent) at endline evaluation for both intervention and control sites, for male children however, the opposite was true. There was an increase in the number of male children who were underweight from (10.8 percent and 9.4 percent) at baseline to (14.7 percent and 15.2 percent) at evaluation for both intervention and control sites respectively.

Wasting on the other hand had a different scenario, where both intervention and control sites indicated marginal increases in WHZ at endline evaluation. The prevalence of WHZ was 4.4 percent and 4.2 percent at evaluation for intervention and control sites compared to 4.1 percent and 3.9 percent at baseline. The D-in-D for WHZ indicates a slight increase in intervention sites comparatively (D-in-D = 0.1 percent). By gender, there were more male children (5.3 percent vs. 6.8 percent) who were wasted at both evaluations in intervention and control sites compared to females (3.3 percent vs. 1.4 percent).

Overall, there was an 11.7 and 11.5 percentage points reduction in HAZ at endline evaluation in the intervention and control sites respectively. It is not clear what explains this result for the control sites but suffice to say the presence of other stakeholders with a focus on nutrition programs in both Lundazi and Chadiza may be part of the reasons. Notwithstanding, the benefits of the N@C project are indisputable since communities in intervention sites have or gained knowledge on good feeding practices for themselves and their children due to the presence of N@C. Extracts from a KII attest:

A KI in (Lundazi) said: *“The benefits that I have found are that previously, the diseases that were common were children becoming swollen, they used to swell a lot, even adults would swell very much, because we did not know the proper diet. But, now after CARE came, they taught us on foods to eat, the food groups are like this, such diseases have reduced compared to old times”.*

In a FGD, a participant (Lundazi) said; *“Now we have learnt how to eat diverse foods when previously we would just keep the foods that we produced. We did not know how to cook foods, because of CARE now we know how to cook. Sweet potatoes...we know how to prepare pumpkins. Now we know all those things”.*

Table 3.5-4: Children's anthropometric measurements

Variable	Stunting Endline						Stunting Baseline						Differences			
	Intervention			Control			Intervention			Control			Intervention	Control	D-in-D Stunting	D-in-D Mean Z-score
	% <-3 SD	% <-2 SD	Mean HAZ	% <-3 SD	% <-2 SD	Mean HAZ	% <-3 SD	% <-2 SD	Mean HAZ	% <-3 SD	% <-2 SD	Mean HAZ	EL-BL (<-2 SD)	EL-BL (<-2 SD)		
Age in Months																
6 - 11	5.5	24.8	-1.0	8.2	20.7	-0.9	11.7	28.5	-1.0	13.0	25.9	-1.0	-3.7	-5.2	1.5	-0.1
12 - 23	16.7	39.6	-1.6	12.8	34.8	-1.4	29.8	59.0	-2.2	27.2	51.2	-1.9	-19.4	-16.4	-3.0	0.1
24-35	19.6	44.9	-2.0	19.8	46.9	-2.1	26.5	51.0	-2.1	25.9	52.5	-2.1	-6.1	-5.6	-0.5	0.1
Child's Sex																
Male	17.8	45.1	-1.7	18.1	39.8	-1.6	28.2	55.1	-2.1	25.5	48.2	-1.9	-10.0	-8.4	-1.6	0.1
Female	10.8	28.2	-1.4	9.2	28.8	-1.3	19.7	42.5	-1.6	21.4	43.6	-1.6	-14.3	-14.8	0.5	-0.1
Total	14.5	37.0	-1.5	13.7	34.3	-1.5	24.2	48.7	-1.9	23.4	45.8	-1.8	-11.7	-11.5	-0.2	0.1
Variable	Underweight Endline						Underweight Baseline						Differences			
	Intervention			Control			Intervention			Control			Intervention	Control	D-in-D underweight	D-in-D Mean Z-score
	% <-3 SD	% <-2 SD	Mean WAZ	% <-3 SD	% <-2 SD	Mean WAZ	% <-3 SD	% <-2 SD	Mean WAZ	% <-3 SD	% <-2 SD	Mean WAZ	EL-BL (<-2 SD)	EL-BL (<-2 SD)		
Age in Months																
6 - 11	1.7	9.5	-0.1	2.2	9.0	-0.2	1.8	8.7	-0.2	2.2	5.4	-0.1	0.8	3.6	-2.8	-3.5
12 - 23	3.5	11.6	-0.5	2.9	10.7	-0.5	3.2	11.1	-0.7	1.4	8.6	-0.5	0.5	2.1	-1.6	-1.9
24-35	3.6	14.3	-0.9	3.1	16.3	-0.9	1.8	11.9	-0.8	3.9	12.1	-0.8	2.4	4.2	-1.8	-4.3
Childs Sex																
Male	3.6	14.7	-0.6	4.3	15.2	-0.7	2.4	10.8	-0.7	2.8	9.4	-0.6	3.9	5.8	-1.9	-5.7
Female	2.5	8.4	-0.4	1.2	8.6	-0.4	2.4	10.8	-0.5	2.1	9.0	-0.5	-2.4	-0.4	-2.0	0.5
Total	3.0	11.7	-0.5	2.8	11.9	-0.5	2.4	10.8	-0.6	2.4	9.2	-0.5	0.9	2.7	-1.8	-2.6
Variable	Wasting Endline						Wasting Baseline						Differences			
	Intervention			Control			Intervention			Control			Intervention	Control	D-in-D Wasting	D-in-D Mean Z-score
	% <-3 SD	% <-2 SD	Mean WHZ	% <-3 SD	% <-2 SD	Mean WHZ	% <-3 SD	% <-2 SD	Mean WHZ	% <-3 SD	% <-2 SD	Mean WHZ	EL-BL (<-2 SD)	EL-BL (<-2 SD)		
Age in Months																
6 - 11	2.2	7.7	0.2	1.3	3.9	0.3	1.8	4.1	0.6	1.1	4.3	0.7	3.6	-0.4	4.0	0.0
12 - 23	1.1	3.7	0.2	2.9	6.6	0.1	0.6	2.8	0.6	1.4	3.8	0.6	0.9	2.8	-1.9	0.1
24-35	0.9	2.8	0.2	1.1	1.1	0.4	1.5	4.5	0.5	0.7	2.8	0.5	-1.7	-1.7	0.0	-0.2
Childs Sex																
Male	1.4	5.3	0.2	3.7	6.8	0.1	1.4	3.8	0.6	1.7	4.7	0.5	1.5	2.1	-0.6	0.1
Female	1.1	3.3	0.2	0.0	1.4	0.4	1.4	4.5	0.5	0.9	3.2	0.7	-1.2	-1.8	0.6	-0.1
Total	1.3	4.4	0.2	1.9	4.2	0.2	1.4	4.1	0.6	1.2	3.9	0.6	0.3	0.3	0.0	0.0

3.6. WATER, SANITATION AND HYGIENE PRACTICES

Highlights

- There was an increase of 22.8 percentage points of households with access to protected water sources in intervention sites.
- There was an increase in the percentage of households who treated drinking water in intervention site at endline (35.1 percent) compared to baseline evaluation (18 percent).
- Boiling water and use of chlorine were widely used.
- More than half of women in intervention sites indicated they washed hands at all critical times.
- There was an increase in washing of hands after using the toilet at this evaluation (87.4 percent from 82.1 percent).
- A reduction of 16.3 percentage points in households that no longer practice open defecation in intervention sites.

This section presents findings of the evaluation on sources of drinking water, treatment of water and methods used to treat the water. Further, the section also presents findings on types of toilet facility used by households, practices on washing of hands at critical moments and place of defecation for children.

