

# MELA RESEARCH

**Infant and young child  
feeding practices, household  
food security and nutrition  
in SNNP, Ethiopia: A  
*baseline study for A&T***

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**This study was sponsored by World Vision  
Ethiopia, June 2010, Addis Ababa**

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## ACRONYMS

A&T:	Alive & Thrive program
AED:	Academy for Educational Development
ANC:	Antenatal Care
BCC:	Behavioral Change Communications
BCG:	Bacillus of Calmette and Guerin
BMI:	Body mass index
CBN:	Community-based nutrition
CDC:	Center for disease control and prevention
DALYs:	Disability adjusted life years
HEP:	Health Extension Program
HEW:	Health extension worker
IFHP:	Integrated Family Health Program
IYCF:	Infant and young child feeding
MAD:	Minimum Acceptable Diet
MDD:	Minimum Dietary Diversity
MMF:	Minimum Meal Frequency
NCHS:	National Center for Health Statistics
PENAT:	Pentavelent
PPS:	Probability proportion to size
PSU:	Primary sampling unit
SD:	Standard Deviation
SNNPR:	Southern Nations Nationalities and Peoples Region
TB:	Tuberculosis Bacilli
UK:	United Kingdom
USA:	United States of America
vCHW:	voluntary Community Health Worker
WHO:	World Health Organization

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The Alive & Thrive program in Ethiopia is funded by the Academy for Educational Development (AED) and implemented by the World Vision Ethiopia along with other partners.

The SNNPR regional health bureau has been quite instrumental in facilitating the successful conduct of the study. This baseline study has been possible thanks to the many women and children in the study areas who responded to the rather lengthy questionnaire.

The highly dedicated data collectors, survey supervisors and data entry clerks are commended for collecting and compiling the data. Kathryn Reider and Dr. Mesfin Beyro provided technical guidance at various stage of the study and also provided useful comments on an earlier version of this report.

## EXECUTIVE SUMMARY

Funded by the Academy for Educational Development (AED), World Vision along with other partners<sup>1</sup> is implementing the Alive & Thrive program (A&T) in Ethiopia over a period of five years (2009-2013). The goal of Alive & Thrive is to increase rates of exclusive breastfeeding and improve feeding practices for children 6-23 months of age. Specifically, A&T aims to reduce by at least 50% the disability adjusted life years (DALYs) lost due to poor infant and young child feeding (IYCF), reaching more than 16 million children 0 to 23 months across the three countries. A&T program objectives are to - develop new models for creating demand and sustaining improved IYCF at large scale in three distinct learning environments, test novel private-public partnerships and other approaches for improving IYCF, advocate for sustained IYCF support and monitor and evaluate progress.

As part of the initial activities of the project, World Vision Ethiopia conducted a baseline study in the A&T project target Woredas of SNNPR. This is a multi-indicator survey focusing on child feeding practices, nutritional status of children and mothers, maternal and child health care services including child immunization, morbidity and treatment seeking practice, antenatal care use, among others. It was conducted in four A&T implementation Woredas in SNNPR, namely *Chencha*, *Hulla*, *Humbo* and *Kochore* and four non-implementation Woredas as control Woredas. The control Woredas includes *Bursa*, *Dita*, *Kindo Koyisha* and *Wonago*. The selection of control Woredas considered similarities in livelihood zones, absence of other implementing partners including the Integrated Family Health Program (IFHP), and non-existence of other major interventions that could likely impact feeding practices and nutrition conditions of children, among others.

The survey employed a two-stage cluster sampling approach. A total of 1600 women with children 0-23 months were interviewed (800 in the intervention and 800 in the non-intervention area). Anthropometric measurements were taken from children aged 0-59 months in the selected households. Women's body mass index (BMI) was also measured.

The study obtained ethical clearance from the SNNPR regional ethical clearance committee. It was fielded during the period August-September 2010.

Detailed recommendations by area of focus are provided in the main text of this report. Below is a summary of the salient findings of this baseline study.

### **Household water and sanitation:**

- About 63.5% of the households in the intervention and 68.5% in the non-intervention have access to clean water supply (i.e. piped water into dwelling, piped into compound, piped outside compound, covered well and protected spring).
- The vast majority of the households in both areas reported to have pit latrine/traditional pit toilet facility – 87.7% in the intervention and 86.6% in the non-intervention.

### **Household Food Insecurity:**

- About 19% and 23.5% of the households in the intervention and non-intervention area, respectively, reported that there was ever a day in the previous 30 days where there was no food at all in the household because there were no resources to get food.
- The proportion that reported that there was no food at all in the household for 10 or more days (last 30 days) because there were no resources to get food was only 1.8% and 3% in the intervention and non-intervention areas, respectively.

- The proportion of households who were ever not able to eat the kinds of foods they preferred because of a lack of resources (in the last 30 days) were 30.8% and 37.6%, respectively, in the intervention and non-intervention areas.
- About 31% and 36% of the households in the intervention and non-intervention areas, respectively, said household members ever ate a few kinds of food day after day because of a lack of resources in the last 30 days.
- About 31% and 34% of the households in the intervention and non-intervention area, respectively, reported that household members ever eat food that they did not want to eat because of a lack of resources to obtain other types of food during the last 30 days.

#### **Maternal health care service use:**

- On the whole, 51.4% and 47.8% of women in the intervention and non-intervention area, respectively, received antenatal care (ANC) during pregnancy of their child age 0-23 months. Only 16.7% of the women in both study areas received 4 or more ANC visits during pregnancy.
- Health posts reported to be the primary sources for antenatal care in both study areas. Of all the women who had ANC in the previous 2 years, 59.4% in the intervention and 69.1% in the non-intervention had their ANC check up in health posts.
- The vast majority of the births (96.4% in the intervention and 96.9% in the non-intervention) took place at home. Institutional delivery is reported at 3.6% in the intervention and 3.1% in the non-intervention areas.

#### **Vitamin A to mother within 2 months after delivery:**

- Only 7.5% and 5.1% of the mothers in the intervention and non-intervention areas, respectively, reported to have received Vitamin A during the first 2 months after child birth.

#### **Child Immunization**

- Based on the information either recorded on the card or reported by the mother, 22.4% and 30.2% of the children in the intervention and non-intervention areas, respectively, were fully vaccinated.
- Analysis of vaccine-specific data shows that 72.4% in the intervention and 82.9% in the non-intervention have received Bacillus of Calmette and Guerin (BCG) vaccine.
- Pentavalent (PENTA) 1 was received by 64.2% and 72.2% of the children in the intervention and non-intervention area, respectively. Whereas PENTA3 by 35.4% and 49.8%, respectively. The continuation rate from the first to the third dose of PENTA indicated considerable dropout (46.5% in the intervention and 35.6% in the non-intervention).
- Measles coverage was found 44.4% in the intervention area while it slightly higher in the non-intervention at 50.2%.

#### **Vitamin A and De-worming**

- Among children age 6-23 months about 38% in the intervention area and 34% in the non-intervention reported to have received Vitamin A during the six months prior to the survey.
- In the same age group, de-worming tablets were received by 24.4% and 19.4% of the children in the intervention and non-intervention areas, respectively.

#### **Childhood illness and treatment practice:**

- In the whole, 21.9% and 23.2% of the children age 0-23 months, respectively, in the intervention and non-intervention area reported to have any illness in the previous 2 weeks.
- Of all children age 0-23 months, 8.2% in the intervention and 7.5% in the non-intervention reported to be sick with ARI in the previous 2-week. Among those mothers with children having had symptoms of ARI, 52.7% and 39.6% of children in the intervention and non-intervention area, respectively, were taken to health facility/provider for treatment.
- The 2-week incidence of fever is reported at 13.8% and 13.1%, respectively, in the intervention and non-intervention areas. Among children who were sick with fever in the previous 2 weeks, 55.1% of those in the intervention and 42.3% those in the non-intervention were taken to health facilities.
- In the previous two weeks, 14.4% of the children in the intervention and 14% in the non-intervention reported to have diarrhea. Among those children with diarrhea, 57% were taken to health facility.

#### **Timely initiation of breastfeeding:**

- Among children 0-23 months the proportions that started breastfeeding within an hour of birth were 63.5% and 62.7%, respectively, in the intervention and non-intervention areas.

**Pre-lacteal feeding:**

- Among children age 0-23 months, 13.6% in the intervention and 14.7% in the non-intervention were given pre-lacteal feeding.

**Colostrum feeding:**

- Among children 0-23 months, 71.2% in the intervention and 67.9% in the non-intervention reported to have received colostrum.

**Exclusive breastfeeding among children 0-5 months:**

- Based on a 24-hour mother's recall, the proportion of children age 0-5 months that were given only breast milk (exclusively breastfed) were 57.9% and 65.6%, respectively, in the intervention and non-intervention areas.

**Continued breastfeeding:**

- In the intervention area 96.6% of the children age 12-23 months reported to have breastfed for 1 year or longer. The corresponding figure in the non-intervention area was even higher at 98.4%.

**Bottle feeding:**

- Among children age 0-23 months, the proportions that were fed with bottle the previous day were 5.5% and 5.7%, respectively, in the intervention and non-intervention areas. The highest bottle feeding rate of 13.1% was reported among women with children 6-11 months in the intervention area.

**Introduction of solid, semi-solid or soft foods:**

- Among children age 6-8 months, 85% and 94.4% of the children in the intervention and non-intervention areas, respectively, had received solid, semi-solid or soft foods in the previous day.

**Minimum Dietary Diversity:**

- Children age 6-23 months who received foods from 4 or more food groups in the previous day are considered meeting the minimum dietary diversity. In this survey, the proportion of children age 6-23 months who met the minimum dietary diversity was low at 7.2% in the intervention and 1.7% in the non-intervention. The lowest minimum dietary diversity rate was noted among children age 6-11 months at 4.6% in the intervention and nil in the non-intervention.

**Minimum Meal Frequency:**

- Breastfed and non-breastfed children age 6-23 months who received solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more the previous day are considered meeting the minimum meal frequency. Minimum is defined as 2 times for breastfed children age 6-8 months, 3 times for breastfed children 9-23 months, and 4 times for non-breastfed children 6-23 months. 'Meals' include both meals and snacks (other than trivial amounts), and frequency is based on caregiver report. Based on the definition for minimum frequency for breastfed and non-breastfed children, 55% and 52% of the children age 6-23 months in the intervention and non-intervention areas, respectively, can be considered meeting the minimum meal frequency

**Minimum Acceptable Diet:**

- The minimum dietary diversity and minimum meal frequency scores were combined to form the minimum acceptable diet. Only 5% and 1.5% of the children in the intervention and non-intervention areas, respectively, met the minimum acceptable diet. There is some trend in the proportion having the minimum acceptable diet by age. In the intervention area, it increased from a low of 3.1% among children 6-11 months to 4.7% and 7.5%, respectively, among children age 12-17 and 18-23 months.

**Nutritional status of children:**

- Among children age 6-23 months, the proportion of children stunted (<-2SD) were 32.3% and 36%, respectively, in the intervention and non-intervention area.
- The proportions wasted (<-2SD) among children age 6-23 months were 9.4% and 7.4%, respectively, in the intervention and non-intervention areas.



- The proportions underweight (<-2SD) among children age 6-23 months were 31.6% and 38.2%, respectively, in the intervention and non-intervention areas.

#### **Nutritional status of women**

- Based on the Body Mass Index (BMI), 13.4% of the women in the intervention and 15.7% in the non-intervention were malnourished (BMI<18.5). Only 1% of the women in both areas were severely malnourished (BMI<16).

#### **Type of information on child feeding and nutrition:**

- Most women, 63.6% in the intervention and 62.1% in the non-intervention, reported that they heard about putting the baby to breast immediately after birth in the previous year.
- Information on feeding the baby only breast milk up to 6 months (i.e. exclusive breastfeeding) was reported to be received by 48.1% and 50% of the women (last year) in the intervention and non-intervention areas, respectively. About 37% and 41.4%, respectively, reported that they heard about feeding colostrums in the first day or two until breast milk comes.
- Some of the women (27% in the intervention and 34.9% in the non-intervention) reported that they received information on postponing giving children water and any other liquid up to the age of 6 months.
- Women in general lack information on issues such as on how to help child eat better, how to feed children when sick, and feeding a child an extra meal or extra food during illness. They also lack information concerning position for proper breastfeeding and emptying one breast before giving to the other side.

#### **Source of information on child feeding and nutrition:**

- Health extension workers appeared the leading source of information on child feeding practices as reported by 29.9% and 38.2% of the women in the intervention and non-intervention areas, respectively.
- Next to HEWs, families/friends/neighbors were reported among the major sources of information on child feeding, as reported by 25.8% and 26% of the women in the intervention and non-intervention areas, respectively.
- Volunteer community health workers (vCHWs) were reported among the sources of such information by 9.4% and 15% of the women, respectively.

#### **Access to Timed Targeted Counseling (TTC) :**

- Among women with children 0-23 months, 19.8% in the intervention area and 26.5% in the non-intervention reported receiving information on child feeding practices from HEWs during the 3<sup>rd</sup> trimester of pregnancy.
- About 19% and 17.2% of the women in the intervention and non-intervention areas, respectively, were contacted by HEWs at the day of birth who talked about child feeding practices.
- The proportion of women who reported having been contacted by HEWs at the 4<sup>th</sup> week after child birth was 15.2% and 18.3% in the intervention and non-intervention areas, respectively.
- At the 4<sup>th</sup> month following delivery only 13.4% and 21.2% of the mothers, respectively, in the intervention and non-intervention were contacted by the HEWs.
- Sixteen percent of the mothers in the intervention and 21.3% in the non-intervention were contacted by HEWs when the child was 6 months of age.
- At the age of 8 months, 14.7% in the intervention and 19.1% in the non-intervention were contacted by the HEWs that talked about child feeding practices.
- A small portion of the mother interviewed reported to have been contacted by HEWs that talked to them about child feeding practices when the child was 12 months old – 9.6% in the intervention and 17.1% in the non-intervention.

## I. BACKGROUND AND OBJECTIVES

### 1.1. Background

Funded by the Academy for Educational Development (AED), World Vision along with other partners is implementing the Alive & Thrive program (A&T) in Ethiopia over a period of five years (2009-2013). The goal of Alive & Thrive is to increase rates of exclusive breastfeeding and improve feeding practices for children 6-24 months of age. Specifically, Alive & Thrive aims to reduce by at least 50% the disability adjusted life years (DALYs) lost due to poor infant and young child feeding (IYCF), reaching more than 16 million children 0 to 24 months across the three countries. Program Objectives for Alive and Thrive are to:

- Develop new models for creating demand and sustaining improved IYCF at large scale in three distinct learning environments
- Test novel private-public partnerships and other approaches for improving IYCF
- Advocate for sustained IYCF support, and
- Monitor and evaluate progress

In Ethiopia, the goal of the A&T Program is to increase exclusive breastfeeding rates by 25%, to reduce stunting in 353,000 children 2 years or younger, and reduce infant deaths by 47%. The program aims to design, implement and test strategies which can have a substantive impact on complementary feeding practices and that can readily be adapted and scaled up all over the project area. To achieve coverage at scale, A&T is partnering with World Vision Ethiopia and other organizations which support the Government of Ethiopia delivery system to effect changes in infant and young child feeding (IYCF) through three main strategies: (1) improving policy and regulatory environment, (2) shaping IYCF demand and practice, and (3) increase supply demand and use of fortified complementary food and related products.

One of the major platforms for program implementation is to shape IYCF demand and practice is through strengthening existing programs, which address community-based nutrition in food secure areas. The government of Ethiopia launched the Health Extension Program (HEP) over the past few years with the objective of addressing the health and nutrition problems at the grass root level. The program focuses on three major areas: (1) Disease Prevention and Control which deals with the dominant communicable diseases: TB and HIV/AIDS and other STI prevention and control, Malaria prevention and control, and First Aid and emergency measures; (2) Family health services which covers Maternal and child health, Family planning, Immunization, Adolescent reproductive health, and Nutrition, and (3) Hygiene and environmental sanitation which deals with excreta disposal, Solid and liquid waste disposal, Water supply and safety measures, Food hygiene and safety measures, Healthy home environment, Control of insects and rodents, and Personal hygiene. Health education and communication is the cross-cutting approach.

Lessons learned from Behavior Change Communications (BBC) on child caring (optimal breastfeeding and complementary feeding practices) indicated an improvement of caring practices after the interventions. These counseling interventions, in turn, will be more effective depending on the knowledge and skill of the counselor, the frequency of contact between the counselor and client, timing of the counseling, and the type of messages delivered. The HEWs and volunteer community health workers (vCHWs) have 16 themes to cover, of which nutrition is one of them. Because of the

many competing issues, the focus on nutrition and particularly on improving IYCF practices has been limited. The A&T project will make use of the “peer mother” and relieve time constraint of the HEWs in addition to the existing traditional community structure, health extension and community-based nutrition (CBN) program. The project will be implemented in four Woredas in the SNNPR, namely, *Chencha, Hulla, Humbo and Kochore*.

