Ethiopia Baseline Report

Communication for Health

Johns Hopkins Center for Communication Programs (CCP)

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Acknowledgements

The baseline survey report for the Communication for Health project is a product of teamwork and collaboration of many individuals and organizations.

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List of Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
ART	Antiretroviral Therapy
BF	Breastfeeding
CCP	Johns Hopkins Center For Communication Programs
CI	Confidence Interval
CSA	Central Statistical Agency of Ethiopia
DCDL	Domestic Chores And Daily Life
DPT-HepB-Hib	Diphtheria, Tetanus, Pertussis, Hepatitis B, Haemophilus influenzae Type B
EA	Enumeration Area
EDC	Electronic Data Collection
EDHS	Ethiopian Demographic Health Survey
FHC	Family Health Card
FP	Family Planning
GEM	Gender Equitable Men
HDA/WDA	Health Development Army/Women's Development Army
HEW	Health Extension Worker
HH	Household
HIV	Human Immunodeficiency Virus
ITN	Insecticide-Treated Mosquito Net
IUD	Intrauterine Contraceptive Device
JSI	John Snow Inc.
MDG	Millennium Development Goals
MNCH	Maternal, Neonatal, and Child Health
penta	Pentavalent
PMTCT	Prevention of Mother-to-Child Transmission
PNC	Postnatal Care
PPS	Probability Proportional To Size
PV	Partner Violence
RHDP	Reproductive Health and Disease Prevention
RMNCH	Reproductive, Maternal, Neonatal, and Child Health
SBCC	Social and Behavior Change Communication
SLI	Standard Living Index
SNNP	Southern Nations, Nationalities, and People's Region
TB	Tuberculosis
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
TV	Television
UNICEF	United Nations Children's Fund
USAID	United States Agency For International Development
WASH	Water, Sanitation, and Hygiene

Executive Summary

The goal of Communication for Health, a project funded by the United States Agency for International Development (USAID), is to create health social norms and increase healthy practices of individuals and communities while supporting systems to improve the quality, capacity, and coordination of social and behavior change communication programs in Ethiopia. The project has targeted 240 districts in the Tigray, Amhara, Southern Nations, Nationalities, and People's (SNNP), and Oromia regions in Ethiopia across six health areas for interventions. The objectives of the baseline study are the following:

Objective 1: To provide baseline estimates for target population-level health indicators related to utilization, care seeking, knowledge, attitudes, gender norms, and practice.

Objective 2: To identify key behavioral determinants for health services use and health practice in project target regions.

Objective 3: To identify appropriate communication channels for targeted populations in the intervention regions.

Data were collected from August to September 2016 in four regions of Ethiopia, Amhara, Oromia, Tigray, and SNNP. A total of 2,770 women of reproductive age (15–49 years) were interviewed, using a structured survey covering six health areas. The 38 baseline key indicators were explored, and a behavioral analysis was conducted with 16 major behavioral outcome variables, using logistic regression analysis.

Gender was found to be a cross-cutting issue across all six health areas of focus, with the norms related to gender inequality adversely impacting several health behaviors. The report also describes media availability and utilization trends in four regions of Ethiopia. The different sources of health information depict a scenario that identify the most commonly used media sources and health topics in four regions of Ethiopia. The study also found regional variation across multiple health behaviors. High vulnerability or low standard of living in women leads to low levels of adoption for several health behaviors. Knowledge was related to 10 out of 16 behaviors, and self-efficacy was also related to six out of 16 health behaviors.

The study identified three gateway behaviors for the Hulu Betena (integrated communication intervention) to focus on: undertaking early antenatal care registration (<12 weeks), having a family health card, and having a proper handwashing station. Overall, the overarching communication strategy should not be knowledge focused, but social factors do need to be incorporated. Knowledge should be behaviorally focused and linked to the expected behavior, and specific recommendations are also made by health area. In addition, gender inequitable norm should be included in every aspect of the integrated communication interventions. Media exposure is a key component to uptake of key health behaviors, and with 50% of respondents owning a mobile phone, an mHealth (mobile health is the practice of medicine and public health supported by mobile devices) strategy is recommended.

1. Introduction

Ethiopia, with a population of 99.4 million, is the second largest country in Sub-Saharan Africa, and it has taken major economic strides in the past decade.[1] While the country has advanced in six of eight Millennium Development Goals (MDGs), much work is still required in the areas of maternal health, newborn and infant health, and gender inequities.[2] The Communication for Health project aims to cater to the health needs of the rural population with integrated interventions that cover six health areas.

1.1. Health in Ethiopia

Despite economic growth and advances in the areas of health policy, physical infrastructure, and the availability of trained service providers, use of potentially high-impact services, such as antenatal care (ANC), family planning (FP), facility-based delivery services, and services for the prevention of mother-to-child transmission (PMTCT), remain low.[3] A quarter of Ethiopian women have an unmet need for FP, use of modern contraceptives is low (36%), only 32% of women avail themselves of ANC visits, and institutional deliveries are very low (28%).[4] Urban–rural disparities abound in Ethiopia, with rural women at a disadvantage with substantially lower utilization of antenatal and institutional delivery services.[4]

The child health scenario in Ethiopia requires immediate strengthening. An estimated 40% of children in Ethiopia suffer nutritional deficiencies during the first critical 1,000 days of life (pregnancy to two years), putting them at risk of stunting.[5] Nearly 50% of under-five deaths in Ethiopia are caused by underlying malnutrition.[6] The United Nations Children's Fund (UNICEF) reports diarrhea as the second leading cause of mortality for children under five in Ethiopia, causing 23% of all under-five deaths.[7]

Ethiopia is characterized by an overall low malaria prevalence rate. However, it has a distinct pattern of seasonal local epidemics in areas under 2,000 m of altitude.[8] According to the 2011 Ethiopia Malaria Indicator Survey, only 55% of households have at least one long-lasting insecticidal net (LLIN) to prevent malaria, and only 35% of pregnant women and 38% of children under five years old slept under an LLIN during the previous night.[9]

Ethiopia ranks third in Africa among the 22 highest tuberculosis (TB)-burdened countries in the world.[10] The TB case detection rate is 74%, and the treatment success rate is as high as 83%, with TB treatment coverage at 71%.[10, 11] An estimated 64,540 children could be saved every year by improving water, sanitation, and hygiene in the country.[7] However, 29% of the Ethiopian population practices open defecation, only 57% of the population has access to an improved water supply, and more than half (58%) of

the households in rural and urban populations practice inappropriate means of waste disposal to avoid fecal matter from children under five.[12]

1.2. Social Behavioral Change Communication and the Communication for Health Project

Improving the health status of Ethiopians requires accessible and quality health services as well as changes in individual behavior, social norms, and community practices. This

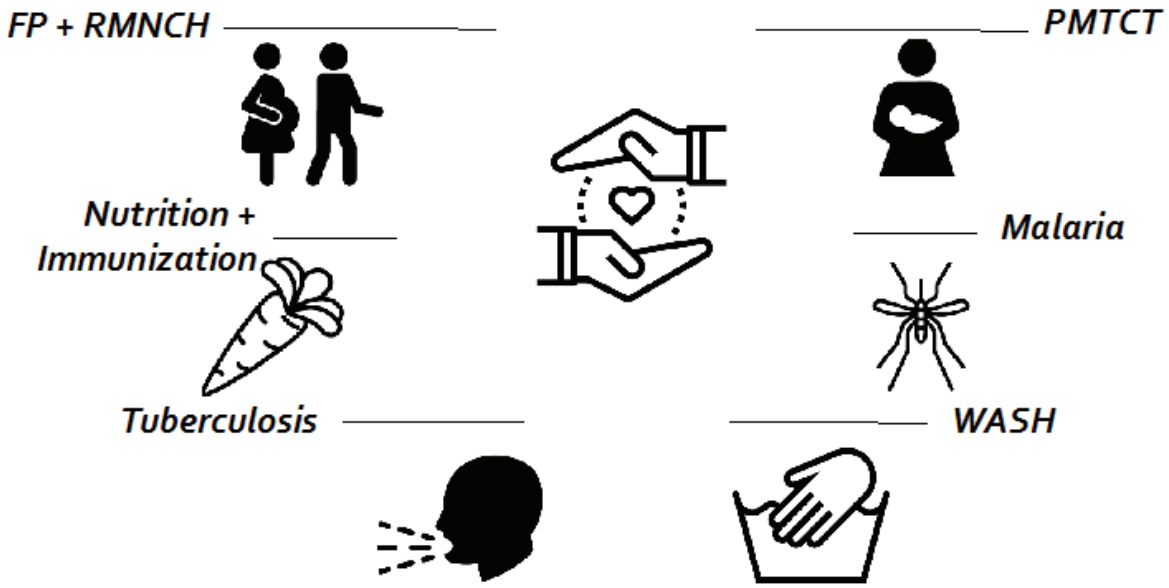

Figure 1.1 Six Health Areas of Communication for Health

improvement can be facilitated through well-designed and implemented social and behavior change communication (SBCC). SBCC is the art of using communication to inform, influence, empower, and motivate individuals, communities, and institutions to adopt evidence-based practices and behaviors that protect and improve health

The goal of the Communication for Health, a project funded by the United States Agency for International Development (USAID), is to create health social norms and increase healthy practices of individuals and communities, while supporting systems to improve the quality, capacity, and coordination of SBCC programs in Ethiopia. The project has targeted 240 districts in Tigray, Amhara, Southern Nations, Nationalities, and People's (SNNP), and Oromia regions in Ethiopia across six health areas for interventions as seen in Figure :1.1 (for selection criteria, see Section 1.4). According to the Ethiopian Population and Housing Census, the four regions account for more than 85% of the country's population.[13] However, data on health behaviors and related factors in the target areas remain limited and insufficient to inform programmatic goals for the Communication for Health project.

Integration is a key component of Communication for Health. Program integration can strengthen health systems to deliver effective, equitable, and sustainable primary health care.1 Integration has been recommended as a crucial strategy for achieving improved health outcomes in the face of persisting health inequities and weakened health systems.2, 3 Integration, in the context of health programs, involves the "management and delivery of health services so that clients review the continuum of preventative and curative services, according to their needs over time and across different levels of the health system."4 Given the diversity of Ethiopia's health needs, an integrated SBCC program is planned.

1.3. Objectives of Baseline Study

Objective 1: To provide baseline estimates for target population-level health indicators related to utilization, care seeking, knowledge, attitudes, gender norms, and practice.

Objective 2: To identify key behavioral determinants for health services use and health practice in project target regions.

Objective 3: To identify appropriate communication channels for targeted populations in the intervention regions.

The study includes measurements on program outcomes, such as knowledge, self-efficacy, outcome expectancies, health behaviors, and gender norms. An endline study will be conducted to assess the impact of the Communication for Health project by identifying associations between exposure to the interventions and key behavioral and outcomes indicators. A subsequent sociocultural qualitative study will also follow based on the findings from the baseline.

1.4. Rationale for Region Selection

Ethiopia is divided into nine regions and two chartered city administrations. Each region is divided into administrative zones and subdivided into woredas (or districts). The woredas are then further subdivided into kebeles (or municipalities). In cooperation with the Ethiopian Federal Ministry of Health and USAID, the selection of regions and woredas were based on the following criteria:

- burden of disease, public health needs, and disparity
- current health services uptake
- opportunities to align with government priorities and donor investments (USAID)
- population coverage

The four regions of Ethiopia selected for the project are provided in

Figure :1.2: Amhara, Oromia, SNNP, and Tigray, which together include 240 woredas.

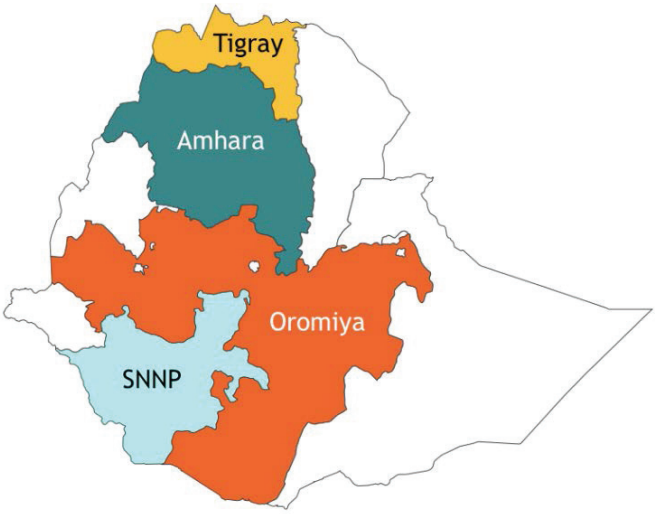

Figure 1.2 Four regions of Communication for Health

1.5. Conceptual Framework

The core premise of the Communication for Health project is that adoption of healthy behaviors as a collective community response will lead to the prevention of morbidity and mortality in six key health areas. The conceptual framework for the project has guided the baseline survey and the socio-cultural study. Individual constructs are highlighted in the baseline study (self-efficacy, outcome expectancy, and knowledge), while social, cultural and relational constructs such as norms, couple communication, social expectations, and cultural identity are included in the socio-cultural study.

The overall Health Communication and Prevention model, see Figure :1.3, is a multi-theoretical model that provides a theory-driven approach to the process of sustained health behavior change. In Figure :1.3, Column 1 of the model outlines the main communication theories underlying the processes of motivation and behavior change, followed by the binding principle of integration that guides programs at the individual/ household, community, health service, policy, and environmental levels (column 2). The third column lists the behaviors that will be promoted in the Health for Communication project. Unless a collective response is in place for these behaviors, prevention of morbidity and mortality will not occur. Column 4 describes the potential health gains of the project in terms of life expectancy at birth; reduced total fertility rate (TFR); reduced neonatal, infant, and child mortality; reduced maternal mortality; and reduced adolescent pregnancy. The other set of health gains listed in column 4 are early detection and treatment of malaria, TB, and human immunodeficiency virus (HIV).

The Communication for Health program intervention will be theory driven, taking into consideration the individual, social, and cultural determinants of behavior in four regions

of Ethiopia. Individual determinants such as self-efficacy, outcome expectancy, and knowledge are an integral part of Bandura's Social Cognitive Theory.[14] Self-efficacy refers to a person's confidence in adopting or performing an action, and outcome expectancy refers to the benefit perceived if the behavior is adopted. Knowledge related to a health behavior or health condition is another cognitive construct linked to the individual level.

In combination with Bandura's social cognitive theory is the African PEN3 model that includes constructs such as social relationships and expectations, cultural identity, and empowerment.[15, 16] Airhihenbuwa's PEN3 communication model promotes the "value" approach in which community strengths are identified and acknowledged. For example, the one-by-five structure represents a community strength that can be leveraged by the project. The Health Development Army (HDA), also known as the Women's Development Army (WDA), has a one-by-five structure that enables a group of volunteers to reach out to every household in the community. Each volunteer covers 30 households, and a leader coordinates the five volunteers. The project intends to work with this community structure to ensure that community involvement and leadership are integral parts of the SBCC strategy.

Social relationships highlight a context in which the "relational" supersedes the individual in terms of decision-making, societal expectations, and norms. Relational constructs include couple communication, household communication, and communication with friends and neighbors. Often, in rural areas of Ethiopia, "word-of-mouth" communication is the primary source of health information. Communication interventions can gain much if they build on the core "cultural identity" of the audience. This approach implies that core values associated with cultural identity need to be articulated and incorporated in an intervention. It is important to identify what Ethiopians value and treasure about their culture.

"Shared compassion" is considered as essential for "real" communication to occur, according to Sadharanikaran, an Indian theory of communication.[17, 18] Infusing "shared compassion" into campaigns can trigger a positive emotional response in the audience, and it is also relevant to health provider campaigns.

Bounded social norms refer to the cluster of influence that exerts the maximum influence on households. The cluster can be a neighborhood, a hamlet, or a homogenous small village that has a substantial social influence on individuals and households. The collective response envisaged in the conceptual model (Figure :1.3) will occur after social norms shift towards healthy behaviors.[19]

Column 2 of the model (Figure: 1.3) describes the interventions that will be utilized in the project at different levels. These levels include the individual/household, community, health facility, policy, and environment. Column 3 lists behaviors in six health areas that the project aims to change.

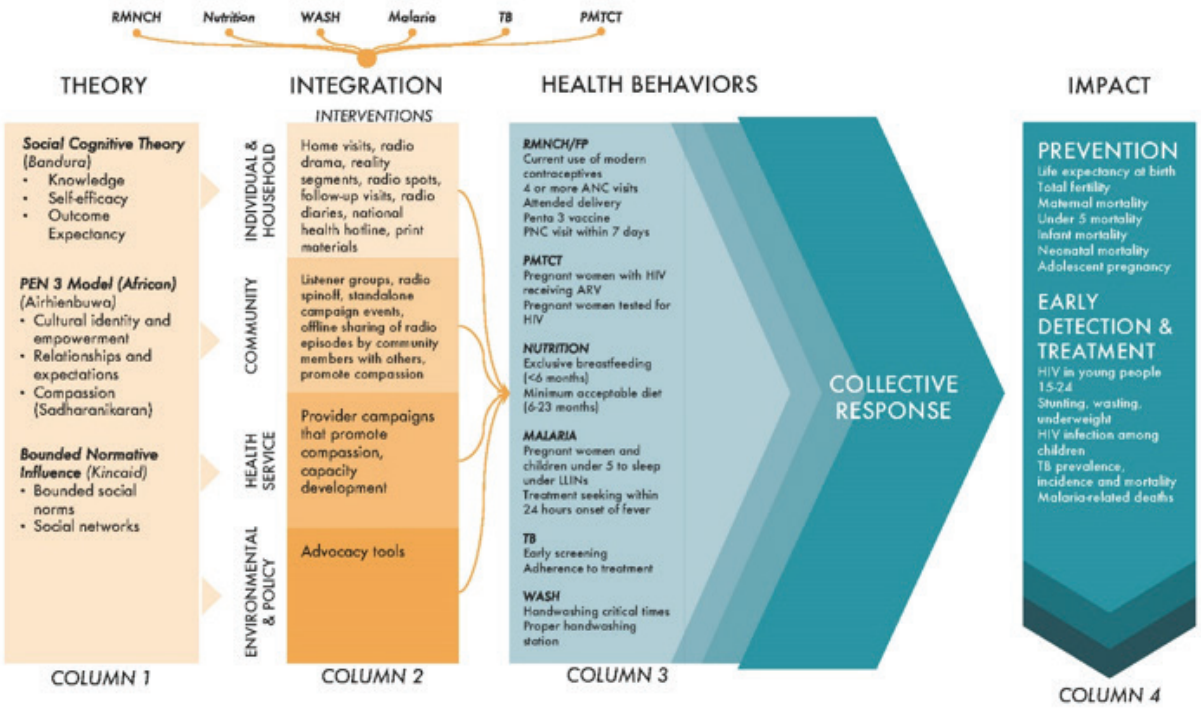

Figure 1.3 Prevention Model Conceptual Framework for Communication for Health

1.6. Organization of Report

The baseline indicators provide a snapshot of health behaviors, practices, and outcomes in order to inform programmatic interventions. The report is designed to provide evidence to actualize the conceptual framework across six health areas. We first describe the target population women of reproductive age 15–49 years old across the four regions, particularly in rural areas. Beyond a broad overview, we provide in-depth analysis that further describes key health behaviors and outcomes and explores the health determinants that drive such health behaviors. We focus our attention on two key areas: media exposure and gender equality, both of which have been identified as cross-cutting issues across the six health areas. Understanding the relationship between these areas will help focus SBCC efforts to the most vulnerable population and increase our potential impact. All tables referred to in the report are located in the appendix.

2. Methods

2.1 Participants and Setting

Data were collected from August to September 2016 in four regions of Ethiopia Amhara, Oromia, Tigray, and SNNP. A total of 2,770 women of reproductive age (15–49 years) were interviewed using a structured survey covering six health areas.

2.2. Study Design

The study design was a quasi-experimental study (with pre-post surveys, no control group).[20] The four regions of the study were purposively selected because they represent 85% of the population. Control groups were not selected because of the potential "spill over" of health communication campaigns. Preventing the saturation of messages from crossing over from one woreda to the next may be difficult, especially if the interventions (such as radio campaigns) are implemented on a regional level. The study measured participants' health behaviors, practice, knowledge, self-efficacy, and outcome expectancy across the six health areas.

2.3. Sampling Technique

A multi-stage cluster-sampling technique was applied to identify eligible households. Using probability proportionate to size (PPS) sampling, 10% of the project's target woredas (24 of 240 woredas) were selected. Woredas are administrative units that consist of several kebeles (the lowest government administrative unit, which is composed of approximately 500 households). Three enumeration areas (EAs) were randomly selected per woreda using PPS.

The Central Statistical Agency (CSA) in Ethiopia created national EAs (81,654) for the 2007 census (the most recent census in Ethiopia) in 10 of its 11 geographic regions. An EA is a geographic area consisting of a manageable number of dwelling units for household listing, which served as the counting unit for the census. Sketch maps were also available from CSA for each EA, which delineated the geographic boundaries of the EA. Each kebele has up to 10 EAs, and the number of estimated households per EA ranges from 150 to 200. A complete listing of households with women of reproductive age was conducted for each selected EA, and 35 households were selected per EA using systematic random sampling. All eligible women of reproductive age were interviewed in each household.

The sample size was determined using a statistical power software, G-Power.[21] For a power analysis for chi-square tests with effect size = 0.23 and alpha = .05, beta 0.2 with six degrees of freedom, the projected total sample size was 625 women per region (accounting for 20% nonresponse, refusals, and potential interviewer error).

2.4. Data Collection Training

The structured survey tool included measurements of health behaviors, knowledge, self-efficacy, outcome expectancy, and gender norms. The survey tool was then programmed into an electronic data collection (EDC) platform for mobile phone data collection using koBo Toolbox.[22]

A five-day training was conducted for 12 supervisors (two women and 10 men) and 41 data collectors from June 28 to July 2, 2016, in Addis Ababa, Ethiopia. Data collectors had at least a BA/BSc degree, were fluent in both Amharic and English, had prior experience collecting data, and/or were fluent in other regional written regional (including Afan Oromo or Tigrigna) and oral languages. Supervisors had an MA/MSc or doctorate in health or social science fields and previous experience supervising studies. The training covered topics such as research ethics in the field, rights of human subjects during research, research methodology and protocol, sampling procedures, informed consent, data collection tools, interviewing techniques, data management, security and quality, and gender considerations during data collection. The structure of the training included presentations, role-playing, review sessions, interactive hands-on sessions with EDC, and review of survey instruments.

The survey tool and EDC software were pretested in Sandafa and Sululta woredas in Oromia for 65 households not included in the data collection sample. The research team identified and documented issues found in the EDC software and survey instrument (including skip patterns), clarified questions, and provided operational definitions to improve the survey. This process allowed us to test the instrument (across all languages), clarify questions, and improve the EDC.

A refresher training was conducted in Addis Ababa for data collectors and supervisors on August 22, 2016, before they headed to the field. The refresher training revisited research and ethical protocols and introduced updates to sampling procedures. An additional 10 data collectors and a supervisor were trained from September 7 to September 9, 2016, in Mekelle, Ethiopia to include additional Tigrigna, Agewigna, and Wolaltgna languages.