3.6.1. Source and treatment of drinking water

Table 3.6-1 shows the percentage distribution of households by drinking water sources. An increase represented by 22.8 percent and 25.1 percent for intervention and control sites respectively was observed in the number of households with access to protected water sources at endline evaluation compared to baseline evaluation. This was mostly due to the N@C project. According to the 2015 LCMS report, 51.6 percent of rural areas in Zambia had access to improved water sources and 76 percent of households in Eastern province had access to improved water sources.

Findings in table 3.6-1 further show an increase of 17.1 percentage points in households that treated drinking water in intervention sites at endline compared to baseline evaluation. Further, 40.7 percent and 48.9 percent of women that reported treating water in intervention sites, used boiling and bleach/chlorine respectively as a method. Comparatively, the difference (D-in-D=1.4 percent) in the use of bleach/chlorine to treat drinking water between the control and intervention sites was minimal.

Boiling water and use of chlorine methods are preferred because chlorine is accessed when available at the nearest health facility or in shops. Boiling water is common because it is easier and when households are far from health facilities, it is more economical. The N@C project endeavored to ensure people utilize locally sourced materials or methods to cope with daily life and boiling of drinking water was very critical. FGD transcript affirm this position.

A FGD participant in Lundazi said; “... *when there is no Chlorine because most of us cannot be given chlorine in our households, we can get the water and boil it, you cover it and wait for it to cool and the germs are killed.*”

Table 3.6-1: Percent distribution of households by source and treatment of water

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
Protected water source	82.0	86.1	59.2	61.0	22.8	25.1	-2.3
Unprotected water source	18.0	14.0	40.6	39.0	-22.6	-25.0	2.4
Treat Drinking Water	35.1	28.9	18.0	20.0	17.1	8.9	8.2
Method of treatment							
Boil water	40.7	32.9	5.5	4.9	35.2	28.0	7.2
Add bleach/chlorine	48.9	45.2	16.2	13.9	32.7	31.3	1.4
Strain it through the cloth	2.2	1.9	0.1	0.4	2.1	1.5	0.6
let it stand and settle	3.9	6.5	2.1	1.9	1.8	4.6	-2.8

Table 3.6-2 shows the average time taken to fetch water. Women took 18.3 and 17.8 minutes round trip to fetch water in intervention and control sites respectively; an increase of 4.3 and 3.8 minutes for the intervention and control sites respectively.

Table 3.6-2: Average time required to fetch water in minutes

		Endline		Baseline		Differences		D-in-D
		Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
Protected water source	Mean(minutes)	18.3	17.8	14.0	14.0	4.3	3.8	0.5
	Standard dev	21.5	21.4	11.9	10.2	9.6	11.2	-1.6
Unprotected water source	Mean(minutes)	29.1	28.5	16.0	16.2	13.1	12.3	0.8
	Standard dev	28.8	24.3	11.3	13.9	17.5	10.4	7.1

3.6.2. Type of toilet facility used

The provision of facilities and services that enable safe disposal of human waste (urine and faeces) is of great importance to reduce morbidity and mortality. This evaluation-collected data on types of toilet facilities used in both intervention and control sites and this information is tabulated in table 3.6-3. Overall, results show an increase in the percentage of households using toilets with slab (25.7 percent and 24.8 percent for intervention and control sites respectively). Although there was an increase in the percentage of households using flush/pour flush to septic tank, (0.3 percent and 0.6 percent for intervention and control sites respectively), very few households had access to such facilities. Similarly, while the use of open pit/pit latrine without slab was found to be common among households, there was a decrease in the use of such toilets in both control and intervention sites, (-14.3 percent and -15.9 percent respectively). It is worth noting that there was a decrease of 16.3 percent and 15.3 percent in the intervention and control sites respectively in the proportion of households without access to toilet facilities.

Table 3.6-3: Percentage distribution of households by type of toilet facility

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
Flush/pour flush to septic tank	0.3	0.6	0.1	0.1	0.2	0.5	-0.3
Pit latrine with slab	35.1	31.7	9.4	6.9	25.7	24.8	0.9
Pit latrine without slab/open pit	51.6	55.2	65.9	71.1	-14.3	-15.9	1.6
Hanging toilet/hanging latrine	0	0.2	0.1	0	-0.1	0.2	-0.3
No facilities/bush/field(open defecation)	8	6.5	24.3	21.8	-16.3	-15.3	-1
Other	0.6	1.1	0.2	0	0.4	1.1	-0.7

3.6.3. Place of defecation for youngest child

Appropriate disposal of children stool is very important since it helps to prevent the transmission of fecal oral diseases such as diarrhea. Table 3.6-4 shows that most children defecated outside the yard or house (49 and 45 percent in intervention and control sites respectively). The use of a potty (in rural sites) is almost non-existent. The evaluation learnt that children (below the age of three) practice open defecation and feces are picked and thrown in the toilet and at times also washed. FGD citations affirm this:

A FGD participant in Lundazi said; *“the faeces (of young children) are picked and thrown in the toilet. For washable diapers, you put in a bucket that can be covered and then you wash them when you have time in the evening”*

However, there are views that some households still had inherent negative methods of stool disposal. The extract below attests;

KI (Lundazi) stated that, *“There may be still those that just throw babies stool anywhere, but usually when they see us they practice the things we taught them. Some women do not listen, in the villages there are people of different behaviors, some throw in the toilet and others just throw were people throw other things. Others throw in the rubbish pits but most throw in the toilet and it’s common to throw in toilet if you have a toilet.”*

Table 3.6-4: Percentage distribution of households by disposal of child stool

	Endline		Baseline		Differences		D-in-D
	Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
	%	%	%	%			
Used potty	1.7	0.9	0.4	0.5	1.3	0.5	0.8
Used washable diaper	26.9	31.9	11.8	12.0	15.1	20.0	-4.9
Used disposable diaper	2.9	4.3	0.3	0.1	2.6	4.2	-1.6
Used latrine	8.2	6.9	37.6	34.6	-29.4	-27.7	-1.7
Went in his/her clothes	10.8	9.9	22.4	24.9	-11.6	-15.0	3.4
Went in house	0.3	0.2	24.1	22.8	-23.8	-22.6	-1.2
Went outside of house/yard	49.2	45.9	3.2	5.0	46.0	40.9	5.1
Don't know	0.2	0	0.1	0.0	0.1	0.0	0.1

3.6.4. Hand washing at critical times

Table 3.6-5 shows that, most of the women washed their hands at critical times. Most women in intervention sites washed their hands for all the five critical times. A FGD extract attest:

A participant in a FGD (Lundazi) said; *“We have emphasized and now women wash hands immediately after using the toilet and before touching anything.”*

The use of tippy taps promoted during the N@C project implementation were essential to the increase in the proportion of women who washed hands after using the toilet. KIs commended the N@C project for the provision of tippy taps which subsequently has generally improved community sanitation. KI extracts attest to these findings:

KI (Chadiza) stated that, “*One thing that people have really changed is that in the old times, everyone would wash hands in the same dish, this one washes there, another one washes in there, and another one washes there. They didn’t know that they were washing the dirt that others left.*”

Another KI (Lundazi) stated that, “*We encourage women in this community to wash hands whenever they want to eat food and that is what everyone knows....we have also taught them that they are supposed to wash their hands after visiting the toilet and they are practicing that. Women also wash their hands after doing some dirty work.*”