As part of the initial activities of the project, World Vision conducted a baseline study in the project target Woredas of SNNPR. The study also included a carefully selected non-intervention Woredas to serve as comparison group for future program evaluation. This report presents findings from the baseline survey that was fielded in August-September 2010.

## 1.2. Study objectives

The study aims at assessing:

- Maternal and child health and child feeding practices among children age 0 to 23.9 months that include:
  - Antenatal care and delivery care
  - Childhood illnesses and treatment patterns
  - Immunization
  - Breastfeeding practices, such as early initiation of breastfeeding, colostrums feeding frequency of breastfeeding, continuation of breastfeeding, etc
  - Timely introduction of complementary feeding
  - Nutritional status of children and mothers
- Socio-demographic patterns of families
- Women’s decision making power
- Household food insecurity and dietary diversity patterns
- Sources of information for health and nutrition
- Current Infant feeding counseling practices by HEWs and vCHWs

## II. METHODOLOGY

### 2.1. Study area and target population

**Study area:** The baseline study was conducted in four A&T implementation Woredas in SNNPR, namely *Chencha, Hulla, Humbo* and *Kochore* and four non-implementation Woredas as control Woredas. The control Woredas include *Bursa, Dita, Kindo Koyisha* and *Wonago*. The selection of the controls Woredas considered similarities in livelihood zones, absence of other implementing partners including the Integrated Family Health Program (IFHP), and non-existence of other major interventions that could likely impact feeding practices and nutrition conditions of children, among others.

**Target study participants:** Mothers and caretakers of young children age 0 to 23.9 months were the primary focus of the study.

### 2.2. Study design

The study was primarily based on quantitative methods. This study lends itself to a Quasi-experimental study design where the infant feeding practices as well as health and nutritional status of infants and children in project intervention and non-intervention Woredas are assessed and compared before (baseline) and after (post-intervention) the intervention. The effect of the interventions will be examined by comparing the magnitude of pre-post intervention changes observed in IYCF practices, nutritional and health status between the children in the intervention and non-intervention Woredas.

### 2.3. Survey indicators

The study involved a wide range of indicators on feeding practice, child nutrition, maternal health, food insecurity, child health, availability of services, women's decision making, among others. Women's access to information on child feeding practices and nutrition was also assessed. In particular, the study collected information on current practice and women's access to timed and targeted counseling (TTC) of IYCF via the HEWs and volunteer community health workers (vCHWs).

### 2.4. Sample size determination

The key considerations in sample size determination were:

- Exclusive Breastfeeding rate is considered as a key indicator in the estimation of sample size, as the A&T program set a clear target for this indicator
- EB rate is computed for children age 0-5.9 months.
- Baseline exclusive breastfeeding<sup>2</sup> rate 50% (Recent region wide data on EB is lacking and the safest choice is to take 50%)
- Anticipated increase in exclusive breastfeeding rate by 25%
- 95% Confidence level

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<sup>2</sup> EB rate (DHS 2005)=31%; EB rate (ESHE 2008)=64%

- 80% power
- Design effect (cluster sampling)=1.5
- Accordingly, the sample size required:
  - for children 0-5.9 months=393 (intervention) & 393 (control)
  - for children 6-23.9 months=393 (intervention) & 393 (control)

**Sample size for implementation:** we approximated the sample size to 400 per group for ease administration, yielding 1600 in the entire study groups.

## 2.5. Sampling

The study employed a cluster sampling method, involving selection of Kebeles and Households. A cluster is a Kebele. A total of 40 Kebeles were selected and included in the survey using probability proportion to size (PPS) – 20 in the intervention and 20 in the non-intervention. In each Kebele we interviewed 40 women – i.e. 20 women with children 0-5.9 months and 20 women with children 6-23.9 months.

The selection of households was based on systematic sampling with a random start. The number of households in a Kebele was obtained from the HEWs to serve as sampling frame. Then, a systematic sample, using an appropriate selection factor based on the total number of families listed and the desired sample size in each group was administered to select the households for the study. Once the households were selected, information was collected from women with children 0-5.9 months and 6-23.9 months. Only those households with children age 0-23.9 were eligible for the survey.

## 2.6. Survey instruments

**Questionnaire:** Structured and pre-coded questionnaire was used. The questionnaire covers knowledge, attitude and practices regarding appropriate breastfeeding practices (exclusive breastfeeding, initiation, colostrums feeding, frequency and length of breastfeeding), complementary feeding (initiation, types, frequency and nutrient density), maternal and child health (15 days morbidity), vaccination status, types and frequency of foods consumed, iron and vitamin A supplementation status. It also collected information on household, women and children characteristics, access to information, and women's knowledge of child feeding practices, household food insecurity, among others. The questionnaire was administered in Amharic.

**Anthropometric measurements:** Weight and height of children age 0-59 months were collected. Weight of the children was measured with minimum clothing and without any ornaments on a digital scale (salter hanging scales) to the nearest 0.1 kg; following the standard procedures recommended by WHO. Laying length of under two children was measured on a wooden board to the nearest 0.1 cm. Standing height of children older than two years was measured without shoes or anything on the head on a wooden board or Leicester stadiometer (Child Growth Foundation, UK) to the nearest 0.1 cm, following the standard procedures recommended by WHO.

## 2.7. Training of survey teams

A total of 21 data collectors, 4 field supervisors and 2 overall survey coordinators were trained on the baseline survey. A 3 & 1/2-day training was given during August 17-20, 2010 in Hawassa. The data collectors and supervisors have extensive experience in data collection with most holding university Degrees in public health, nursing, and social science fields. They were recruited from the survey Zones and Woredas. Speaking the local languages was among the requirements for recruiting data collectors. The training encompassed orientation about the A&T project, the objectives of the baseline survey, survey indicators, and methods of data collection. Item by item review of the questions, mock interview and field practice were the major parts of the training. The principal and co-investigators led and facilitated the training. Staff member of the A&T project also attended the training and gave orientation about the project and the objectives of the baseline survey.

## 2.8. Fieldwork and Data collection

Four data collection teams were formed. Each team has given assignment Woredas. All teams were deployed to the field immediately after the training was completed. Data collection started on August 21 and ended on September 8, 2010 in all the survey sites. Close supervision on the survey, include spot checking, field questionnaire editing and frequent meeting with the survey teams and supervisors.

Out of the 40 originally selected clusters/Kebeles, 3 clusters had to be replaced due to extreme inaccessibility and the heavy rain during the survey period. In most instances, data collectors had to travel over 2 hours on foot to get to the selected cluster. Despite these challenges, the survey can be considered a success. We have achieved a 100% completeness rate of the intended sample size. On the whole, individual questionnaires including anthropometric information were collected from 1600 households/mothers/children. HEWs were interviewed in 37 Kebeles out of the 40. In 3 of the Kebeles HEWs were not present for the interview.

## 2.9. Data management and analysis

Data was entered into a computer using EPI-INFO by 3 experienced data encoders. Ranges and skip rules as well as frequency distributions of variables was used to ensure data quality. The data on weight and height of children age 6-59 months were used to calculate three summary indices of nutritional status according to WHO child growth standard and the National Center for Health Statistics (NCHS). The World Health Organization (WHO) reference for child nutritional status z-score values were computed using EPI-INFO (Ver. 3.5.1). While the NCHS reference standards were computed using Anthro ver. 3.1.0 (WHO software).

Of note, the main findings on nutritional status of children in this report are presented based on the WHO standard. The WHO standard is recommended as a better tool to monitor the rapid and changing rate of growth in children<sup>3</sup>. However, for the comparison purpose we also computed nutritional indices based on the National Center for Health Statistics (NCHS) and annexed in the report (see Annex III).

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<sup>3</sup> Mercedes de Onis, Adelheid W Onyango, Elaine Borghi, Cutberto Garza and Hong Yang, et al . Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutrition*: 9(7), 942–947. 2006

Data analysis mainly focused on descriptive statistics and Univariate analysis. Multivariate Logistics regression analysis was used to examine the determinants of stunting among children 6-23 months. STATA 10 was used for data analysis.

### **2.10. Ethical Considerations**

The study obtained ethical clearance from the SNNPR regional ethical clearance committee. Participants of the study were given complete information as to the objective of the study and their benefits/risks and only following their consent will they participate in the interview. Data collectors and other survey teams were given orientations on how to maintain the ethical aspect of the study.

The information to be collected was anonymous and no identification, such as, names, identification numbers, etc. were collected that can be used for tracing purpose after the collection of data. All the information and data collected was accumulated, organized, stored, analyzed, and retrieved guaranteeing confidentiality. Information was analyzed as group data and not on individuals. No one outside of the study team has access to any of the information collected.

### III. PRESENTATION OF SURVEY RESULTS

#### 3.1. Household characteristics

Table 1 presents household water supply and toilet facilities in the intervention and non-intervention areas. On the whole 62.5% of the households in the intervention and 68.5% in the non-intervention can be considered as having access to clean water supply. In both areas, covered wells appeared the most common source of water supply as reported by 29.9% and 30.5% of the households in the intervention and non-intervention areas, respectively. This was followed by piped water from outside the compound at 17.6% and 13%, respectively. Open spring as a source of drinking water supply was reported by 15.1% and 16.6% of the households, respectively.

The vast majority of the households in both areas reported to have pit latrine/traditional pit toilet facility – 87.7% in the intervention and 86.6% in the non-intervention. Toilet facilities were not at all present in 11.7% and 10.9% households, respectively, in the intervention and non-intervention areas. Other types of toilet facilities such as improved pit latrines were virtually absent in both areas.

Table 1. Household water supply and sanitation, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b>Source of drinking water</b>		
Piped into dwelling	1.0	1.1
Piped into compound	1.4	0.0
Piped outside compound	17.6	13.0
Covered Well	29.9	30.5
Protected Spring	12.6	23.9
Open Well	7.3	5.1
Open Spring	15.1	16.6
Other	3.6	5.9
<b><i>%Households with clean water supply<sup>1</sup></i></b>	62.5	68.5
<b>Toilet facility</b>		
Pit Latrine/traditional pit toilet	87.7	86.6
Ventilated improved pit latrine	0.4	0.1
Flush toilet	0.2	0.4
No facility/Bush/Field	11.7	10.9

<sup>1</sup>*this comprises - piped into dwelling, piped into compound, piped outside compound, covered well and protected spring*



### 3.2. Household economic status

Different indicators that measure household economic situation are presented in Table 2. In terms of the materials used for the construction of the floor, the vast majority of the households have natural/earth floor – 87.9% in the intervention and 87.6% in the non-intervention. Wooden floor was reported from 10.3% and 10.6%, respectively, of the households in the intervention and non-intervention area. Another indicator of household condition is the material used to construct the roof. Most roofs were made of grass or leaves as reported by 55.9% of those in the intervention and 59.7% in the non-intervention.

Two indicators are presented to serve as proxy measures for household economic status – (1) household furniture/appliances possession index<sup>4</sup> and (2) livestock possession index<sup>5</sup>.

Households both in the intervention and non-intervention areas can be considered as having low or moderate economic scores in both indicators. In the intervention area 37.5% of the households scored high in the household furniture/appliance possession index. This was significantly higher than the 27.6% who scored for the same in the non-intervention area. Likewise, significantly higher score can be noted among households in the intervention than in the non-intervention area on household livestock possession index. The proportion of households that scored high in the livestock position index was 40.4% and 35.3%, respectively, in the intervention and non-intervention areas.

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<sup>4</sup> For the computation of the index for household economic status availability/possession of electricity supply, watch, radio, TV, mobile phone, telephone (landline), refrigerator, table, chairs, bed, electric *mitad* (Injera stove) were used. The more of these items a family possesses the higher the economic index.

<sup>5</sup>For the computation of the livestock position index weights were given to each domestic animal based on their market price where cow/ox=1; horse=0.4; donkey=0.1; mule=0.2; goat=0.08; sheep=0.08; chicken=0.01

Table 2. Materials used for the construction of houses, household economic and livestock index, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b>Main floor material</b>		
Natural (earth/sand)	87.9	87.6
Wood/Bamboo	10.3	10.6
Concrete	1.4	0.5
Finished (tile/ceramic/mosaic)	0.1	0.3
<b>Main roof material</b>		
Rudin (Grass, Palm, leaves, Straw)	55.9	59.7
Finished roof (corrugated tin, wood, etc)	28.3	24.4
No roof	2.3	3.9
Others	13.5	12.0
<b>Household furniture/appliance ownership index</b>		
Low	28.6	28.9
Moderate	33.9	43.5
High	37.5**	27.6
<b>Household livestock ownership index</b>		
Low	29.2	24.5
Moderate	30.4	40.2
High	40.4**	35.3

\*\*p<0.01

### 3.3. Household Food Insecurity

Food security is defined as a state in which “all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life”<sup>6</sup>. Because it is a complex, multidimensional concept, measuring food insecurity has been an ongoing challenge to researchers and practitioners alike. Until very recently, most household-level measures of food access, such as income and caloric adequacy, have been technically difficult, data-intensive, and costly to collect. A household Food Insecurity Access Scale (HFIAS) was developed by Food and Nutrition Technical Assistance Project (FANTA) and Academy for Educational Development with funding from USAID<sup>7</sup> that yields information on food insecurity (access) at the household level. Different types of indicators can be calculated to help understand the characteristics of and changes in household food insecurity (access) in the surveyed population. These indicators provide summary information on: (1) Household Food Insecurity Access-related **Conditions** (2) Household Food Insecurity Access-related **Domains** and (3) Household Food Insecurity Access (HFIAS) **Scale Score**

**Household Food Insecurity Access-related Conditions:** Two indicators are presented. As shown in Table 3, the indicators measure the percent of households experiencing food shortage in the previous 30 days and the frequency of occurrence of the problem. Data show that 18.6% and 23.5% of the households in the intervention and non-intervention area, respectively, reported that

<sup>6</sup> United States Agency for International Development (USAID). “Policy Determination 19, Definition of Food Security, April 13, 1992.” Washington, DC, 1992.

<sup>7</sup> Coates, Jennifer, Anne Swindale and Paula Bilinsky. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3)*. Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, August 2007.

there was ever a day in the previous 30 days where there was no food at all in the household because there were no resources to get food. The proportion that reported that there was no food at all in the household for 10 or more days because there were no resources to get food was only 1.8% and 3% in the intervention and non-intervention areas, respectively.

***Household Food Insecurity Access-related Domains:*** These indicators provide summary information on the prevalence of households experiencing one or more food related problems such as insufficient quality and insufficient food intake. Three indicators were presented in this section. On the whole, our findings suggest that the prevalence of these indicators is relatively high in the study areas. The proportion of households who were ever not able to eat the kinds of foods they preferred because of a lack of resources (in the last 30 days) were 30.8% and 37.6%, respectively, in the intervention and non-intervention areas. About 31% and 36% of the households in the intervention and non-intervention areas, respectively, said household members ever ate a few kinds of food day after day because of a lack of resources in the last 30 days. Food quality also appeared among the major concerns of these households as 31% and 34% of the households in the intervention and non-intervention area, respectively, reported that household members ever eat food that they did not want to eat because of a lack of resources to obtain other types of food during the last 30 days.

***Household Food Insecurity Access Scale (HFIAS) Score:*** This summary score is a continuous measure of the degree of food insecurity (access) in the household in the previous 30 days. This score is computed based on 9 items/questions<sup>8</sup>. The responses to all nine frequency-of-occurrence questions was coded as 1 if it occurs once or twice (rarely), 2 if occurs 3-10 times (sometimes) and 3 if occurs more than 10 times (often). The higher the score, the more food insecurity (access) the household experienced. The lower the score, the less food insecurity (access) a household experienced. The HFIAS data revealed that 15%-16% of the households across the three groups were categorized as being food secure. On the other hand 37.4%-45% were moderately food insecure while 35% -43.4% of the households across the three groups were severely food insecure. These data taken together suggest that the study households across the three groups are exposed to high notably high level of food insecurity.

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<sup>8</sup> Items/questions used for the computation of HFIAS: (1) In the past 30 days were you or any household members not able to eat the kinds of foods you preferred because of a lack of resources? If "Yes", how often did this happen in the last 30 days? (2) In the past 30 days did you or any household member eat just a few kinds of food day after day because of a lack of resources? If "Yes", how often did this happen in the last 30 days? (3) In the past 30 days did you or any household member eat food that you did not want to eat because of a lack of resources to obtain other types of food? If "Yes", how often did this happen in the last 30 days? (4) In the past 30 days did you or any household member eat a smaller meal than you felt you needed because there was not enough food? If "Yes", how often did this happen in the last 30 days? (5) In the past 30 days did you or any household member eat fewer meals in a day because there was not enough food? If "Yes", how often did this happen in the last 30 days? (6) In the past 30 days was there ever no food at all in your household because there were no resources to get more? If "Yes", how often did this happen in the last 30 days? (7) In the past 30 days did you or any household member go to sleep at night hungry because there was not enough food? If "Yes", how often did this happen in the last 30 days? (8) In the past 30 days did you or any household member go a whole day without eating anything because there was not enough food? If "Yes", how often did this happen in the last 30 days? (9) In the past 4 weeks, did you or any household member go a whole day and night without eating anything at all because there was not enough food? If "Yes", how often did this happen in the last 30 days?