2.5. Ethical Procedures

Ethical approval was obtained from the Johns Hopkins School of Public Health Institutional Review Board Office and the Ethiopian Public Health Institute Scientific and Ethical Review Committee. Data collectors and supervisors were trained in ethical research procedures including informed consent, privacy of participants, and confidentiality.

The study followed standard ethical procedures. Head of household permission and participant consent were obtained for all participants prior to interview. For women under the age of 18, parental permission and participant assent were obtained.

2.6. Data Analysis

Incoming data were monitored, checked, and validated to immediately identify and address any issues during data collection directly with supervisors and data collectors. Once data collection was complete, an intensive cleaning process was conducted including categorizing responses, addressing refusals and nonresponse for each question, and validating content.

Distributions and bivariate analyses were conducted to describe the characteristics of women in the sample, and Pearson's chi-square tests were calculated to assess the statistical significance. Logistic regression was used to assess the predictors of 16 priority behaviors. Analysis was conducted using SPSS.[23] To account for clustering at the household level (due to multiple respondents for each household) nonresponse rates were recorded for each household and a weight was calculated and applied.

2 .7. Measurements

Outcome Variables

The 38 baseline key indicators (described in detail in Section 3.2 Regional Overview of Key Baseline Indicators) were explored and a behavioral analysis was conducted with 16 major behavioral outcome variables by running logistic regression models. Final dichotomous outcomes explored for baseline analysis are highlighted in Figure: 2.1.

Current modern family planning (FP) use	Immunization (penta 3)
4 or more antenatal care (ANC) visits	Handwashing at all key times
Early registration for ANC	Handwashing station
Institutional delivery	Household (HH) toilet ownership
HIV test during pregnancy	Use of long lasting insecticidal net (LLIN) women 15-49
Early initiation of breastfeeding (BF)	Use of LLIN under 5 children
Minimum diet diversity	Early treatment for fever (<24 hrs)
Minimum acceptable diet	Family health card

Figure 2..1 The 16 Health Behaviors Explored in Baseline

In addition to key health behaviors, knowledge, self-efficacy, and outcome expectancy related to the health behavior were measured in each health section. Knowledge refers to either knowing prevention methods related to the health area or having an awareness of the key health behavior(s) in the specific health area. Self-efficacy refers to statements related to the belief that the respondent feels she can achieve the key health behavior. Finally, outcome expectancy refers to whether the respondent perceives the benefit of adopting a behavior (see respective health sections for detailed descriptions of each behavioral outcome variable). For example, self-efficacy related to TB was measured by agreement with the statement, "I can go immediately to be screened for suspected TB." Outcome expectancy for TB was measured with the following statement, "Early screening of TB may lead to full recovery."

Individual, Household, and Community Variables

Variables were selected for each model by assessing their Pearson's correlation with the outcome variable and for conceptual reasons. For each model, variables were selected based on evidence related to each outcome. In all models, demographics of age, respondent type, and education level were included. We assessed individual variables including behavior, knowledge, self-efficacy, and outcome expectancy. Household variables include standard living index (SLI), vulnerability index, and mobile phone usage. Community-level variables include a gender equitable scale (gender equitable men [GEM]) and subscales related to GEM. Given the critical integration of health areas in the project and cross-cutting nature, gender and media (further described below) were included in the models. In the report, the variables are described in the footnote of tables.

The vulnerability index was constructed using the following four items: lacked enough food to eat, lacked shelter/house to stay in, not able to afford to send children to school, and lacked money to buy medicines/medical treatment (experienced by the participant in the past 12 months). Low vulnerability was considered to be ≤4; moderate, 5–7; and high, 8–12.

The SLI was constructed from household ownership of the following 13 items: electricity, working radio, working television, non-mobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and the four items of the vulnerability index mentioned above. Low vulnerability was a score of ≤6; moderate, 7–8; and high, ≥9.

3. Results

3.1. Characteristics of Respondents

Respondents included women of reproductive age (15–49 years). The sample was equally distributed among three age groups, 15–24, 25–34, and 35–49 years, with about one third of respondents in each category. A majority of women had a child under five years old (26% with a child under two years, and 23% with a child between three and five years). Less than 10% of respondents were currently pregnant at the time of interview.

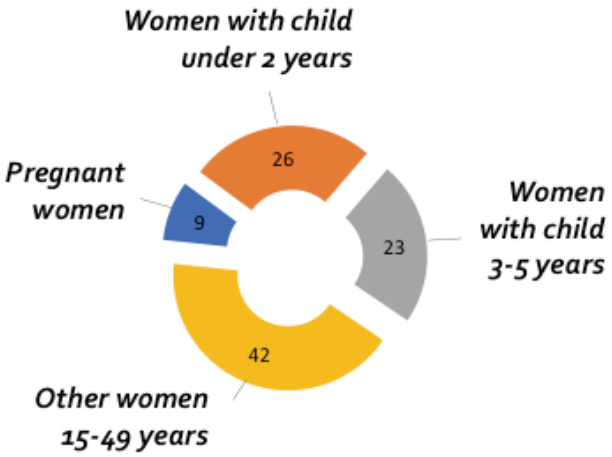

Figure.3.1 Respondent Type

Over half of the respondents (57.9%) reported no formal education. Across all regions, 75% of women were married or cohabitating and a quarter of women were either divorced, widowed, or single. Reported income was also relatively equally distributed, with 39.1% of women reporting a monthly income between 501 and 1,300 birr (approximately US$22 to US$57).

To better assess the respondents' socio-economic status, the study also explored their vulnerability levels based on four areas: food security, shelter, education, and access to health services. The women were asked to report whether they experienced these issues in the past 12 months, and a vulnerability index was created (for more details please see Table 1 located in the appendix). Greater proportions of high vulnerability were found in respondents from Tigray (25%) and SNNP (33.2%). Over half of respondents in Oromia (58.9%) and Amhara (55.6%) reported low vulnerability.

3.2. Regional Overview of Key Baseline Indicators

Baseline findings reveal regional variation as well as patterns similar to national-level data.[24, 4, 5] Compared with national levels, however, our total figures may differ because they pertain to only four regions rather than all regions of Ethiopia. In this section, we provide an overview of key behaviors in each health area. For some sections, we will also highlight knowledge, self-efficacy, and outcome expectancy findings. Readers

should note that more in-depth explanations by health area will follow in subsequent sections and a detailed table with all baseline indicators by region can be found in Table 2 in the appendix. The analysis that includes logistic regression analysis provides an explanation of the drivers of the regional variation and other differences by health area. This section provides a brief description of the indicators by region in order to prepare for the more in-depth analysis; therefore, it should be viewed with a critical understanding that regional differences are just one of many explanations for the findings. For a more detailed description of each of the measured health indicators, including sample, key behaviors, knowledge, self-efficacy, and outcome expectancy, please refer to Table 2 in the appendix.

Family Planning

In Figure: 3.2, current use of modern FP contraceptives is our main behavior of interest. While most women in all regions (at least 88.2%) have knowledge about modern FP methods, self-efficacy and outcome expectancy as they relate to using modern FP methods remain very low, especially in Oromia, with 24.0% and 32.0%, respectively, compared with Tigray, with 70.5% and 67.1%, respectively. More FP-related findings can be found in Table 2 in the appendix and Section :3.5.

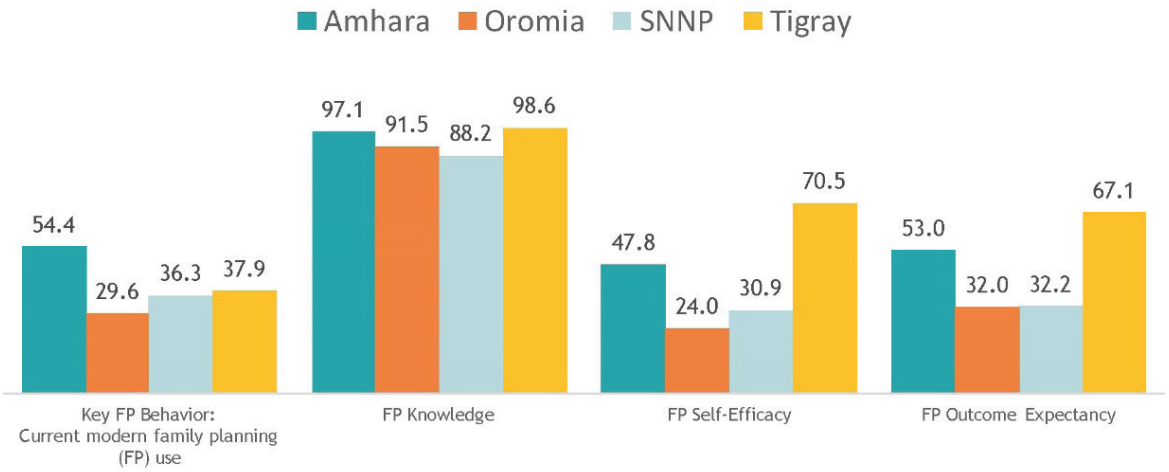

Figure 3.2. Current modern FP use, FP knowledge, FP self-efficacy and FP outcome expectancy among married women 15-49 years

Mother, Neonatal, and Child Health: Antenatal Care, Institutional Delivery, and Postnatal Care

Regional differences with ANC, institutional delivery, and early postnatal care (PNC) were less drastic between Amhara, SNNP, and Tigray as seen in Figure 3.3. However, across all three key health indicators, Oromia was the weakest performing. Approximately one third of women in Oromia reported at least four ANC visits, institutional delivery, or early PNC compared with more than half of women in the other regions. Detailed findings for maternal, neonatal, and child health (MNCH) can be found in Table 2 in the appendix and Section: 3.6.

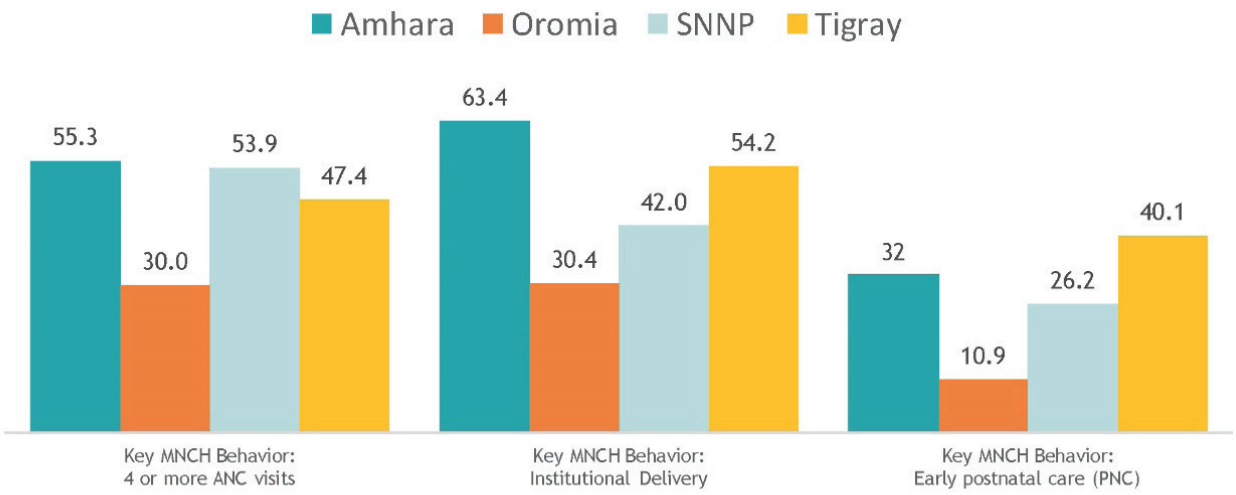

Figure 3.3 Key MNCH behaviors among women 15-49 years with children under 2 years

Prevention of Mother-to-Child Transmission

HIV testing during the most recent pregnancy was used to measure PMTCT as seen in Figure 3.4. HIV testing during the most recent pregnancy was highest in Amhara (65.4%) and Tigray (67.1%) and the lowest in Oromia (32.1%). Observations on knowledge, self-efficacy, and outcome expectancy with PMTCT reveal areas in need of additional SBCC. SNNP reported the lowest PMTCT knowledge, self-efficacy, and outcome expectancy across all regions. See appendix Table 2 and Section 3.7 for further details.

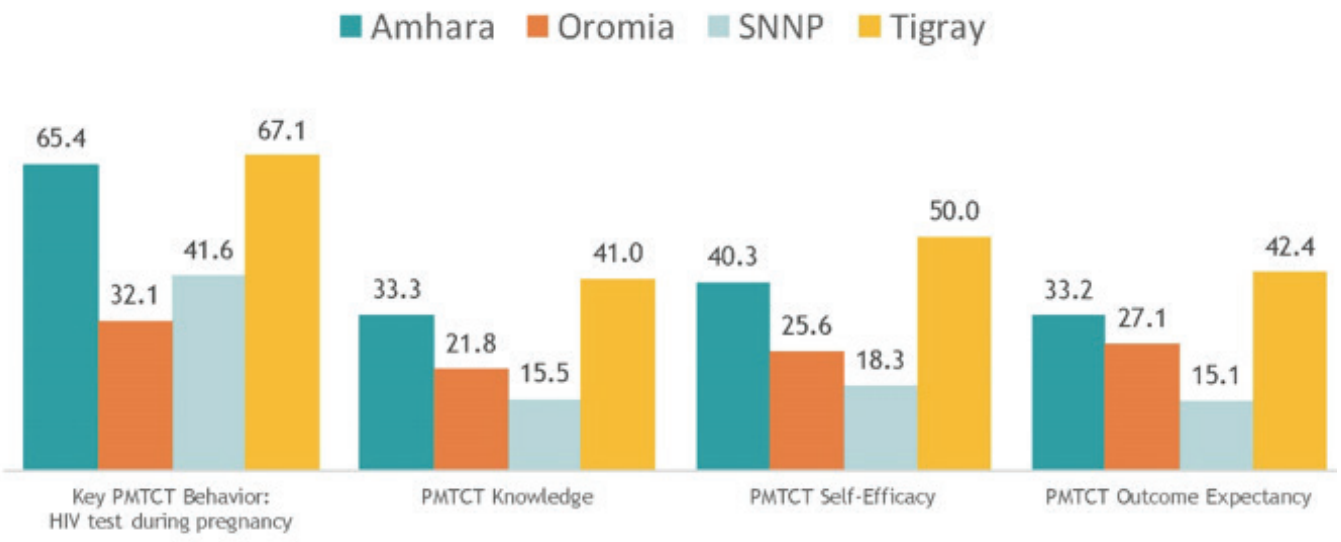

Figure 3.4 HIV test during recent pregnancy, PMTCT knowledge, self-efficacy and outcome

Nutrition and Immunization (Child Health)

Key child health behaviors related to nutrition measured during the baseline were exclusive breastfeeding (BF) for children under six months and minimum acceptable diet for children six to 23 months (Figure 3.5). Exclusive BF was relatively consistent across all regions; however, minimum acceptable diet differed. The proportion of children who met the minimum acceptable diet was the lowest in Oromia (34.8%) and SNNP (31.3%). In addition, regional differences for immunization were found and were the lowest in Oromia, where 14.0% of children under two had pentavalent (penta) 3 coverage compared with over 40% in the other regions. Penta 3 coverage is defined as having received at least three pentavalent vaccines for diphtheria, tetanus, pertussis, hepatitis B, and Haemophilus influenzae type B (DPT-HepB-Hib). More details related to the behaviors and knowledge, self-efficacy, and outcome expectancy can be found in the appendix Table 2 and section 3.8 Nutrition and Immunization (Child Health).

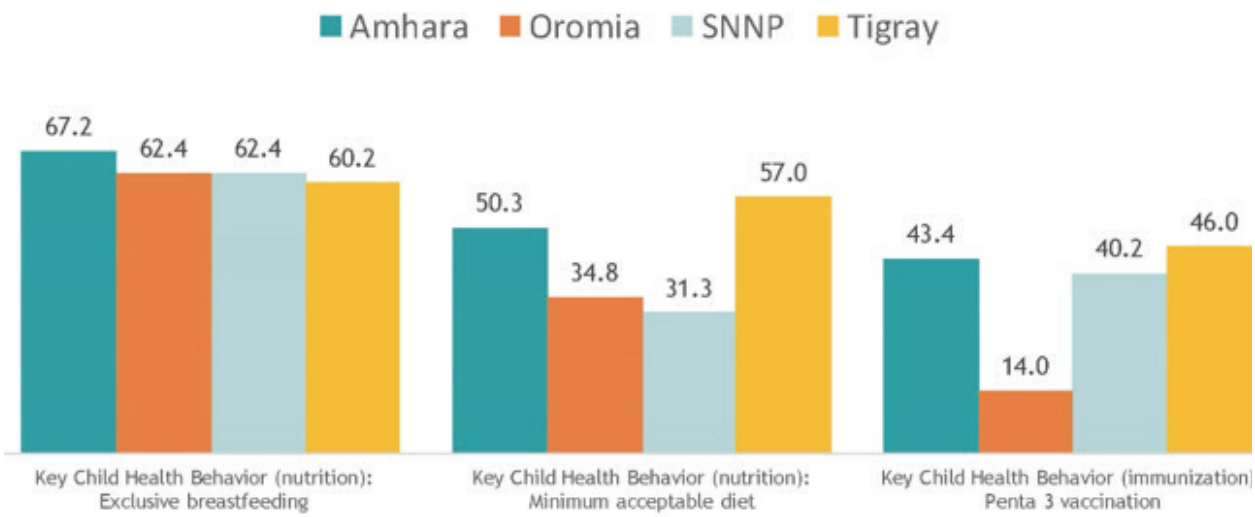

Figure 3.5 Key Nutrition and Immunization Behaviors among Children under Two Years (Exclusive BF among Children under Six Months, Minimum Acceptable Diet among Children Six to 23 Months and Penta 3 Vaccination among Children Four to 23 Months)

Malaria

Figure 3.6 highlights the prevalence of pregnant women and children under five who slept under a net in areas with malaria. Early treatment seeking for a child under five years for fever within 24 hours was also a key malaria behavior indicator. More than half of pregnant women who owned at least one net, slept under a net during the previous night (ranging from 50.5% in SNNP to 75.1% in Amhara). For children under five years, coverage was lowest in SNNP (37.4%) and Amhara (40.5%). Seeking treatment for fever for children under five years within 24 hours was the lowest for children in Tigray (11.1%), followed by children in Amhara (12.0%). For more information regarding malaria, see Table 2 in the appendix and review Section 3.9, where findings by malaria areas only are also reported.

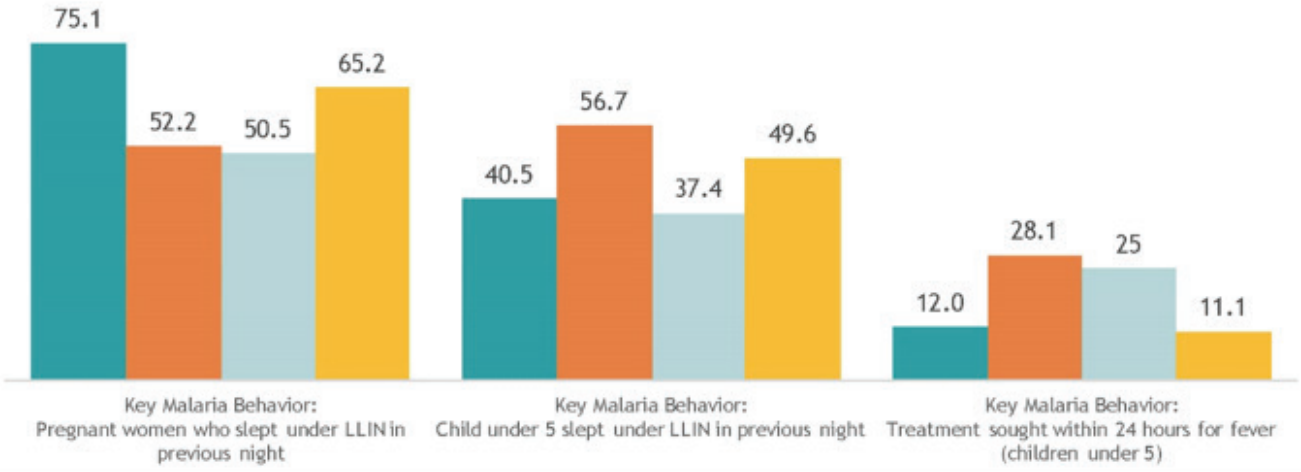

Figure 3.6 Key Malaria Behavior Indicators: LLIN Use for Pregnant Women and Children under Five and Fever Treatment Seeking for Children under Five

Tuberculosis

Across all regions in Figure 3.7, TB knowledge, self-efficacy, and outcome expectancy were relatively low. Knowledge was based on the respondents' ability to identify three or more preventative measures for TB, and Tigray had the lowest knowledge of TB (14.7%). Key behavior was not measured specifically in the baseline, but it is drawn from other sources of data. More TB-related findings can be found in appendix Table 2 and Section 3.10.

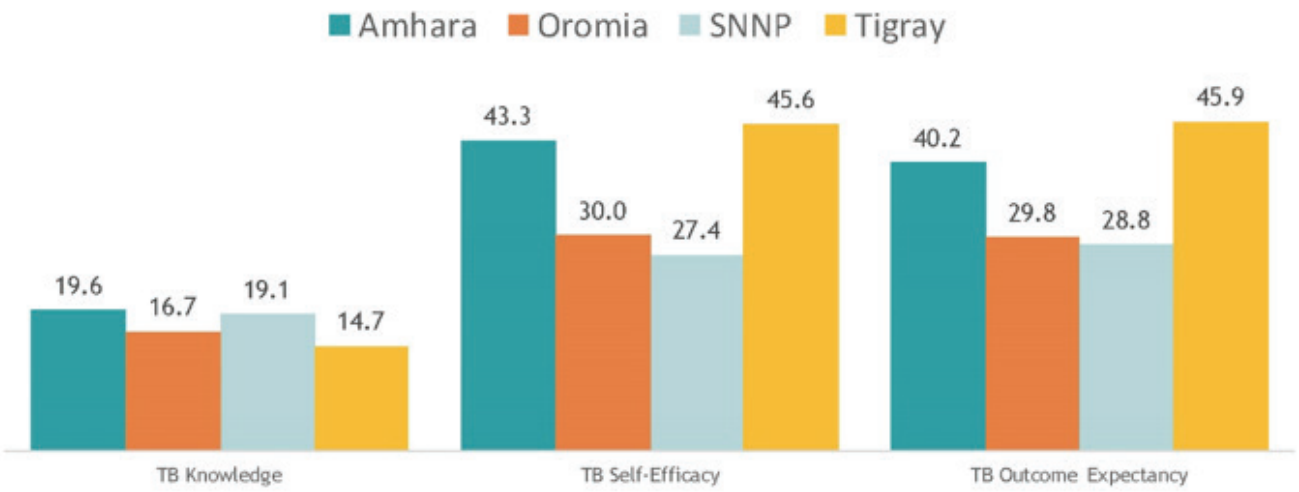

Figure 3.7 Tuberculosis (TB) knowledge, self-efficacy, and outcome expectancy among all women 15-49 years

Water, Sanitation, and Hygiene

Knowledge of handwashing at key times was lowest in SNNP (59.2%) as seen in Figure 3.8. Water, sanitation, and hygiene (WASH) knowledge related to key handwashing times was overall low (7.7% in Amhara and 5.9% in Tigray) compared with self-efficacy and outcome expectancy related to handwashing at all key times. While regional differences provide a brief snapshot, further nuances and differences are explored in Section 3.11.