Table 3.6-5: Percentage distribution of respondents reported handwashing practices at critical times

		Endline		Baseline		Differences		D-in-D
		Intervention	Control	Intervention	Control	EL-BL (Intervention)	EL-BL (Control)	
		%	%	%	%	%	%	
Before eating	Never	3.2	3.7	1.0	0.5	2.2	3.2	-1.0
	Always	93.0	93.5	95.8	97.1	-2.8	-3.6	0.8
	Sometimes	3.8	2.8	3.2	2.4	0.6	0.4	0.2
Before preparing the food	Never	21.5	23.7	4.1	4.9	17.4	18.8	-1.4
	Always	64.6	59.3	81.9	82.6	-17.3	-23.3	6.0
	Sometimes	13.8	17.0	14.0	12.5	-0.2	4.5	-4.7
Before feeding the baby	Never	29.3	32.1	7.1	7.1	22.2	25.0	-2.8
	Always	56.6	52.2	79.7	85.1	-23.1	-32.9	9.8
	Sometimes	14.1	15.7	13.2	7.8	0.9	7.9	-7.0
After toilet use	Never	4.7	3.7	2.3	2.1	2.4	1.6	0.8
	Always	87.4	88.1	82.1	85.7	5.3	2.4	2.9
	Sometimes	7.9	8.2	15.6	12.2	-7.7	-4.0	-3.7
After changing the baby	Never	25.8	29.3	11.3	10.9	14.5	18.4	-3.9
	Always	60.5	58.4	66.8	74.6	-6.3	-16.2	9.9
	Sometimes	13.7	12.3	21.9	14.5	-8.2	-2.2	-6.0
Wash hands, other	Never	0.0	0.0	82.9	84.1	-82.9	-84.1	1.2
	Always	17.5	13.8	12.0	11.8	5.5	2.0	3.5
	Sometimes	0.0	0.0	5.0	4.1	-5.0	-4.1	-0.9

3.6.5. Hand cleansing agent

Washing of hands without detergent or any local cleansing agent is not sufficient to kill the bacterium that might be on the hands. Therefore, it is always recommended that people should wash their hands with a cleansing agent. In table 3.6-6 data shows an increase of 36.5 percent in the use of soap when washing hands in the intervention sites at endline evaluation. There was also an increase of 20.1 percent in the use of ash as a cleansing agent in the intervention site as well. An increase in the use of detergents (liquid/powder/paste) in intervention and control sites (4.8 percent and 9.5 percent) was also observed. Women in intervention sites used more cleansing agents such as bar soap, ash, mud/sand and other local cleansing agents while those in control sites were using more detergents (paste/liquids/powder) and liquid soap (including shampoo) comparatively. The use of both local and other cleaning agents was higher at endline evaluation compared to baseline evaluation.

Table 3.6-6: Percent distribution of women by type of cleansing agents used during hand washing

	Endline		Baseline		Differences		D-in-D
	Intervention %	Control %	Intervention %	Control %	EL-BL (Intervention)	EL-BL (Control)	
Soap/detergent							
Bar soap	48.2	41.5	14.4	10.2	33.8	31.3	2.5
Detergent(powder/liquid/paste)	6.0	10.3	1.2	0.8	4.8	9.5	-4.7
Liquid soap including shampoo	0.0	0.4	0.2	0.0	-0.2	0.4	-0.6
Locally sourced cleansing agent							
Ash	21.0	17.3	0.9	0.7	20.1	16.6	3.5
Mud/sand	5.1	5.5	0.2	0.2	4.9	5.3	-0.4
Other local cleansing agent	0.0	0.9	0.1	0.0	-0.1	0.9	-1

3.7. WOMEN EMPOWERMENT

Highlights

- There was a decrease in the percentage of women who participated in decision making regarding their own health care in both intervention and control sites.
- There was a decrease in the percentage of women who participated in decision making concerning their child's health in both intervention and control sites.
- There was a decrease in the percentage of women in decision making about spending own money either independently or jointly.
- There was an increase in the percentage of women deciding on spending husband's money in both intervention and control sites (5.1 percent and 6.3 percent respectively).
- There was a decrease in the percentage of women who participated in decision making with regards to sharing food in the household.

This section presents findings of the evaluation on women empowerment regarding women's participation in household decision-making.

3.7.1. Women's participation in decision making

Table 3.7-1 shows women's participation in household decision-making on 12 types of key decisions pertinent in a home setting. Women participate in decision making when they make decisions alone or jointly with their husbands/spouses. There was reduction in the percentage of women who participated in decision making about their health care and that of their child in control and intervention sites. However, more women in intervention sites participated in making decisions regarding their own health care compared to women in control sites (D-in-D= 9.2 percent). More women in intervention sites also participated in decision making regarding their child's health than women in control sites (D-in-D= 8.8 percent).

Results in table 3.7-1 also show that, there was a decrease in the percentage of women in decision making about spending own money either independently (20 percent in the intervention sites and 22.8 percent in the control) or jointly with their husband in both control and intervention sites (28.8 percent and 31.5 percent respectively). However, more women in intervention sites participated in decision making about spending their own money than women in control sites (D-in-D=2.7 percent). Table 3.6-1 further shows an increase in the percentage of women making decisions about spending husband's money in both intervention and

control sites (5.1 percent and 6.3 percent respectively). It is worth noting that more women in the control than intervention sites participated in decision making about spending husband's money (D-in-D=-1.2 percent). Nevertheless, more women in intervention sites participated jointly with their husbands as regards spending husband's money than women in control sites.

Table 3.7-1 further shows that in both intervention and control sites; there was a reduction in the percentage of women who participated in decision making about sharing food in the household (26.4 percent and 30.8 percent respectively). However, more women in the intervention participated in this decision compared to women in control sites (D-in-D=4.4 percent). In the same way, there was also reduction in the percentage of women who participated jointly with their husbands as regards sharing food in the household (18.6 percent in intervention sites and 17.5 percent in control sites). However, more women in the control than intervention sites participated jointly with their husbands on food sharing (D-in-D=-1.1 percent).

Table 3.7-1: Percent distribution of women by decision making about important household and other activities