Table 3. Household food insecurity indicators, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b><u>Household food insecurity access-related Conditions:</u></b>		
% households that reported there was ever a day where there was no food at all in the household because there were no resources to get food (in the last 30 days)	18.6	23.5
% households that reported there was no food at all in the household for <u>10 or more days</u> because there were no resources to get food (in the last 30 days)	1.8	3.0
<b><u>Household food insecurity access-related Domains:</u></b>		
% households who were ever not able to eat the kinds of foods they preferred because of a lack of resources (last 30 days)	30.8	37.6
% households whose members ever ate a few kinds of food day after day because of a lack of resources (last 30 days)	30.9	35.9
% households whose members ever eat food that they did not want to eat because of a lack of resources to obtain other types of food (last 30 days)	31.0	34.3
<b><u>Household food insecurity access scale score (HFIAS score):</u></b>		
Mean HFIAS score (95% CI)	9.9(9.6-10.1)	10.2(9.9—10.4)

### 3.4. Respondents and children characteristics

#### *Socio-demographic characteristics of women respondents:*

A total of 1600 women with children 0-23 months responded to the interview. As shown in Table 5 the mean age of respondents was 27.4 and 27.1 year, respectively, in the intervention and non-intervention area. The majority of respondents (i.e. 53.1% of those in the intervention and 55% in the non-intervention) were in the age group 25-34 years. Adolescent mothers (age 15-19 years) represents about 6% of the total. The vast majority of the respondents (over 97%) in both study arms.

Women's educational level can be considered quite low in the study area with 73.1% of those in the intervention and 84.6% in the non-intervention areas did not have any education or cannot read or write. This difference between the two study arms was statically significant at  $p < 0.001$ , suggesting that women in the intervention area relatively have better educational status. The proportions that have elementary education (i.e. grade 1-6) were 15.5% and 10.1%, respectively, in the intervention and non-intervention areas. Only 3.5% and 1.7%, respectively, had 9 or more years of schooling. The majority of the respondents in both areas were followers of the Protestant church - 78.6% of the intervention and 72.5% of the non-intervention. This was followed by Orthodox Christianity as reported by 17% and 20.6% of the respondents in the intervention and non-intervention areas, respectively.

The mean numbers of children ever born among these women respondents was 3.6 and 3.7, respectively, in the intervention and non-intervention areas. Of note, a substantial proportion of the respondents reported to have had 4 or more children - 42.9% in the intervention and 46.5% in the non-intervention. This signals the long-standing high fertility in the study areas.

On the whole, the background characteristics of respondents suggest that women in the intervention area are not different than those in the non-intervention in most characteristics with the exception of the noted higher educational level in the intervention than in the non-intervention.

Table 5. Selected characteristics of socio-demographic characteristics of respondents, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b>Age</b>		
15-19	5.7	6.0
20-24	26.0	26.4
25-34	53.1	55.0
35-49	15.1	12.6
Mean age	27.4	27.1
<b>Marital Status</b>		
Currently in Union	97.6	96.9
Never married/divorced/widowed	2.4	3.1
<b>Education</b>		
Cannot read or write	73.1	84.6***
Read or write only	1.7	0.5
1-6 grade	15.5	10.1
7-8 grade	6.1	3.0
9+ grade	3.5	1.7
<b>Religion</b>		
Protestant	78.6	72.5
Orthodox	17.0	20.6
Others	4.4	6.9
<b>Children ever born (CEB)</b>		
1	17.7	18.6
2	21.7	16.7
3	17.6	18.1
4+	42.9	46.5
Mean CEB	3.6	3.7

\*\*\*p<0.001

### ***Age and sex characteristics of sampled children:***

The target children for this survey were those in the age group 0-23 months. These children's age and sex distribution is detailed in Table 6. In each study arm, 800 children were included. Their age distribution depicts that half were in the age group 0-5 months. This is because the survey, by design, divided children in to two groups as 0-5 years and 6-23 months and took equal sample from each group. Of all children surveyed 16.3% and 19.4%, respectively, in the intervention and non-intervention area were aged 6-11 months. About a third in both areas falls in the age group 12-23 months. The children surveyed were nearly equally divided by sex with a slightly higher males than females.

Table 6. Age and sex distribution of children sampled, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b>Age (months)</b>		
0-5	50.0	50.0
6-11	16.3	19.4
12-23	33.7	30.6
<b>Sex</b>		
Male	50.6	52.1
Female	49.4	47.9

### 3.5. Women’s decision making related to feeding practices and health matters

Respondents were asked a number of questions to assess their decision power at the household level as shown in Table 7. Women reported to play the primary decision making in some of the issues such as what food to prepare every day in a household, whether or not to breastfeed and begin supplementation to children and what to feed the infant in the first year of life. Relatively better decision power was reported by women in buying small amount of foods like vegetables for the family. As shown in Table 7, about 58% and 59% of the women in the intervention and non-intervention areas, respectively, said that they could decide by their own to buy small amounts of food like vegetables and beans for the family. They also reported to have better decision making status concerning what food should be prepared every day in a household- i.e. 64.9% in the intervention and 69.2% in the non-intervention. Breastfeeding children and weaning reported be the women's primary decision by 80.8% and 79.9% of the respondents in the intervention and non-intervention areas, respectively. Likewise, these women reported to have primary decision role in what and how to feed a child in the first year of life – 71.8% and 73.6%, respectively.

On the other hand, women reported to have relatively lower decision making power in a number of issues such as to purchase bigger amounts of food like grains, medicine for children, and special food for children. The purchase of bigger amount of foods like grains appeared the primary decision of the husband as reported by 68.1% in the intervention and 63.9% in the non-intervention. Likewise, the decision to purchase medicine for children primarily falls in the hands of the husband, as reported by 64.5% and 66.6% of the women in the two areas, respectively. The decision to buy special food for children also reported the primary decision of the husband. However, about a fifth of the women in the intervention and 17.4% in the non-intervention said they often do not buy special food for children.

Table 7. Women's decision making power on food related issues, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b>Can you decide on your own on the following:</b>		
To buy Small amounts of food like vegetables, and beans?		
Yes	57.8	58.6
No	38.6	38.2
Do not buy	4.6	3.1
Bigger amounts of food like grain?		
Yes	20.5	21.4
No	68.1	63.9
Do not buy	11.4	14.7
Medicine for the children?		
Yes	26.4	28.0
No	64.5	66.6
Do not buy	9.1	5.4
Special foods for your children?		
Yes	20.5	20.6
No	58.9	62.0
Do not buy	20.6	17.4
What food is prepared every day?		
Yes	64.9	69.2
No	33.1	30.8
Whether or not you breastfeed the child and when to wean the child?		
Yes	80.8	79.9
No	19.2	20.1
What and how to feed the infant in his first year of life?		
Yes	71.8	73.6
No	28.2	26.4

### 3.6. Maternal health care services

#### *Antenatal care (ANC):*

ANC refers to pregnancy-related health care provided by a health professional in a health facility. ANC can contribute significantly to the reduction of maternal morbidity and mortality because it also includes advice on the correct diet and the provision of iron and folic acid tablets to pregnant women, besides medical care. Improved nutritional status, coupled with improved antenatal care, can help to reduce the incidence of low birth weight babies and thus reduce prenatal, neonatal and infant mortality.

In this survey, each woman who has a child aged 0-23 months was initially asked whether she had gone for ANC check-up to a health institution when she was pregnant with the child. Next she was asked at which month of pregnancy she first went for an antenatal check-up and how many such visits she made. Table 8 shows that 51.4% and 47.8% of women in the intervention and non-intervention area, respectively, received ANC during pregnancy of their child age 0-23 months. The number of antenatal care visits is important for the health and outcome of the pregnancy. However, data show only 16.7% of the women in both study areas received 4 or more ANC visits during pregnancy.

Health posts reported to be the primary sources for antenatal care in both study areas. Of all the women who had ANC in the previous 2 years, 59.4% in the intervention and 69.1% in the non-intervention had their ANC check up in health posts. The noted higher ANC uptake from health posts in the non-intervention area was statically significant at  $p < 0.05$ .

Next of health posts, health centers reported the primary sources for ANC as reported by 36.1% and 28.9% of the women in the intervention and non-intervention areas, respectively. This difference was statically significant. Other sources for ANC were rarely reported.

Table 8. Among women with children age 0-23 months, the proportion who had antenatal care in health facilities, the number of visits and places where service received, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=800	Non-intervention area N=800
Received ANC in health facility	51.4	47.5
Number of ANC visits		
None	48.6	52.5
1	4.6	7.2
2	11.4	11.2
3	16.8	12.0
4+	16.7	16.7
Missing	1.9	0.2
Among antenatal care users	n=411	n=380
Place of ANC (more than one place possible)		
Government Hospital	2.4	1.0
Health Center	36.1*	28.9
Health Post	59.4	69.1*
NGO health facility	1.0	0.5
Private health facility	1.5	0.3

\* $p < 0.05$

### ***Information during pregnancy by HEWs and community workers:***

Women were asked if they were visited by Health extension workers (HEWs), volunteer community health workers (vCHWs) or traditional birth attendants (TBAs) during pregnancy of their children age 0-23 months (i.e. in the last 2 years). In general, most women in the study areas reported to have limited access to information from HEWs and community workers during pregnancy (Table 9). A tenth of the women in both areas reported being contacted by HEWs during pregnancy in the previous 2 years. The reporting of vCHWs is even much lower at 3.2% and 4%, respectively, in the intervention and non-intervention areas. The proportion visited by TBAs during pregnancy is nearly nil – 0.5% in the intervention and 0.7% in the non-intervention.



Table 9. Among women with children 0-23 months, the proportion visited by HEWs and other community workers during pregnancy, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=800	Non-intervention area N=800
% visited by HEW at home during pregnancy of the youngest child (age 0-23 months)	9.5	10.2
% visited by vCHW at home during pregnancy of the youngest child (age 0-23 months)	3.2	4.0
% visited by TBA at home during pregnancy of the youngest child (age 0-23 months)	0.5	0.7

### *Delivery care:*

From the standpoint of child survival and health of the mother, the first priority for delivery care is that it is safe and clean. The majority of maternal deaths and much of the chronic morbidity resulting from childbirth are due to the failure to get timely help for complications at delivery. It is therefore, essential that delivery be conducted under proper hygienic conditions with assistance of a trained medical practitioner.

Women who have a child age 0-23 months were asked where she delivered and who assisted her during the delivery. Overall, the vast majority of the births (96.4% in the intervention and 96.9% in the non-intervention) took place at home (Table 10). Institutional delivery is reported at 3.6% in the intervention and 3.1% in the non-intervention areas.

Table 10 also presents information on assistance during delivery. Professionally assisted delivery is extremely low in the study areas. In all, only 4.1% and 3.5% of the births in the intervention and non-intervention areas, respectively, were assisted by health workers (Medical doctors/Nurses/Midwife). Health extension workers reported to have assisted 2.2% and 2%, respectively. Another 13.1% and 10.8% in the two study areas, respectively, were attended by traditional birth attendants, and the majority (79.4% and 83%, respectively) by relatives, friends or neighbors. In general, there is no significant difference in the pattern of delivery care services between the intervention and non-intervention areas.

Table 10. Among women with children 0-23 months, the proportion that were assisted by professionals and others during delivery, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=800	Non-intervention area N=800
<b>% home delivery</b>	96.4	96.9
<b>% institutional delivery</b>	3.6	3.1
<b>Assistance during delivery</b>		
Health professional	4.1	3.5
Health Extension Workers	2.2	2.0
Traditional birth attendant	13.1	10.8
vCHW	1.4	0.7
Families/friends/neighbors	79.4	83.0

### ***Baby weighing at birth and perceived size at birth:***

Given that the vast majority of the deliveries happened at home and not assisted by health professionals, it is natural to expect the majority of the babies wouldn't be weighted at birth. Data show that only 2.3% and 0.6% of the births in the intervention and non-intervention areas, respectively, had their weight measured at birth.

In order to gain some insight into the size of the babies at birth, mothers were asked their opinion of the size of the baby at birth. About 55% of the mothers in both areas said the baby was of average size. While 12.6% in the intervention and 13.3% in the non-intervention reported that their child was smaller than average or very small at delivery. There were also 21% and 25%, respectively, who thought their babies measured larger than average or even very large at birth.

Table 11. The proportion of children that were weighted at birth and mothers' perception of the size of a child, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=800	Non-intervention area N=800
<b>Baby weighted at birth</b>		
Yes	2.5	0.6
No	94.8	97.0
Do not know	2.7	2.4
<b>Perceived size of baby at birth</b>		
very large	6.4	6.4
larger than average	16.6	19.6
average	54.6	55.1
smaller than average	10.0	11.9
Very small	2.6	1.4
Do not know	0.2	0.0

### ***Information to the mother soon after delivery by HEWs and community workers:***

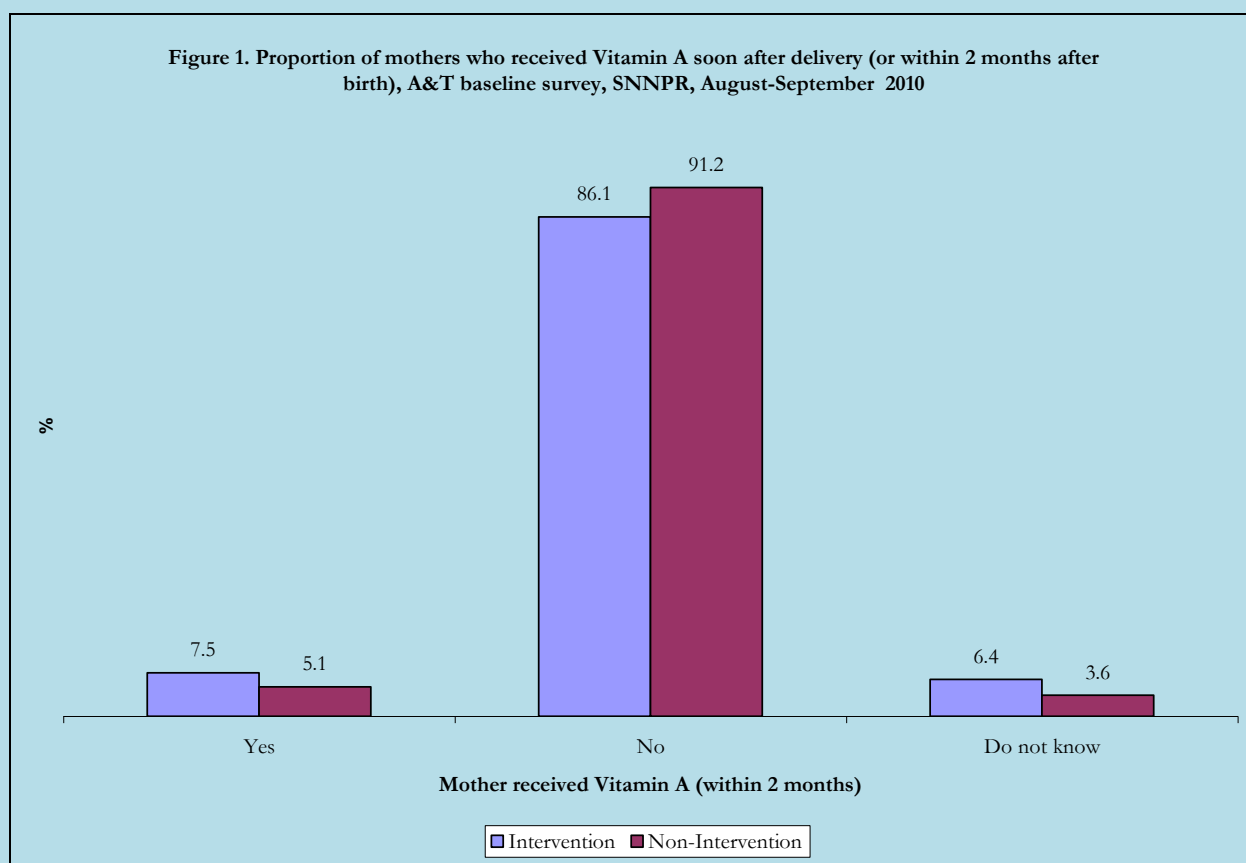
Among those who gave birth at home, we asked if they were visited by HEWs or community workers or TBAs soon after delivery of their child age 0-23 months. As shown in Table 12, about 13% of the mothers in both areas reported being contacted by HEWs soon after delivery of their child age 0-23 months. Only 2.7% and 4% in the intervention and non-intervention area, respectively, reported being contacted by vCHWs during the time. The corresponding figure for TBA was extremely low at 1.8% and 0.6%, respectively.