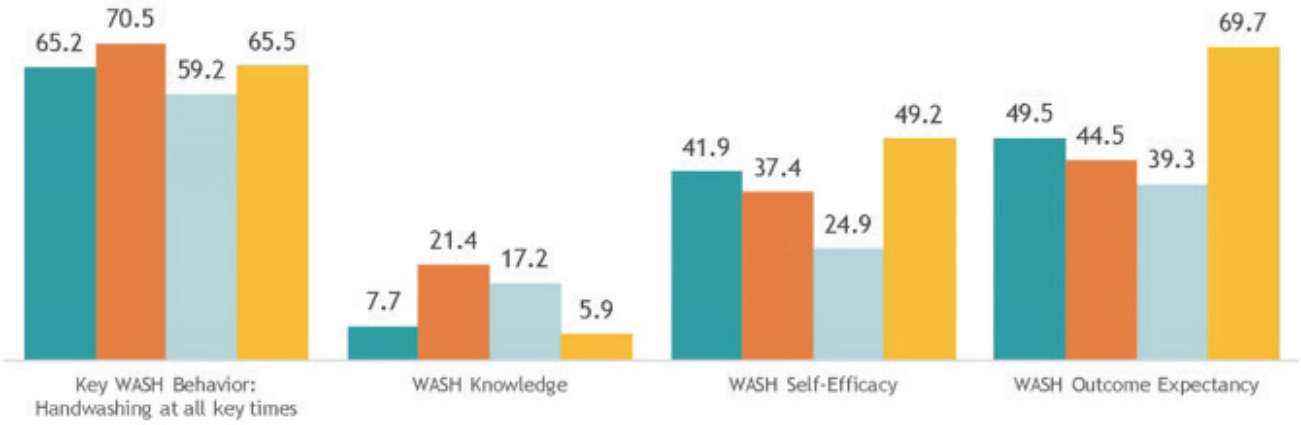

Figure 3.8 Key WASH behavior, knowledge, self-efficacy and outcome expectancy related to handwashing at key times for women 15-49 years.

3.3. Gender

Gender is a cross-cutting issue across all six health areas of focus. In Ethiopia, gender Gender is a cross-cutting issue across all six health areas of focus. In Ethiopia, gender norms place key decision-making with the husband or male of the household, including decisions about health care utilization, shelter, and food.[25, 26] Women have major responsibilities related to the household and child care, but they are less likely to have formal education and have less access to the media compared to men.[24] Women are predominantly engaged in agricultural occupations, have few manual skills, and are less likely than men to be engaged in professional, technical, or managerial fields.[24] Aside from roles, social norms promote gender inequality and may increase risk for sexually transmitted infections, HIV, and intimate partner violence (PV). A critical strategy for improving reproductive health is reducing inequity in gender norms.

The study explored gender inequality using Ethiopian Demographic Health Survey (EDHS) measurements of decision-making autonomy related to their health care, major household purchases, visits to family/relatives, and home/land ownership. In order to boost the measurement of gender inequality, the study employed the GEM scale.[27-32] The GEM scale has been tested in multiple countries, including Ethiopia (Cronbach's alpha = .88), Kenya, and Tanzania. We adapted the GEM scale to the study with a 21-item index and incorporated subset scales related to PV, sexual relationships, reproductive health and disease prevention (RHDP), and domestic chores and daily life (DCDL). The scale is designed to provide information about the prevailing gender norms in a community, in addition to the effectiveness of programs that seek to influence them.[28] The GEM scale is meant to be multi-faceted and to measure multiple domains within the construct of gender norms, with a focus on support for equitable or inequitable gender norms and address program goals related to sexual and intimate relationships, and sexual and RHDP.[27] Throughout the report the measurement for the GEM scale is reported as levels of gender inequality. Support for gender inequitable norms was measured on three levels: high, moderate, and low. High support for gender inequitable norms represents high gender inequality, while low support represents low gender inequality.

Results

Gender Inequality by Region

Across all regions, 64.2% of women had at least moderate levels of gender inequitable norms and variation was detected by region (Table 3). High levels of gender inequitable norms were found in Tigray (28.7%) and Oromia (21.6%).

Gender Inequality by Vulnerability Index

The vulnerability index comprised four items related to food security, shelter, education, and health access, and low, moderate, and high levels were reported (Table 4). The index revealed that 71.5% of women with high vulnerability had moderate levels of gender inequality.

Gender Inequality by Respondent Type

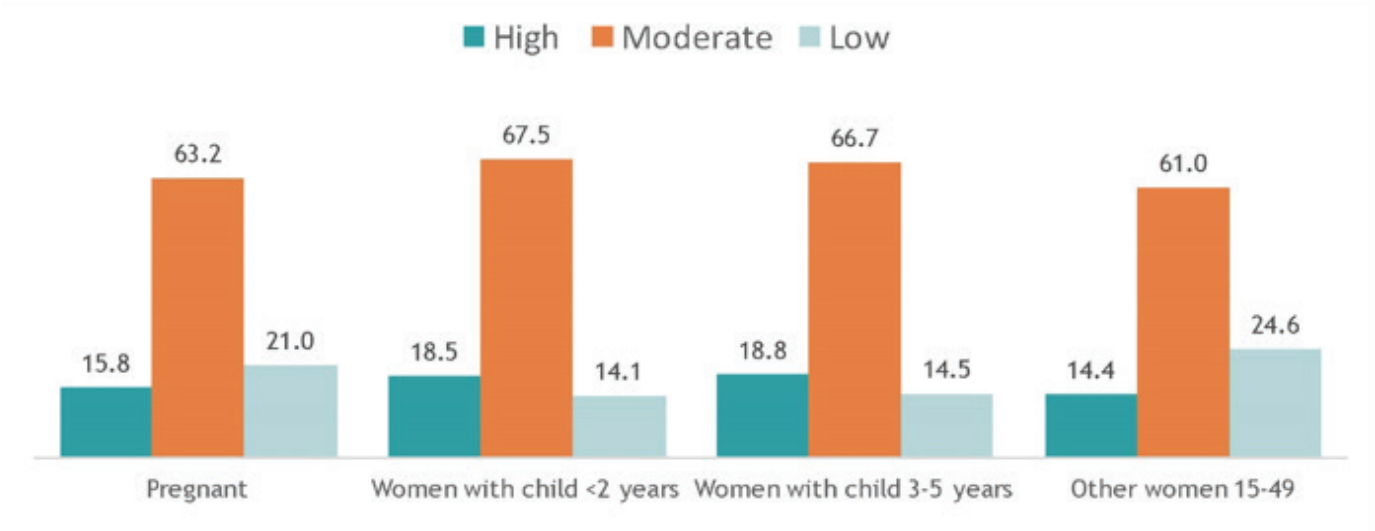

Figure 3.9 Gender Inequality by Respondent Type

Gender inequality was measured by types of respondents in the study sample, currently pregnant women, women with children under two years, women with children three to five years, and other women 15–49 years (Table 5). High levels of gender inequitable norms were found among women with children under two years (18.5%) and women with children three to five years (18.8%) as seen in Figure 3.9. Low levels of gender inequitable norms were found among 21% of pregnant women and 24.6% of women 15–49 years.

Economic Characteristics by Region

Economic characteristics focused on four measurements: a woman's income, home ownership, decision-making as related to her cash earnings, and support for household chores. A nine-point scale of household decisions was also constructed from decision-making related to a woman's health, major household purchases, and visits to family and relatives. In the study sample, 72% of women earned less than their husbands and 8.2% owned their own home or land (Table 6 in the appendix). For a quarter of women, their husband decided how their cash earnings were used. Household chores were a major responsibility of women, with 80.6% of women rarely or never receiving assistance with chores from their husbands. Economic characteristics in Oromia region were most disparate, with 38.1% of women in Oromia having their husbands determine how their

cash earnings were used and 40.4% exhibiting low levels of household decision-making, as seen in Figure 3.10.

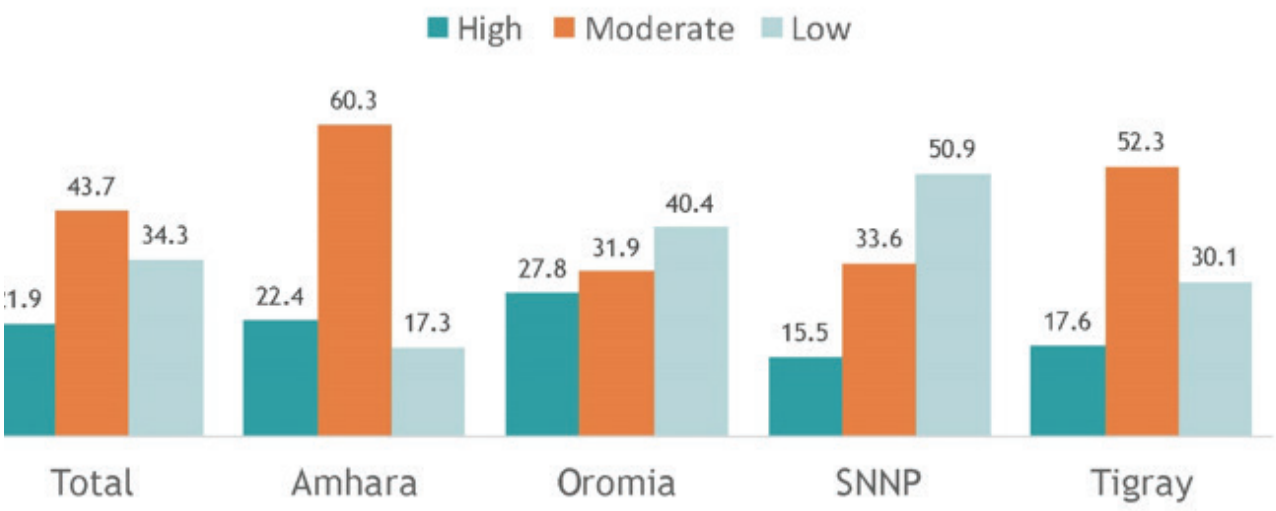

Figure 3.10 Women's Household Decision-Making Ability

Economic Characteristics by Vulnerability Index

Women with moderate to high levels of vulnerability also exhibited low levels of decision-making, 39.3% and 38.8%, respectively (Table 7).

Economic Characteristics by Respondent Type

Half of the pregnant women in the study sample had low levels of household decision-making compared with women with children under two years (35.9%) and children three to five years (33.5%) (Table 8).

3.4 Media

This section describes media availability and utilization trends in four regions of Ethiopia. The rapidly changing media landscape in Ethiopia needs to be assessed in the context of the Communication for Health program, which covers six health areas. The different sources of health information depict a scenario that identifies the most commonly used media sources and health topics in four regions of Ethiopia.

The family health card (FHC) was introduced in Ethiopia in 2002. The card was developed by John Snow Inc. during the Essential Services for Health project and adapted by the Ethiopian Ministry of Health, and it is intended to be used as a tool to promote health behavior change.[33] Every family is meant to have its own FHC at the household level. The FHC is designed with simple visuals and text to promote health actions in different

health areas. The FHC contains 64 health messages that include reproductive, maternal, neonatal, and child health (RMNCH), TB, malaria, sanitation, and hygiene.[34] Since the FHC is an integral part of the Ethiopian health system, the availability of the FHC and its use were covered in the baseline survey.

Ethiopia had 43 million mobile phone users in 2015, and it has set a goal of 103.7 million mobile phone users by 2020.[35, 36] The mobile phone has become an important tool for SBCC programs. Mobile technologies provide the opportunity for SBCC programs to "narrowcast" radio and television (TV) content to remote media dark areas through the availability of offline sharing technologies such as Bluetooth.[37, 38] The baseline study estimated the number of mobile phones that are owned by households in four regions of Ethiopia.

Results

Family Health Card

Overall, 22.6% of the respondents had ever heard of the FHC, and its ownership was much lower (9.5%). FHC use was minimal, with a mere 1.7% of the respondents stating frequent use of the FHC and another 5.4% reporting moderate use (Table 9). The highest knowledge (40%), ownership (22.8%), and use (4.3%) of the FHC was in Tigray. SNNP had the lowest knowledge (12.2%), ownership (5%), and use of the FHC (0.4%, Table 9)

FHC knowledge, ownership, and use remain low across all categories of vulnerability index (Table 10).

Pregnant women were most likely to have heard of (29%), owned (11.4%), and used (3.8%) the FHC compared with mothers with children under two years, mothers with children three to five years, and other women (15–49 years) as seen in Figure 3.11. Estimates for the other three respondent categories (mothers with children under two years, mothers with children three to five years, and other women 15–49 years) were very low for all three FHC indicators (Table 11).

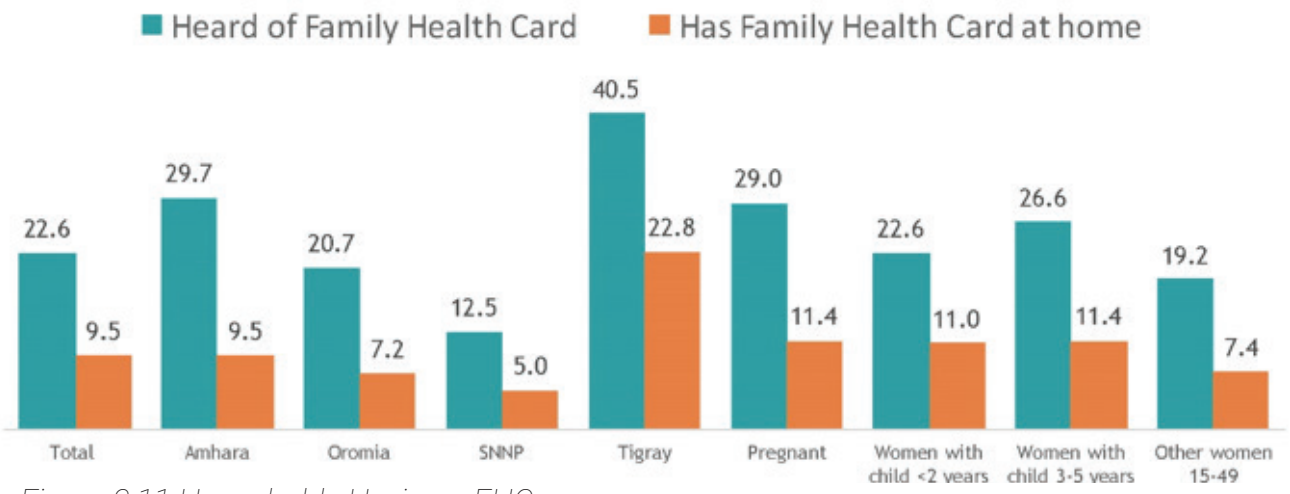

Figure 3.11 Households Having a FHC

Exposure to Health Messages by Region

The baseline survey assessed the type and sources of health messages received by the respondents in past three months. About 28% women reported receiving a health message, indicating that a majority of women (62%) did not receive any health message in the past three months either from mass media, health system (including health extension workers [HEWs]), WDA, or family and friends (Table 12).

Topics that reached less than 5% of the respondents in the past three months included ANC, PNC, delivery, malaria, TB, and PMTCT. SNNP had the lowest exposure to health messages in the past three months (0.4 to 5%) in an overall scenario of low exposure to health information.

Source of Health Information by Region

Among 28% respondents who received health information in the past three months, HEWs (13.3%) were the most common source, followed by radio (6.4%) and health facility (5.2%). Community-level sources of health information included family, friends, and relatives (5.1%); community events (4.6%); and HDA (2.9%). Exposure to TV for health information was a mere 1.7%; newspapers, 0.10%, and pamphlets, 0.20%. Obtaining health Information from print media was almost nonexistent. Information from mobile text messages was very low at 1.3% (Table 12).

Among mass media, radio exposure was highest in Oromia (10.2%) and lowest in SNNP and Tigray (3%), while TV exposure was 2.9% in Oromia and very low (0.20%) in SNNP. Print media (newspapers, leaflets/pamphlets, etc.) was an almost nonexistent source of health information in all four regions.

Among sources from the health system, information from HEWs was highest in Tigray (25.2%) and lowest in SNNP (5.7%). Tigray also had the highest exposure to health information from the health facility (8%), and SNNP was the lowest with 2%.

Community-level sources of information include community events; HDA; and family, friends, and relatives. Regional variation indicated that community events were highest at 7.2% in Oromia and the lowest at 1.1% in SNNP. The HDA that included the one-by-five approach at the village level (explained in Section 1.5) was relatively more active in Tigray (5.5%) compared with SNNP (1.1%). Family and friends as a source of health information was highest in Oromia (11.2%) and lowest in SNNP (0.40%).

Among sources from the health system, information from the HEW was highest in Tigray (25.2%) and the lowest was in SNNP (5.7%). Tigray also had the highest exposure to health information from the health facility (8%) and SNNP was the lowest with 2%.

Community level sources of information include community events, HDA and family/ friends/relatives. Regional variation indicated that community events were highest at 7.2% in Oromia and the lowest was at 1.1% in SNNP. The HDA that includes the 1 by 5 approach at village level (explained in section 1.5), was relatively more active in Tigray (5.5%) compared with SNNP (1.1%). Family and friends as a source of health information was highest in Oromia (11.2%) and lowest in SNNP (0.40%).

Sources of Health Information by Vulnerability Index

The vulnerability index is described in detail in Section 2.7 Measurements. The data indicate that respondents in the high-vulnerability category had the lowest access to and use of media sources (Table 13). Only 19% respondents in the high-vulnerability category had access to health information in the past three months compared with 30% in the medium and low vulnerability categories. The topics accessed follow the pattern of highest exposure to WASH followed by FP. However, for maternal health, malaria, TB, and PMTCT, respondents in the high-vulnerability groups were half as likely to access information compared with respondents in the moderate and low vulnerability categories (Table 13).

Overall, exposure to mass media was very low in the moderate- and high-vulnerability categories. Radio exposure was 8.9% for respondents with low vulnerability and about less than half in the moderate category (4.1%) and 3.9% in high-vulnerability group.

TV exposure was also highest in the low-vulnerability group (2.9%), while it was almost negligible in the other two groups (Table 13). Print media (magazines, leaflets, or

pamphlets) was not a source of health information in the past three months in any of the three groups.

Even the HEWs and health facility were the least used as sources of health information for the groups with the most vulnerability. The moderate-vulnerability group received the highest information from HEWs (16%) and health facility (6%). Interestingly, community events and friends and family were higher sources of information than the HDA across all groups. But the high-vulnerability group had the lowest access to all community-level sources of health information (HDA, community events, family and friends, etc.; Table 13).

Sources of Health Information by Respondent Type

Overall, little difference was found among the four respondent groups (pregnant women, mothers with children under 2 years, mothers with children three to five years, and other women 15–49 years). Among the four types of respondents, pregnant women accessed health information the most (32%) and women with a child under two years the least (26.3%) (Table 14). WASH information was most accessed by women with child three to five years and other women of reproductive age 15–49 years (17%) and was accessed the least by pregnant women (13%). The next most common topic after WASH was FP, at only 6.4%. Little variation existed among the respondents for the other topics (Table 14).

Mass media as a source of health information was extremely low in four regions sampled, with other women 15–49 years reporting the most exposure to radio (9%) and women with a child under two years having the least exposure. The other three mass media sources, TV, pamphlets, and newspaper, were used very little and did not show much variation across respondent groups (Table 14).

Health system sources of information were HEWs and the health facility. Pregnant women were most likely to receive health information from HEWs (18.7%) and other women 15–49 years were the least likely to receive information form HEWs (11.3%). Community-level sources of information included community events, HDA, and family and friends. Community events were most accessed by women with a child three to five years (5.4%) and least accessed by pregnant women and other women 15–49 years (4%). HDA had an overall exposure of 2.1% and there was not much variation by type of respondent. Similarly, family and friends were a source of information to 5.1% women and there was not much difference between the respondent types (Table 14).

Media Exposure by Region

The media exposure section includes patterns of newspaper readership, radio listenership, TV viewership, and the preferred radio and TV programs of the respondents.

Overall newspaper readership was very low (93% did not read the newspaper). The same is true of TV viewership (90% did not view TV). Radio, on the other hand, had about 30% of respondents listening to it (Table 15). But the frequency of listening to radio was not high; only 12% of the respondents listened to radio once a week.

In terms of regional variation of radio listenership at least once a week, Oromia was highest (16.2%) and Tigray was lowest at 5.5%. Figure 3.12 summarizes exposure for respondents who were exposed to media at least once a week or more by type of media. Daily TV viewership was about 4% in Amhara and Oromia and a mere 0.5% in SNNP. About 25% respondents from Oromia preferred news programs on radio/TV compared with 12% in Tigray. Oromia has the highest preference for drama (21.5%) and Tigray the lowest (4.5%). Oromia led the preference for music programs (29.4%), while Tigray (9.5%) has the lowest preference for music programs.

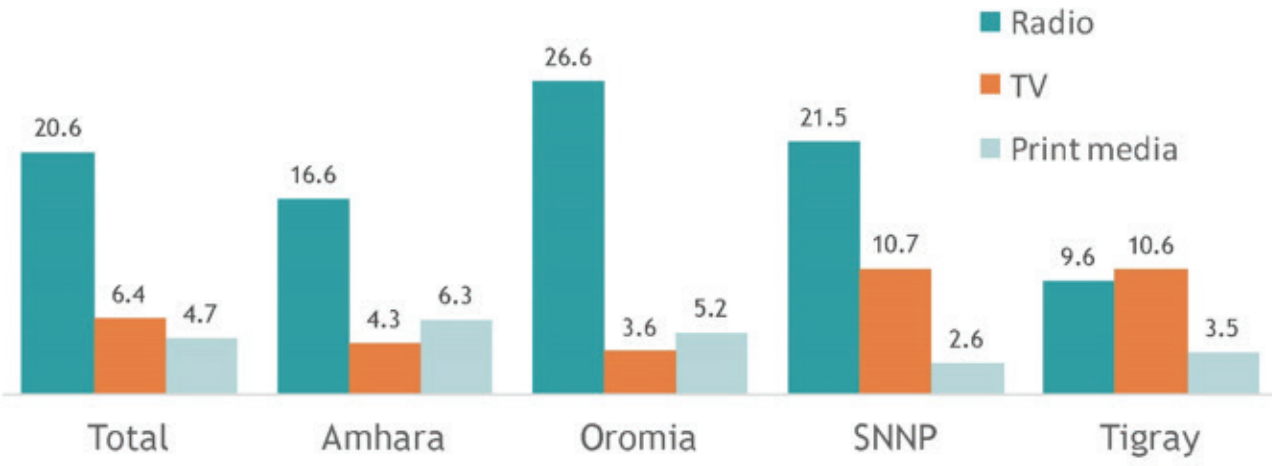

Figure 3.12. Respondents who have media exposure at least once a week or more

Media Exposure by Type of Respondent

Among the key audiences of pregnant women, women with children under two years, and women with children three to five years, newspaper readership was close of zero percent. Only other women 15–49 years (12.3%) read the newspaper (Table 10.8). Similarly, radio listenership was highest for other women 15–49 years (37%) and lowest for women with children three to five years (22%). Daily TV viewership was highest in women with children three to five years (4.3%) and lowest in women with children under two years (1.9%). About 22.1% of other women 15–49 years preferred watching news programs compared with 11.4% pregnant women (Table 15).