Decision about:	Endline		Baseline		Differences		D-in-D
	Intervention %	Control %	Intervention %	Control %	EL-BL (Intervention)	EL-BL (Control)	
Own health:							
You (respondent)	25.9	21.8	83.1	88.2	-57.2	-66.4	9.2
Your husband	54.3	52.1	7	3.2	47.3	48.9	-1.6
Both you and your husband	9.3	12.3	9.5	7.4	-0.2	4.9	-5.1
Other	10.5	13.7	0.4	0.6	10.1	13.1	-3
Child's health:							
You (respondent)	38.5	33.6	59.1	63	-20.6	-29.4	8.8
Your husband	36.9	39.2	11.4	8.6	25.5	30.6	-5.1
Both you and your husband	18.1	20.9	28.8	27.9	-10.7	-7	-3.7
Other	6.6	6.3	0.7	0.6	5.9	5.7	0.2
Large household purchases:							
You (respondent)	6.7	9.9	6.3	5.1	0.4	4.8	-4.4
Your husband	62.1	57.8	49.4	45.6	12.7	12.2	0.5
Both you and your husband	20.6	22	40.3	46.2	-19.7	-24.2	4.5
Other	10.6	10.3	4	3.1	6.6	7.2	-0.6
Household purchases for daily needs:							
You (respondent)	30.5	31.9	56	60.8	-25.5	-28.9	3.4
Your husband	43.4	41	9.5	5.4	33.9	35.6	-1.7
Both you and your husband	15.6	16.8	30.8	31	-15.2	-14.2	-1
Other	10.5	10.2	3.7	2.8	6.8	7.4	-0.6
Own visit to family relatives:							
You (respondent)	12.7	15.7	30.6	35.4	-17.9	-19.7	1.8
Your husband	59.9	58.2	25.8	26.9	34.1	31.3	2.8
Both you and your husband	17.3	17.2	41.5	36.1	-24.2	-18.9	-5.3
Other	10	8.9	2	1.7	8	7.2	0.8
Family visit to parent's family:							
You (respondent)	9.3	11.8	10.6	11.5	-1.3	0.3	-1.6
Your husband	63.7	59.9	32.6	37.1	31.1	22.8	8.3
Both you and your husband	16.5	18.5	53.3	48.8	-36.8	-30.3	-6.5
Other	10.6	9.8	3.5	2.6	7.1	7.2	-0.1
Spending own money:							
You (respondent)	16.8	16.8	36.8	39.6	-20	-22.8	2.8
Your husband	54.2	55.8	13.6	8.4	40.6	47.4	-6.8
Both you and your husband	20.2	19.8	49	51.3	-28.8	-31.5	2.7
Other	8.8	7.6	0.6	0.7	8.2	6.9	1.3
Spending husband's money:							
You (respondent)	10	9.9	4.9	3.6	5.1	6.3	-1.2
Your husband	58.7	55.8	39.5	35.4	19.2	20.4	-1.2
Both you and your husband	22.2	24.4	50.1	56.3	-27.9	-31.9	4
Other	9.1	9.9	5.5	4.8	3.6	5.1	-1.5
Selling Large Items:							
You (respondent)	4.7	7.6	5	4.7	-0.3	2.9	-3.2
Your husband	62.5	59.7	42.5	40.8	20	18.9	1.1
Both you and your husband	22.2	21.5	48.1	51.4	-25.9	-29.9	4
Other	10.7	11.2	4.3	3.1	6.4	8.1	-1.7

Sell Small Items:							
You (respondent)	19.1	18.1	32.1	37.8	-13	-19.7	6.7
Your husband	49.2	49.1	18.6	13.2	30.6	35.9	-5.3
Both you and your husband	21.4	22.4	45.4	46.3	-24	-23.9	-0.1
Other	10.3	10.4	3.9	3	6.4	7.4	-1
Work to Earn Money							
You (respondent)	12.6	16.2	30	33.9	-17.4	-17.7	0.3
Your husband	64.3	60.4	32.3	24.5	32	35.9	-3.9
Both you and your husband	14.6	16	37	41	-22.4	-25	2.6
Other	8.5	7.4	0.7	0.6	7.8	6.8	1
How food is shared when not have enough:							
You (respondent)	37.6	35.3	64	66.1	-26.4	-30.8	4.4
Your husband	42	42.9	4.2	2.3	37.8	40.6	-2.8
Both you and your husband	9.9	11.4	28.5	28.9	-18.6	-17.5	-1.1
Other	10.5	10.4	3.3	2.6	7.2	7.8	-0.6

3.8. PROGRAM PARTICIPATION – INTERVENTION SITES ONLY

Highlights

- The rate of participation in nutrition support group (NSG) meetings was 36 percent.
- Participation rate in village loans and savings association (VSLA) was 13.4 percent.
- Only 7 percent of women participated in SAA program.
- Participation rate in Tippy Tap program was 30.8 percent.

This section presents findings of the evaluation on the participation of women in community programs that encourage sanitation, nutrition literacy, economic development and women empowerment in intervention sites only.

3.8.1. Women’s Participation in N@C Programs

This evaluation was primarily designed to also gather information on women’s participation in various community programs introduced through the N@C project. These programs include the Nutrition Support Group (NSG), Village Savings and Lending Association (VLSA), women empowerment Social Action Analysis (SAA) and Tippy tap programs.

Findings in table 3.8-1 show that there were more women that attended NSG meetings (36 percent) while only 13.4 percent participated in VSLA. It was learnt that higher levels of participation in VSLA would have been achieved if the implementation of this component were introduced at the same time as health, nutrition and agricultural components. Another reason for low participation in VSLA stated by KI was that some husbands in the community bar their wives from such activities because they were of the view that once women have money they become disrespectful. Extract from the KII attest to this cultural hindrances:

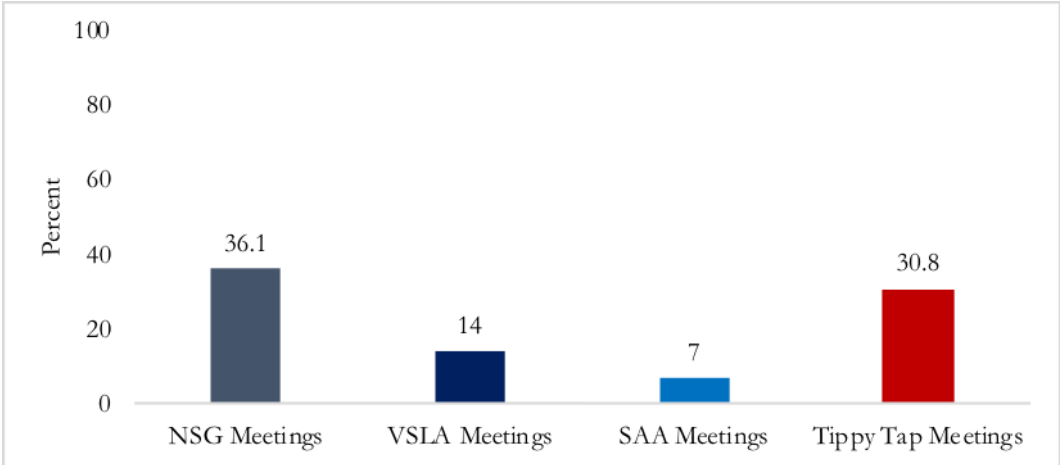
A KI (Lundazi) stated that, *“some men do not allow their wives to engage in village banking activities because they think they will become disrespectful.”*

However, participation in SAA programs was low (7 percent). This was attributed to challenges associated with organization of meetings and other gender related challenges still existing in much of rural Zambia. Extracts from the KIIs attest to this cultural hindrances:

A KI (Chadiza) noted that, *“One major challenge (in implementing N@C activities) is that sometimes it was the group leaders who were supposed to organize people...attendance was poor maybe because of miscommunication”* While another KI (Lundazi) stated that, *“some people have welcomed women empowerment whilst others are against it because some men believe a woman is not supposed to do anything other than house chores only.”*

In addition, 30.8 percent of women participated in WASH programs such as the Tippy Tap.

Figure 3.8-1: Percentage of various program participation of women



4. LESSONS LEARNT ON THE N@C PROJECT

In the current section, we attempt to highlight some of the lessons we thought could be shared as a result of the N@C project. The lessons learnt presented are based on the consultants' analysis and conclusions on responses from KIIs.

Project interventions using already established district and community health and agricultural infrastructure ensures a sense of ownership by targeted project beneficiaries. The choice of staff to coordinate the N@C project activities at health facility and agricultural camp level was cardinal to the success of the project. However, health staff were required to monitor the CHVs and NSGLs outside their regular or daily workloads; some of the staff engaged (i.e. nurses and EHTs) found it difficult to participate in community outings or educational programs since there are many NHCs per health facility. This approach therefore left much of this work to either volunteers or CARE staff who may or may not have been available for all these activities. The learnt lesson therefore would mean for the future, a less busy cadre, specifically trained for project activities would instead be more beneficial. In addition, most of the staff such as the CHVs, EHTs and nurses affiliated to the N@C were themselves not nutritionists and therefore relied on information and activities from the district nutritionists or CARE. This may be avoided in future projects to ensure no adulteration of delivery of project activities.