Table 12. Among women with children 0-23 months, the proportion that were visited by HEWs and other community workers soon after delivery at their home, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=771	Non-intervention area N=775
% visited by HEW at home soon after delivery of the youngest child (age 0-23 months)	12.8	13.0
% visited by vCHW at home soon after delivery of the youngest child (age 0-23 months)	2.7	4.0
% visited by TBA at home soon after delivery of the youngest child (age 0-23 months)	1.8	0.6

***Vitamin A to mother within 2 months after delivery:***

Vitamin A deficiency (VAD) is a major public health problem. The supplementation of lactating women with vitamin A soon after birth or within 2 months after birth could be an effective strategy to combat VAD. In this survey mothers of children age 0-23 months were asked if they had received Vitamin A supplementation within 2 months after delivery. As shown in Figure 1, only 7.5% and 5.1% of the mothers in the intervention and non-intervention areas, respectively, reported to have received Vitamin A during the specified period. Whereas 6.4% and 3.6% of the mothers, respectively, reported that they were not sure whether they had received vitamin A.



### 3.7. Child Immunization, vitamin A and De-worming

#### *Child Immunization:*

This survey computed child immunization indicators based on the sub-sample of children age 12-23 months and, thus, for each study arm the sample size appears low to provide a robust estimate for immunization. Thus, cautions should be made while interpreting this data.

Immunization against childhood diseases contributes to reductions in mortality, and permanent disability among children. Therefore, the immunization of children against a six serious but preventable disease has been a cornerstone of the child health care system worldwide. In these survey woman who has a child age 12-23 months was asked weather she had a vaccination card for the child. If card was available, the interviewer was required to copy carefully the dates on which the child received vaccinations against each disease. When the mother could not produce the card, she was asked weather the child had received a vaccination against tuberculosis (BCG), Pentavalent<sup>9</sup> (PENTA), poliomyelitis (Polio) and measles. For PENTA and Polio, information was also obtained on the number of injections or oral doses given. Although card data is the most valid, history data have been confirmed to be reliable worldwide for monitoring EPI performance.

Table 13 shows the percentage of children age 12-23 months who have received the various vaccinations. Vaccination cards were seen by the interviewers for only 28.4% and 32.2% of the children in the intervention and non-intervention areas, respectively.

In general, children in the non-intervention area appeared more likely than those in the intervention to have received immunization. Based on the information either recorded on the card or reported by the mother, 22.4% and 30.2% of the children in the intervention and non-intervention areas, respectively, are fully vaccinated. The noted higher fully immunized coverage in the non-intervention area is statistically significant.

Analysis of vaccine-specific data shows that 72.4% in the intervention and 82.9% in the non-intervention have received BCG vaccine. The difference was statically significant. Likewise, significantly more children in the non-intervention area than in the intervention (53.1% and 38.1%, respectively) received Polio 3. PENTA 1 was received by 64.2% and 72.2% of the children in the intervention and non-intervention area, respectively. Whereas PENTA3 by 35.4% and 49.8%, respectively. The difference in PENTA coverage between the two areas was statistically significant. The continuation rate from the first to the third dose of PENTA indicates considerable dropout (46.5% in the intervention and 35.6% in the non-intervention). Measles coverage was found 44.4% in the intervention area while it slightly higher in the non-intervention at 50.2%.

With the caveat of the limitation of this analysis due to small sample size, the data suggest that child immunization coverage is significantly lower in the intervention area than in the non-intervention.

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<sup>9</sup> Pentavalent is a multi-dose vaccine consisting of the following 5 vaccines: Diphtheria, Tetanus Toxoid, Pertussis, Hepatitis B, and Haemophilus Influenza (Hib)

Table 13. Among children age 12-23 months, the proportion of children that received the different vaccines, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=268	Non-intervention area N=245
% With vaccination card	28.4	32.2
BCG	72.4	82.9*
POILO0	12.7	15.9
POLIO1	73.1	82.9*
POLIO2	55.6	69.4**
POLIO3	38.1	53.1**
PENTA 1	64.2	72.2*
PENTA 2	53.0	36.7*
PENTA 3	35.4	49.8**
Measles	44.4	50.2
Fully immunized <sup>1</sup>	22.4	30.2*
<u>Drop-out rate:</u>		
PENTA 1 to PENTA 3	46.5	35.6*

### ***Vitamin A and de-worming:***

Routine administration of Vitamin A every six months is recommended for countries such as Ethiopia with very high levels of malnutrition and high childhood disease and mortality rates. Among children age 6-23 months about 38% in the intervention area and 34% in the non-intervention reported to have received Vitamin A during the six months prior to the survey (Table 14). In the same age group, de-worming tablets were received by 24.4% and 19.4% of the children in the intervention and non-intervention areas, respectively.

Table 14. Among children age 6-23 months, the proportion who received Vitamin A and de-worming in the previous 6 months, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=400	Non-intervention area N=400
% children age 6-23 months who received vitamin A in the past 6 months	37.9	34.0
%children age 6-23 months who received medicine for worm in the past 6 months	24.4	19.4

### **3.8. Childhood illness and treatment practice**

The 2-week incidence of childhood illnesses for children 0-23 months and treatment practices for acute respiratory infection (ARI), fever, and diarrhea is presented in Table 15. In the whole, 21.9% and 23.2% of the children age 0-23 months in the intervention and non-intervention area,

respectively, reported to have had any illness in the previous 2 weeks. The section presents incidence of illness and treatment practices separately for ARI, fever and diarrhea.

***Acute Respiratory Infection (ARI): incidence and treatment seeking***

Of all children age 0-23 months, 8.2% in the intervention and 7.5% in the non-intervention reported to be sick with ARI. A symptom of ARI is defined as cough accompanied by short rapid breathing, which is chest related. Among children having had symptoms of ARI, 52.7% and 39.6% in the intervention and non-intervention area, respectively, were taken to health facility/provider for treatment. Among those who were sick with ARI, 35.7% in the intervention and 20.8% in the non-intervention were taken to health center. The corresponding proportions that were taken to health post were 8.9% and 5.7%, respectively. Other facilities were rarely reported.

***Fever: incidence and treatment seeking***

The 2-week incidence of fever was reported at 13.8% and 13.1%, respectively, in the intervention and non-intervention areas. Among children who were sick with fever in the previous 2 weeks, 55.1% of those in the intervention and 42.3% those in the non-intervention were taken to health facilities. Health center reported to be the main place for care for children with fever as reported by 30.3% and 26.8%, respectively, in the intervention and non-intervention areas. This was followed by health post at 10.1% and 5.1%, respectively. The proportion of children with fever that were taken to hospital was 3.7% in the intervention while none of the children with fever in the non-intervention was taken to hospital.

***Diarrhea: incidence and treatment seeking***

In the previous two weeks, 14.4% of the children in the intervention and 14% in the non-intervention reported to have diarrhea. Treatment seeking for diarrhea is similar with that of fever and ARI as shown in Table 15. Among those children with diarrhea, 57% of those in the intervention area were taken to health facility. This was significantly higher than the 33.9% reported for the same among children in the non-intervention. It appeared that health post is the most preferred place to visit for children with diarrhea in the intervention area, as reported by 21.1% of those with diarrhea. This was followed by health center at 18.4%. In the non-intervention area, 15.2% of those with diarrhea were taken to health center and 6.3% to health post.

Table 15. Among children age 0-23 months, the proportion that were sick, had ARI, diarrhea and fever in the previous 2-weeks and treatment practice, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=800	Non- intervention area N=800
<b>% children 0-23 months who were ill (previous 2 weeks)</b>	21.9	23.2
<b>% children 0-23 months with symptoms of ARI (previous 2 weeks)</b>	8.2	7.5
Among children 0-23 with symptoms of ARI (Previous 2 weeks):	n=55	n=53
taken to health facility/provider (any)	52.7	39.6
taken to Hospital	1.8	0.0
taken to Health center	35.7	20.8
taken to Health post	8.9	5.7
taken clinic/health station	7.1	7.6
taken to other facilities/providers	1.8	1.9
	n=800	n=800
<b>% children 0-23 months with fever (previous 2 weeks)</b>	13.8	13.1
Among children 0-23 with fever (Previous 2 weeks):	n=107	n=97
taken to health facility/provider (any)	55.1	42.3
taken to Hospital	3.7	0.0
taken to Health center	30.3	26.8
taken to Health post	10.1	5.1
taken clinic/health station	3.7	5.2
taken to other facilities/providers	0.9	1.0
	n=800	n=800
<b>% children 0-23 months with any diarrhea (All diarrhea)</b>	14.4	14.0
Among children 0-23 with any diarrhea (Previous 2 weeks):	n=114	n=112
taken to health facility/provider (any)	57.0***	33.9
taken to Hospital	1.8	0.0
taken to Health center	18.4	15.2
taken to Health post	21.1**	6.3
taken clinic/health station	4.4	3.6
taken to other facilities/providers	6.1	2.7

### 3.9. Access to information on child feeding and nutrition

#### ***Information on child feeding and nutrition:***

Women were asked to spontaneously report if they received any information about child feeding practices in the previous year. The majority (63.6% in the intervention and 62.1% in the non-intervention) reported that they heard about putting the baby to breast immediately after birth. This was followed by information on feeding the baby only breast milk up to 6 months (i.e. exclusive breastfeeding) as reported by 48.1% and 50% of the respondents in the intervention and non-intervention areas, respectively. About 37% and 41.4%, respectively, reported that they heard about giving colostrums in the first day or two until breast milk comes. Among the type of information

received by the women include washing hands with water and soap before preparing food or feeding a child, as reported by 30.9% and 39.7% of the women in the intervention and non-intervention areas, respectively. Some portion of the women (27% in the intervention and 34.9% in the non-intervention) were also reported that they received information on postponing giving children water and any other liquid up to the age of 6 months. Likewise, 26.6% and 29.2%, respectively, reported that they heard about feeding mashed family food to children after 6 months. A few portion of the women reported receiving other types of information in the previous year as depicted in Table 16.

Of note, women lack information on issues such as on how to help child eat better, how to feed children when sick, and feeding a child an extra meal or extra food during illness. They also lack information concerning position for proper breastfeeding and emptying one breast before giving to the other side.

Women also asked the source of information on child feeding in the previous year (Table 16). Health Extension workers appeared the leading source of information on child feeding practices as reported by 29.9% and 38.2% of the women in the intervention and non-intervention areas, respectively. Next to HEWs, families/friends/neighbors were reported among the major sources as reported by 25.8% and 26% of the women in the intervention and non-intervention areas, respectively. Volunteer community health workers (vCHWs) were reported among the sources of such information by 9.4% and 15% of the women, respectively.



Table 16. Among women with children 0-23 months, the distribution of women according to the type of information on child feeding practices/nutrition received and the source of information, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
% who received information on the following child feeding practices (last year)		
Putting baby to breast immediately after birth	63.6	62.1
Giving only colostrums in the first day or two until breast milk comes	36.7	41.4
No pre-lacteals (honey/mustard oil/glucose water)	22.2	21.9
Feed only breast milk up to six months	48.1	50.0
Not giving the child any water or other liquids up to six months	27.0	34.9**
How to hold the baby at the breast so he/she can breastfeed easily	17.1	18.2
How to put the baby's mouth at the breast so that he/she can feed easily	13.4	16.9
Emptying one breast before giving to the other side	13.9	15.9
Feeding mashed family food after 6 month	26.6	29.2
Feeding eggs, meat, fish, and other animal source foods to children older than 6 months	15.1	23.0***
Cooking children's with oil (or adding oil to children's food)	15.6	19.6*
Adding sprinkles to the child's food	18.5	22.0
Washing hands with water and soap before prep/feeding child	30.9	39.7
How to help your child eat better	12.2	14.9
How to feed your child when he/she is sick	10.4	14.1*
Feeding the child an extra meal or extra food after illness	11.4	13.8
% who received information on feeding practice from the following sources (last year)		
Medical Doctor	0.6	0.4
Midwife/nurse	8.7	4.7
HEW	29.9	38.2**
vCHW	9.4	15.0
TBA	3.1	1.9
Pharmacy	0.9	1.4
Radio/TV	0.9	0.6
Books/News Paper/Poster/Bill Board	0.4	0.2
Family/friends/neighbors	25.8	26.0

### ***Timed targeted counseling (TTC)***

Women's access to information and counseling services regarding child feeding at different time from the 3<sup>rd</sup> trimester of pregnancy to the day of birth, 4<sup>th</sup> week, 4<sup>th</sup> month, 6<sup>th</sup> month, 8<sup>th</sup> month, and 12<sup>th</sup> months is assessed as shown in Table 17. In particular, we assessed the receipt of such information from HEWs and vCHWs.

In general, women have limited access to such timed targeted counseling on child feeding practices in both study arms. Nevertheless, the few women who were contacted by the HEWs at the different times reported to have received key and adequate information on child feeding practices (Table 17). Data also suggest that access to TTC via HEWs appeared significantly better among women in the non-intervention area than in the intervention.

Among women with children 0-23 months, 19.8% in the intervention area and 26.5% in the non-intervention reported receiving information on child feeding practices from HEWs during the 3<sup>rd</sup> trimester of pregnancy. Among those who were contacted by the HEWs during the 3<sup>rd</sup> trimester, it appeared that nearly 80% received most of the relevant information concerning breastfeeding including giving colostrums, avoidance of pre-lacteal feeding and the benefits of exclusive breastfeeding up to 6 months.

About 19% and 17.2% of the women in the intervention and non-intervention areas, respectively, were contacted by HEWs at the day of birth who talked about child feeding practices. Most of the women who were contacted by HEWs at birth (nearly 80%) reported receiving important information on breastfeeding related practices such as initiating breastfeeding within 1 hour, giving colostrums, avoidance of pre-lacteal feeding and exclusive breastfeeding up to 6 months.

The proportion of women who reported having been contacted by HEWs at the 4<sup>th</sup> week after child birth was 15.2% and 18.3% in the intervention and non-intervention areas, respectively. Among those contacted by HEWs at the 4<sup>th</sup> week, the vast majority (90.5%) said they were told to feed only breast milk up to 6 months. Only 59% of these women in the intervention area were told to consult health professionals if any problem and 47.6% were told to monitor and follow child weight gain.

At the 4<sup>th</sup> month following delivery only 13.4% and 21.2% of the mothers, respectively, in the intervention and non-intervention were contacted by the HEWs. Feeding only breast milk up to 6 months was the main information received from HEWs during that contact. In the intervention area, among those contacted by HEWs at the 4<sup>th</sup> month, 68.4% were told to start supplementation at 6 months and 61.5% to consult health professionals if any problem and to monitor and follow child weight gain.

Sixteen percent of the mothers in the intervention and 21.3% in the non-intervention were contacted by HEWs when the child was 6 months of age. The majority of the women (90.2%) of the women who were contacted when their children were 6 months of age reported that they were told to introduce complementary feeding to the child by the HEWs. Seventy-two percent of these women in the intervention and 87.9% in the non-intervention were told to continue breastfeeding by the HEWs.

At the age of 8 months, 14.7% in the intervention and 19.1% in the non-intervention were contacted by the HEWs that talked about child feeding practices. Of these women, the majority (92% in the intervention and 92.1% in the non-intervention) were told to continue breastfeeding. About 82% of such women in both areas reported to have told to introduce complementary feeding. The importance of monitoring child weight and growth was communicated by the HEWs to 62.1% and 68.2% in the intervention and non-intervention areas, respectively.

A small portion of the mother interviewed reported to have contacted by HEWs that talked to them about child feeding practices at the first year of birth of their children – 9.6% in the intervention and 17.1% in the non-intervention. The type of information received at the 12 months of age of the child includes the need to introduce complementary feeding and continuing breastfeeding.