Media Exposure by Vulnerability Index

Newspaper readership at least once a week was lowest in the high-vulnerability group (1.7%) compared with 2.7% in the group with low vulnerability. Radio listenership at least once a week was 6.6% in the group with high vulnerability compared with 15.6% in the group with low vulnerability group. Daily TV viewing was highest in the low-vulnerability group (5.5%) and was almost nonexistent in the high-vulnerability group (0.1%). The most preferred TV program was news. For women with low vulnerability, it was 24.5% and for the most vulnerable women it was 7.6% (Table 16). Trends indicate that the high-vulnerability group had the lowest access to mass media.

Ownership of Household Media Items

About 26.3% of all women in the sample reported having a working radio, 3.9% owned a working TV, and landline ownership was only 0.4%. Meanwhile, about 51% of the sample owned mobile phones (Table 18).

Oromia had the highest percentage of working radios (37%) and Tigray, the lowest (13.3%). Similarly, the highest number of working TVs was found in Oromia (6.2%), while only 0.5% respondents in SNNP had working TVs. However, the presence of mobile phones in households was high. Amhara reported the most mobile phones (58.8%) and SNNP had the least (46.1%).

Factors Influencing Key Media Behaviors (Logistic Regression Analysis)

Media Behavior: Family Health Card

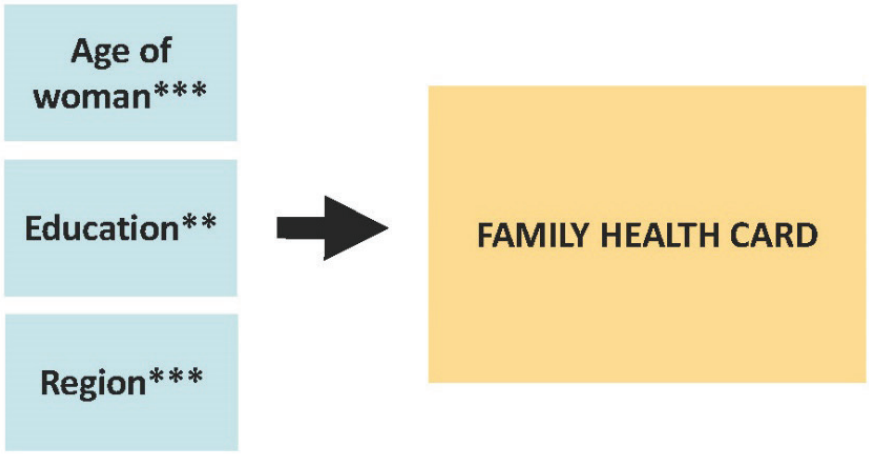

*Figure 3.13 Family Health Card, * p < 0.05; ** p < 0.01; *** p < 0.001*

Ownership of an FHC was influenced by three major predictors related to region, the age of the woman, and education of the woman (Table 78). All three predictors were significantly associated with owning an FHC (Figure 3.13 Family Health Card).

Compared with women in Oromia, women in Amhara [adjusted odds ratio (AOR) 1.67, 95% confidence interval (CI) = 1.15–2.43] and Tigray [AOR 3.74, 95% CI = 2.65–5.28] were much more likely to have an FHC. However, FHC availability among women in SNNP was 53% less likely [AOR 0.53, 95% CI = 0.33–0.84] compared with women in Oromia. FHCs were more available among women with at least a primary school education compared with nonliterate women [AOR 1.51, 95% CI = 1.12–2.02]. Lastly, FHC availability was more likely among women 25–34 years [AOR 2.00, 95% CI = 1.44–2.80] and 35–49 years [AOR 1.73, 95% CI = 1.19–2.51] compared with younger women 15–24 years.

3.5. Family Planning (FP)

Ethiopia has reduced its TFR from 5.5 births per woman in 2000 to 4.2 births per woman in 2015.[4] However, its rural TFR continues to be high at 5.2, indicating a vast disparity between urban and rural TFRs. According to EDHS 2016, current use of modern contraception is 35% among married women.[4] Modern methods include female sterilization, male sterilization, the intrauterine contraceptive device (IUD), implants, injectables, the pill, male condoms, female condoms, emergency contraception, the standard days method, and the lactational amenorrhea method.[4] Injectable contraception (23%) is the most commonly used method, followed by implants (8%), IUD (2%), and oral pills (2%).1 Use of traditional methods is almost negligible in Ethiopia at 1%. Current use of modern FP methods in the four regions of the project is 46.9% in Amhara, 39.6% in SNNP, 36.3% in Tigray, and 28.1% in Oromia.[4]

Results

FP Knowledge

Almost universal knowledge of at least one modern method exists in the overall sample
Almost universal knowledge of at least one modern method existed in the overall sample (N = 2,770) (Table 19). However, knowledge of long-acting methods (73%) was significantly lower in respondents compared with knowledge of short-acting methods (90.2%). Tigray had significantly higher levels of knowledge of a modern short-acting FP method (97.8%) and a long-acting FP method (83.2%) compared with the other three regions. SNNP had the lowest levels of knowledge of a short-acting method (87.3%) and a long-acting method (65.1%).

Commonly used modern FP methods in Ethiopia are injectables and implants, as seen in Figure 3.14. However, knowledge of oral pills was the highest (66.4%) in respondents from all methods, followed by injectables (60.6%) and implants (59.4%). Tigray and Oromia had much higher levels of knowledge of pills, injectables, and implants compared with SNNP and Oromia (Table 19). Knowledge of other methods included male condom (57.5%), female condoms (12.8%), diaphragm (1.5%), female sterilization (21.6%), male sterilization (7.8%), lactational amenorrhea (24.4%), and the standard days method (3.8%). Table 20 displays further details regarding FP knowledge index by region, respondent type, and vulnerability.

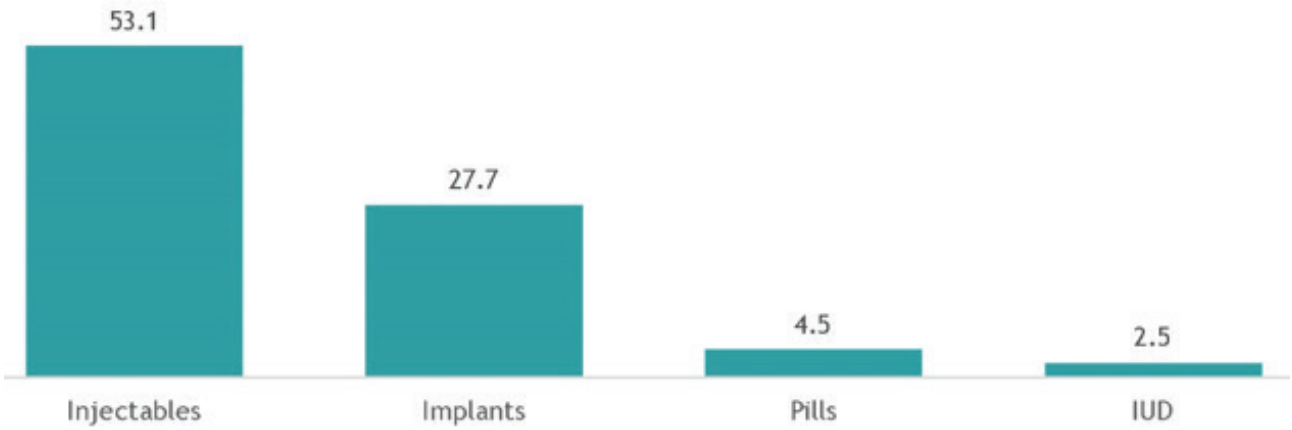

Figure 3.14 Type of common FP methods used

FP Current Use, Ever Use, and Services

Current use of modern FP for the respondents (minus currently pregnant women) is 41%, but regional variations persist (Figure 3.15). Amhara (54.4%) had significantly higher current FP use compared with the other three regions. Tigray and SNNP were in the 36%–37% range and Oromia had the lowest use of modern contraceptives at 29.6% (Table 21).

Ever use of FP was assessed for the entire sample (N = 2,770) and was 57.8% (Figure 3.15). Amhara (75.6%) had the highest ever use of modern contraceptives and SNNP (46.1%) had the lowest. About 42% of the respondents reported they had received services for modern contraceptive methods in the past 12 months (Table 21). FP service utilization was highest in Amhara (55.5%) and lowest in Oromia (30.7%).

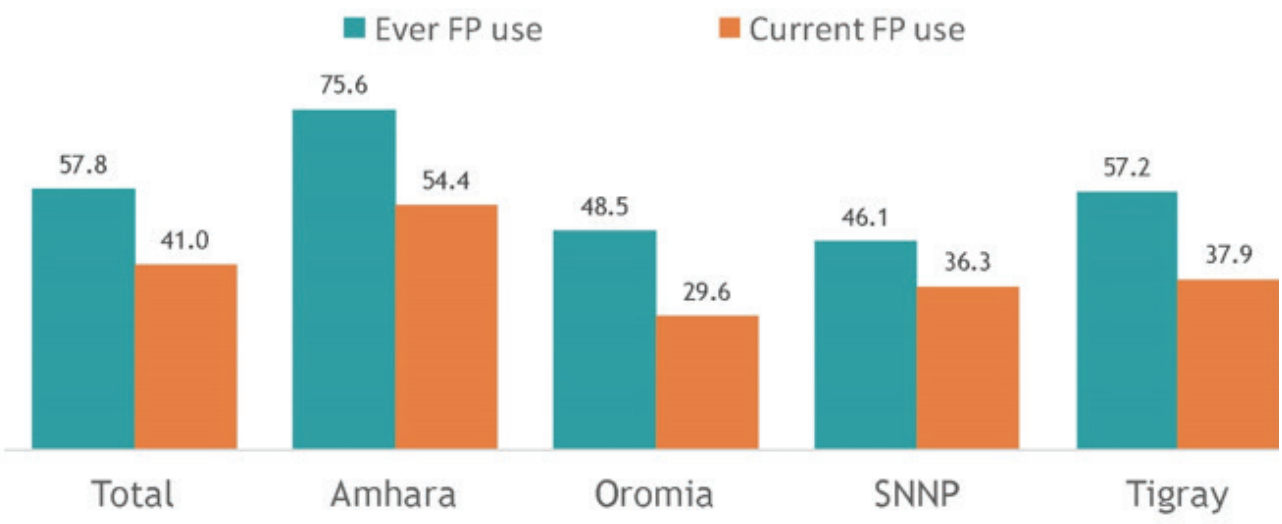

Figure 3.15 Ever FP Use versus Current FP Use by Region

Women with children three to five years were most likely to be currently using contraceptives (61.4%). About 49.3% women with children under two years were currently using modern contraceptives (Table 21). The lowest level was found in other women (26.8%). A similar trend is evident in terms of ever use of contraceptives. Similarly, women with children three to five years were most likely to have used FP services in the past month (61.4%) compared with women with children under two years (51.3%). Other women (29.7%) had low usage of FP services in the past 12 months.

Women from more vulnerable backgrounds were significantly less likely to use modern contraceptives (34.2%) compared with women with lower vulnerability (44.1%). Table 21 indicates that the use of FP services by women from marginalized households (high vulnerability) was significantly lower (34.7%) compared with women with low vulnerability (44.7%). A similar trend is observed in terms of ever use of contraceptives (Table 21).

The most commonly cited reasons for not using contraceptives were that the women were currently not having sex (46%) or they wanted to get pregnant (23.3%). Regional variation indicates that 57% of FP nonusers in SNNP said they were not having sex compared with 37.1% in Oromia (Table 22). About 31.8% of the FP nonusers in Tigray stated they wanted to get pregnant compared with 16.6% in Oromia (Table 22). Another 9.7% women stated they were menopausal or had had a hysterectomy.

Self-Efficacy and Outcome Expectancy

Self-efficacy and outcome expectancy for FP were measured with a single item each. The items were, "I feel confident that I can use family planning to avoid unwanted pregnancies" (self-efficacy) and "The use of modern family planning methods improves the quality of my family life" (outcome expectancy).

Self-efficacy for FP was very strong in 37.3% of the overall sample, but wide regional variations existed (Figure 3.16). About 70% of the women in Tigray reported a high level of efficacy for FP compared with 24% in Oromia. Women from Amhara reported 47.8% high self-efficacy for FP, while the level for SNNP was 30.9%.

Overall, high outcome expectancy for FP was reported by 41.6% of the women (Table 23). The regional outcome expectancy trend is similar to that of self-efficacy. Tigray (67.1%) had the highest proportion of women with strong FP outcome expectancy, followed by Amhara (53%), Oromia (32%), and SNNP (32%).

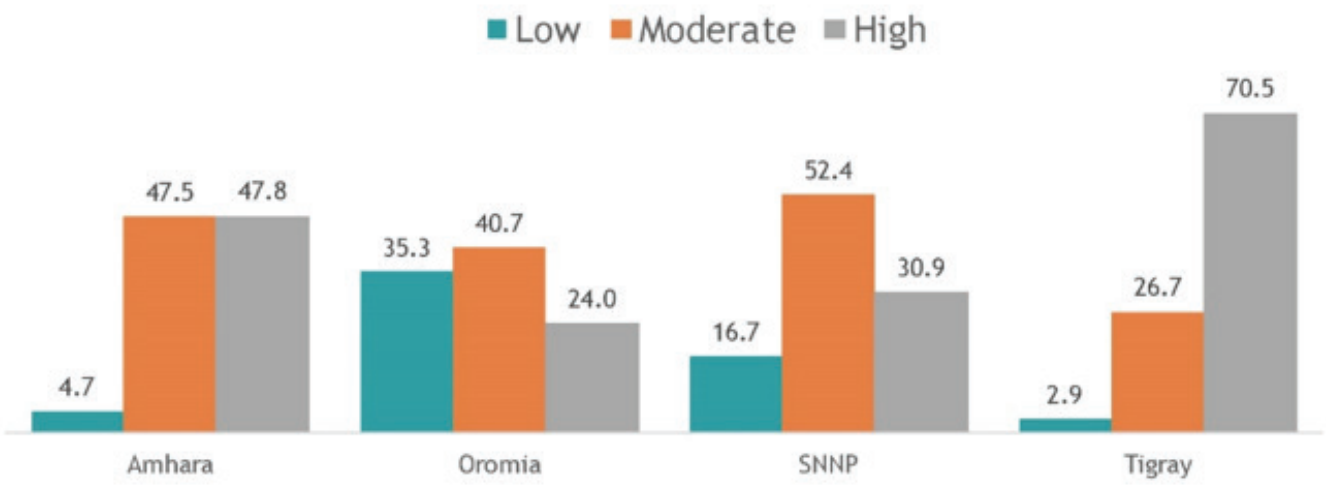

Figure 3.16 FP Self-Efficacy

Factors Influencing Key FP Behavior (Logistic Regression Analysis)

FP Behavior: Current Modern FP Use

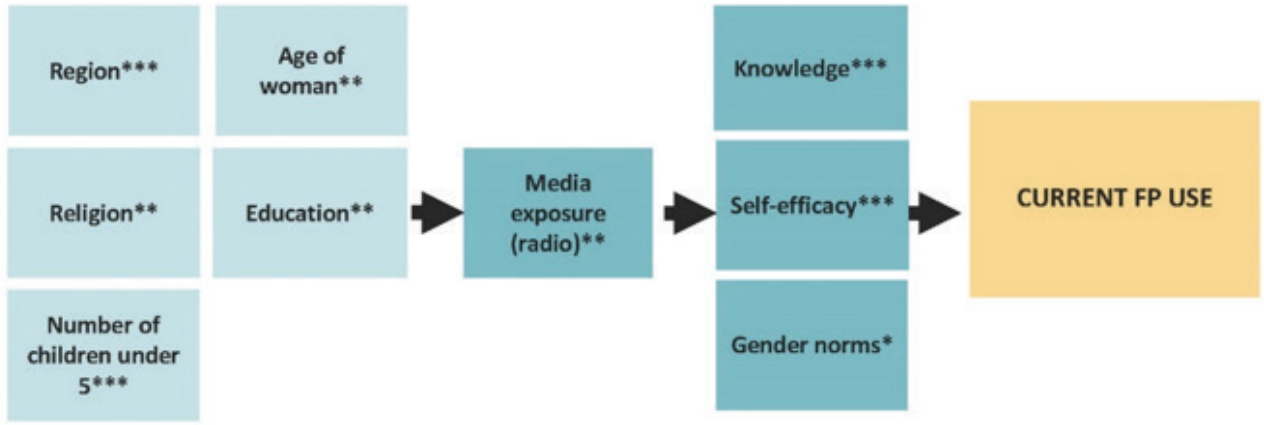

*Figure 3.17 Current Modern FP Use, * p < 0.05; ** p < 0.01; *** p < 0.001*

Odds ratios were estimated by using logistic regression for current FP use among married women in the study sample (excluding pregnant women). Details of the model are described in Table 79. The model was fitted for age of the woman, education, religion, region, and the number of children under five years. Additionally, we explored the influence of radio-listening frequency and gender inequality on current FP use. Lastly, predictors including knowledge of modern FP methods and self-efficacy were also assessed. Significant predictors are shown in Figure 3.17.

Women from Amhara [AOR 2.96, 95% CI = 2.16–4.05] and SNNP [AOR 2.23, 95% CI = 1.59–3.13] were more likely to be using FP compared with women in Oromia. Current modern FP use was 40% less likely among older women 35–49 years compared with women 14–24 years [AOR 0.60, 95% CI = 0.44–0.82]. Women with at least primary education were 1.5 times as likely to be currently using FP methods as nonliterate women [AOR 1.48, 95% CI = 1.16–1.88]. Religion also influenced current FP use, with women who identified as Christian being 1.5 times as likely to be using FP methods compared with women who identified as Muslim [AOR 1.47, 95% CI = 1.13–1.90]. Compared to women with no children under five, women with one child under five were 1.7 times as likely to be currently using FP methods [AOR 1.70, 95% CI = 1.33–2.18]. No significant difference was found between women who had two or more children under five compared to women with no children under five.

Radio-listening frequency of at least once a week appeared to influence current FP use. Women who listened to the radio at least once a week were 1.5 times as likely to be currently using FP methods compared with women who did not listen [AOR 1.45, 95% CI = 1.14–1.85]. Current FP use was more likely to have been found among women with low

[AOR 1.38, 95% CI = 1.06–1.78] to moderate [AOR 1.48, 95% CI = 1.07–2.06] support for gender inequality compared with women with high gender inequality support.

Knowledge of FP methods was assessed by the respondent knowing three or more methods compared with knowing fewer than three methods. Knowledge of three or more FP methods had a significant impact on current FP use, with current FP use being twice as likely among women who had sufficient knowledge of FP use compared with those that did not [AOR 2.18, 95% CI = 1.69–2.81]. Compared with women with low to moderate self-efficacy levels related to modern FP use to avoid unwanted pregnancies, women with high self-efficacy were twice as likely to use modern FP methods [AOR 2.05, 95% CI = 1.63–2.58].

3.6. Mother, Neonatal and Child Health: Antenatal Care, Institutional Delivery, and Postnatal Care

The baseline study explores the MNCH health area through ANC, delivery, and PNC health practices, including knowledge, self-efficacy, and outcome expectancy. Women in Ethiopia have a one-in-52 chance of dying from childbirth-related causes each year. [39] Improving maternal and child health in Ethiopia is a major priority for the Ministry of Health in Ethiopia, including emergency obstetric care, quality maternal and newborn health care, and home-delivery-free kebeles.[40]

In the study sample, we observed ANC, delivery, and PNC behaviors and key indicators among 745 women with children under two years. Regional and vulnerability differences were observed.

Results

ANC Services by Region

In Table 24, 75.3% of women with children under two years had an ANC visit with a skilled provider (including doctors, nurses, or HEWs). The number was lowest in Oromia (66%) and highest in Tigray (82.8%). Nearly half of women (47%) had an ANC visit with a nurse/midwife and one third of women (30.2%) had an ANC visit from a HEW. ANC visits were mostly conducted in a government health clinic (50.7%) or a health post (21%). Five out of 10 women with children under two years (47.2%) had four or more ANC visits (Figure 3.18). Regionally, only 30% of women in Oromia had four or more ANC visits, and a third of women (33.7%) in Oromia had no ANC visits at all. Among women with children under two years, 45.6% had their first ANC visit past the first trimester (13 weeks or greater), particularly in SNNP, where six out of 10 women (60.6%) had their first ANC visit after their first trimester.

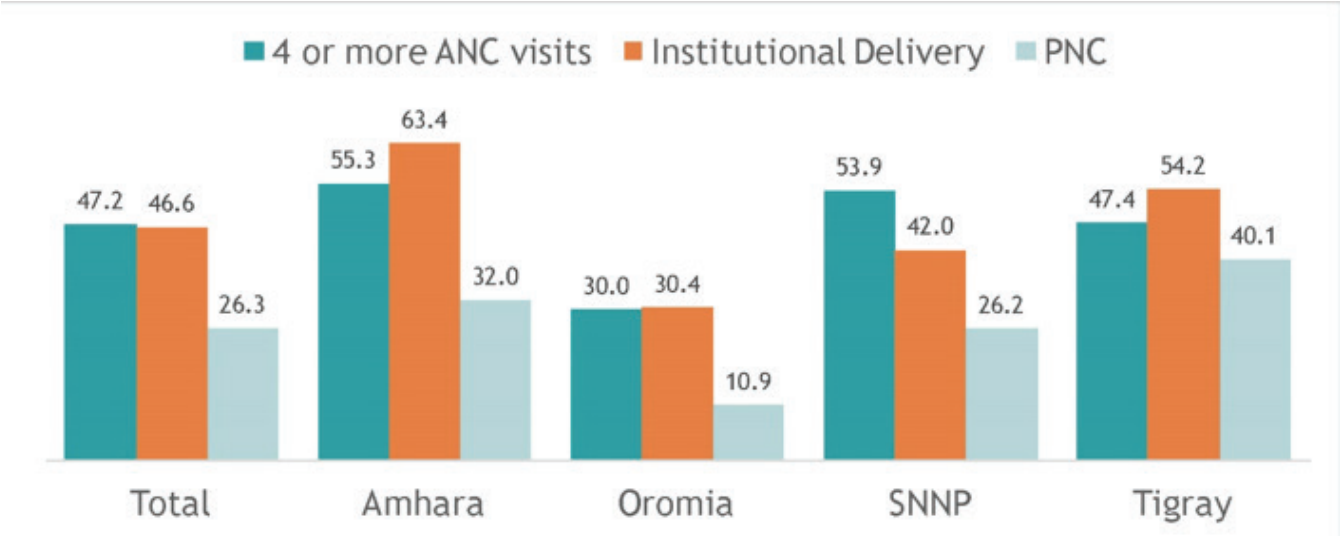

Figure 3.18 MNCH services uptake

Institutional Delivery and Postnatal Care by Region

Half of women (50.5%) with children under two years had a skilled delivery (by a doctor, nurse, or midwife), with the highest proportion in Tigray (66.4%) compared with Oromia (32.9%) (Table 25). The breakdown of who assisted during respondents' most recent delivery is displayed in Figure 3.19. Nurses and midwives were the most commonly cited provider in Amhara and Tigray. Traditional birth attendants (TBAs) played a role in deliveries in Oromia, with nearly four out of 10 women (37.9%) being assisted by TBAs. Slightly more women delivered in their home (53.4%) than in a health facility (46.6%). Although the proportions of home deliveries were generally high, home deliveries were more common for women in Oromia (69.6%) and SNNP (58%) compared with women in Amhara (36.6%) and Tigray (45.8%). Only three out of 10 women (30.4%) in Oromia delivered in any type of health facility (Figure 3.18).