Whilst monthly activity preparatory meetings were held with women and other staffs involved in the project, it is vital that planning for project activities include all key stakeholders from the district up to the community level. Staff at the health facility and community level were of the view that they mostly implemented activities expected of them by CARE and had limited input on what and how activities were to be undertaken. The lesson learnt from this perspective is to ensure future activities involve all from planning to implementation to ensure the cementation and ownership of the project and also for future sustainability. Another lesson learnt was that merely encouraging staff and NSG members on ensuring that the program continues may not effectively result in uptake and adoption of the N@C initiatives into the existing platforms because different players at health facility level had different interpretations of how N@C and NSGs will sustainably continue operating after CARE ceased to operate in the districts. During planning phase, there was need to deliberately design the purported project structure, design and operation of N@C interventions beyond the project end that would have guided the stakeholders such as health facility staff.

Materials provided to staff by the N@C project aided the learning process on maternal and child health and nutrition related subjects and more especially on how to prepare various locally available nutritious foods. Most, if not all of materials provided for demonstration of various foods were in English. Whilst this may have been adopted for standardizing purposes, the lesson learnt was for the need to have these materials translated in languages spoken in Lundazi and Chadiza districts. Translation was done at trainings by trainers with limited command of the local languages; this had potential to distort some messages. For the future projects, it will be pertinent to have such materials translated and have them more in picture form to accommodate women with less education who are the majority in much of rural Zambia. In the design of the project, the focus was on women with children that had not yet attained the age of age 3. However, women with older children to some extent felt to have been discriminated from the project initiatives. Therefore, women and grandparents (“Dr Gogo”) would discourage and discredit the aspects of nutrition that N@C promoted. The mothers to women in NSGs usually use they (the women in NSG) as a reference to how it is irrelevant to attend the NSG meetings, since, they were raised without such nutrition support. Some women in the NSGs reported that they had to choose either knowledge from N@C or obedience to their parents. Initiatives such a N@C may periodically consider incorporating or focusing on all women in the reproductive age group in rural communities where grandmothers play a critical role in raising grandchildren because nutritional programs benefit all.

Effective monitoring of the N@C by government staff was problematic. Mostly, lack of adequate transport and insufficient fuel availability inhibited these staff to conduct frequent monitoring visits to all NSGs in various NHCs, which are too many per health facility. The lesson therefore and for future projects to work

effectively in monitoring of these groups would be to ensure such requirements were readily available. Frequent monitoring could have enabled quick identification of areas in project that needed strengthening.

Knowledge gained by women as a result of interactions with the N@C likely enhanced women and child health in both Lundazi and Chadiza districts. However, some individuals prefer direct benefits to themselves rather than communal, and future project focus require to factor this aspect from inception. Further, whilst cooking demonstrations were meant to help women to learn how to prepare nutritious foods using available local foods, which NSG members were supposed to contribute, this instead was viewed as providing help to CARE to promote their project and not vice versa. In addition, NSGLs gave an indication that some NSG members were of the view that health facility, CARE and/or the NSGL should have been providing the required foods. Nevertheless, the lesson learnt was that the genuine lack of food to use in cooking demonstrations resulted in NSGs failing to conduct cooking demonstrations. Another lesson learnt from here was that future similar projects, should have adequate sensitizations aimed at ensuring that women are made to understand why they have to make contributions for cooking demonstrations.

5. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Discussion of findings

The goal of N@C project was to improve the nutritional status for women (15-49) and children less than 3 years of age in Chadiza and Lundazi districts, identified as resource poor geographical areas. The N@C project therefore aimed at improving nutrition-related behaviors, use of maternal and child health and nutrition services, increasing household adoption of appropriate water and sanitation practices and increasing availability and equitable access to quality food. This led to adapting and working with different stakeholders in order to achieve the desired outcomes through interventions in agriculture, maternal and child health, WASH and women empowerment.

Agriculture production is a major economic activity in Zambia more especially in rural areas where about 80 percent of the population are engaged. Findings from the N@C project endline evaluation have shown that most households (88 percent) in the intervention sites produced their own food to sustain their livelihood. The 2015 Living Conditions and Monitoring Survey (LCMS) Report shows that 89.4 percent of households in rural areas engaged in agricultural activities. The 2015 LCMS Report also shows that Eastern Province had the highest number of agricultural households in the tune of 307,640 representing 89.8 percent. Trainings implemented by the N@C project did not only introduce women to planting new crops thereby introducing diversity, but also in food crop storage and preservation (fruits and vegetables). Notably also was that the N@C project led to a paradigm shift in community (women) mindset where household nutrition status preceded the desire to earn income. In the same way, provision of dryers used to preserve fruits and vegetables had enhanced nutrients intake in Lundazi and Chadiza districts.

Agricultural extension officers played an important role in the implementation of agricultural production and food security interventions of the N@C project. Some of these roles included; facilitation of trainings of target groups on different topics related to agriculture farming (orange maize and sweet potato production) and food crop storage and preservation. The N@C project linked households in intervention sites to agricultural extension officers; results show that these officers visited more households in the intervention sites than in the controls sites. Agriculture officers argued that more could have been done, but, the frequency of visits to households relied on availability of resources such as fuel which was inconsistently provided. Further, agricultural officers indicated that in some instances would-be participants never showed up for meetings, as such they lagged behind in agricultural and food security information that was to be provided within a particular month.

Food security occurs when “all people at all times have physical and economic access to food to meet their dietary needs for a productive and healthy life” (World Food Summit, 1996). This is important because children from food secure households are less likely to be malnourished compared to those from food insecure households. In food insecure households, an indicator known as the Household Hunger Scale is commonly used to assess hunger partly because of its applicability across cultures (Ballard et al., 2011; Deitchler et al., 2010). Overall, findings have shown that there was a reduction of food secure households (little or no hunger in households) at endline evaluation compared to the baseline. This could be attributed to the lean time “hunger months” at which the evaluation was conducted since most households had just begun farming and most likely had little food preserved and stored from their harvest for household consumption. This also entails inertia in the application of methods learnt from the N@C on food preservation and storage. In all aspects, while the lean period reason may explain these findings, it is also worrisome since some practices initiated by the N@C project were not implemented or scantily implemented.

The N@C project was multifaceted and among issues of importance enshrined was ANC. It is true in principle and practice that issues of nutrition affect both mothers and children quite significantly. In view of this intertwines of relations between maternal health and nutrition, this evaluation collected data on ANC as well. It is also well known fact that “Antenatal Care (ANC) from a skilled provider is important to monitor the pregnancy and reduce the risk of morbidity and mortality for the mother and her baby during pregnancy and delivery”. The quality of ANC can be monitored through the services received and the kind of

information mothers are given during their visit (ZDHS 2013-14). Findings show that more than 90 percent of women attended ANC at endline and baseline evaluations in both intervention and control sites. Further, more than half of women in intervention and control areas had their first ANC in the first trimester. These findings are higher than those of the 2013-14 ZDHS, which found that only 1.4 percent of women in Zambia attended their first ANC in the first trimester. The evaluation found that there was a reduction in women attending 4 or more ANC visits at endline compared to baseline. However, even with this reduction, these findings are better when compared to the 2013-14 ZDHS report which indicated that 55.2 percent of women in rural Zambia attended at least 4 antenatal visits. The N@C project created a cohort of women who became a mechanism to inform others on the need and importance of early ANC booking. In addition, these cohorts or groups of women, provided a basis for enhanced learning and communication on ANC and therefore affected better outcomes on this intervention. In the same way, results under this study also found that almost all women took iron tablets; this is similar to what was recorded by the 2013-14 ZDHS report where 95.4 percent of women took iron tablets or syrup during pregnancy.