Table 17. Timed targeted counseling on child feeding practices by the HEW, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
% who received information on child feeding practices from HEWs during the Third Trimester	n=800 19.8	n=800 26.5*
Type of information received from HEW at the Third Trimester:	n=159	n=212
Putting baby on the breast immediately within 1st hr	79.9	80.7
Giving colostrums to the baby	78.6	76.9
Pre-lacteal feeding is not necessary	79.1	79.7
The benefit of feeding only breast milk first 6 months	77.9	81.1
% who received information on child feeding practices from HEWs at day of birth	n=800 18.8	n=800 17.2
Type of information received from HEW at the day of birth:	n=151	n=138
Putting baby on the breast immediately within 1st hr	82.9	86.2
Giving colostrums to the baby	76.1	78.3
Pre-lacteal feeding is not necessary	78.1	82.6
The benefit of feeding only breast milk first 6 months	60.3	73.9*
% who received information on child feeding practices from HEWs at Four weeks after birth	n=692 15.2	n=698 18.3
Type of information received from HEW at Four weeks after birth:	n=105	n=128
Feed only breast milk up to six months	90.5	93.1
Consulting health professional if any problem	59.0	76.1
Monitoring Infant weight gain	47.6	75.6**
% who received information on child feeding practices from HEWs at the 4 <sup>th</sup> month after birth	n=486 13.4	n=467 21.2*
Type of information received from HEW at the 4 <sup>th</sup> month after birth:	n=65	n=99
Feed only breast milk up to six months	92.3	88.9
Consulting health professional if any problem	61.5	63.6
Monitoring Infant weight gain	64.6	72.7
Waiting up to six month to start supplementary feeding	68.4	77.4
% who received information on child feeding practices from HEWs at the 6 <sup>th</sup> month after birth	n=382 16.0	n=389 21.3
Type of information received from HEW at the 6 <sup>th</sup> month after birth:	n=61	n=83
Introducing complementary feeding	90.2	93.9
Continuing breastfeeding	72.1	87.9
% who received information on child feeding practices from HEWs at the 8 <sup>th</sup> month after birth	n=339 14.7	n=329 19.1
Type of information received on child feeding practices from HEW at the 8 <sup>th</sup> month after birth:	n=50	n=63
Introducing complementary feeding	82.0	84.1
Continuing breastfeeding	92.0	92.1
Monitoring Infant weight gain	62.0	68.2
% who received information on child feeding practices from HEWs at the 12 <sup>th</sup> month after birth	n=229 9.6	n=216 17.1*
Type of information received from HEW at the 12 <sup>th</sup> month after birth:	n=22	n=37
Introducing complementary feeding	73.9	89.5
Continuing breastfeeding	69.6	81.6

On the whole, women's access to TTC from vCHWs is extremely low (Data not shown). Only 2% and 4.9% of the women in the intervention and non-intervention areas, respectively, reported to have been contacted by vCHWs who talked about child feeding practices during the third trimester of pregnancy. Likewise, the proportions contacted by vCHWs at the day of birth were 2.5% and 4.5%, respectively. Access to such information at the different interval following child birth can be considered virtually non-existent. It was not possible to gain in sight into the type of information provided by the vCHWs due to the very small numbers of respondents contacted by vCHWs.

### **3.10. Women's knowledge of child feeding practices**

Women's knowledge of selected child feeding practices including breastfeeding practices, complementary feeding, knowledge of food containing vitamin A, and meal frequency per day was assessed (Table 18).

#### ***Knowledge of breastfeeding:***

Accurate knowledge of some key breastfeeding practices is a necessary condition for actual practice. However, knowledge doesn't necessarily translate in to actual practice due to several intervening factors such as attitude, culture, resources, among others. When asked to mention the correct timing to initiate breastfeeding, 71.7% of the women in the intervention and 65.2% in the non-intervention reported immediately after birth (within an hour of birth). Only 50.7% of the women in the intervention and 58.9% in the non-intervention said that children should be fed with colostrums. Most women (86.7% in the intervention and 95.5% in the non-intervention) held the view that children should continue breastfeeding for one year or longer. It appears that women in the non-intervention area have significantly better knowledge on accurate breastfeeding practices than those in the non-intervention.

#### ***Knowledge of the age at introduction of complementary feeding:***

Women were asked the accurate age of a child to introduce liquid (including water) and solid foods in addition to breast milk. Table 18 shows 57.2% of the women in the intervention and 54.4% in the non-intervention said a child should start liquids (including water) in addition to breast milk at the age of 6 months. Likewise, 67.5% and 63%, respectively, said a child should start food in addition breast milk at the age of 6 months. There is no significant difference in the knowledge of the accurate age of introduction of liquids, semi-solid and solid food between women in the intervention and non-intervention areas.

#### ***Knowledge of vitamin A sources:***

With the caution that some women respondents might not understand the precise meaning of vitamin A due to lack of equivalent word in local language, some findings are apparent. Egg appears the most frequently reported source of vitamin A compared to other sources. In the intervention area 29.6% of the women reported egg as a source of vitamin A. This was reported significantly higher at 37.1% in the non-intervention. Next to eggs, women reported cow's milk as a source of vitamin A – 27.1% in the intervention and 34.1% in the non-intervention. This difference was statically significant. Breast milk was reported as a source of vitamin A by 18.4% and 20.4%, respectively. Orange colored fruits/vegetables as a source of vitamin A was implicated by 17.9% in the intervention and 23.6% in the non-intervention. On the whole, women in the non-intervention area were found to be significantly more knowledgeable than their counterparts in the intervention.

***Knowledge of the number of meals for children per day:***

The WHO recommendation classifies children's daily required number of meals by age and breastfeeding status. In this survey we asked mothers to report daily meal frequency for three age categories of children, i.e., for children age 7-8 months, 9-12 months and 13-23 months. We didn't ask the question separately by breastfeeding status. Based on the recommendations we considered in this study women as having acceptable knowledge of minimum meal frequency requirements if they report 3 or more meals a day for children 7-8 months and 4 or more meals a day for children age 9-23 months.

As shown in Table 18, about 70% of the women in the intervention and 65.4% in the non-intervention reported that children age 7-8 months should get 3 or more meals a day. The proportions that said a child age 9-12 months should get 4 or meals were 71.2% and 66.8%, respectively, in the intervention and non-intervention areas. For children age 13-23 months, the proportion of mothers who though a minimum daily meal frequency of 4 or more was 69.4% and 66.4% in the intervention and non-intervention areas, respectively.

Table 18. Women's knowledge of child feeding practice, A&T baseline survey, SNNPR, August-September 2010

	Study area	
	Intervention area N=800	Non-intervention area N=800
<b><u>Knowledge of Breastfeeding:</u></b>		
% mothers who said a child should start breastfeeding immediately after birth	71.7*	65.2
% mothers who said a child should be given the first breast milk (colostrums)	50.7	58.9*
% who said a child should continue breastfeeding for one year	86.7	95.5**
<b><u>Knowledge of age at introduction of complementary feeding:</u></b>		
% mothers said a child should start liquids (including water) in addition to breast milk at the age of 6 months	57.2	54.4
% mothers said a child should start food in addition breast milk at the age of 6 months	67.5	63.0
<b><u>Knowledge of foods containing vitamin A</u></b>		
% women who said the following food contains vitamin A:		
Orange colored fruits/vegetables	17.9	23.6*
Green leafs	14.4	19.1*
Eggs	29.6	37.1**
Liver	4.0	5.8
Breast milk	18.4	20.4
Cow's milk	27.1	34.1*
<b><u>Knowledge of the number of meals for children per day</u></b>		
% who said a child age 6-8 months should eat a minimum of 3 times a day	69.9	65.4
% who said a child age 9-12 months should a minimum of 4 times a day	71.2	66.8
% who said a child age 13-23 months should a minimum of 4 times a day	69.4	66.4

### 3.11. Infant and young child feeding practices

Table 19 presents key breastfeeding related indicators including timely initiation of breastfeeding, pre-lacteal feeding, colostrum feeding, exclusive breastfeeding, and continuation of breastfeeding for children 0-23 months. It also presents data on bottle feeding.

#### ***Timely Initiation of breastfeeding:***

It is recommended that children be put to the breast immediately or within one hour after birth. Among children 0-23 months the proportions that started breastfeeding within an hour of birth were 63.5% and 62.7%, respectively, in the intervention and non-intervention areas. The timely initiation of breastfeeding does not vary by age of the child with comparable prevalence for children 0-11 months and 12-23 months, somehow suggesting that this indicator has been stable over the past 2 years.

#### ***Pre-lacteal feeding:***

Pre-lacteal feeding is giving liquids or foods other than breast milk prior to the establishment of regular breastfeeding. In this survey we asked respondents whether they gave liquids or foods to their children immediately after birth. Of all children age 0-23 months, 13.6% in the intervention and 14.7% in the non-intervention were given pre-lacteal feeding. There was no difference in the prevalence of pre-lacteal feeding between children age 0-11 months and those 12-23 months.

#### ***Colostrum feeding:***

During the first few days after delivery, colostrum, an important source of nutrition and antibody protection for the newborn, is produced and should be fed to the newborn while awaiting the production of regular breast milk. On the whole, colostrum appeared fairly high in both study arms. Among children 0-23 months, 71.2% in the intervention and 67.9% in the non-intervention reported to have received colostrum. Likewise, we found no statistical difference in colostrum feeding coverage between children 0-11 months and those 12-23 months.

#### ***Exclusive breastfeeding among children 0-5 months:***

WHO<sup>10</sup> recommends that children be exclusively breastfed—fed only breast milk with no other liquids (including water) or food—on demand for the first 6 months of life. Breastfeeding status for children under 6 months is determined on the basis of a mother's recall of her child's intake over the previous 24-hour period (past day and night). Based on a 24-hour mother's recall, the proportion of children age 0-5 months that were given only breast milk (exclusively breastfed) were 57.9% and 65.6%, respectively, in the intervention and non-intervention areas (Table 19). Among children 0-3 months of age, the proportion exclusively breastfeeding was 67.7% and 73.1%, respectively. Data also show exclusive breastfeeding prevalence of children 0-5 months was significantly higher in the non-intervention area than in the intervention.

#### ***Continued breastfeeding:***

Continued breastfeeding is important for older infants and young children age 6-23 months, contributing significantly to overall nutrient intake. Among children age 12-23 months, the proportion that continued breastfeeding for one year or longer is computed as shown in Table 19. In general, continued breastfeeding for one year and beyond can be considered universal in the

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<sup>10</sup> WHO. The optimal duration of exclusive breastfeeding: a systematic review. Geneva: World Health Organization. WHO/NHD/01.08;WHO/FCH/CAH/01.23, 2001

study areas. In the intervention area 96.6% of the children age 12-23 months reported to be breastfeeding for 1 year or longer. The corresponding figure in the non-intervention area was even higher at 98.4%.

Table 19. Prevalence of key breastfeeding practices by age, A&T baseline survey, SNNPR, August-September 2010

	Intervention area	Non-intervention area
<b>Initiation of breastfeeding within one hour after birth, by age of child</b>		
Children 0-11 (n)	n=532	n=555
% initiated breastfeeding within one hour after birth (0-11 months)	65.0	62.9
Children 12-23 (n)	n=268	n=245
% initiated breastfeeding within one hour after birth (12-23 months)	60.4	62.4
Children 0-23 (n)	n=800	n=800
% initiated breastfeeding within one hour after birth (0-23 months)	63.5	62.7
<b>Pre-lacteal feeding</b>		
Children 0-11 (n)	n=532	n=555
% with pre-lacteal feeding (0-11 months)	13.7	14.6
Children 12-23 (n)	n=268	n=245
% with pre-lacteal feeding (12-23 months)	13.4	15.1
Children 0-23 (n)	n=800	n=800
% with pre-lacteal feeding (0-23 months)	13.6	14.7
<b>Colostrum feeding</b>		
Children 0-11 (n)	n=532	n=555
% who received colostrums (0-11 months)	71.3	68.6
Children 12-23 (n)	n=268	n=245
% who received colostrums (12-23 months)	68.6	66.1
Children 0-23 (n)	n=800	n=800
% who received colostrums (0-23 months)	71.2	67.9
<b>Exclusive breastfeeding, by age of child</b>		
0-3 months old (n)	n=257	n=257
% exclusively breastfeeding (0-3 month)	67.7	73.1
0-5 months old (n)	n=400	n=400
% exclusively breastfeeding (0-5 month)	57.9	65.6*
<b>Among children age 12-23 months (n)</b>		
% continued breastfeeding at 1 year	96.6	98.4

***Problem related to breastfeeding:***

Women were asked if they encountered any problem related to breastfeeding when they first started breastfeeding the child as well as when the child was 3-4 months (Table 20).

Only 9.1% in the intervention areas and 6.9% in the non-intervention reported some problems/difficulties when they first started breastfeeding the child. Among these few women, the major problems, in order of priority, include pain in the breast, the feeling of not having enough breast milk, cracked nipples, child not suck well, and lack of time to breastfeed. Few of these women sought advice for this problem from health workers - 13.7% in the intervention and 14.5% in the non-intervention. The proportion that sought advice from HEWs was 13.7% and 18.2%, respectively, in the intervention and non-intervention areas.

When asked if they encountered any problem/difficulty when they breastfed a child age 3-4 months, 7.5% and 5.9% of the mothers in the intervention and non-intervention areas, respectively, reported affirmatively to this question. Among these women, pain in the breast was reported as the leading problem, followed by child unable to suck well, the feeling of having not enough breast milk, cracked nipples and lack of time to breastfed.

Table 20. Reported concerns/difficulties related to breastfeeding, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=788	Non-intervention area N=785
<b><u>Concerns/difficulties when first started breastfeeding</u></b>		
% who reported any concern when first started breastfeeding	9.1	6.9
Type of concerns/difficulties :	n=73	n=55
Problems with breast (pain)	54.8	63.6
Child not suck well	9.6	12.7
Not enough time to feed child	5.5	0.0
Cracked nipples	15.1*	3.6
Felt not enough breast milk	24.7	23.6
Among those who had concerns/difficulties, the percentage	n=73	n=55
who sought advices from health workers	13.7	14.5
who sought advices from HEWs	13.7	18.2
who sought advices from vCHW	4.1	0.0
<b><u>Concerns/difficulties in breastfeeding when the child was 3-4 months old</u></b>		
% who reported any concern in breastfeeding when the child was 3-4 months	7.2	5.9
Type of concerns/difficulties :	n=41	n=34
Problems with breast (pain)	41.5	41.2
Child not suck well	29.3	17.6
Not enough time to feed child	2.4	2.9
Cracked nipples	9.8	2.9
Felt not enough breast milk	17.1	23.5
Among those who had concerns/difficulties, the percentage	n=41	n=34
who sought advices from health workers	29.3	29.4
who sought advices from HEWs	14.6	20.6
who sought advices from vCHW	0.0	0.0

### ***Bottle feeding:***

Bottle feeding appeared low in the study areas (Table 21). Among children age 0-23 months, the proportion that was fed with bottle the previous day were 5.5% and 5.7%, respectively, in the intervention and non-intervention areas. The highest bottle feeding incidence of 13.1% was reported among women with children 6-11 months in the intervention area. This was significantly lower at 3.8% among children 6-11 months in the non-intervention. Bottle feeding the previous day was also low at 6% and 5.7% among children age 12-23 months in the intervention and non-intervention areas, respectively.



Table 21. Prevalence of bottle feeding practices, A&T baseline survey, SNNPR, August-September 2010

	Intervention area	Non-intervention area
<b>Bottle feeding among children, by age of child (yesterday)</b>		
0-5 months old	n=400	n=400
% who fed with bottle yesterday	2.7	0.25
6-11 months old	n=130	n=157
% who fed with bottle yesterday	13.1*	3.8
12-23 months old	n=268	n=245
% who fed with bottle yesterday	6.0	5.7
0-23 months old	n=800	n=800
% who fed with bottle yesterday	5.5	5.7

***Introduction of solid, semi-solid or soft foods:***

Here we report the proportion of children age 6-8 months who received solid, semi-solid or soft foods in the previous day. As shown in Table 22, 85% and 94.4% of the children age 6-8 months in the intervention and non-intervention areas, respectively, had received solid, semi-solid or soft foods in the previous day.

***Minimum Dietary Diversity:***

Proportion of children 6-23 months who received foods from 4 or more food groups in the previous day is considered meeting the minimum dietary diversity. To compute a value for this indicator, a 7 food group<sup>11</sup> score variable was created. To create the seven food groups categories we asked mothers of the type of food the child had the previous day and the different food items were grouped into the 7 food groups. The list of the food items is detailed in Annex 1. A score, based on the food groups, was categorized into two as (1) 4 or more food groups and (2) less than 4 food groups. This indicator was also presented separately in three age categories as age 6-11, 12-23 and 6-23 months.

Figure 2 presents the distribution of children age 6-23 months who received from the different food groups in the previous day. Data show that most children received food made of grains the previous day – 66.3% in the intervention and 59.2% in the non-intervention. Next to grains, children reported to eat vitamin A rich foods as reported by 25.4% and 18.9% in the intervention and non-intervention areas, respectively. Dairy products were reported to be received the previous day by 27.1% of the children in the intervention area. The reporting for the same was significantly lower at 10.7% in the non-intervention. Other food groups received by small proportion of children include legumes, eggs and very few had flesh and other fruits and vegetables. On the whole, the data suggest very limited food diversity for children age 6-23 in the study area with most receiving grains, followed by vitamin A rich foods.

The proportion of children age 6-23 months who met the minimum dietary diversity was low at 7.2% in the intervention and 1.7% in the non-intervention (Table 23). The noted relatively higher minimum dietary diversity rate in the intervention area than in the non-intervention was statistically

<sup>11</sup> The 7 food groups used for calculation of this indicator are: (1)Grains, roots and tubers, (2)Legumes and nuts, (3)Dairy products (milk, yogurt and cheese), (4)Flesh foods (meat, fish, poultry and liver/organ meats), (5)Eggs, (6)Vitamin-A rich fruits and vegetables, and (7)Other fruits and vegetables

significant. The lowest proportion who met the minimum dietary diversity was documented among children age 6-11 months at 4.6% in the intervention and nil in the non-intervention.