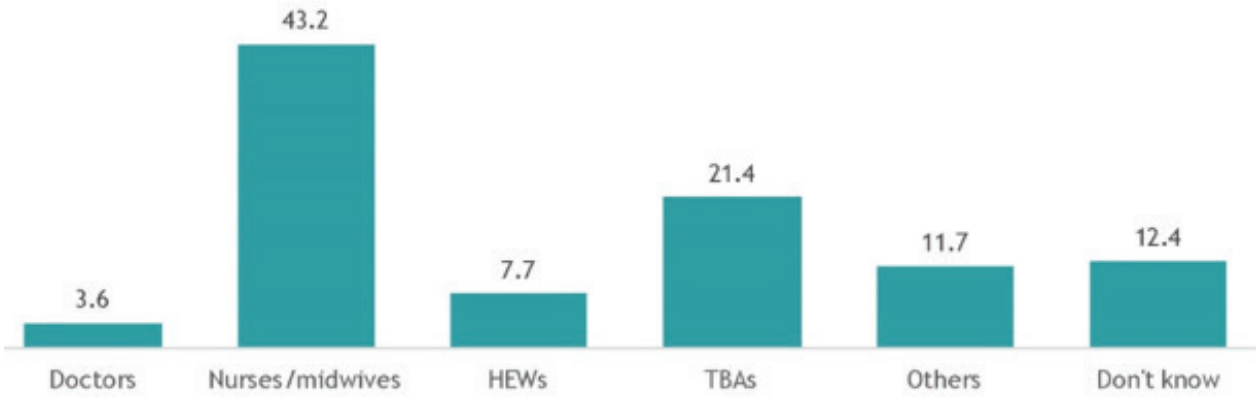

Figure 3.19 Type of provider for delivery

PNC by a skilled provider within seven days of delivery was generally uncommon for all women with children under two years (26.3%). PNC was lowest in Oromia (10.9%) and highest in Tigray (40.1%), followed by Amhara (32%) and SNNP (26.2%). PNC by a skilled provider within seven days of delivery was found to be higher among women who delivered in a health facility. Of the 343 women who had a postnatal check after their delivery by a skilled provider, 47.8% were seen within seven days of delivery. A timely postnatal check within seven days of delivery was more likely in Tigray (65.8%), where six out of 10 women reported timely PNC compared with Oromia (31.6%), Amhara (48.6%), and SNNP (51.8%).

Institutional Delivery and Postnatal Care by Vulnerability Index

The vulnerability index (described in Section 2.7 Measurements) included three levels, low, moderate, and high. Table 26 shows women with high vulnerability were less likely to be assisted at their last delivery by a nurse or midwife (31.9%) or a doctor (2.7%) compared with women with low to moderate vulnerability. A quarter of women with high vulnerability (24.3%) reported using TBAs, and these women were also more likely to have had a birth at home (68.6%). Only three out of 10 women with high vulnerability (27.9%) reported giving birth in a government health facility compared with five out of 10 with low (49.4%) or moderate (47.8%) vulnerability.

Reasons for Not Delivering in a Health Facility by Region

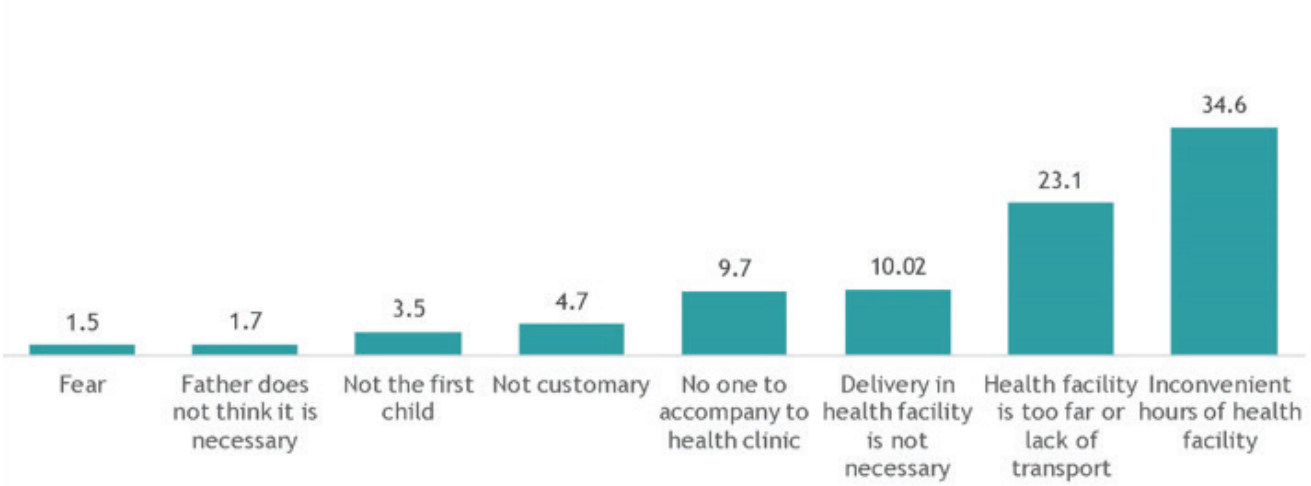

Figure 3.20 Reasons for Not Delivering in a Health Facility

The 402 women who did not deliver in a health facility reported various reasons for their decision (Table 27). Most women reported either the inconvenient hour when they were in labor (34.6%), followed by lack of transport or distance to the health facility (23.1%) and the belief that delivery in a health facility was not necessary (10.2%), as seen in Figure 3.20. A majority of women in SNNP reported the inconvenient hour of their labor (57.3%)

to be a main reason for not delivering in a health facility, while three out of 10 women in Oromia reported the lack of transportation or distance to the health facility to be their main reason (30.2%) along with the inconvenient hour of their labor (29.8%). Also of note, 12.7% of women in Amhara and 12.8% of women in Oromia reported the lack of someone to accompany them to the health facility as a major reason for not delivering in a health facility. Nearly a quarter of women in Oromia (22.2%) did not perceive delivery at a health facility to be necessary.

Reasons for Not Delivering in a Health Facility by Vulnerability Index

Women with high vulnerability were more likely to cite inconvenient hour (41.4%) and lack of transportation or distance to the health facility (29.7%) as major reasons for not delivering in a health facility, as shown in Table 28. However, women with low vulnerability were much more likely to report that they did not think delivery in a health facility was necessary (20.7%) compared with women with moderate to high vulnerability.

Knowledge of Danger Signs during Pregnancy and Delivery by Region

Table 29 lists the knowledge of danger signs of pregnancy and delivery reported. Women most commonly reported vaginal bleeding or discharge (48.6%), high blood pressure (26.5%), and fast breathing or breathing difficulty (22.7%). Other major symptoms reported were severe headaches, dizziness, or blurred vision (21.4%), followed by extreme swelling of hands, feet, or face (19.8%) and prolonged labor (greater than 12 hours) (16.3%). Some regional differences were found. Women in Oromia reported two major danger signs, vaginal bleeding or discharge (41.7%) and severe headaches, dizziness, or blurred vision (43.9%). Women in SNNP, on the other hand, reported vaginal bleeding or discharge (43.6%) and high blood pressure (35.3%), whereas women in Tigray also reported vaginal bleeding or discharge (58.6%), with nearly a quarter of women (25.1%) reporting fast or difficult breathing.

Knowledge of pregnancy and delivery danger signs was assessed by three categories: low (knowing one or no danger signs), medium (two or three danger signs), and high (four or more danger signs). Overall, 13.7% of women knew four or more pregnancy and delivery danger signs (high knowledge). Women in Tigray (5.6%) and Amhara (8.9%) were less likely to have high knowledge of danger signs compared with the other regions; however, moderate knowledge in Tigray (40.7%) and Amhara (51.2%) was greater compared with Oromia and SNNP. Low knowledge of danger signs was greatest in Tigray (53.6%) and SNNP (55.4%).

Knowledge of Danger Signs during Pregnancy and Delivery by Vulnerability Index

Among women with high vulnerability, knowledge of danger signs during pregnancy and delivery was low compared with women with low and moderate vulnerability, as shown in Table 30. Across almost all danger signs, women with high vulnerability were less likely to know the danger sign. For instance, only 5% of women with high vulnerability reported fevers, chills, and vomiting as danger signs compared with 14.7% of women with low vulnerability and 14.3% of women with moderate vulnerability. Among the commonly cited danger signs, 16.3% of women with high vulnerability reported fast or difficult breathing compared to 23.6% of women with low vulnerability.

ANC Knowledge, Self-Efficacy, and Outcome Expectancy by Region

As shown in Table 31, 84.3% of women reported that pregnant women should have at least four or more ANC visits. While four out of 10 women (40.1%) overall reported high self-efficacy for four or more ANC visits starting in the first trimester, the proportion was lowest in SNNP, where only two out of 10 women (23.4%) had high self-efficacy for four or more ANC visits. Lastly, five out of 10 women (50%) had high outcome expectancy related to better birth outcomes related to having at least four or more ANC visits. This figure was lowest SNNP, where 33.7% of women had high outcome expectancy as related to ANC visits and birth outcomes.

ANC Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability Index

Women with high vulnerability were less likely to have high self-efficacy related to having four or more ANC visits starting in the first trimester (31.5%) compared with those with low vulnerability (36.7%) (Table 32). Differences in outcome expectancy related to four or more ANC visits were also found between women with high vulnerability (38.2%) and those with low vulnerability (48.4%).

Factors Influencing Key MNCH Behaviors (Logistic Regression Analysis)

Three behaviors were explored for the health area of MNCH: early ANC registration, four or more ANC visits, and institutional delivery.

Maternal, Neonatal, and Child Health Behavior: Early Antenatal Care Registration (<12 weeks)

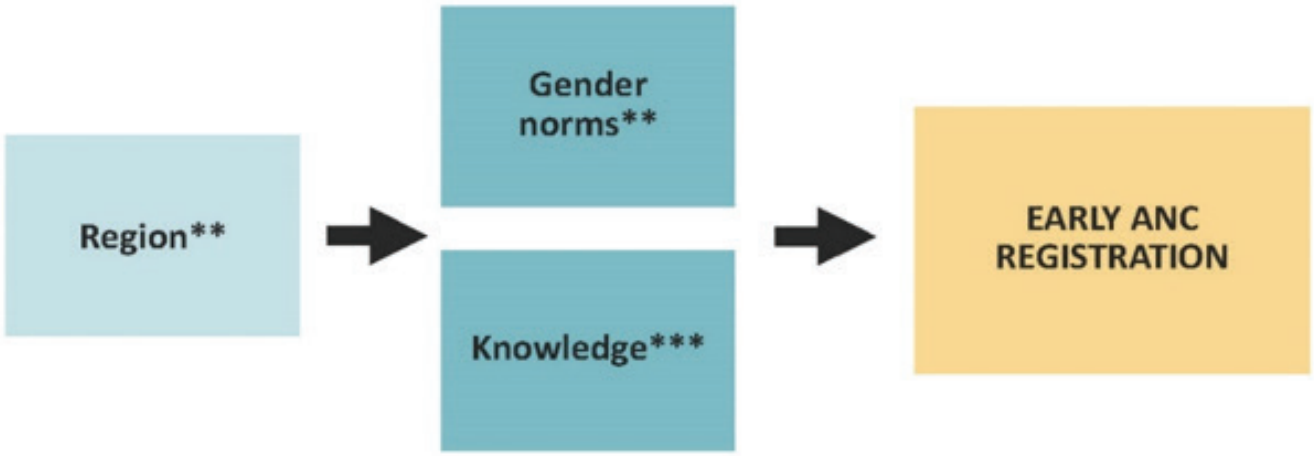

*Figure 3.21 Early ANC registration, * p < 0.05; ** p < 0.01; *** p < 0.001*

In Table 80, a logistic regression model for early ANC registration (first 12 weeks of pregnancy) was fitted with region, gender inequality, knowledge related to number of ANC visits, and outcome expectancy related to ANC services. Figure 3.21 demonstrates the significant predictors.

Regionally, women in Tigray were twice as likely [AOR 1.99, 95% CI = 1.26–3.14] as women in Oromia to have an early ANC registration. In contrast, women in SNNP were 58% less likely to have registered for ANC within the first 12 weeks of pregnancy compared with women in Oromia [AOR 0.58, 95% CI = 0.35–0.96]. Compared with women with high gender inequality, women who had low support for gender inequality were more likely to register for ANC early [AOR 2.55, 95% CI = 1.50–4.31]. Lastly, women who reported that women should have at least four or more ANC visits during their pregnancy were more than twice as likely to have registered for ANC early compared to women who suggest fewer than four ANC visits [AOR 2.48, 95% CI = 1.63–3.77].

Maternal, Neonatal, and Child Health Behavior: Four or More Antenatal Care Visits

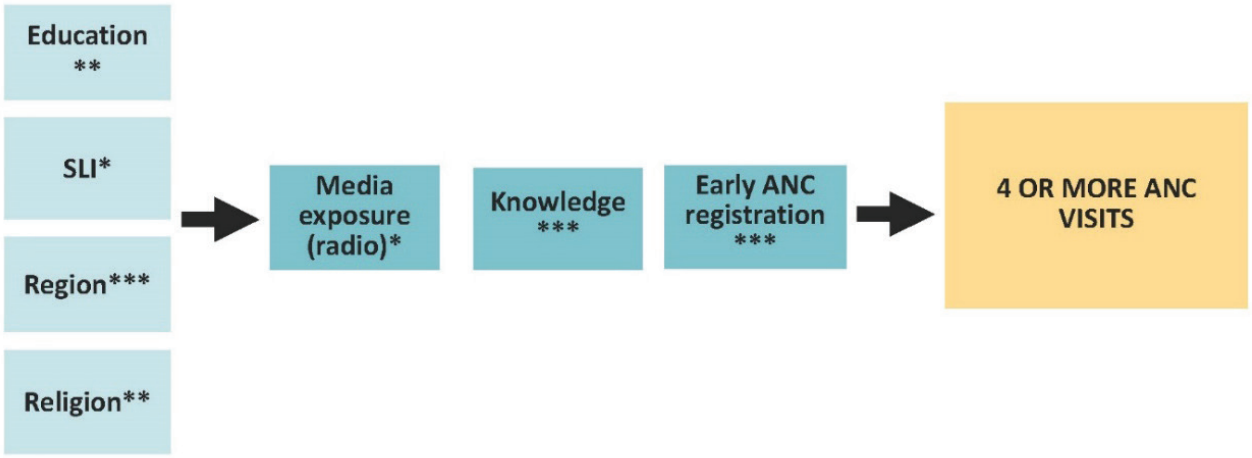

*Figure 3.22 Four or More ANC Visits, * p < 0.05; ** p < 0.01; *** p < 0.001*

The AORs were estimated for a logistic regression model related to a woman having four or more ANC visits during her most recent pregnancy (Table 81). The model explored background variables such as region, SLI, religion, and education levels. Other predictors for four or more ANC visits were also explored, including radio-listening frequency, early registration for ANC, and knowledge of the recommended minimum number of ANC visits. Figure 3.22 shows the significant predictors of the model.

Compared with Oromia, in all other regions women were three times as likely to engage in four or more ANC visits: Amhara [AOR 3.74, 95% CI = 2.11–6.64], SNNP [AOR 3.64, 95% CI = 2.03–6.51], and Tigray [AOR 3.12, 95% CI = 1.66–5.85]. The odds of having four or more ANC visits during their most recent pregnancy was also higher among women with a high SLI compared with those with a low SLI [AOR 1.83, 95% CI = 1.10–3.04]. Women with at least a primary-level education were 1.6 times as likely to have met the minimum number of ANC visits of four or more compared with nonliterate women [AOR 1.60, 95% CI = 1.13–2.26]. Women who identified their religion as Christian were 54% less likely to have ANC visits compared with women who identified as Muslim [AOR 0.54, 95% CI = 0.34–0.85].

Media exposure related to radio-listening frequency of at least once a week predicted four ANC visits. Compared with women who never listened to the radio, women who had radio exposure at least once a week were 1.7 times as likely to have had four or more ANC visits during their most recent pregnancy [AOR 1.65, 95% CI = 1.09–2.51].

Early ANC registration (<12 weeks) was a strong predictor for women completing four or more ANC visits. Compared with women who had not had an early ANC registration, women with an early ANC registration were three times as likely to have had four or more ANC visits [AOR 2.93, 95% CI = 2.04–4.19]. Finally, women with knowledge on the minimum number of ANC visits (four or more) recommended for pregnant women were five times as likely to have had four or more ANC visits [AOR 5.35, 95% CI = 3.39–8.45].

Maternal, Neonatal, and Child Health Behavior: Institutional Delivery

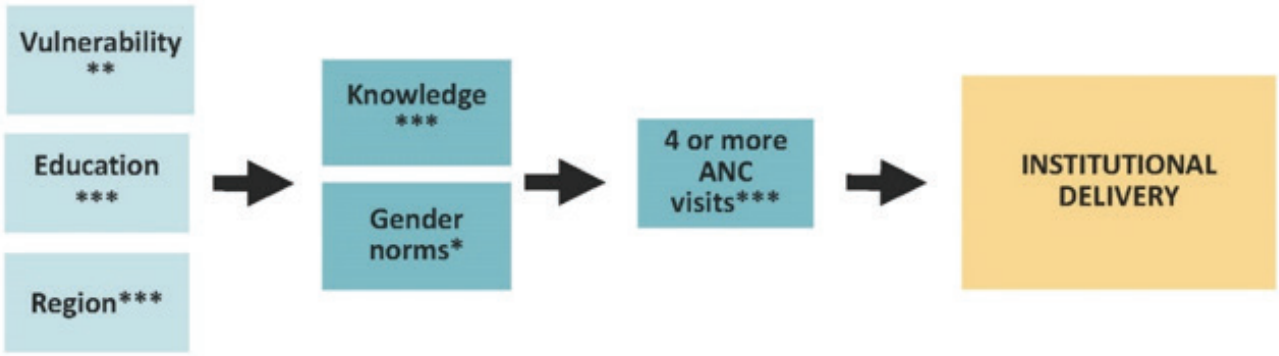

*Figure 3.23 Institutional Delivery, * p < 0.05; ** p < 0.01; *** p < 0.001*

Institutional delivery refers to delivery in a health facility such as a hospital, health clinic, or health post. Region, education, religion, vulnerability, and gender inequality were explored in a logistic regression model for institutional delivery. Odds ratios were also estimated for number of ANC visits and knowledge of minimum number of ANC visits, as shown in Table 82. Figure 3.23 shows the six significant predictors of the model.

Compared with women in Oromia, women in Amhara [AOR 3.00, 95% CI = 1.78–5.07], SNNP [AOR 2.03, 95% CI = 1.16–3.57], and Tigray [AOR 2.88, 95% CI = 1.63–5.09] were more likely to have had an institutional delivery. Education was also a positive predictor of institutional delivery, with women with a primary education being 1.7 times as likely to have had a delivery in a health facility compared with nonliterate women [AOR 1.65, 95% CI = 1.17–2.32]. Compared with women with high vulnerability, women with low [AOR 2.28, 95% CI = 1.48–3.51] to moderate [AOR 2.49, 95% CI = 1.58–3.93] vulnerability were twice as likely to have had an institutional delivery. Institutional delivery was more than three times as likely to have occurred among women with a low level of gender inequality compared with women with high levels of gender inequality [AOR 3.61, 95% CI = 1.15–11.30].

Finally, having four or more ANC visits positively predicted institutional delivery compared with having fewer than four visits. Women with four or more ANC visits were twice as likely to have given birth in a health facility [AOR 1.99, 95% CI = 1.42–2.78]. Finally, women with knowledge of the minimum number of ANC visits (four or more) were twice as likely to have had an institutional delivery [AOR 2.12, 95% CI = 1.40–3.20].

3.7. Prevention of Mother-to-Child Transmission

Knowledge of PMTCT of HIV in Ethiopia is relatively high, and 71.2% of rural women understand that HIV can be transmitted by BF.[4] However, further improvement is needed in understanding how mother-to-child transmission can be reduced by antiretroviral therapy (ART) because only 43.6% of pregnant women reported that understanding compared with 78.0% of urban women.[4] In our study, we evaluated HIV prevention practices and knowledge, self-efficacy, and outcome expectancy of PMTCT.

Results

Human Immunodeficiency Virus Prevention Practices by Region

In Table 33 and Figure 3.24, 59.7% of women in the study sample were ever tested for HIV. Regionally, HIV testing prevalence was lowest in Oromia, with only 39.1% of women having ever been tested. Nearly a quarter of women in Tigray (24.1%) were tested within the past six months prior to the interview. Of women in the study sample, 49.1% reported being tested for HIV during their recent pregnancy.