A very important component of the N@C intervention was the message on the importance of pregnant women to deliver at health facilities and also being attended to by a skilled health personnel when such a moment came through. In the intervention sites of the N@C, most (96.6 percent) of the deliveries took place at health facilities, indicating a 11.8 percentage point's increase when compared to the baseline assessment. The N@C project may have been one of the drivers of this achievement and FGD (already stated earlier) with women affirmed this aspect.

Delivery from health facilities was or is not an end in itself; once women delivered, it is important that they go back to health facilities for check-up both for their sake and their children. The N@C endline evaluation collected data on this outcome. According to the 2013-14 ZDHS report, "the postpartum period is particularly important for women, as during this period they may develop serious, life-threatening complications". In the N@C endline evaluation, most women attended their first PNC visit within six days of delivery. These findings have increased when compared to the 2013-14 ZDHS report, which shows that only 3.8 percent of women in Eastern province attended PNC at 3-6 days. Some of the N@C interventions, which may have influenced this outcome, included follow-ups that were a typical of the N@C project in the NSGs. Further, in both the intervention and control sites, some health facility initiatives such as withholding of children's under-five cards was motivation for women to return for postnatal checkup within six days.

A major focus of the N@C project was nutrition for women and more also for children. Women consuming foods from five or more food groups have a greater likelihood of meeting their micronutrient needs than women consuming foods from fewer groups (N@C Baseline, 2014). Findings of the evaluation have shown that, women in both the intervention and control sites were not meeting their micronutrient needs. Evidence of meeting or not meeting micronutrient needs is exhibited physically by either the BMI (in women) or by HAZ, WAZ or indeed other IYCF indicators generated through anthropometric measurements. Using the BMI for women as a measure, this evaluation found that overall there was an improvement in the mean BMI of women for both intervention and control sites, although the increase was higher in the N@C project sites. However, normal BMI at endline evaluation in both the intervention and control sites had reduced. It is a known fact, obesity is an outcome of over nutrition. Suffice to note that in the 2013-14 ZDHS report, 15.6 percent and 4 percent of women in Eastern Province were overweight and obese respectively. As such the findings of the endline evaluation are not odd. These findings suggest the need for programs such as the N@C to focus not only on dealing with underweight but should include aspects of controlling overweight and obesity among women in areas where such interventions are implemented in future.

Within the nutrition platform, the N@C design among others contributed to the improvement of IYCF indicators in children especially. While the proportion of children put to the breast immediately after birth increased in both control and intervention sites, findings on other WHO recommended IYCF indicators did not perform as good. For example, the MDDS, MMF and MAD all performed below what was found at baseline. While these results are indicative of the lean period in which the endline was conducted, it is

possible also that there may have been lack in terms assimilation of knowledge and the importance of meeting these dietary recommendations. In addition, it is also possible that women have genuine lack of access to locally available nutritious foods coupled with inadequate time to prepare nutritious food and time to feed their children

While the forgoing indicated a gloomy picture in terms of the IYCF outcomes, the endline evaluation shows a convincing improvement in stunting levels amongst children aged 6-35 months in intervention sites. This was a 1.9 percentage point higher than what the project had intended to achieve. However, stunting levels improved more in the control compared to intervention sites. It is not clear why this may be the case, however, what should be noted is that Lundazi and Chadiza have other players working to improve the nutrition status of mothers and children. Some of the interventions include the Saving Mothers Giving Life (SMGL) project under USAID and CDC and the SUNI project whose focus is intervening during the First 1000 Most Critical Days. In the same way, the evaluation found that children in both intervention and control sites were more underweight compared to baseline, and this seemed to increase with increasing age of the children. As already stated in previous sections, the lean period under which this evaluation was conducted could have been one of the reasons; however, it was also established that the N@C design where women whose children turned two years were graduated may have created an impression that such children did not need any more nutritional concerns thereby affecting these outcomes. Results in this evaluation indicate that children who were 24 months and above were more likely to be underweight than those who were younger at the time of evaluation. In addition, it is also viewed that once children attain age 2 years, there is a general inconsistency among mothers to continue presenting such children for under five clinics.

Another very critical ingredient to nutrition for both women and children is access to clean water and safe sanitation. WASH helps improve health, life expectancy, gender equality, and other important issues of national and international development nature (Kooy, M. and Harris, D. 2012). Results in this evaluation show that most households had access to protected water sources; meaning they had low exposure to waterborne diseases. The N@C project interventions had a positive effect on most of the people through WASH. In the same way, not only was access to potential clean water encouraging, but results also show that generally, people were also making water safe to drink by either boiling it or indeed adding chlorine. In terms of sanitation, results show more improvements attributable mostly to the N@C interventions although, as pointed out already, other organisations such as Akros and the Ministry of Local Government and Housing also have a presence in the two districts through the Community Led Total Sanitation (CLTS). In the same way, the number or proportion of households with access to build toilet structures improved at endline while the proportion of individuals practicing open defecation reduced. In addition, disposal of stool also improved while the proportion of women washing their hands at critical times was also generally better.

The N@C was also designed to empower women with knowledge on many aspects of their livelihoods. It has become traditional for nutrition programs to incorporate women empowerment due to the link it has with general household nutrition status and other outcomes affecting children. It has been argued that ability for women to be able to make decisions on their own as regards their personal circumstances is an essential element of empowerment and serves as an important contributor to their overall development. Evaluation results have shown that there was a reduction in the percentage of women who participated in decision making regarding health care, child's health, spending own money and how food is shared in the household in both control and intervention areas. This is so because in rural areas, men continue wielding more power over women and therefore make a number of decisions concerning the household. While this result was or is counterproductive to the aspirations of the N@C and other gender empowerment programs, it is more a learning perspective than an end in itself. The gender agenda will require extensive paradigm shift in Zambia for it to yield intended results. However, based on FGD extracts, it is argued that household decision making for women is determined by the kind of relationship that they have with their husbands. For example, some women reported that they took a leading role in the decision making through provision of suggestions or initiating an idea; and since the final decision rested on a man's acceptance, it is also likely therefore that few women would feel they made such a decision. In whatever form, women empowerment agenda requires recasting and remodeling to suite the cultural orientation existing in much of rural Zambia.

5.1.1. Integrated Approach to Nutrition

The use of health facilities in addressing barriers to WASH was commendable because most communities respect the authenticity of information provided by health staff. However, the use of health personnel based at facilities may have impeded the efficiency of N@C project operations. This is because health facility personnel only dedicated a portion of time to the project since they had other demanding duties of attending to patients. Where resources allow, it would be convenient to have some N@C personnel at health facilities solely dedicated to the implementation of project interventions. Further, emphasis on integrating the traditional leaders as one of the key stakeholders to work with the EHTs would have also contributed to achieving the objective of households adopting appropriate WASH practices. This is because traditional leaders have a high level of legitimacy and command influence in rural communities. Traditional leaders can institute punitive measures in cases where households are not adhering.