### ***Minimum Meal Frequency:***

Proportion of breastfed and non-breastfed children 6-23 months who received solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more the previous day. Minimum is defined as - 2 times for breastfed children age 6-8 months, 3 times for breastfed children 9-23 months, and 4 times for non-breastfed children 6-23 months<sup>12</sup>. 'Meals' include both meals and snacks (other than trivial amounts), and frequency is based on mothers/caregiver report.

Based on the definition for minimum frequency for breastfed and non-breastfed children, 55% and 52% of the children age 6-23 months in the intervention and non-intervention areas, respectively, have meet the minimum meal frequency (Table 23). There was an increasing trend in the proportion who met the minimum meal frequency by age. In the intervention area, the proportion of children age 6-11 months who received the minimum meal frequency was 45.3%. This has increased to 58.1% and 65%, respectively, for children 12-17 months and 18-23 months. The corresponding values for the three age brackets in the non-intervention area were 45.2%, 48.5% and 66.1%, respectively. There was no significant difference in the proportion who received the minimum meal frequency between the intervention and non-intervention areas.

The minimum meal frequency was also computed separately by breastfeeding status. In general data show that children who were breastfeeding tended to have significantly higher minimum meal frequency than those who were not breastfeeding. Among currently breastfeeding children age 6-23 months, 56.8% and 53.5% in the intervention and non-intervention areas, respectively, have meet the minimum meal frequency the previous day. On the other hand, 37.1% of the non-breastfeeding children in the intervention area received the minimum meal frequency the previous day. The corresponding value for the same in the non-intervention was lower at 17.7%. Of note, the number of children who were not breastfeeding in both areas was low for any meaningful statistical analysis.

### ***Minimum Acceptable Diet:***

The Minimum acceptable diet indicators are computed for children age 6-23 months, first separately by child's breastfeeding status<sup>13</sup> and, then by combining breastfeeding and non-breastfeeding children to yield a single indicator. The minimum dietary diversity and minimum meal frequency scores computed above were combined to form the minimum acceptable diet indicator. However, for non-breastfed children, the dietary diversity component of this indicator is different from the individual practice indicator calculated earlier (which did not distinguish between breastfed and non-breastfed children). A dietary diversity for non-breastfeeding children was computed using a 6 food group score (instead of the 7 food group score above) in order to exclude the dairy group from the calculation. The number of milk feeds was counted separately for non-breastfed children to determine if the child received at least 2 milk feeds, the minimum number required for this indicator. Details about how to compute these and the other IYCF indicators can be consulted from "*CARE*."

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<sup>12</sup> CARE. Infant and Young Child Feeding Practices: Collecting and Using Data: A Step-by-Step Guide. Cooperative for Assistance and Relief Everywhere, Inc. 2010.

<sup>13</sup> **For breastfeeding children:** [Breastfed children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day / breastfed children 6-23 months]

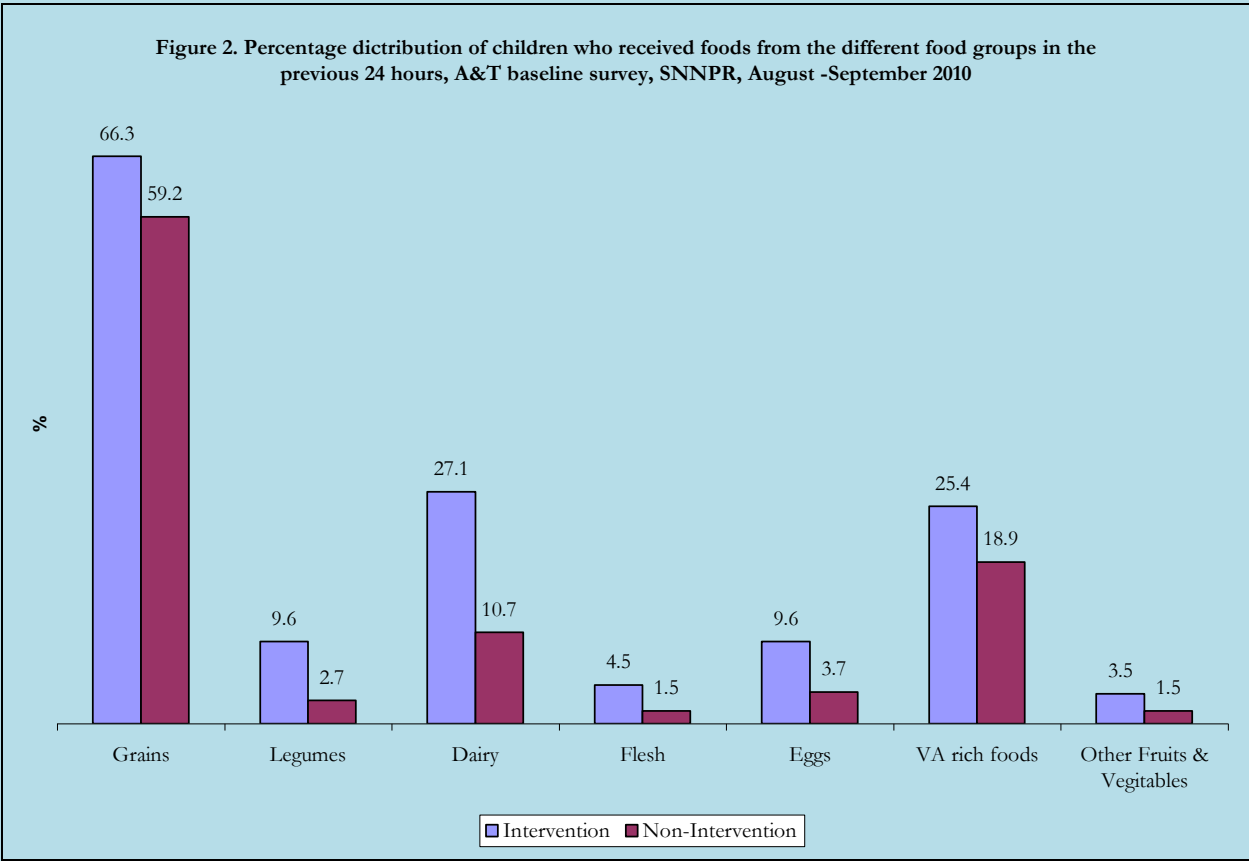
**For non-breastfed children:** [Non-breastfed children 6-23 months of age who had at least the 2 milk feedings and had at least the minimum dietary diversity and the minimum meal frequency during the previous day / non-breastfed children 6-23 months]

*Infant and Young Child Feeding Practices: Collecting and Using Data: A Step-by-Step Guide - Cooperative for Assistance and Relief Everywhere, Inc. 2010."*

Table 22 also provides data on the minimum acceptable diet for children 6-23 months, stratified by age of child and breastfeeding status. On the whole, data suggest that the vast majority (over 95%) of children both in the intervention and non-intervention areas did not receive the minimum acceptable diet the previous day. Only 5% and 1.5% of the children in the two areas, respectively, were considered as having the minimum acceptable diet the previous day. There is some trend in the proportion having the minimum acceptable diet by age. In the intervention area, it increased from a low of 3.1% among children 6-11 months to 4.7% and 7.5%, respectively, among children age 12-17 and 18-23 months. In the non-intervention area, the corresponding values were 0.0%, 2.2% and 2.7%, respectively.

Table 22. Complementary feeding practices, Minimum dietary diversity, Minimum meal frequency and Minimum acceptable diet by age, A&T baseline survey, SNNPR, August-September 2010

	Intervention area	Non-intervention area
<b>6-8 months old, n</b>	n=60	n=72
Introduction of solid, semi-solid or soft foods among children 6–8 months of age	85.0	94.4
<b>Minimum dietary diversity, by age of child</b>		
6-11 months old, n	n=130	n=157
% <b>Minimum dietary diversity (6-11)</b>	4.6**	0.0
12-23 months old, n	n=270	n=243
% <b>Minimum dietary diversity (12-23)</b>	8.6**	2.9
6-23 months old, n	n=400	n=400
% <b>Minimum dietary diversity (6-23)</b>	7.2***	1.7
<b>Minimum meal frequency</b>		
By age of child		
6-11 months old, n	n=130	n=157
% <b>Minimum meal frequency (6-11)</b>	45.3	45.2
12-23 months old, n	n=270	n=243
% <b>Minimum meal frequency (12-23)</b>	61.2	56.3
6-23 months old, n	n=400	n=400
% <b>Minimum meal frequency (6-23)</b>	55.0	52.0
By breastfeeding status		
currently breastfed, n	n=750	n=765
% <b>Minimum meal frequency (6-23)</b>	56.8	53.5
Not currently breastfed. n	n=50	n=35
% <b>Minimum meal frequency (6-23)</b>	37.1	17.7
<b>Minimum acceptable diet</b>		
By age of child		
6-11 months old, n	n=130	n=157
% <b>Minimum acceptable diet (6-11)</b>	3.1	0.0
12-23 months old, n	n=270	n=243
% <b>Minimum acceptable diet (12-23)</b>	6.0	2.4
6-23 months old, n	n=400	n=400
% <b>Minimum acceptable diet (6-23)</b>	5.0	1.5



***Problem related to child feeding practices:***

Women were asked if they had any concern or difficulty when feeding children with semi-solid or solid foods. As shown in Table 23, 10.5% of the women in the intervention and 7.5% in the non-intervention reported affirmatively to this question. Among those who reported facing difficulties in child feeding, most (60% in the intervention and 80% in the non-intervention) reported that they had concerns/difficulties in feeding sick children. This was followed by the reporting of child's refusal or spit the food out when feeding. Some women also blamed children's poor appetite among the reasons that make it difficult to feed children properly. Lack of resource was also reported among the problems. Only a quarter of the women who had concerns in child feeding in the intervention area sought advice from health workers. This was higher but insignificantly at 32.5% in the non-intervention. The proportion of such mothers who sought advice from HEW's was 23.3% and 20%, respectively, in the intervention and non-intervention areas.

Table 23. Problem related to child feeding, as reported by mothers, A&T baseline survey, SNNPR, August-September 2010

	Intervention area	Non-intervention area
Concerns/difficulties when feeding child semi-solid/solid foods	n=573	n=536
% who reported any concern/difficulty when feeding the child semi-solid/solid foods	10.5 n=60	7.5 n=40
Child refusal or child spits it out	46.8	38.1
Child sick	60.0	80.0
Child's poor appetite	23.3	32.5
Mother does not have time to prepare/feed	0.0	0.0
Family does not have resources	15.0	7.5
Family members discouraged certain Foods/practices	0.0	0.0
Among those who had concerns/difficulties, the percentage	n=60	n=40
% who sought advices from health workers	25.0	32.5
% who sought advices from HEWs	23.3	20.0
% who sought advices from vCHW	3.3	2.5

### 3.12. Nutritional status of children

The data on weight and height of children age 6-59 months were used to calculate three summary indices of nutritional status (according to WHO child growth standard), which affects susceptibility to disease and their chance of survival. These indices are height-for-age, weight-for-height, and weight-for-age. The three nutritional status indices are expressed in standard deviation (SD) unit (z-score) from the median for the international population. Children, who fall more than 2 standard deviations below the reference median are considered to be malnourished, while those who fall more than 3 standard deviations units below the reference median are considered to be severely malnourished.

Each of the indices provides somewhat different information about the nutritional status of children. The height-for-age index measures linear growth retardation among children. Children who are more than 2 SD below the median of the reference population in terms of height-for-age are considered short for their age or *stunted* (chronically malnourished). The weight-for-height index measures body mass in relation to body length. Children who are more than 2 SD below the median of the reference population in terms of their weight-for-height are considered to be thin or *wasted* (acutely malnourished). Weight-for-age is a composite measure which takes into account both chronic and acute under-nutrition. Children who are more than 2 SD below the reference median on this index are considered *underweight*.

Table 24 presents the three nutritional status indices for children age 6-59 months. Malnutrition is common in both the intervention and non-intervention areas. Among children 6-23 months, the proportion of children stunted (<-2SD) were 32.3% and 36%, respectively, in the intervention and non-intervention area. The corresponding proportions for wasted (<-2SD) was 9.4% and 7.4%,

respectively. The proportion of children who were severely undernourished is also notable. In the case of height-for-age, 4% and 4.8% of the children age 6-23 months, respectively, in the intervention and non-intervention areas were severely stunted (<-3SD). The proportion severely wasted was 4.1% in the intervention and 3.4% in the non-intervention area.

There is a marked increase in the prevalence of stunting and underweight with age. In the intervention area, the prevalence of stunting (<-2SD) rises from 21% for children age 6-11 months to 32.3% for children age 12-23 months in the intervention area. In the non-intervention, this was increased from 25.9% to 36%. Of note, there was no statistical significant difference in child malnutrition between the intervention and non-intervention areas.

Among children age 24-59 months, the proportion stunted were 35.3% and 34.7%, respectively, in the intervention and non-intervention areas. The corresponding figures for wasting were 7.4% and 9.6%, respectively.

Results of the anthropometric indices computed based on the National Center for Health Statistics (NCHS) is presented in Annex III. Of note, the NCHS standard yielded lower prevalence estimates for the three indices compared to the WHO. The WHO standard is recommended as a better tool to monitor the rapid and changing rate of growth in children<sup>14</sup>.

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<sup>14</sup> Mercedes de Onis, Adelheid W Onyango, Elaine Borghi, Cutberto Garza and Hong Yang, et al . Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutrition*: 9(7), 942–947. 2006

Table 24. Percentage of children classified as malnourished according to [WHO references] three anthropometric indices of nutritional status: height-for-age, weight-for-height and weight-for-age by child's age, A&T baseline survey, SNNPR, August-September 2010

	Intervention area	Non-intervention area
<b>HEIGHT-FOR-AGE</b>		
<i>Child's age ( 6-11 months-N)</i>	n=125	n=147
% below -2 SD	21.0	25.9
% below -3 SD	4.0	4.8
<i>Child's age (12-23 months-N)</i>	n=250	n=234
% below -2 SD	38.3	42.3
% below -3 SD	19.4	17.9
<i>Child's age (6-23 months-N)</i>	n=375	n=381
% below -2 SD	32.3	36.0
% below -3 SD	14.2	12.9
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	35.3	34.7
% below -3 SD	13.7	15.9
<i>Child's age (6-59 months-N)</i>	n=726	n=776
% below -2 SD	33.7	35.3
% below -3 SD	15.0	13.3
<b>WEIGHT-FOR-HEIGHT</b>		
<i>Child's age ( 6-11 months-N)</i>	n=121	n=147
% below -2 SD	9.9	6.8
% below -3 SD	4.1	3.4
<i>Child's age (12-23 months-N)</i>	n=247	n=233
% below -2 SD	9.3	7.7
% below -3 SD	4.9	3.0
<i>Child's age (6-23 months-N)</i>	n=371	n=380
% below -2 SD	9.4	7.4
% below -3 SD	4.6	3.2
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	7.4	9.6
% below -3 SD	2.9	4.1
<i>Child's age (6-59 months-N)</i>	n=722	n=775
% below -2 SD	8.4	8.5
% below -3 SD	3.7	3.6
<b>WEIGHT-FOR-AGE</b>		
<i>Child's age ( 6-11 months-N)</i>	n=122	n=147
% below -2 SD	18.0	18.4
% below -3 SD	4.1	5.4
<i>Child's age (12-23 months-N)</i>	n=250	n=233
% below -2 SD	31.6	38.2
% below -3 SD	14.8	16.7
<i>Child's age (6-23 months-N)</i>	n=372	n=380
% below -2 SD	26.9	30.5
% below -3 SD	11.3	12.4
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	21.4	24.0
% below -3 SD	10.3	8.6
<i>Child's age (6-59 months-N)</i>	n=723	n=775
% below -2 SD	24.2	27.2
% below -3 SD	10.7	10.4



### 3.13. Nutritional status of women

Body mass index (BMI) is an estimate of body composition that correlates an individual's weight and height to lean body mass. High values can indicate excessive fat stores, while low values can indicate reduced fat stores. The BMI is a useful tool in both clinical and public health practice for assessing the nutritional status. In this survey, we used BMI to assess the malnutrition status of women. It is calculated by dividing weight in kilograms by height in meters squared ( $m^2$ ). Four categories were created to estimate the degree/severity of malnutrition in women (a) Severely malnourished (BMI: < 16  $kg/m^2$ ), (b) Moderately malnourished (BMI: 16-16.9  $kg/m^2$ ), (c) Mildly malnourished (BMI: 17-18.49  $kg/m^2$ ) and (d) Normal (BMI: 19-24.9  $kg/m^2$ ).