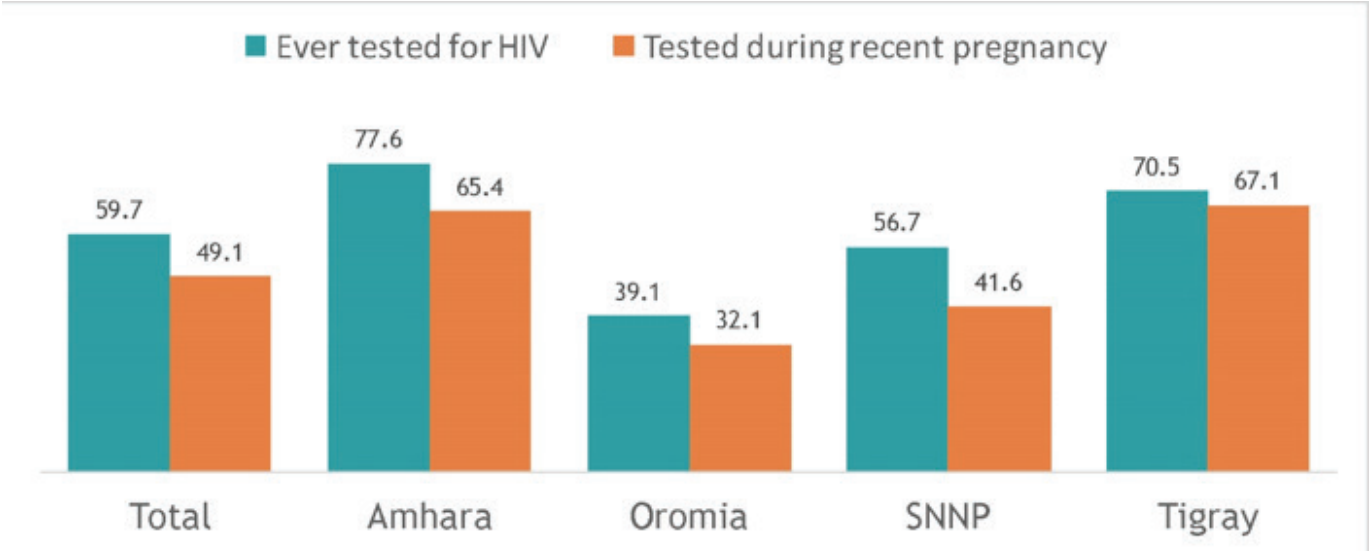

Figure 3.24 HIV Testing Status, Ever Tested versus Tested during Recent Pregnancy

However, among women who were currently pregnant, HIV testing remained low (36.1%). Regionally, only 18.6% of currently pregnant women in Oromia were tested for HIV compared with 75.7% of currently pregnant women in Tigray. Figure 3.25 shows that women with at least one ANC visit were more likely to have had an HIV test during their most recent pregnancy compared with women with no ANC visits.

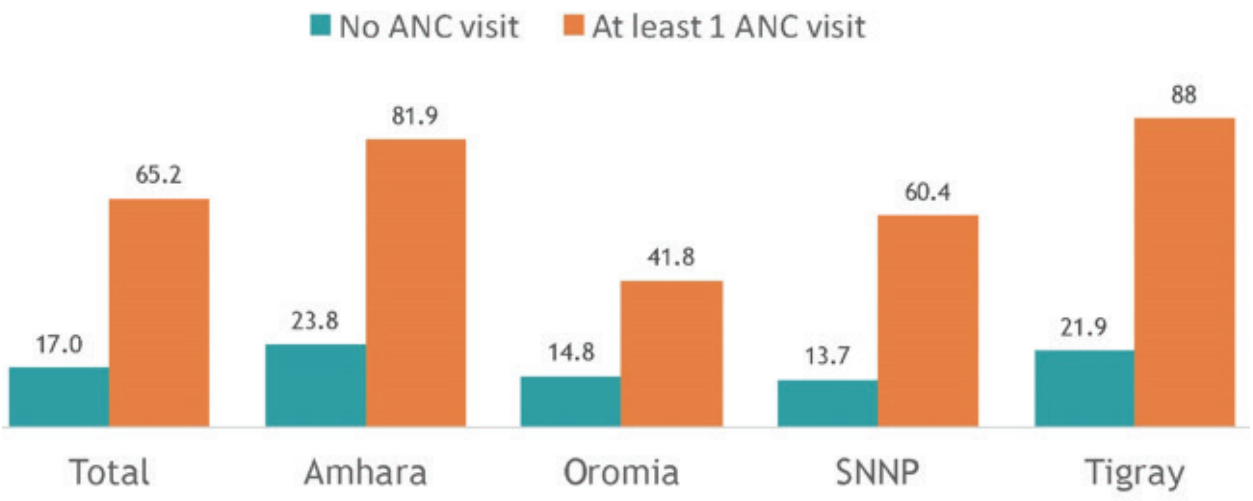

Figure 3.25 ANC Visits by Women Who Were Tested for HIV during Their Most Recent Pregnancy by Region

Human Immunodeficiency Virus Prevention Practices by Vulnerability Index

HIV testing prevalence was higher among women with low vulnerability (61.7%) compared with women with high vulnerability (55.9%) (Table 34). In addition, 54.7% of women with low vulnerability were tested for HIV during their recent pregnancy compared with 39.4% of women with high vulnerability.

Human Immunodeficiency Virus Prevention Practices by Respondent Type

While women with children under two years and children three to five years had a higher HIV-testing prevalence (68.6% and 64.7%, respectively) in Table 35, a quarter (25.5%) of pregnant women were tested within the past six months. Nearly half of pregnant women (46.1%) and other women 15–49 years (46.9%) had never had a HIV test.

Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Region

Knowledge of PMTCT was measured using two statements: a pregnant woman with HIV can transmit the virus to her baby and a pregnant woman can prevent transmitting HIV to her baby if she takes ARVs. The maximum score was three, with knowledge measured as low if the score was less than 1.5, medium if the score was equal to two, and high

if the score was in the range of 2.5 to three. Table 36 shows nearly half (46.6%) of the study sample had at least a medium level knowledge of PMTCT. High PMTCT knowledge was found in Tigray (41%) and Amhara (33.3%) and the lowest knowledge was in SNNP (15.5%), as shown in Figure 3.26. Half of the women in Tigray had high self-efficacy for PMTCT compared with only 18.3% of the women in SNNP. A similar pattern was also found in outcome expectancy for PMTCT with higher outcome expectancy found in Tigray (42.4%) compared with SNNP (15.1%).

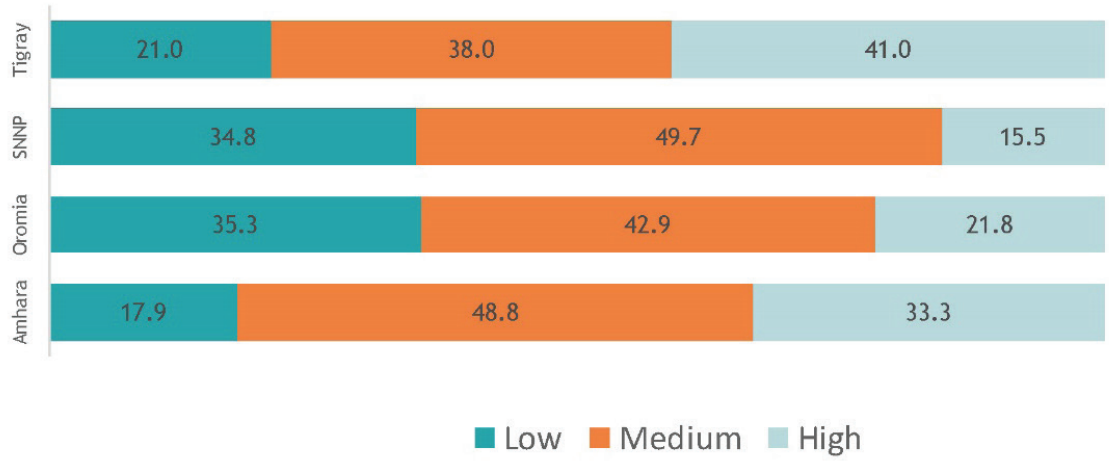

Figure 3.26 PMTCT Knowledge Levels by Region

Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability

Over a third (35.7%) of women with high vulnerability had low PMTCT knowledge (Table 37). A greater percentage of women with high vulnerability had poor self-efficacy (13.5%) and outcome expectancy (28.6%) compared with women with moderate or low levels of vulnerability.

Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Respondent Type

In Table 38, knowledge and outcome expectancy of PMTCT did not vary significantly between respondent types (pregnant women, mothers with children under two years, women with children three to five years, and other women 15–49 years). However, 15.8% of pregnant women had the lowest PMTCT self-efficacy compared with 8.1% of women with children under two years.

Factors Influencing Key Prevention of Mother-to-Child Transmission Behavior (Logistic Regression Analysis)

HIV testing during the most recent pregnancy was explored as the key PMTCT behavior at baseline.

Prevention of Mother-to-Child Transmission Behavior: HIV Testing during Pregnancy

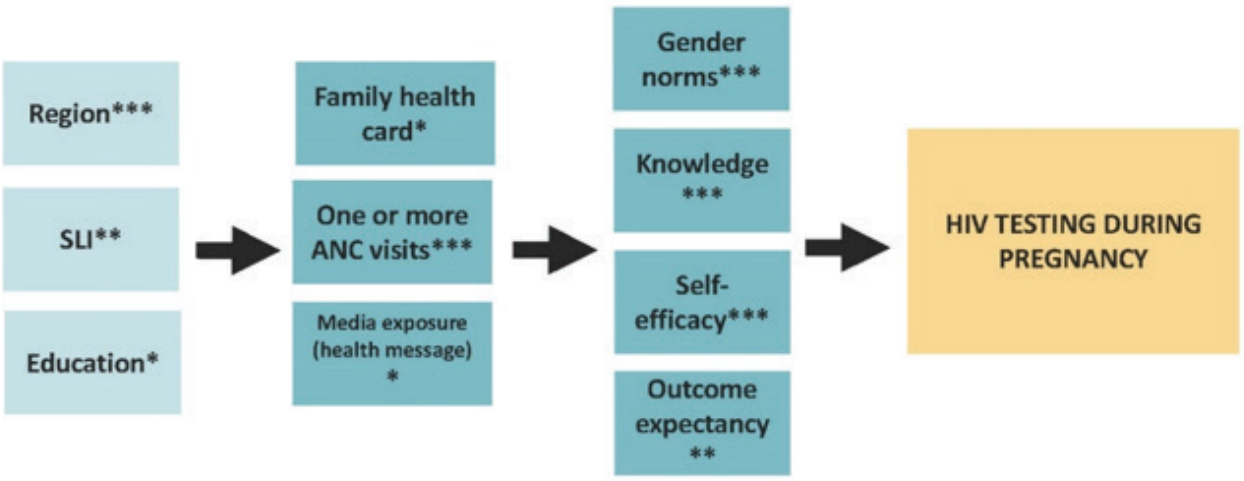

*Figure 3.27 HIV Testing during Pregnancy, * p < 0.05; ** p < 0.01; *** p < 0.001*

With the use of logistic regression, HIV testing during the most recent pregnancy was modeled with SLI and region as predictors in Table 83 in the appendix. Predictors related to health message exposure, FHC ownership, having at least one ANC visit, and level of support for gender inequality were also included, as shown in Figure 3.27. Lastly, we explored the influence of knowledge related to PMTCT (described above) and outcome expectancy of PMTCT.

Compared with women in Oromia, women from Amhara [AOR 3.70, 95% CI = 2.12–6.47], SNNP [AOR 2.40, 95% CI = 1.40–4.09], and Tigray [AOR 10.80, 95% CI = 5.82–20.05] were significantly more likely to have had an HIV test during their most recent pregnancy. In addition, women who had moderate [AOR 1.60, 95% CI = 1.03–2.48] or high SLI [AOR 2.28, 95% CI = 1.35–3.85] were more likely to have tested for HIV compared with women with low SLI. Gender inequality measured by a subscale focused on domestic chores revealed that compared with women with high levels of gender inequality, women with moderate levels of gender inequality were more likely to have had an HIV test [AOR 1.80, 95% CI = 1.11–2.90], and even more so for women with low levels of gender inequality [AOR 3.19, 95% CI = 1.68–6.08].

Exposure to health information in the past three months positively predicted the likelihood of being tested for HIV during the most recent pregnancy [AOR 1.77, 95% CI = 1.15–2.72]. Women with a FHC were twice as likely as women without a FHC to have had HIV testing during pregnancy [AOR 1.90, 95% CI = 1.03–3.52]. Finally, women associated with having at least one or more ANC compared to women with no ANC visits were five times as likely to have been tested for HIV during their pregnancy [AOR 4.70, 95% CI = 2.87–7.69].

Lastly, moderate PMTCT knowledge [AOR 2.16, 95% CI = 1.42–3.28] and PMTCT outcome expectancy [AOR 2.27, 95% CI = 1.36–3.79] were positively associated with HIV testing during most recent pregnancy.

3.8. Nutrition and Immunization (Child Health)

Undernutrition is an underlying cause of 53% of infant and child deaths.[6]. Household food insecurity, hunger, and undernutrition remain pervasive issues and central concerns of the project. We also explored penta 3 coverage because immunization is another key part of the project. It is recommended that children have at least four meals a day, breastfeed exclusively in the first six months of life, and receive their penta 3 on a timely schedule by the time they reach two years.

The study sample for this section included 737 women with children under two.

Results

Penta 3 Coverage by Region

Overall in Table 39 and Figure 3.28, one third (29.6%) of women with children under two years reported penta 3 coverage, with Oromia reporting the lowest coverage at only 11.2%. Based on mothers' reports, 19.6% women reported that their children received penta 3, for a total of approximately half (49.2%) of women in the study sample reporting that their children received penta 3 from either source, vaccination card or mother's self-report of the vaccination. Despite accounting for both sources, Oromia had the lowest coverage for penta 3 (27.8%).

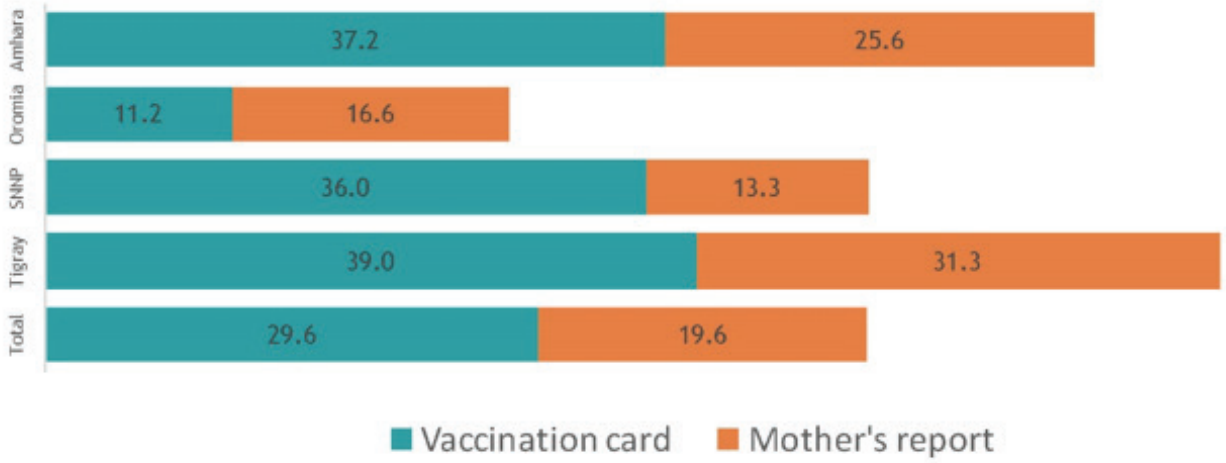

Figure 3.28 Penta 3 Coverage by Region

BF Practices by Region

BF practices were measured on early initiation of BF within one hour of birth and exclusive BF for children under six months in the study sample (206 mothers had children under six months). Early initiation of BF was 68% and exclusive BF was 63.7% (Table 40). No major differences were found regionally.

Exclusive BF among Children under Two Years

Table 41 assesses exclusive BF by monthly age. Overall, a significant drop-off occurred after 5 months, with 52.9% of children four to five months being exclusively breastfed compared with 12.3% at six to eight months, as shown in Figure 3.29. This drop-off was consistent across all regions. After nine months the total percentage of children being breastfed was less than 10% for all regions.

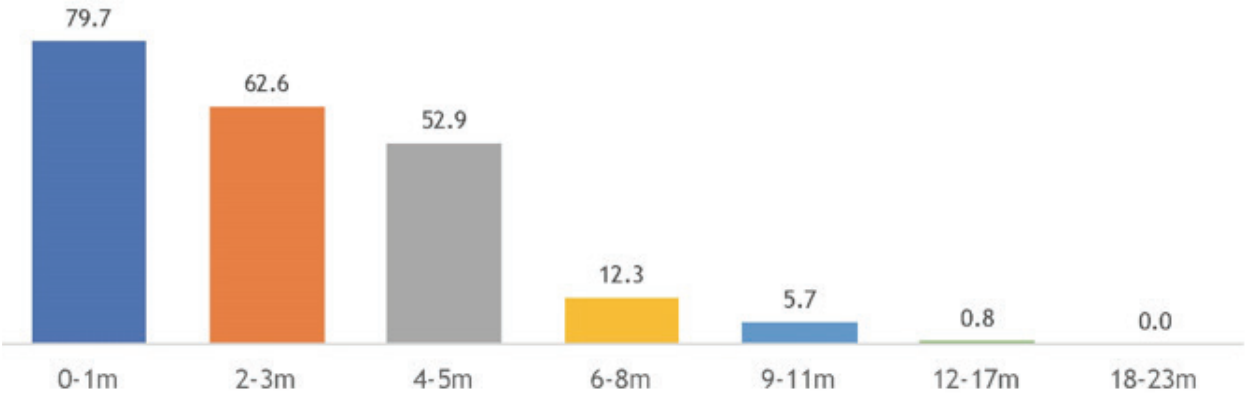

Figure 3.29 Exclusive BF by Age (Months)

Nutrition Practices among Children Ages Six to 23 Months by Region

Nutrition practices were measured using standards of minimum dietary diversity, meal frequency, and minimum acceptable diet. To measure each of these indicators, we used the standard procedures followed by UNICEF.[41] Overall in Table 42 and Figure 3.30, nearly two out of 10 children (18.5%) met the minimum dietary diversity. Meal frequency was met by six out of 10 children in the study sample (58.4%). However, overall, the minimum acceptable diet was similar to that reported at national levels (7%) and was slightly higher at one out of 10 children (9.8%). Regional differences were found. Dietary diversity was lowest in Amhara and SNNP, with 13.6% and 16.4%, respectively. SNNP had the lowest meal frequency at 47.5%, and Amhara had the highest at 67.1%; however, regional variation was not great. There were, however, regional differences with minimum acceptable diet; Amhara (7.6%) and SNNP (6.9%) had nearly half that of Oromia (14.2%) and Tigray (17.3%).

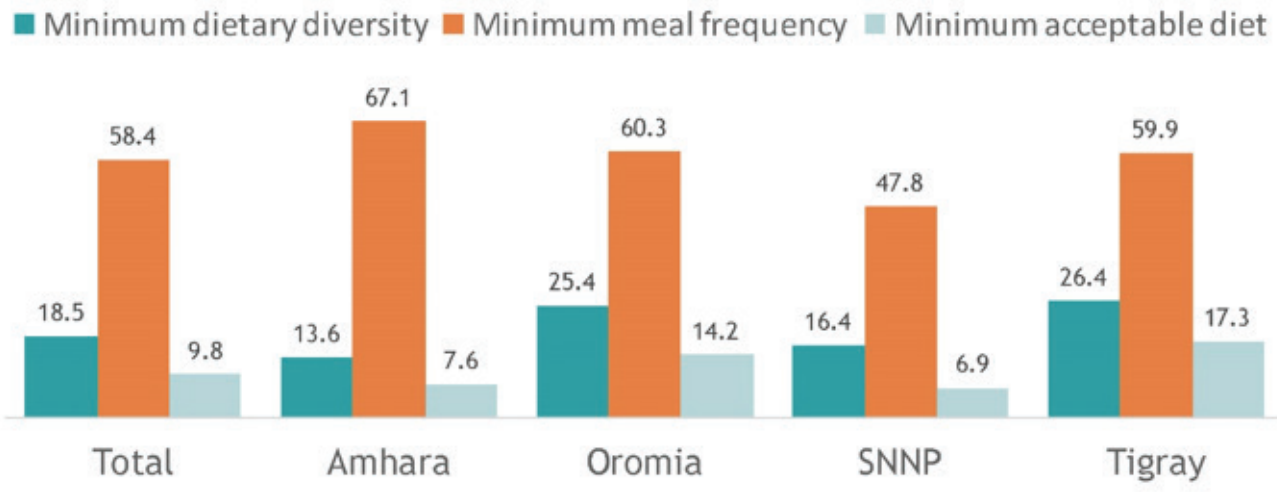

Figure 3.30 Minimum Acceptable Diet among Children Six to 23 Months

Nutrition Knowledge, Self-Efficacy, and Outcome Expectancy by Region

Four out of 10 women (43.3%) strongly agreed that children should have at least four food groups a day and should eat two to four meals a day (Table 43). This agreement was less in SNNP compared with other regions, with only three out of 10 women (32%) strongly feeling this way in SNNP compared with nearly six out of 10 women in Tigray (66.1%). Differences between regions were found for self-efficacy for children to meet the minimal acceptable diet. While half of the women in the sample population felt they could provide a minimal acceptable diet, only 21.4% strongly felt this way in SNNP and 27.9% in Amhara, compared with 49.2% of women in Tigray.

Factors Influencing Key Child Health Behaviors (Logistic Regression Analysis)

Four child health behaviors focused on nutrition and immunization were explored: penta 3 vaccination, minimum dietary diversity, minimum acceptable diet, and early initiation of BF.

Child Health Behavior: Penta 3 Vaccination

*Figure 3.31 Penta 3 Vaccination, * p < 0.05; ** p < 0.01; *** p < 0.001*

Penta 3 vaccination (three doses of DPT-HepB-HiB) recorded on a vaccination card was explored in a multivariate logistic regression model. Figure 3.31 shows the predictors, controlled for the respondents' religion, region, and radio-listening frequency and whether they delivered in an institution (hospital, health clinic, health post) for their most recent birth (for more details see Table 84 in appendix).

The model revealed significant regional influences. Compared with children in Oromia, children in Amhara [AOR 4.31, 95% CI = 2.22–8.39], SNNP [AOR 3.93, 95% CI = 2.00–7.74], and Tigray [AOR 4.36, 95% CI = 2.15–8.86] were four times as likely to have had their penta 3 vaccination. Likewise, children who were delivered in an institution were 64% more likely to have had penta 3 vaccination than children who were not delivered in an institution [AOR 1.46, 95% CI = 1.02–2.11].

Child Health Behavior: Early Initiation of Breastfeeding

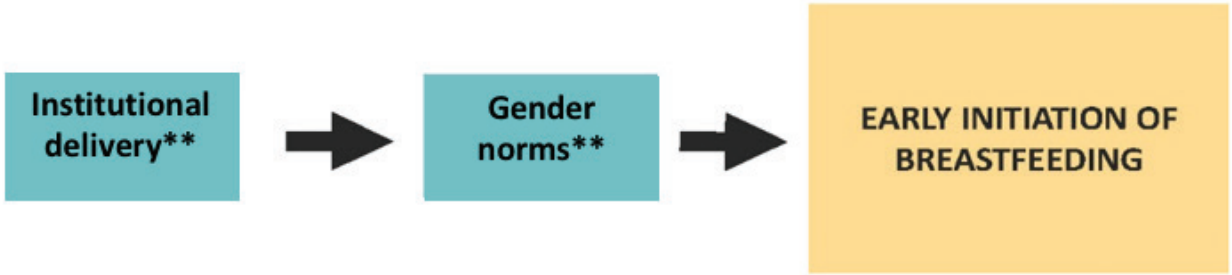

*Figure 3.32 Early initiation of BF, * p < 0.05; ** p < 0.01; *** p < 0.001*

Odds ratios were estimated for early initiation of BF (within one hour of birth) using several predictors, as shown in Table 85 in the appendix. Region, institutional delivery, and gender inequality were included in the logistic regression model. Additionally, outcome expectancy related to exclusive BF improving child health status and minimal acceptable diet enhancing child survival were also included. Figure 3.32 demonstrates the relationship between significant predictors and early initiation of BF.