In food security and access to nutritious foods, N@C project engaged the agricultural extension officers to provide support to NSGLs and household beneficiaries in vegetable production, storage and preservation. The endline evaluation established that these integrations may have enhanced fidelity of information provided to communities. This is because agricultural extension officers are experts in their field and no training was required other than familiarizing them to N@C project interventions.

While the introduction of the NSG was cardinal, the integration could have considered other existing avenues by simply strengthening them. In order to effectively, apply the N@C activities at community level using the newly introduced NSGLs, training was important. However, most of these had limited and/or no knowledge on food security and women empowerment. As a result, integrating CHVs would have had better outcomes than having new NSGs. Most CHVs have training in maternal, child health and nutrition and other aspects at the health facility level. Moreover, CHVs were providing the WASH aspect of the trainings in the NSGs. Further, the project should have considered the use of lead/contact farmers in implementing some aspects of food security as these have already undergone some training in agriculture and are also attached to the Ministry of Agriculture community structures.

Lastly, the integrated approach relies on expertise from different sectors involved. Synergies develop when there is team effort at design stage and not only during the implementation of project activities. The approach could have deliberately incorporated different stakeholders at planning of project activities because they would have added their experiences to enhance the achievement of the N@C project objectives; this opportunity was clearly missed out.

5.1.2. Intervention Effectiveness

The N@C project endline evaluation also aimed at evaluating the effectiveness of core program interventions. Incorporating agriculture activities to improve access to food and nutrition is commendable. However, there seemed to be more emphasis on food diversity and less focus on higher productivity. With food diversity, people have access to different kinds of food but this is only beneficial if the diversity is sustained over a 12-month period. Endline evaluation findings show signs of diversity in the foods consumed but households were already experiencing food shortages while others skipped meals as a coping strategy.

The promotion of the use of Tippy taps was effective because it brought water closer to the toilet facilities thereby enhancing hand-washing practices. This contributed to the increase in people washing hands after using the toilet. This evaluation found that in comparison to the baseline, an increase in people that washed hands after using the toilet and the tippy tap system was pivotal to this success. Women also learnt, appreciated and put into practice the use of clean water and the evaluation documented cases of women having accessed water from distant sources because nearby areas did not have protected water sources. Further, a significant percentage point's reduction in households that practice open defecation was achieved. This achievement was cardinal in the reduction of water borne diseases.

The use of CHVs and NSGLs was effective because of the outreach programs and follow-ups conducted in communities. Because the CHVs and NSGLs interacted with the NSG members, it was easier to identify and advise women on appropriate maternal and child health behaviors and practices such as attending ANC and PNC in time, exclusive breastfeeding and complementary feeding. Further, women reported that they reminded each other in cases of doubt on dates and CHVs would also make follow-ups on women to remind them on the importance of adhering to ANC and PNC visits. This contributed to improved visitations and health seeking behavior for maternal and child health services to health facility overtime.

The focus on women may also have affected the project effectiveness; the evaluation found that there was a lot of influence by men in decisions on household aspects including the purchase of essential household commodities. This implies that although a woman may have had the knowledge in the appropriate food needs, majority of men still decided on which foods should be provided. As earlier alluded to, the need to periodically incorporate men and other women of the reproductive age was cardinal to eliminating negative feeding practices and adoption of appropriate WASH practices, food security and health seeking behavior being promoted by the project.

Using Anthropometric and BMI measures, which are true reflections of results obtaining in intervention sites, the N@C project achieved its goal of contributing to improved nutrition status. However, we are of the view that women may have reported being more vulnerable as a strategy to campaign for more help from CARE. Despite having results indicating overweight and obese signs in women, indicating “over nutrition”, women somehow reported more vulnerability at endline compared to the baseline.

5.1.3. Sustainability

This evaluation documented varied perspectives that may promote or hinder sustainability of the N@C project initiatives. The design of the N@C project aimed at ensuring sustainability of health and nutrition initiatives by working through existing structures such as the health facility and neighborhood health committees (NHCs). At each health facility, NHCs in specific catchment areas were channels through which women (and in some instances pregnant women) were enrolled for membership in NSG. Each NHC had a provision for one NSG whilst NHCs with large population sizes and those communities, which were far apart, had a provision for two NSGs.

Each NSG was designed to have a maximum of 20 members; and whilst the N@C project targeted women with children below the age of 3 years, the evaluation established that once their child attained the age of 2 years, such women were graduated from the NSG. Graduating children above two years created more space for more women to be enrolled as long as they met the set criteria. This approach had or has the ability to ensure continuation of group meetings without creating unnecessary gaps while making NSG meetings more “exciting” since at all intervals of two years, new women get in on the project. There were other aspects within this arrangement with a high potential to hinder sustainability of the N@C project. Paying allowances during preparatory meetings and stationary were inbuilt dangers to sustainability since once these, provisions were no longer available, people then became disinterested in some or most of the activities initiated through the project. KI interviews with health personnel indicated that some CHVs and NSGLs had already started absconding preparatory meetings because there were no longer monetary incentives.

In the same way, the N@C project provided stationary, including a standardized household visit form and activity form. These forms enabled CHVs, NSGLs and other staff to report on activities or health and nutrition problems in communities i.e. recording of malnourished children in need of health and nutrition support. These reports were critical sources of information from which more activities or course of actions were generated and planned. With the current phase out process of the N@C project, some health facility staff expressed doubt as to whether or how they would continue providing stationary to continue the feedback mechanism espoused by the N@C project. Subsequently therefore, this reporting mechanism, if not handled and assimilated in the normal health facility system will be lost. It will be incumbent therefore upon the N@C project as it phases out to customize this reporting process to suit the MoH system. There was no

deliberate effort by N@C to engage or influence the uptake of program interventions into existing feedback and reporting platforms and systems on this particular front.

Whilst N@C project implementation ended only some three months ago, most stakeholders (e.g. health and agricultural staff) had not yet set up clear systems and structures to ensure sustainability of initiatives set by the project. Some health facilities' staff indicated that there were no measures in place to enable sustainability of the project's activities; other health facility staff however were more positive and more proactive in that they had initiated processes of incorporating activities set up by the N@C project into their systems. This opportunity can be followed to strengthen those not ready and to encourage those hoping to proceed with the system.

The N@C project had quite a good number of volunteers; however, voluntarism in most of such projects has been highly monetarized and it is therefore very possible for these volunteers to shift camp once they perceive no more gains from the N@C project. It is evident currently that some of these volunteers are no longer keen to continue some of the N@C activities and this therefore possess a significant blow to the sustainability of the N@C initiatives. Apart from the aforementioned, voluntarism in much of the intervention sites worked through the CHVs; these cadre of volunteers were or are in most cases already engaged in a number of other activities supported by other partners within the same areas. In most cases, therefore, the CHVs are almost always overwhelmed and if supervision on N@C activities is compromised (as is the case currently due to the phase-out), efforts of the N@C may erode within the shortest possible time.

The design of the flow of information in the N@C project was linear, from the district to the NSGs, through a series of stakeholders. In other words, information, education materials and support provided from the center (CARE staff at the district) to the peripheries (health facility) will now be unavailable thus creating an information gap. This entails that the onus is in the desire of the health facility and agricultural staff involved in the N@C project to continue with the design and implementation of the project initiatives which will not only require adequate time to prepare but will also be challenging. In this vein, strengthening of local actors to adopt N@C proposed interventions or scale them up is uncertain and may impede on sustainability.