As shown in Table 25, on the whole 13.4% of the women in the intervention and 15.7% in the non-intervention had BMI less than 18.5% and were malnourished. Only 1% of the women in both areas were severely malnourished. The proportion of women moderately malnourished was 2.1% and 2.6%, respectively, in the intervention and non-intervention areas. While 10.3% and 12.1%, respectively, were categorized as being mildly malnourished.

Table 25. Proportion of women who are malnourished based on BMI cut-off points, A&T baseline survey, SNNPR, August-September 2010

	Intervention area N=789	Non-intervention area N=796
Severely malnourished (BMI < 16)	1.0	1.0
Moderately malnourished (BMI 16-16.9)	2.1	2.6
Mildly malnourished (BMI 17-18.49)	10.3	12.1
Normal (BMI $\geq$ 18.5)	86.6	84.3
<b>Total malnourished (BMI &lt;18.5)</b>	<b>13.4</b>	<b>15.7</b>

### 3.14. Determinants of child malnutrition

We attempted in this report to examine the determinants of stunting among children 6-23 months. Three separate multivariate logistic regression models were fitted - Model 1 includes background characteristics and household socio-economic variables including food insecurity, among others; Model 2 includes a number of maternal and child health indicators such as antenatal care, child immunization, vitamin A supplementation for the mother and BMI; Model 3 includes child feeding practice indicators such as breastfeeding status, dietary diversity, meal frequency etc. It important to note that the findings from these models should be interpreted with caution due to a number of unobserved confounding factors and the fact that such multivariate analyses do not allow the investigation of causality.

#### ***Child, mother and household background characteristics:***

In model 1 (Table 26) we included child's sex, age, mother's age, educational status, religion, the number of children ever born, household economic status, household water and toilet accesses, and household food insecurity level. In this multivariate logistic regression model five variables appeared to significantly and independently predict stunting among children age 6-23 months. These are child's sex, age, household economic status, availability of toilet facility in the household and household food insecurity level.

The odds of stunting among children age 6-23 months appeared 1.6 times higher among the male children as compared to their female counterparts. Children age 12-23 months appeared 2.2 times more likely than those age 6-11 months to be stunted.

Better household economy found to carry a lower risk of stunting among children age 6-23 months. Children from those households with high economic status index were 40% less likely to be stunted as compared to those from households that scored low in the economic index. There was also a 40% decrease in child stunting rate among households with toilet facilities vis-à-vis those without toilet facilities.

High household food insecurity level, as measured by HFIS, tended to correlate positively with stunting rate among children age 6-23 months. Children from those households with high food insecurity level were found 60% more likely to be stunted as compared those children from households having low food insecurity level.

Table 26. Model 1 - the prevalence of stunting and adjusted odds ratio (OR) and 95% confidence interval (CI) according to selected characteristics of children, mother and households, A&T baseline survey, SNNPR, August-September 2010

<b>Child, mother and household characteristics</b>	<b>% Stunted</b>	<b>Adjusted OR (95% CI)</b>
<b><u>Child characteristics:</u></b>		
Sex of child		
Male	39.3	<b>1.6 (1.2-2.2)</b>
Female (ref)	29.9	1.0
Age of child		
6-11 months (ref)	23.6	1.0
12-23 months	40.2	<b>2.2(1.5-3.1)</b>
<b><u>Mother characteristics:</u></b>		
Age of mother		
15-19 (ref)	42.9	1.0
20-24	32.6	0.6(0.2-1.3)
25-34	32.7	0.6(0.3-1.4)
35-49	40.2	0.8(0.3-2.0)
Education		
Cannot read or write (ref)	33.6	1.0
Read or write	37.0	1.3(0.9-1.9)
Religion		
Protestant	33.2	1.2(0.6-2.4)
Orthodox	39.7	1.3(0.6-2.9)
Others (ref)	30.0	1.0
Children ever born (CEB)		
1 (ref)	34.9	1.0
2	37.1	1.1(0.6-1.9)
3	31.2	0.9(0.5-1.7)
4+	34.0	0.9(0.5-1.7)
<b><u>Household characteristics:</u></b>		
Household economic status		
Low (ref)	39.7	1.0
Medium	36.3	1.0(0.7-1.4)
High	27.3	<b>0.6(0.4-0.9)</b>
Household clean water supply		
No (ref)	33.5	1.0
Yes	34.7	1.2(0.8-1.6)
Household toilet facility		
No (ref)	45.6	1.0
Yes	32.7	<b>0.6(0.3-0.9)</b>
Household food insecurity scale (HFIS):		
Low	29.6	1.0
High (score >66% on the HFIS)	41.4	<b>1.6(1.1-2.2)</b>
<b><u>Study arm:</u></b>		
Non-intervention (ref)	36.0	1.0
Intervention	32.3	0.8(0.6-1.1)

***Maternal and child health indicators:***

In Model 2 we included, as predictors of stunting, mother's antenatal care use, child illness in the previous two weeks, the receipt of measles immunization, fully vaccination status (for children age 9 years or older), vitamin A supplementation for children, de-worming, vitamin A supplementation for the mother (within 2 months after birth) and mother's BMI (Table 27).

In this model, among the variables included, the single most important predictor of stunting among children age 6-23 months was measles' immunization. Children who received measles's vaccination appeared 60% less likely to be stunted compared to those who didn't receive measles vaccination. This interesting finding may be confounded by some unobserved indicators but other studies from elsewhere have documented some non-specific effects of measles immunization. A study showed the non-immunized children were twice as likely to be stunted, underweight, and wasted than the immunized children<sup>15</sup>.

Of note, this study did not find any significant effect of the other variables included in Model 2 to predict stunting.

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<sup>15</sup> F Chowdhury, Ashraful I Khan, Mohammad I. Hossain, et al. Young children non-immunized against measles: Characteristics and programmatic implications. *Acta Pædiatrica*, Volume 95, Issue 1, pages 44–49, January 2006

Table 27. Model 2- the prevalence of stunting and adjusted odds ratio (OR) and 95% confidence interval (CI) according to selected maternal and child health indicators, A&T baseline survey, SNNPR, August-September 2010

Maternal and child health:	%	OR (95% CI)
ANC use		
No (ref)	33.2	1.0
Yes	35.3	1.2(0.9-1.7)
Child sick last 2 weeks		
No (ref)	33.2	1.0
Yes	36.9	1.2(0.8-1.7)
Child received measles vaccine		
No (ref)	36.8	1.0
Yes	30.1	<b>0.5(0.3-0.8)</b>
Child fully immunized		
No (ref)	40.1	1.0
Yes	33.3	1.2(0.7-1.9)
Child (age <9 months)	19.9	0.3(0.2-0.5)
Child received vitamin A (last 6 months)		
No (ref)	35.2	1.0
Yes	32.6	0.9(0.6-1.3)
Child received De-worming (last 6 months)		
No (ref)	34.0	1.0
Yes	35.1	1.0(0.7-1.6)
Mother received Vitamin A (within 2 months of delivery)		
No (ref)	33.1	1.0
Yes	37.3	1.2(0.7-2.1)
Do not know	45.6	1.5(0.8-2.8)
Mother's BMI		
Not low (ref)	35.0	1.0
Low (<18.5)	29.4	0.7(0.5-1.1)

### ***Child feeding practices:***

In Model 3 a number of child feeding indicators were included as determinants of stunting (Table 28). Child breastfeeding indicators including the timely initiation of breastfeeding, colostrum feeding, pre-lacteal feeding, and current breastfeeding status were included. Some of the key IYCF indicators such as minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD) were also included in the model.

Among the variables included in Model 3, only current breastfeeding status appeared to independently predict stunting among children age 6-23 months. The odds of stunting found 60% lower among children currently breastfeeding compared to those who were not. The fact that indicators such as MDD, MMF and MAD did not appear as significant predictors of stunting in this model partly due to their very low prevalence in the study areas. Of note, the MDD carries a 50% lower stunting rate though not significantly. Other indicators such as the timely initiation of breastfeeding (within an hour), and colostrum feeding were not associated with stunting among children 6-23 months. This finding is explicable given the fact that such practices are more important as predictors of nutritional and health status of children under 6 months.

Table 28. Model 3- The prevalence of stunting and adjusted odds ratio (OR) and 95% confidence interval (CI) according to selected child feeding practice indicators, A&T baseline survey, SNNPR, August-September 2010

Child feeding practice:	%	OR (95% CI)
Breastfeeding initiated with one hour		
No (ref)	32.0	1.0
Yes	35.0	1.2(0.8-1.6)
Colostrums given		
No (ref)	31.1	1.0
Yes	35.1	1.2(0.8-1.7)
Pre-lacteal feeding		
No (ref)	34.1	1.0
Yes	34.2	1.0(0.7-1.6)
Child still breastfeeding		
No (ref)	54.2	1.0
Yes	32.9	<b>0.4(0.2-0.7)</b>
Minimum Dietary Diversity (MDD)		
Child did not MDD (ref)	34.7	1.0
Child received MDD	24.2	0.5(0.1-2.4)
Minimum Meal Frequency (MMF)		
Child did not MFF (ref)	35.7	1.0
Child received MFF	33.1	0.9(0.7-1.3)
Minimum Acceptable Diet (MAD)		
Child did not MAD (ref)	34.7	1.0
Child received MAD	20.8	1.0(0.2-5.9)

## IV. SUMMARY AND RECOMMENDATIONS

The findings from this study provide useful information and benchmarks for program planning, monitoring and future evaluation of intervention efforts of the A&T program in SNNPR. A summary of the salient findings and recommendations are detailed below.

### ***63.5% of the children in the intervention area initiated breastfeeding within an hour of birth; 71.2% received colostrums.***

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- The proportion who initiated breastfeeding within an hour in this study compares well with studies conducted during 2008-2009 in the region. In the light of the potential consequences of delayed breastfeeding on child growth and health, the proportion of children (36.5%) that did not start breastfeeding within an hour of birth is an area of great concern. Early initiation provides newborns with high levels of antibodies, vitamin A, and other protective factors through colostrum, the sticky, yellow-white early milk. Skin-to-skin contact during breastfeeding stabilizes the baby's temperature, respiratory rate, and blood sugar level. Program thus needs to promote early initiation of breastfeeding and colostrum feeding in the study area. **Empowering women with appropriate knowledge and skills related to timely initiation of breastfeeding and colostrum feeding, the provision of counseling and support to mothers in breastfeeding practices at the time of delivery and assisting mothers to overcome difficulties associated with initial breastfeeding should be promoted.**

### ***14% of children in the intervention area had pre-lacteal feeding***

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- Pre-lacteal feeding is often the main sources of infections among neonates. Pre-lacteal feeding could be a result of some harmful traditional practices and beliefs. **It is imperative that program educate mothers, families and community leaders to dispel any misconception and cultural practices that promote pre-lacteal feeding.**

### ***60% of the children age 0-5 months in the intervention area were exclusively breastfed***

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- The documented exclusive breastfeeding rate by this study compares well with recent surveys. Although there is a recent improvement in the practice of exclusive breastfeeding, especially after the advent of the HEP, there is still a considerably large portion of the children (40%) who are not exclusively breastfeeding in the study area. This study also found that women lack information on breastfeeding practices including the need for exclusive breastfeeding, attachment, positioning and alternating breasts. The limited access of women to timed targeted counseling on breastfeeding has also been documented by this study. **Thus, efforts are due to provide the necessary information on exclusive breastfeeding through provision of information via different channels and continuous and targeted counseling during pregnancy, child birth and within 6 months following birth.**

### ***Bottle feeding practice can be considered low at 13% and 6%, respectively, among children age 6-11 months and 12-23 months in the intervention area***

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- The recommendations against the use of bottle feeding infants, evolved primarily from the concern that due to the poor hygiene and sanitation practices prevalent in developing countries, bottle feeding can increase the risk of infections. Studies have consistently confirmed that bottle-fed children are at increased risk of infection compared to non bottle-fed children. Other reason discouraging bottle feeding is related to its negative impact on breastfeeding. Once children are introduced to bottle feeding, it usually becomes difficult to re-establish breastfeeding, because of the ease of sucking from bottle compared to sucking from breasts. While the bottle feeding practice documented by this study can be considered low, the noted 13% of children aged 6-11 months who were bottle fed in the day

prior to the survey can be suggestive of the increasing trend of bottle feeding in the rural areas. In a rural community where the hygiene condition is uncertain, such practice may have a devastating effect to children. **Rigorous behavior change communication efforts are due to abandon the practice. It must also be articulated that at times of difficulties to breastfeed using cups is preferable.**

***Among children age 6-8 months, 85% have already started complementary feeding.***

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- The noted high complementary feeding rate for children age 6-8 months in the study area is encouraging. It is recommended that complementary feeding is initiated at six months of age with semi-fluid and meshed foods and constantly increase the frequency of feeding, density of the nutrients and the diversity of the diet. **This positive behavior should be maintained and further improved to insure that every child starts complementary feeding at exactly six months. It is equally important to educate and encourage mothers to feed their children from different food groups.**

***Only 4.6%, 7.4% and 10.0% of the children aged 6-11 months, 12-17 months and 18-23 months, respectively, have met recommended minimum dietary diversity in the intervention area.***

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- As a proxy indicator to the quality of the complementary diet, the WHO developed the minimum dietary diversity indicator based on the food groups consumed by the child over the previous 24 hours. The WHO recommends that if a child has consumed food from at least four food categories then he/she is considered as meeting the minimum dietary diversity. In this study, the proportion of children who had reportedly met the recommended minimum dietary diversity is extremely low. The fact that small fraction of respondents has mentioned the consumption of foods from most food sources (except the foods from grain sources and dairy sources to some extent) over the day confirms the seriousness of food diversity problem in the area. The monotonous nature of diet in the area, that also is prevailing all across the country, perhaps as a result of lack of diversity in agricultural production, is most likely the main impediment in infant and child feeding practices in the area. Knowledge about the importance of diversifying complementary diets, lack of resources and time further compounded the consumption of diversified foods. **In order to overcome the problems of food diversity, agricultural interventions geared towards diversification of food production in the study area should constitute among the long term intervention priorities. We also believe that the lack of dietary diversity may well be attributed to lack of women's and community's knowledge on how to prepare food for children from different food groups. Targeted interventions that focus on behavior change communication and educating mothers on food preparation from locally available resources are among the important intervention strategy.**

***45.3%, 58.1% and 65.0% of the children aged 6-11 months, 12-17 months and 18-23 months, respectively, have met the minimum meal frequency in the intervention area***

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- As an estimate of the quantity of complementary foods consumed, minimum meal frequency index was developed. The index is based on the age-specific recommended meal frequencies as follows. Two times a day for breastfeeding children aged 6-8 months, three times a day for breastfeeding children aged 9-23 months and four times a day for non breastfeeding children aged 6-23. The fact that only about half of the children meeting the minimum meal frequency is indicative of the widespread occurrence of inadequate food consumption probably a result of several synergetic factors including shortage of food in the area, lack of awareness about the importance of feeding children more frequently, lack of resources, lack of time to prepare and feed children. **This will undoubtedly entails interventions that aim at insuring food security, provision information and support to mothers on proper frequency of child feeding as well as strengthened behavior change communication activities.**



***Only 3.1%, 4.7% and 7.5% of the children aged 6-11 months, 12-17 months and 18-23 months, respectively, have met the minimum acceptable diet in the intervention area.***

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- Minimum acceptable diet is a composite index based on minimum dietary diversity and minimum meal frequency. Children who have met the minimum dietary diversity and minimum meal frequency are considered as meeting the minimum acceptable diet. The proportion of children who were reported to have met the minimum acceptable diet is very low in all age groups, signaling that children in the study area do not consume adequate food in terms of quantity and quality. **As discussed above, efforts that aim at improving food diversity and proper meal frequency for children should constitute among the priority intervention.**

***32.3% of children age 6-23 months and 35.3% children age 24-59 months in the intervention area stunted. The pick prevalence of stunting (38.3%) was documented among children age 12-23 months***

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- Similar level of stunting was reported from previous studies elsewhere in Ethiopia and in SNNPR. This high prevalence of stunting in the area is suggestive of longstanding child malnutrition in the area. The fact that stunting peaked among children age 12-23 months is indicative of the critical lack of appropriate complementary feeding among children in the study area, as discussed elsewhere above. In the multivariate analysis, a higher risk of stunting among children age 6-23 months is significantly and independently associated with low household economic status, absence of toilet facility, high household food insecurity, not-immunized against measles and lack of breastfeeding. An increased level of stunting was also documented among children that did not meet the minimum dietary diversity. **Multifaceted interventions that encompass improving household food security, household access to toilet facilities, increasing vaccination coverage, continued breastfeeding, the provision of appropriate complementary feeding and meeting the minimum dietary diversity, and meal frequency, among others is highly recommended.**

***9.4% and 7.4% of children age 6-23 months and 24-59 months, respectively, in the intervention area were wasted.***

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- The wasting rate documented here is high and comparable to previous data in the country and the region. Several factors influence wasting including food shortage, inappropriate infant and young child feeding practices, prevalence of diseases, among others. **Interventions aimed at improving infant and young child feeding practices coupled with efforts to reduce major child health problems in the area and improving treatment seeking behaviors for sick children are critical.**