The model indicated that early initiation of BF was 1.7 times as likely to be practiced by women who had an institutional delivery compared to women who had not [AOR 1.71, 95% CI = 1.23–2.38]. In addition, gender inequality measured with a subscale focused on reproductive health and disease demonstrated that compared with women with high gender inequality, women with low [AOR 2.09, 95% CI = 1.21–3.62] to moderate [AOR 2.02, 95% CI = 1.11–3.70] level of gender inequitable norms were two times as likely to have initiated early BF for their infant.

Child Health Behavior: Minimum Dietary Diversity

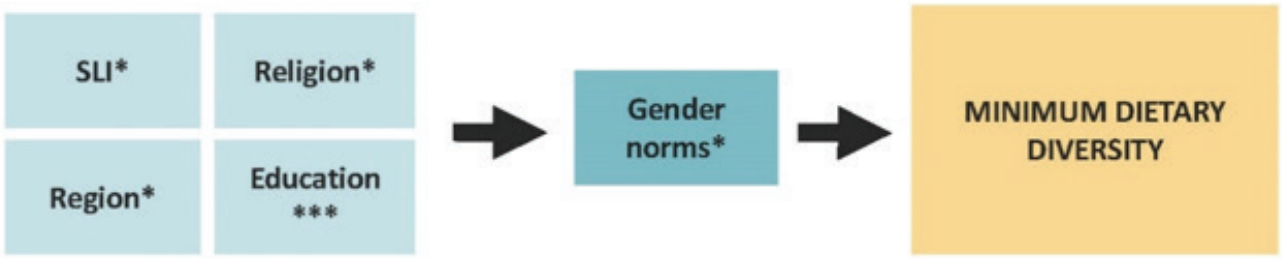

*Figure 3.33 Minimum Dietary Diversity, * p < 0.05; ** p < 0.01; *** p < 0.001*

The influence of predictors related to a woman's education, religion, SLI, region, and gender inequality on their children meeting minimum dietary diversity requirements is demonstrated in Figure 3.33. Measurement for minimum dietary diversity is described in Section 2.7 Measurements. Table 86 in the appendix further describes the significance of the predictors on dietary diversity in the study in detail.

Women who had at least a primary education were twice as likely as women with no formal education to have their child meet minimum dietary diversity requirements [AOR 2.38, 95% CI = 1.49–3.81]. The daily minimum dietary diversity for their children was also more likely to be met by women with a moderate SLI compared with women with low SLI [AOR 1.94, 95% CI = 1.13–3.32]. In addition, Muslim women were also twice as likely as Christian women to have their children meet the daily required minimum dietary diversity in their meals in the 24 hours prior to the survey [AOR 1.98, 95% CI = 1.03–3.84].

Compared with women in Oromia, women residing in Amhara [AOR 0.42, 95% CI = 0.19–0.89] and SNNP [AOR 0.36, 95% CI = 0.17–0.80] were, respectively, 58% and 64% less likely to have their child meet daily requirements for minimum dietary diversity.

Gender inequality measured through a GEM subscale focused on PV revealed a three times higher likelihood of meeting the minimum requirement for dietary diversity for women with low [AOR 2.93, 95% CI = 1.00–8.54] to moderate support [AOR 2.72, 95% CI = 1.01–7.34] for gender inequitable norms compared with women with high support for gender inequitable norms.

Child Health Behavior: Minimum Acceptable Diet

*Figure 3.34 Minimum Acceptable Diet (Six to 23 Months), * p < 0.05; ** p < 0.01; *** p < 0.001*

Odds ratios were estimated using multivariate logistic regression for the nutrition behavior of meeting the daily minimum acceptable diet for children six to 23 months in the study sample. Further details on minimum acceptable diet are explained in Section 2.7 Measurements, and the model is detailed in Table 87 of the appendix. The final model of predictors included mother's education level, SLI, and region, as shown in Figure 3.34.

Women with at least a primary education were twice as likely to have their child meet the minimum acceptable diet compared with women with no formal education (nonliterate) [AOR 2.72, 95% CI = 1.55–4.76]. Minimum acceptable diet was more likely to be met by women with a high SLI compared with those with a low SLI [AOR 2.28, 95% CI = 1.09–4.78]. Compared with women in Oromia, women in SNNP were 64% less likely to have their child six to 23 months meet the minimum acceptable diet [AOR 0.37, 95% CI = 0.17–0.84].

3.9. Malaria

Ethiopia is characterized by an overall low malaria prevalence rate, but it has a distinct pattern of season local epidemics in areas lower than 2,000 m in altitude.[8] About 60% of Ethiopia's population is vulnerable to malaria. The country is characterized by three patterns of malaria prevalence; 27 million people live in the high-transmission zone (more than one case per 1,000 population), about 40 million people live in low-transmission areas (less than one case per 1,000 population), and another 31.8 million are in malaria-free areas (2015).[42]

Using a universal coverage approach, the government of Ethiopia has provided free bed nets (insecticide-treated mosquito nets [ITNs]/LLINs) since 2004. The Malaria Indicator Survey reported that 38% of people slept under ITNs in malaria-prone areas. Coverage of sleeping under bed nets remains low. Ethiopia faces challenges of sustaining the reductions in malaria prevalence and ensuring that malaria preventive behaviors are consistently adopted.

Results

Child under Five Years with Fever by Region

The baseline study assessed the prevalence of fever in children under five years and prompt treatment seeking and if medicines were provided. Malaria knowledge, preventive behaviors like sleeping under an LLIN, self-efficacy, and outcome expectancy were also measured. The analysis for this section includes aggregated data for malaria-prone sites (N = 1,817) and the entire sample (N = 2,770).

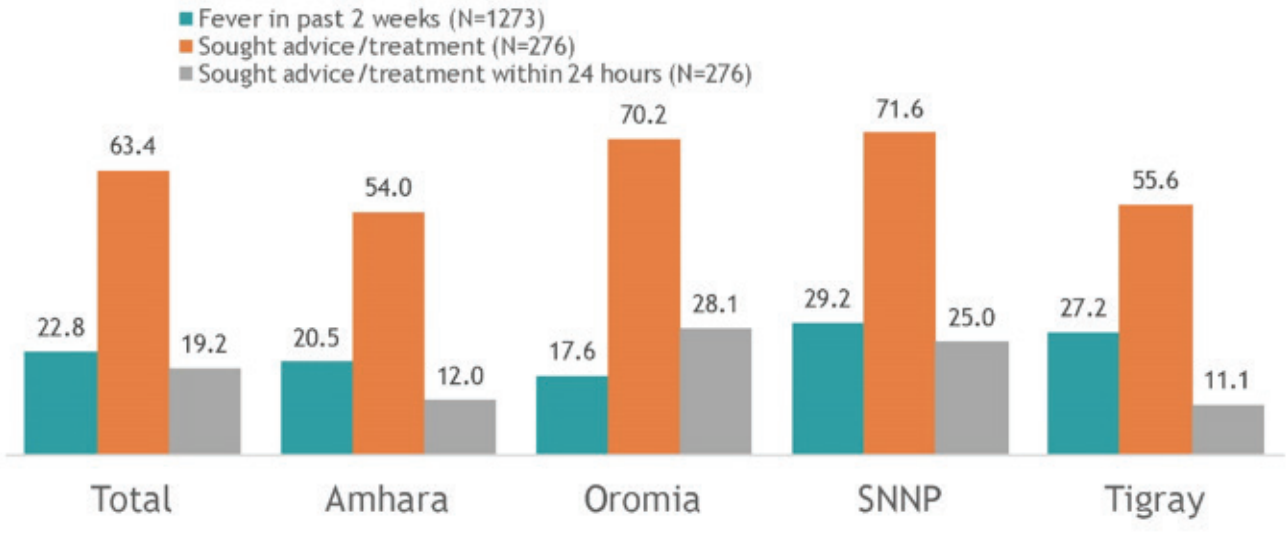

Figure 3.35 Fever and Treatment Seeking in Overall Sample of Children under Five Years

The prevalence of fever in children under five years in the past two weeks differed little between the malaria-prone areas (24.5%) and the overall sample (22.8 %). However, SNNP (30.1%) and Tigray (29.1) had significantly higher levels of fever in children under five years in the malaria-prone areas compared with the overall sample (Table 44). Figure 3.35 displays a broad overview of children with fever and treatment-seeking behavior among the study sample across all regions.

Treatment Seeking for a Child under Five Years with Fever by Region

Table 44 describes the treatment-seeking patterns for fever, including promptness (<24 hours), type of service provider, and the provision of medicines. About 63.4% of women sought treatment for fever for their child under five years, with women in Amhara (54%) and Tigray (55.6%) reporting lower-than-average levels (Table 44). Prompt treatment seeking was defined as receiving treatment within 24 hours of onset of fever. Prompt treatment seeking was low overall (19%), with Oromia (28%) and SNNP (25%) having higher levels than Amhara (12%) and Tigray (11%).

The preferred choice of treatment by the majority of mothers was a government health center (29%), followed by private facilities (14.9%) and a government health post (13%). SNNP and Amhara used government health centers more than the other two regions. Interestingly, mothers from Tigray reported no use of private facilities, indicating complete dependence on the government health structure. SNNP (25%) and Oromia (24.6%) reported higher use of private health facilities. Wide variation existed between the regions on provision of medicines to a child with fever. SNNP (84%) and Oromia (75.4%) reported high levels of medicine provision compared with Amhara (46%) and Tigray (55.6%).

Treatment Seeking for a Child under Five Years with Fever by Vulnerability Index

Having children under five years with fever was significantly more likely among women with high vulnerability (29.2%) compared with women with low vulnerability (15.5%). Mothers with high vulnerability were less likely to take their children for treatment (59%) compared with mothers with moderate (65%) and low vulnerability (69.5%). The difference by vulnerability was even more stark for prompt treatment-seeking behavior, which was only 9% in the high-vulnerability group, 30% in the moderate-vulnerability group, and 19.2% in mothers with low vulnerability (Table 45).

The vulnerability index is not significantly associated with place of care and provision of medicines to a child (Table 45).

Malaria Knowledge by Region

Data on the malaria knowledge section are presented for the entire sample of 2,770 women. Malaria knowledge was assessed by four indicators, heard of malaria, signs and symptoms, causes, and protection measures. Almost all respondents had heard of malaria (94.7%), but knowledge of signs and symptoms varied substantially. The most commonly known symptom was feeling cold (78.3%), followed by fever (48.9%), headache (46.2%), and nausea and vomiting (32.3%). SNNP had the highest knowledge of malaria symptoms, while Oromia had the lowest knowledge (Table 46).

Knowledge related to the cause of malaria was surprisingly low (31.9%), with only a third of the respondents knowing that a mosquito bite leads to malaria. Amhara (35.2%) had the highest knowledge related to cause of malaria and Tigray had the lowest (24.6%).

Respondents were asked if they knew of any preventive measures for malaria. About 28% women knew three or more preventive measures, with knowledge of malaria prevention highest in SNNP (35.4%) and lowest in Amhara (20.5%). Table 49 shows malaria site-specific knowledge by region as well.

Malaria Knowledge by Vulnerability

Although knowledge of malaria was lowest in the high-vulnerability group, data indicate little difference in malaria knowledge by level of vulnerability (Table 47). See Table 50 for site-specific information regarding malaria knowledge by vulnerability index.

Malaria Knowledge by Respondent Type

In contrast with knowledge by regions, almost no variation in malaria knowledge existed by respondent type. Knowledge levels were similar across four respondent categories (Table 48). Malaria knowledge by respondent type is also displayed by malaria sites only in Table 51.

Malaria Prevention Behaviors

An important malaria prevention behavior is sleeping under an LLIN. This behavior depends upon the availability of LLINs at the household level. We assessed net ownership in two ways, by asking respondents and by observing during the interview (interviews were conducted at a household level).

Data indicate a big gap between reported and observed ownership of bed nets. The proportion of persons sleeping under a bed net has been calculated for households where bed nets were observed by interviewers.

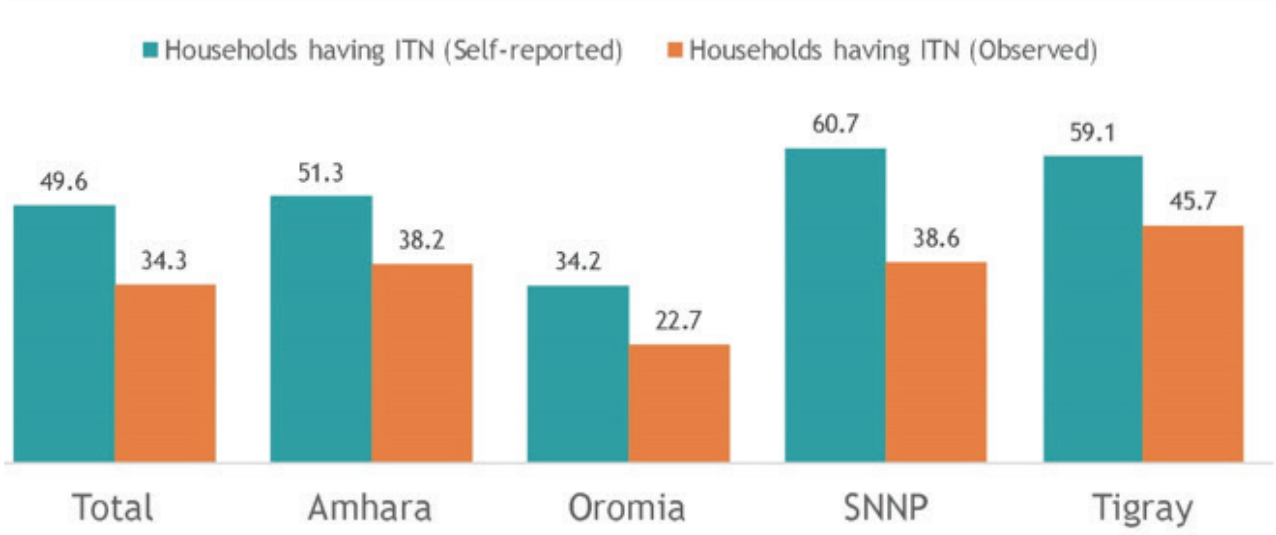

Figure 3.36 Household ITN Use (Self-Reported versus Observed)

Almost half the respondents (49.6%) reported owning bed nets, with SNNP (60.7%) having the highest level of net ownership and Oromia (34.2%) having the lowest (Figure 3.36). However, the observed number of bed nets was much lower than the reported number of bed nets. Only bed nets were observed for 34.3% of respondents compared with the 49.6% reported in the overall sample. Similarly, compared with 60% reported in SNNP, bed nets were observed in 38.6% households (Table 52). Tigray (45.7%) had the highest number of observed bed nets in the sample.

About 15.8% of respondents reported owning one bed net, and 24% said they had two or more bed nets. However, as reported figures seem to be inflated, bed net use has been calculated based on the observation of at least one bed net in the household.

Observed bed nets were lowest in high-vulnerability households (25.8%) and highest in households with low vulnerability (37.3%), indicating a significant difference among levels of vulnerability (Table 53). Observed bed nets in the household were highest for women with children under two years (39%) and lowest in pregnant women (30.1%) (Table 54).

Malaria Prevention Behaviors for Malaria Sites

Data from the malaria sites indicate that almost 60% respondents reported ownership of bed nets, 10% higher than reported in the overall sample (Table 55). In malaria-prone areas, Tigray (51.6%), followed by Amhara (45.7%), had the highest number of observed bed nets.

Sleeping under an LLIN the night before the survey was calculated for persons who own at least one LLIN (by observation). About 58.8% of the respondents slept under the net

the night prior to the survey, followed by husbands (43.6%) and children under five years (42%) (Table 55).

Data indicate a significant effect of high vulnerability and sleeping under an LLIN for respondents (25.3%), husbands (18.9%), children under five years (17.2%), and others (20.9%) (Table 56).

The patterns observed in the malaria sites are similar to those observed for the entire sample. Among respondent types, almost two thirds of women with children three to five years reported sleeping under an LLIN (64.6%); the lowest level was in pregnant women (53.4%) (Table 57). Similarly, women with children under two years, reported that 67.1% of their children under five years slept under LLIN compared with only 29.9% in children under five years among pregnant women.

Malaria-Related Self-Efficacy and Outcome Expectancy

Malaria-related self-efficacy was measured with four items and outcome expectancy was measured using three items. Data are presented for each item using a three-category scale: disagree, agree, and strongly agree.

The outcome expectancy items were as follows:

1. Sleeping under an LLIN will prevent malaria.
2. Having my children sleep under an LLIN each night will prevent malaria for them.
3. Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

The self-efficacy items were as follows:

1. I am able to have children under five years sleep under an LLIN each night.
2. I am able to sleep under an LLIN each night.
3. I should seek treatment for children under five years within 24 hours of onset of fever.
4. I can take my child to treatment within 24 hours of onset fever.

Wide variation existed among regions in terms of the three malaria outcome expectancy items. While 37.1% of the respondents strongly agreed that sleeping under an LLIN would prevent malaria, Tigray (69%) reported the highest agreement and SNNP (27.4%) had the lowest. Similarly, for the second item, malaria will be prevented if children sleep under an LLIN, 34.9% of overall respondents showed very high outcome expectancy. Tigray

(58.3%) had the highest proportion of strongly agree for the second item and SNNP had the lowest (28.7%). The third item was about treatment seeking within 24 hours of onset of fever. While overall 41% respondents had high agreement about prompt treat seeking (within 24 hours), 56.3% had high agreement in Tigray and 31.6% in SNNP (Table 58).

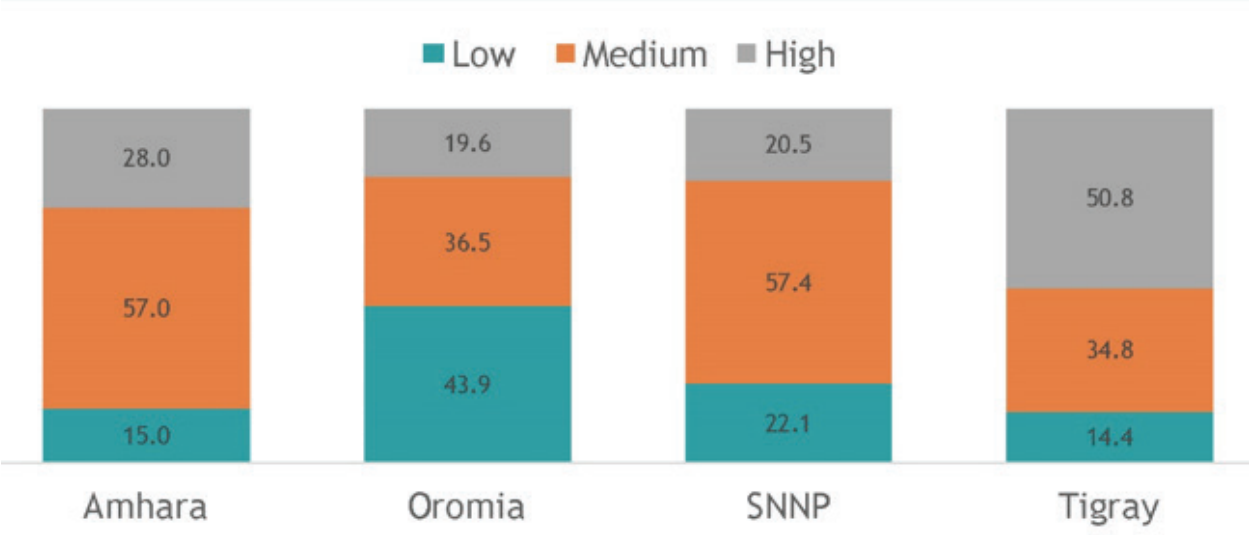

Figure 3.37 ITN Use Self-Efficacy

The respondent's confidence (ability) to ensure that children under five years sleep under an LLIN was the first self-efficacy item. About one fourth of the overall sample strongly agreed (24.8%), and half of the respondents from Tigray (50.8%) expressed high confidence compared with 19.6% respondents from Oromia (Table 58, Figure 3.37).

The second self-efficacy item was about a respondent's confidence in being able to sleep under an LLIN. Here too, only 26.4% respondents expressed high agreement in being able to sleep under an LLIN. A high proportion of respondents from Tigray (51.4%) endorsed their ability to sleep under an LLIN, while 20.9% from SNNP felt they could sleep under an LLIN (Table 58).

The third self-efficacy item related to the ability of the respondent to seek treatment within 24 hours for fever. About a third of the respondents (33.7%) strongly felt they could seek treatment within 24 hours. However, wide regional variation persists with more than half the respondents in Tigray (53.1%) showing confidence in seeking treatment compared with only 22.3% respondents in SNNP (Table 58).

Malaria-Related Self-Efficacy and Outcome Expectancy for Malaria Sites

Table 61 presents the results for outcome expectancy and self-efficacy for malaria sites. The trends are very similar to those seen for the overall sample, except that they are one to five percentage points higher.

Outcome expectancy and self-efficacy were cross-tabulated with the vulnerability index. All three outcome expectancy and four self-efficacy items were lowest for the high-vulnerability group compared with the low-vulnerability group (Table 62), and the difference by vulnerability was significant at $p < 0.05$ level for two outcome expectancy items and one self-efficacy item.

Table 63 shows data for outcome expectancy and self-efficacy by type of respondent. There is not much variation by type of respondent and the outcome expectancy and self-efficacy items.

Long-Lasting Insecticidal Net Ownership and Use (Total Sample and Malaria Sites)

We created a three-category LLIN use indicator that provides an accurate picture of LLIN use. The three categories are has no LLIN, has LLIN but does not use it, and has LLIN and uses it (Table 64).

Table 64 indicates that 50.4% did not own an LLIN in the overall sample compared with 40.6% in the sample from malaria sites (Table 65). About 14.9% of the overall sample had LLINs but did not use them compared with 18.4% of the sample at the malaria sites. Finally, 34.7% of the sample stated they own an LLIN and slept under it compared with 41% from the malaria sites.