5.2. Conclusion

The goal of N@C project was to improve the nutritional status for women (15-49) and children less than 3 years of age in identified resource poor geographical areas of Lundazi and Chadiza districts of Zambia. The project collaborated and worked with other structures especially government in the fight against stunting among children below the age of 3 years. Although there were disparities in achievements, the N@C contributed quite significantly towards achievement of the goal and objectives of the intervention. Evidence presented in this report suggests that women's nutritional status has improved although with room for more improvement; nutrition related behavior also exhibited change although some IYCF indicators under performed. Findings have also shown improvement in the use of maternal and child health and nutrition services as well as an increase in households adopting appropriate water, and sanitation practices. Most importantly, the project contributed intensely to the impact indicator of reducing stunting among children aged 3 years and below.

This endline evaluation was designed to collect quantitative information on nutrition-related topics and to measure achievement/impact of the program. It was designed to measure nutrition-and related topics including: infant and young child feeding practices, food security, child nutritional status, maternal nutrition, WASH, and women's empowerment. This purpose has been achieved through this evaluation process. In addition, the current evaluation had two major objectives namely; 1. To provide an objective assessment of the achievements and results, weaknesses and strengths of the project and; 2. To document evidence, lessons learned and good practices to inform future nutrition programming. In view of the depth and detail of results and findings as well as discussions highlighted in this report, it is fair to state that the two objectives set for this evaluation have generally been achieved. It should be noted that nutrition programs are a complex phenomenon in most of the rural areas of Zambia and require not only a concerted effort as exhibited

through the N@C, but also ensure targeting includes both genders even when it is known that women are the real custodians of positive health outcomes at household level.

5.3. Recommendations

Based on the findings and lessons learnt from this evaluation, the following are the recommendations to guide future nutrition programming:

6. *IYCF practices and current nutritional status among children 0-36 months of age and among women of the reproductive age (WRA)*: Despite having a reduction in stunting, findings have shown that stunting increased with increasing age of a child and that more males than females were stunted. Therefore, approaches to reducing stunting for children should focus on the first 1000 most critical days by: encouraging early initiation and exclusive breastfeeding and timely introduction of complementary feeding with appropriate MDD, MMF and MAD irrespective of child's sex, through promotion and consumption of cheap, easily accessible locally available foods.
7. *Household food security status*: The N@C project incorporated agricultural activities as a means to improve food availability and accessibility for diverse diets in households. Nevertheless, some households were food insecure, which calls for a need to promote not only dietary diversity but also higher productivity. This is because higher productivity will enable households store and preserve enough food, which will not only ensure food availability but also diversity throughout the year.
8. *Household WASH practices*: Increased access to improved drinking water, sanitary facilities and better hygiene practices is cardinal to reduce vector infectious diseases (such as diarrhea) that may cause children to be malnourished again if not well managed. As part of an exit strategy, CARE should liaise with the local authorities (councils) and leaders in these communities to ensure Community Led Total Sanitation (CLTS) Programs are scaled up so that intervention and control sites remain open defecation free zones if gains made by the N@C project are to be sustained. Further, EHTs should work with traditional leaders because they have a high level of legitimacy and command influence among their people and can institute punitive measures in cases where households default on WASH facilities and practices.
9. *Women's empowerment*: Discussions on women empowerment still attract misinterpretations among people especially in rural areas where women are taught to be submissive to their husbands. It is imperative for projects like N@C to deliberately involve men in selected discussions on women empowerment so that they are also able to understand the importance of joint decision making on household needs and its influence on child health and nutrition status as well as all household members.
10. *Evaluations*:
 - iii. In future assessments, the timing of the evaluations (baseline and endline) need to be done during similar times as this will allow for effective comparisons of the changes that may have taken place as a result of the interventions. This is so because; nutritional indicators such as underweight are sensitive to slight changes in food availability and nutritional value of foods available at that particular time to both the mother and children. The increase in underweight children at endline evaluation may have been affected by the timing of the evaluation (December) which is a lean period when in essence, the baseline was conducted in (June/July) when people have quite a lot of food supplies.
 - iv. In future evaluations, the process needs to be sequential where qualitative data is preceded by quantitative data collection. After quantitative data is analysed, qualitative questions to give meaning to the findings should be generated. This approach will give a detailed account of what the actual practices might have been; what weaknesses were observed; what best practices can be adopted and what lessons can be carried forward.

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APPENDICES

Appendix A: Evaluation Work Plan

The final evaluation is planned to place from November to January, 2017 with planning and submission of final report. The work plan is shown in Table 5;

Appendix A: Proposed N@C Endline Evaluation Work Plan

Activities	Responsible Persons	Deliverables	Nov Week 3	Nov Week 4	Nov Week 5	Dec Week 1	Dec Week 2	Dec Week 3	Dec Week 4	Jan Week 1	Jan Week 2	Jan Week 3	Jan Week 4
Initial meeting & contract signing	CARE Zambia	None	13 th										
Development of Inception Report and finalise survey tools	Consultants	Inception Report	13 th – 20 th										
Submission of Protocol to ERES and feedback	Consultants	Protocol and Evaluation Tools		20 th – 28 th									
Planning for logistics (human & financial)	Consultants & CARE Zambia	Contracts for field team			27-28 th								
Training of field team, Pilot & Finalise tools	Consultants & CARE Zambia	None				4-6 th							
Data collection from the field & transcribing	Consultant & field team	Field Report				8-18 th							
Data cleaning, analysis & report writing	Consultants	None						19 th Dec-7 th Jan					
Submission of draft report & review by CARE	Consultants & CARE	Draft report									8 th – 12 th		
Incorporation of feedback & submission of final report	Consultants	Final report, dataset, analysis syntaxes & transcriptions										15 th – 25 th	
Dissemination of findings	Consultants & CARE Zambia	None											TBA

Appendix B: Application of the D-in-D Method

There has to be two time periods with pre and post indicator values for the intervention and comparison groups respectively, in this case the N@C project had collected indicators at baseline evaluation and endline evaluation. Procedure involved calculating the difference in the various indicator values at baseline evaluation (2014) and endline evaluation (2017) for the intervention and comparison sites respectively for Chadiza and Lundazi districts separately. Thereafter, calculation of the D-in-D of the intervention and comparison group pre and post results. It is this difference-in-differences which can then be associated as a causal effect of the N@C project interventions.

Appendix B: Measurement of change associated to project interventions (D-in-D)

	Group where project interventions was done change (Intervention)	Group where project interventions were not implemented (Comparison)
After the N@C project end (endline values, 2017)	$Y_1(u_i) \mid D_i=1$	$Y_1(u_i) \mid D_i=0$
Before the N@C project start (baseline values, 2014)	$Y_0(u_i) \mid D_i=1$	$Y_0(u_i) \mid D_i=0$
Difference	$(\bar{Y}_1 \mid D=1) - (\bar{Y}_0 \mid D=1)$	$(\bar{Y}_1 \mid D=0) - (\bar{Y}_0 \mid D=0)$

$$\mathbf{D-in-D} = [(\bar{Y}_1 \mid D=1) - (\bar{Y}_0 \mid D=1)] - [(\bar{Y}_1 \mid D=0) - (\bar{Y}_0 \mid D=0)]$$

A negative D-in-D indicates that a change in the control site is larger than that in the intervention site while a positive D-in-D gives an indication that a change in the intervention site was higher than that in the control site. Simply put, a positive D-in-D gives the likelihood that more women in the intervention site had for instance attended antenatal care compared to those in the control site and the opposite is also true.