***Only 7.5% of the women in the intervention area received Vitamin immediately or within 2 months after delivery.***

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- Vitamin A deficiency (VAD) is a major public health problem. The supplementation of lactating women with vitamin A soon after birth or within 2 months after birth could be an effective strategy to combat VAD. **Program should solicit ways to improve access and provide vitamin A supplementation to mothers immediately after birth.**

***On the whole about 64% of the women reported to receive some information about infant and young child feeding practices in the previous year. Women appeared better informed about initiation of breastfeeding within an hour, exclusive breastfeeding up to 6 months, colostrums feeding and hand washing practices. On the other hand women are not sufficiently informed about positioning in breastfeeding, dietary diversity, meal frequency, feeding sick child among, others.***

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- The relatively low access to information of key infant and young child feeding practices among women in the study area partly explains the noted low levels of adoption of optimum infant and young children practices. **Appropriate and effective communication strategy must be developed in order to disseminate information on appropriate infant and child feeding practices.**

***About 30% of the women have heard about some important infant and young child feeding practices from health extension workers, 25.8% from family, friends or neighbors, 9.4% from vCHWs and 8.7% from midwives/nurses.***

- Information is said to be strong when disseminated through a mix of channels, such as community advocacy and events; interpersonal communication (community groups, individual counseling, mother to-mother support groups and home visits), and through health workers including HEWs and vCHWs. It is also recommended that information on infant and young child feeding be disseminated whenever health professionals have opportunities to meet mothers. **While the efforts to employ as much channels as possible should be pursued, strengthening community level information such as through HEWs, vCHWs and women's groups etc will be critical.**

***The proportion of women who received timed and targeted counseling from health extension workers during the third trimester of pregnancy was 19.8%, at the date of birth was 18.8% and it was less than 16% at other occasions. The proportion of women who received timed and targeted counseling from voluntary community health workers was less than 3% in all occasions***

- Often, rural women are not well-informed about on how to feed their infants and children. Additionally mothers face difficulties in feeding infants at various stages of the child development. In order to surmount such problems, Timed and Targeted counseling is suggested by WHO. Timed and Targeted Counseling contacts during antenatal care, delivery, 2-3 days after delivery, 5-7 days after birth, 3-4 weeks after birth, 6 months are recommended. The fact that sizeable proportion of women having difficulties in several aspects of child feeding at various stages and the fact that only a few seeking advice reflects the weakness in the timid and targeted counseling in the study area. **As timed and targeted counseling provide opportunities to disseminate information, train skills to optimal feeding, provide/arrange support and assist mothers to overcome problems that arise in the processes of infant and child feeding, it should be rigorously pursued and extensively employed through the HEWs, vCHWs and peer mothers.**

***Immunization coverage of children in the intervention area can be considered far off the target with 64.2% received PENTA 1, 35.4% PENTA 3, 44% received measles, and only 22.4% were fully immunized.***

- PENTA 1 is an access indicator and the noted coverage for PENTA 1 in the intervention area can be considered fairly high. However, the high discontinuation rate of 46.5% (from PENTA 1 to PENTA 3) is an area great concern. **Program needs to put in place a defaulter tracing strategy to minimize the dropouts. Mothers need to be educated and advised to complete child immunization.**
- Being an MDG indicator, the noted 44% coverage for measles requires proper attention. This study also documented lower stunting risk among children that received measles vaccination. **Program needs to ensure high measles coverage through routine immunization services as well as campaigns.**

***38% of the children age 6-23 months received Vitamin A supplementation in the previous 6 months.***

- The reported vitamin A coverage is lower than previously reported in SNNPR. Vitamin A has been provided through the EOS previously and recently the Child Health Day (CHD). According to the

information we obtained from HEWs, only 44% of the Kebeles included in the present survey were covered with the recent CHD campaign (last 6 months). Given the high level of child malnutrition in the study area, vitamin A supplementation is critical in the study area. **It is therefore imperative that vitamin A supplementation through the CHD and other programs is promoted in the study area.**

***The two-week incidence of ARI, diarrhea and fever among children age 0-23 months in the intervention area was 8.2%, 14.4% and 13.8%, respectively. Only a little over half of the sick children were taken to health institution.***

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- Improving mothers' and care takers' awareness of the danger signs of childhood illnesses and encourage them to seek care for sick children are critical. It is equally important to strengthen the health post with equipment and supply, improving HEWs' skills in the management of childhood illnesses and the referral linkage with higher facilities.
- Mothers and caretakers should be equipped with the knowledge and skills required for the home management of childhood illnesses.

***Antenatal care coverage in the intervention area can be considered modest with only 51.4% of the women sought antenatal care in the health institution in the previous 2 years. Only 16.7% had the recommended 4 or more ANC visits.***

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- Efforts to increase ANC service use by educating women on its benefit should always remain a priority intervention. Early initiation of ANC and the need for adequate number of visits should also be emphasized.

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**ANNEX I. List of food items reported to receive by the child in the previous day and the food groups**

Food group	List of food items
Group 1: Grains, roots and tubers	<ul style="list-style-type: none"> <li>○ Any porridge or gruel (Made from grain other than Teff)</li> <li>○ Bread, pasta, rice, noodles, biscuits, cookies, or any other foods made from oats, maize, barley, wheat, sorghum, millet or other grain.</li> <li>○ Any food made from teff, like injera, kita or porridge</li> <li>○ Any white potatoes, white yams, bulla, Kocho, Cassava /boye or any other food made from roots</li> </ul>
Group 2: Legumes and nuts	<ul style="list-style-type: none"> <li>○ Any food made from beans, peas, lentil or pulses</li> <li>○ Any nuts or seeds such as peanuts, sesame, sunflower</li> </ul>
Group 3: Dairy products (milk, yogurt and cheese)	<ul style="list-style-type: none"> <li>○ Any milk product like cheese, yogurt</li> <li>○ Milk (non-human milk – cow, goat or powder)</li> </ul>
Group 4: Flesh foods (meat, fish, poultry and liver/organ meats)	<ul style="list-style-type: none"> <li>○ Any liver, kidney, heart or organ meats</li> <li>○ Any beef, pork, lamb, goat, camel, rabbit or wide game meat such as antelope or deer</li> <li>○ Any chicken ducks or other birds</li> <li>○ Any fresh or dried fish or shell fish</li> </ul>
Group 5: Eggs	<ul style="list-style-type: none"> <li>○ Any eggs</li> </ul>
Group 6: Vitamin-A rich fruits and vegetables	<ul style="list-style-type: none"> <li>○ Any pumpkin, carrot, squash or sweet potato that are yellow or orange inside</li> <li>○ Dark green leafy vegetables (example: Kale, spinach or Amaranth leaves)</li> </ul>
Group 7: Other fruits and vegetables	<ul style="list-style-type: none"> <li>○ Any other vegetables (any starchy vegetables)</li> </ul>

## ANNEX II. Survey Indicators

	Intervention	Non-Intervention
<b>Household water and sanitation</b>		
% households with clean water supply	N=800 62.5	N=800 68.5
% household with toilet facility	N=800 88.3	N=800 89.1
<b>Household food insecurity</b>		
% households that reported there was ever a day where there was no food at all in the household because there were no resources to get food (in the last 30 days)	N=800 18.6	N=800 23.5
% households that reported there was no food at all in the household for <u>10 or more days</u> because there were no resources to get food (in the last 30 days)	N=800 1.8	N=800 3.0
% households who were ever not able to eat the kinds of foods they preferred because of a lack of resources (last 30 days)	N=800 30.8	N=800 37.6
% households whose members ever ate a few kinds of food day after day because of a lack of resources (last 30 days)	N=800 30.9	N=800 35.9
% households whose members ever eat food that they did not want to eat because of a lack of resources to obtain other types of food (last 30 days)	N=800 31.0	N=800 34.3
Mean Household food insecurity access scale (HFIAS) & 95% CI	N=800 9.9 (9.6-10.1)	N=800 10.2(9.9-10.4)
<b>Maternal health care services</b>		
% mothers with children 0-23 months who received ANC from health initiation	N=800 51.4	N=800 47.5
% mothers with children 0-23 months attended by health worker at delivery	N=800 3.6	N=800 3.1
% mothers who received vitamin A supplementation immediately or within two months after birth	N=800 7.5	N=800 5.1
<b>Child Immunization, vitamin A and de-worming</b>		
% children age 12-23 months who received PENTA 1 vaccine	N=268 64.2	N=245 72.2
% children age 12-23 months who received PENTA 3 vaccine	N=268 35.4	N=245 49.8
% children age 12-23 months who received measles vaccine	N=268 44.4	N=245 50.2
% children age 12-23 months who are fully immunized	N=268 22.4	N=245 30.2
% children age 6-23 months who received vitamin A in the previous 6 months	N=400 37.9	N=400 34.0
% children age 6-23 months who received de-worming tablet in the previous 6 months	N=400 24.4	N=400 19.4
<b>Childhood illness and treatment practice</b>		
% children age 0-23 months who were ill in the previous 2 weeks	N=800 21.9	N=800 23.2
% children age 0-23 months who were sick with ARI in the previous 2 weeks	N=800 8.2	N=800 7.5
% children age 0-23 months who had diarrhea in the previous 2 weeks	N=800 14.4	N=800 14.0
% children age 0-23 months who had fever in the previous 2 weeks	N=800 13.8	N=800 13.1
% children with ARI (previous 2 weeks) who were taken to health institution	N=55 52.7	N=53 39.6
% children with diarrhea (previous 2 weeks) who were taken to health institution	N=114 57.0	N=112 33.9
% children with fever (previous 2 weeks) who were taken to health institution	N=107 55.1	N=97 42.3

Information on child feeding practices and nutrition and TTC		
% women with children 0-23 months who received information on child feeding practices from HEWs last year	N=800 29.9	N=800 38.2
% women with children 0-23 months who received information on child feeding practices from vCHWs last year	N=800 9.4	N=800 15.0
% women with children 0-23 months who received information on child feeding practices from HEWs during the third trimester of pregnancy	N=800 19.8	N=800 26.5
% women with children 0-23 months who received information on child feeding practices from HEWs at the day of delivery	N=800 18.8	N=800 17.2
% women with children 0-23 months who received information on child feeding practices from HEWs at the 4th week following delivery	N=692 15.2	N=698 18.3
% women with children 0-23 months who received information on child feeding practices from HEWs when the child was 4 months old	N=486 13.4	N=467 21.2
% women with children 0-23 months who received information on child feeding practices from HEWs when the child was 6 months old	N=382 16.0	N=389 21.3
% women with children 0-23 months who received information on child feeding practices from HEWs when the child was 8 months old	N=339 14.7	N=329 19.1
% women with children 0-23 months who received information on child feeding practices from HEWs when the child was 12 months old	N=229 9.6	N=216 17.1
Women's knowledge of child feeding practices		
% mothers who said a child should start breastfeeding immediately after birth	N=800 71.7	N=800 65.2
% mothers who said a child should be given the first breast milk (colostrums)	N=800 50.7	N=800 58.9
% mothers who said a child should continue breastfeeding for one year	N=800 86.7	N=800 95.5
% mothers who said a child should start liquids (including water) in addition to breast milk at the age of 6 months	N=800 57.2	N=800 54.4
% mothers who said a child should start food in addition breast milk at the age of 6 months	N=800 67.5	N=800 63.0
% mothers who said a child age 6-8 months should eat a minimum of 3 times a day	N=800 69.9	N=800 65.4
% mothers who said a child age 9-12 months should a minimum of 4 times a day	N=800 71.2	N=800 66.8
% mothers who said a child age 13-23 months should a minimum of 4 times a day	N=800 69.4	N=800 66.4
Infant and young child feeding practices		
% children age 0-23 months who initiated breastfeeding within one hour after birth	N=800 63.5	N=800 62.7
% children age 0-23 months who were fed colostrums	N=800 71.2	N=800 67.9
% children age 0-23 months who had pre-lacteal feeding	N=800 13.6	N=800 14.7
% children age 0-5 months who were exclusively breastfeeding	N=400 57.9	N=400 65.6
% children age 12-23 months who were breastfeeding for 1 year or longer	N=268 96.6	N=245 98.4
% children age 0-23 months who received bottle feeding the previous day	N=800 5.5	N=800 5.7
% children age 6-8 months who ate solid, semi-solid or soft in the previous day	N=60 85.0	N=72 94.4
% children 6-23 months who received the minimum dietary diversity (MDD) the previous day	N=400 7.2	N=400 1.7
% children 6-23 months who received the minimum meal frequency (MMF) the previous day	N=400 55.0	N=400 52.0
% children 6-23 months who received the minimum acceptable diet (MAD) the previous day	N=400	N=400

	5.0	1.5
Nutritional status of children		
% children age 6-23 months who are stunted (WHO)	N=375 32.3	N=381 36.0
% children age 6-23 months who are wasted (WHO)	N=371 9.4	N=380 7.4
% children age 6-23 months who are underweight (WHO)	N=375 26.9	N=380 30.5
Nutritional status of women		
% women with low BMI (<18.5%)	N=789 13.4	N=796 15.7



**ANNEX III. Child nutritional indices calculated based on NCHS reference standard**

	Intervention area	Non-intervention area
<b>HEIGHT-FOR-AGE</b>		
<i>Child's age (6-11 months-N)</i>	n=125	n=147
% below -2 SD	18.8	23.2
% below -3 SD	3.6	4.3
<i>Child's age (12-23 months-N)</i>	n=250	n=234
% below -2 SD	34.3	37.9
% below -3 SD	17.4	16.0
<i>Child's age (6-23 months-N)</i>	n=375	n=381
% below -2 SD	28.9	32.2
% below -3 SD	12.7	11.5
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	31.6	31.1
% below -3 SD	12.3	14.2
<i>Child's age (6-59 months-N)</i>	n=726	n=776
% below -2 SD	30.2	31.6
% below -3 SD	13.4	11.9
<b>WEIGHT-FOR-HEIGHT</b>		
<i>Child's age (6-11 months-N)</i>	n=121	n=147
% below -2 SD	6.5	4.5
% below -3 SD	2.7	2.2
<i>Child's age (12-23 months-N)</i>	n=247	n=233
% below -2 SD	6.1	5.1
% below -3 SD	3.2	2.0
<i>Child's age (6-23 months-N)</i>	n=371	n=380
% below -2 SD	6.2	4.9
% below -3 SD	3.0	2.1
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	4.9	6.3
% below -3 SD	1.9	2.7
<i>Child's age (6-59 months-N)</i>	n=722	n=775
% below -2 SD	5.5	5.6
% below -3 SD	2.4	2.4
<b>WEIGHT-FOR-AGE</b>		
<i>Child's age (6-11 months-N)</i>	n=122	n=147
% below -2 SD	14.0	14.3
% below -3 SD	3.2	4.2
<i>Child's age (12-23 months-N)</i>	n=250	n=233
% below -2 SD	24.5	29.6
% below -3 SD	11.5	12.9
<i>Child's age (6-23 months-N)</i>	n=372	n=380
% below -2 SD	20.8	23.6
% below -3 SD	8.8	9.6
<i>Child's age (24-59 months-N)</i>	n=351	n=395
% below -2 SD	16.6	18.6
% below -3 SD	8.0	6.7
<i>Child's age (6-59 months-N)</i>	n=723	n=775
% below -2 SD	18.8	21.1
% below -3 SD	8.3	8.1

#### ANNEX IV. Selected Community and Health Post Characteristics

	Intervention N=18	Non-Intervention N=19
No. VCHWs in the Kebele (mean)	13	26
Health facilities in the Kebele		
○ % Health post	83.3	94.4
○ % Health center	22.2	16.8
Availability of equipments in the health post:		
○ Functional weighing machine	83.3	63.2
○ Functional Salter scale	61.1	68.4
○ Growth monitoring chart	44.4	31.6
○ Child nutrition counseling card	27.8	21.0
○ Maternal nutrition counseling card	5.6	5.9
Availability of some drugs		
○ ORS	77.9	68.4
○ Vitamin A	66.8	52.6
○ Vaccine	38.9	38.9
○ De-worming tablets	27.8	33.3
○ Cotrimoxizole	11.1	22.2
○ Iron tablets	27.8	16.7
○ Malaria drug	22.2	5.6
Therapeutic in the Kebele (last 6 months)	88.2	70.6
CHD in the Kebele (last 6 months)	33.3	47.1
Major topography		
○ Lowland	16.7	11.1
○ Midland	55.6	66.7
○ Highland	27.8	22.2
Major crops in the Kebele		
○ Maize	61.1	52.6
○ Teff	0.0	5.3
○ Barley	16.8	21.0
○ Enset (Kocho)	16.8	21.0
○ Potato	5.5	0.0

*Note: Three HEWs were not present for the interview*