Factors Influencing Key Malaria Behaviors (Logistic Regression Analysis)

Malaria Behavior: Long-Lasting Insecticidal Net Use for Children under Five Years

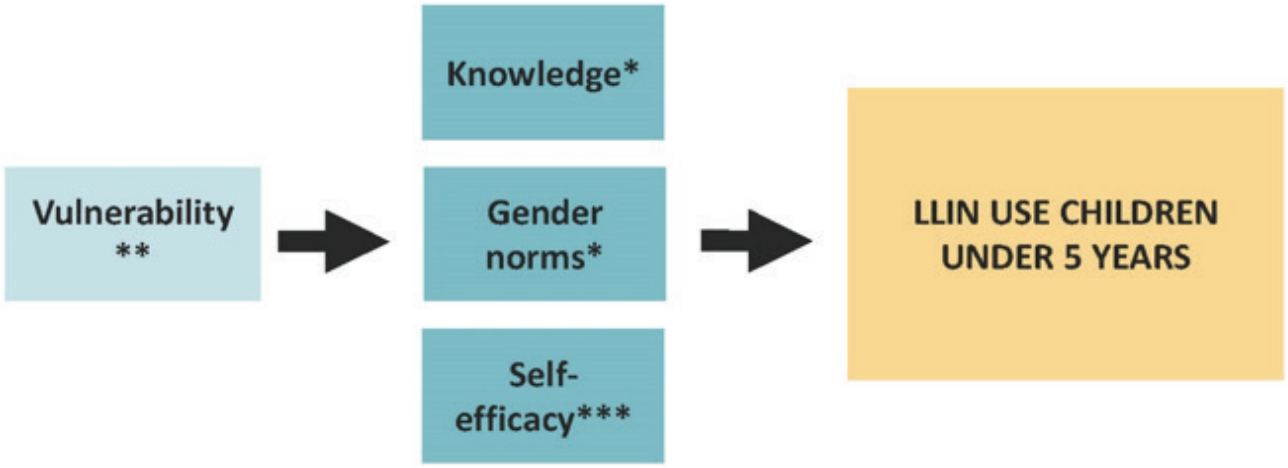

*Figure 3.38 LLIN Use for Children under Five Years (Malaria Zones Only), * p < 0.05; ** p < 0.01; *** p < 0.001*

LLIN use for children under five years was fitted using logistic regression modeling including the following predictors: region, woman's education, vulnerability, gender inequality, and FHC. In addition, we explored the influence of comprehensive malaria knowledge, self-efficacy related to LLIN use, and outcome expectancy related to LLIN use (Table 88).

The final model found that compared with women with high levels of gender inequality, women with a moderate level of gender inequality had a 1.7 times likelihood of children under five years sleeping under an LLIN [AOR 1.65, 95% CI = 1.11–2.45] (Figure 3.38). Women with comprehensive knowledge about malaria transmission were 42% more likely to have their child under five years sleep under an LLIN compared with women with low or moderate knowledge levels [AOR 1.42, 95% CI = 1.06–1.89]. Women with low vulnerability levels were also 68% more likely to have their children under five years sleep under an LLIN compared with women with high vulnerability [AOR 1.68, 95% CI = 1.18–2.40]. The most significant predictor for LLIN use among children under five was related to self-efficacy in using an LLIN. Women with high self-efficacy were nearly four times as likely to have their children under five years sleep under an LLIN compared with women with low or moderate self-efficacy [AOR 3.87, 95% CI = 2.69–5.59].

Malaria Behavior: Long-Lasting Insecticidal Net Use for Women 15–49 Years

Using logistic regression analysis, a multivariate model was fitted for LLIN use for women 15–49 years at malaria sites (Table 89). The model included several predictors related to the woman, including region, respondent type, marital status, vulnerability, and gender inequality. We also assessed for the availability of mobile phones in the household. Lastly, we explored knowledge related to malaria, self-efficacy related to LLIN use, and outcome expectancy related to LLIN use. Figure 3.39 displays the significant predictors of the model.

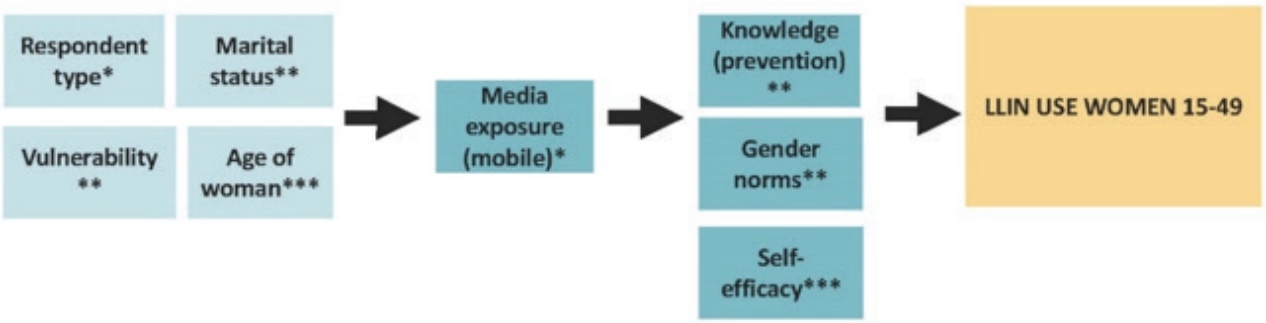

*Figure 3.39 LLIN Use for Women 15–49 years (Malaria Zones Only), * p < 0.05; ** p < 0.01; *** p < 0.001*

The model reveals that women with children under two [AOR 1.61, 95% CI = 1.08–2.39] and children three to five years [AOR 1.50, 95% CI = 1.01–2.25] were more likely to have slept under an LLIN during the previous night compared with women who were currently pregnant. Women who were married/cohabiting were 1.5 times as likely to have slept under an LLIN compared with women who were single, divorced, or widowed [AOR 1.52, 95% CI = 1.14–2.03]. Women with low vulnerability were 1.5 times as likely to use an LLIN compared to those with high vulnerability [AOR 1.48, 95% CI = 1.13–1.95]. Compared with women with high support for gender inequality, women with moderate levels of support were 1.5 times as likely to also sleep under an LLIN [AOR 1.54, 95% CI = 1.17–2.02]. LLIN use was more likely to have been practiced by women with a mobile phone [AOR 1.27, 95% CI = 1.03–1.57].

Knowing at least two malaria prevention methods was a significant predictor for LLIN use for women 15–49 years. Women who knew two or more methods were 1.7 times as likely to have slept under an LLIN compared with women who did not know any prevention methods [AOR 1.70, 95% CI = 1.15–2.50]. The strongest predictor of LLIN use was self-efficacy related to LLIN use. Women who had high self-efficacy were nearly four times as likely to have slept under an LLIN during the previous night compared with those with low to moderate self-efficacy [AOR 3.74, 95% CI = 2.89–4.85].

Malaria Behavior: Early Treatment Seeking for Fever

Early treatment seeking (within 24 hours) for a child under five with reported fever in the past two weeks prior to the interview was explored using multivariate modeling. Odds ratios were estimated for predictors including education of woman, gender inequality, comprehensive knowledge about malaria, knowledge on malaria prevention, and self-efficacy related to early treatment for fever (Table 90). Figure 3.40 shows the model and the final significant predictors.

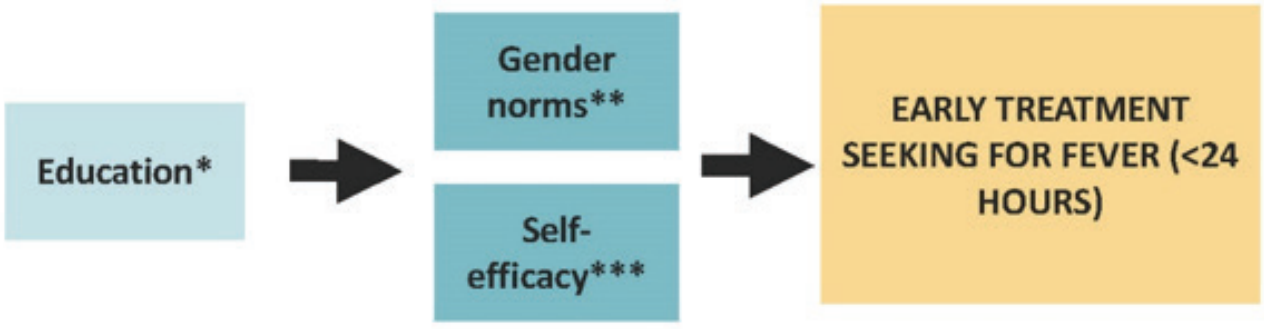

*Figure 3.40 Early Treatment Seeking for Fever (<24 Hours), * p < 0.05; ** p < 0.01; *** p < 0.001*

The odds of early treatment seeking were nearly two times as likely for women who had at least a primary education compared with women who were nonliterate [AOR 1.99, 95% CI = 1.14–3.48]. Two of the strongest predictors for early treatment seeking for children under five years with fever was gender inequality and self-efficacy for early treatment. Women with low gender inequality were 3.5 times as likely as women with high gender inequality to have sought early treatment for their child [AOR 3.53, 95% CI = 1.36–9.15]. Early treatment seeking was also more likely to be reported among women with high self-efficacy related to early treatment for onset of fever compared with women with low and moderate self-efficacy [AOR 3.36, 95% CI = 1.91–5.90].

3.10. Tuberculosis

Ethiopia continues to be one of the world's high-burden TB countries, contributing to a high share of the morality.1 Ethiopia has witnessed a declining trend in TB incidence from 282 per 100,000 in 2010 to 192 per 100,000 in 2015.[43] The baseline survey's section on TB does not include behavioral indicators for TB screening or adherence to treatment. Instead data on TB behavioral indicators were obtained from the health information and management system of the Ethiopian government.

The complete sample of 2,770 women is included for analysis in the TB section. The analysis covers differences by region, type respondent, and level of vulnerability.

Results

Knowledge of Tuberculosis by Region

Four indicators were used to measure knowledge of TB: ever heard of TB, how is TB transmitted, TB symptoms, and curability of TB. Almost three fourths of the entire sample of 2,770 women had heard of TB, as shown in Figure 3.41. The highest number of women who had heard about TB was in Tigray (81.9%), and the region where TB was least known was Oromia (67.2%, Table 66).

Knowledge about transmission of TB was answered accurately by 40.6% of the sample. Women from SNNP and Tigray had the highest knowledge (47%) of how TB is transmitted and Oromia had the lowest knowledge (34.7%).

The third indicator of TB knowledge is knowing three or more TB symptoms. Only 18.3% women in the sample knew three or more symptoms of TB. Amhara had the highest knowledge of symptoms (19.6%), while Tigray (14.7%) had the lowest (Table 66).

The final indicator pertained to the curability of TB. About 68.2% of the sample believed that TB is curable through medical treatment, with Tigray region (76.8%) having the highest knowledge and Oromia region having the lowest knowledge (58.5%).

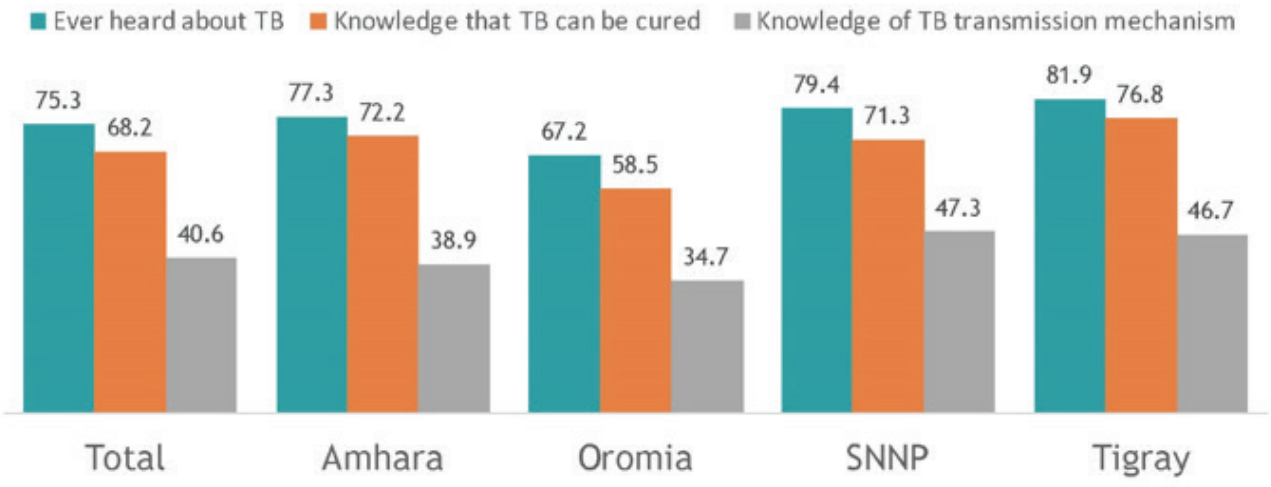

Figure 3.41 Knowledge about TB

Knowledge of Tuberculosis by Vulnerability Index

The frequencies for the four TB knowledge indicators were discussed at the beginning of this section. The vulnerability index is divided into high, moderate, and low categories to see if knowledge levels varied by level of vulnerability (Table 67). Data indicate that the four knowledge indicators for TB did not vary by levels of vulnerability (Table 67).

Knowledge of Tuberculosis by Respondent Type

The four types of respondents in this study represent three fourths of the sample that had heard of TB (75.3%). The variation around "having heard of TB" was minimal (73% to 76.6%), across the four groups of respondents (Table 68).

Pregnant women were least likely to know how TB is transmitted (36.6%) while other women 15–49 years had the highest knowledge about TB transmission (42.1%, Table 68).

Minimal variation existed by type of respondent (16% to 18.7%) for knowledge of three or more symptoms of TB (Table 68). Similarly, there was little variation by type of respondent and knowledge of curability of TB by modern medicine (66.4% to 69.2%).

Tuberculosis Self-Efficacy and Outcome Expectancy by Region

We examined the constructs of self-efficacy and outcome expectancy in the context of TB (please refer to Section 2.6 for definitions). Self-efficacy was measured by agreement with the statement, "I can go immediately to be screened for suspected TB." Outcome expectancy was measured with the following statement, "Early screening of TB may lead to full recovery."

About 34.8% respondents felt very confident that they could avail themselves of a TB screening test (Table 69). Tigray was the region with highest self-efficacy for TB screening (45.6%), and SNNP was the region (27.4%) with lowest self-efficacy for TB screening (Figure 3.42).

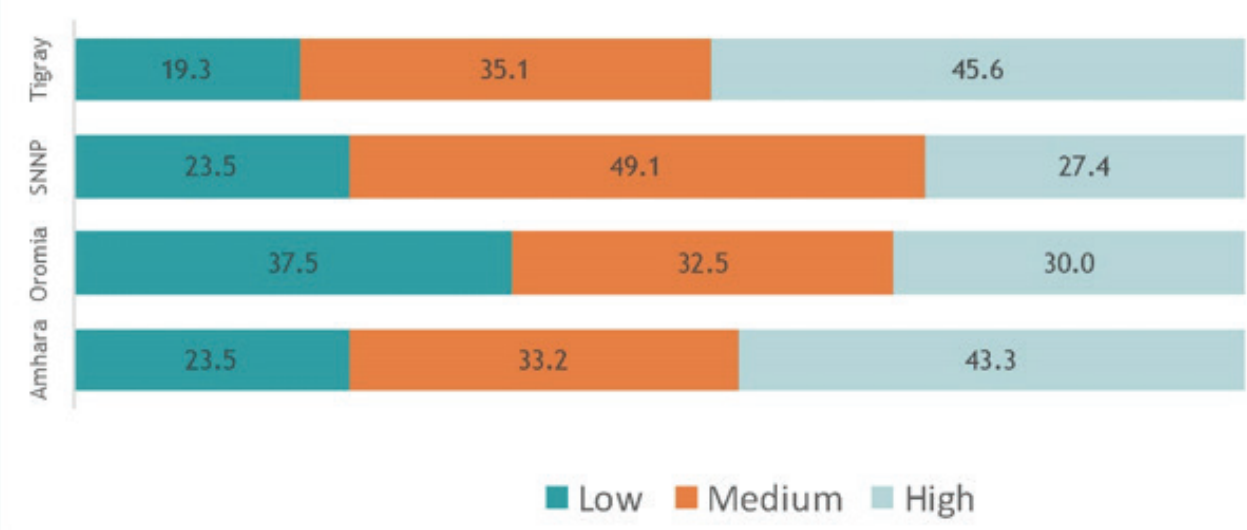

Figure 3.42. TB Self-efficacy

A third of the respondents (34.1%) felt that early screening would lead to a better quality of life (outcome expectancy). About 45.9% respondents from Tigray had a high level of outcome expectancy for TB, while SNNP and Oromia had low levels of high outcome expectancy (29%, Table 69, Figure 3.43).

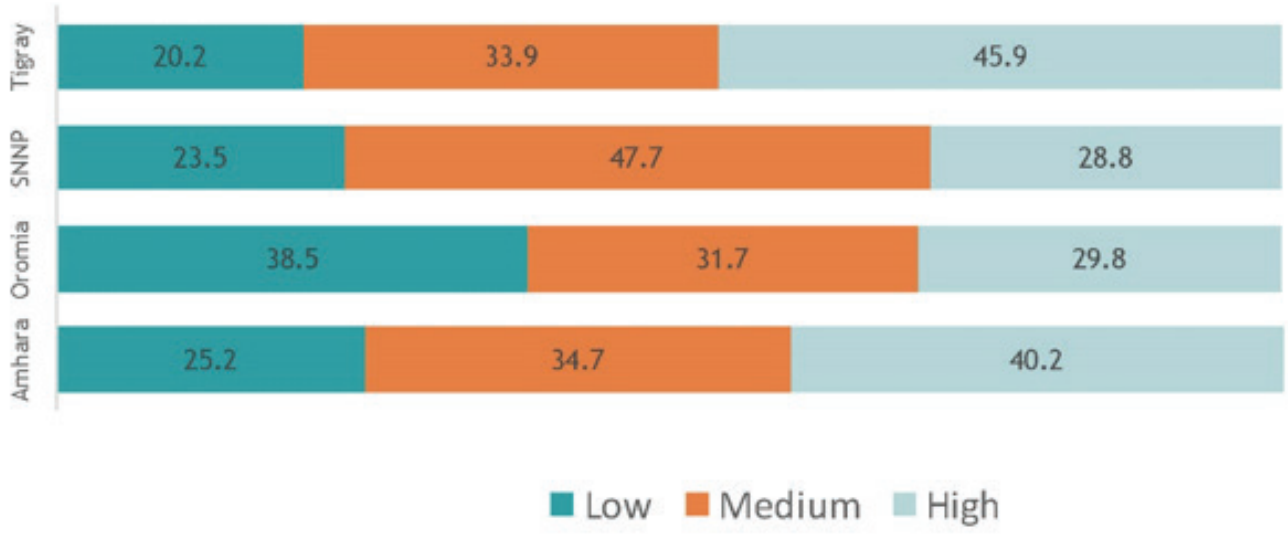

Figure 3.43 TB Outcome Expectancy

Tuberculosis Self-Efficacy and Outcome Expectancy by Vulnerability Index

Self-efficacy for TB screening was lowest in women with high vulnerability (30.7%) compared to women with moderate vulnerability (38.4%). A similar pattern was evident for outcome expectancy for TB. Women in the high-vulnerability group had lower levels of outcome expectancy for TB (28.2%) compared with women in the moderate- (38.1%) and low-vulnerability groups (34.1%, Table 70).

Tuberculosis Self-Efficacy and Outcome Expectancy by Respondent Type

Type of respondents include pregnant women, women with child under two years, women with child three to five years, and other women 15–49 years old.

Unlike the results for region, not much variation by type of respondent existed for both self-efficacy and outcome expectancy (Table 71).

3.11. Water, Sanitation, and Hygiene

In Ethiopia, the WASH national program is based on a sector-wide approach, with phase II occurring from July 2015 to June 2020.[44] While MDG 7 target 7c has been achieved in terms of water supply, a large proportion of the population still does not have access to improved water source (43%), and 28% practice open defecation.[4] WASH has a major impact in protecting and improving the health of households in Ethiopia, especially against outbreaks. Here we measured WASH behaviors, knowledge, self-efficacy, and outcome expectancy.

The complete sample of 2,770 women and differences by region, type of respondent, and level of vulnerability were analyzed.

Results

Key Handwashing Practices by Region

Table 72 shows regional differences in terms of handwashing at key times, the presence of handwashing station, and household ownership of a pit latrine or pour flush toilet. Handwashing at key times includes after defecation, after contact with a child stool, before preparing food, before eating, and before feeding a child. We found that 65% of the study sample practiced handwashing at key times (self-reported). Toilet ownership was high, with 85.6% of women self-reporting toilet ownership; however, a presence of proper handwashing (observed) was only 26.5% (Figure 3.44). There was significant variation on having a proper handwashing station. Over half of the women (52.5%) in SNNP reported a proper handwashing station, in contrast with the women in Amhara, Oromia, and Tigray, with less than 15% reporting the presence of a proper handwashing station. Additionally, toilet ownership was less likely in Tigray, with only 51.3% owning a toilet, compared with Oromia (83.8%), SNNP (89.2%), and Amhara (90.2%).

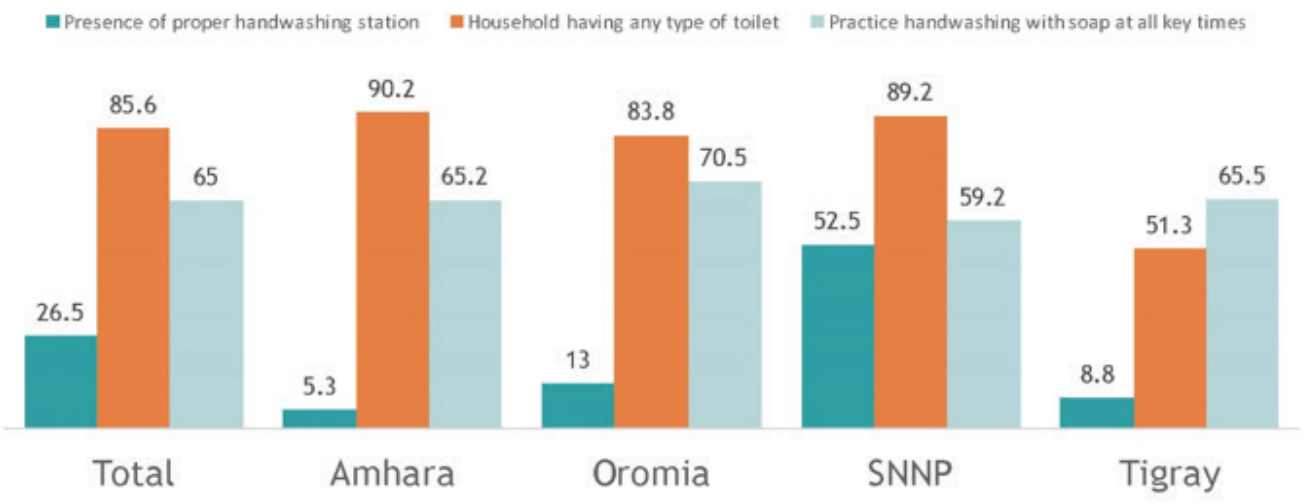

Figure 3.44 Handwashing Practices, Handwashing Station, and Toilet Use

Key Handwashing Practices by Vulnerability

We explored key WASH practices by vulnerability (measurement is described in section 2.7 Measurements) and found that women with high vulnerability were less likely to practice handwashing at key times (57.4%) compared with those with low vulnerability (68.7%), as shown in Table 73. The presence of a handwashing station did not differ substantially between vulnerability levels. However, women with high vulnerability were less likely to have a toilet (74.7%) compared with those with low vulnerability (89.8%).

Key Handwashing Practices by Respondent Type

In Table 74, WASH practices were explored by respondent type, and differences were found. Pregnant women (64%) and other women 15–49 years (57.2%) were less likely to wash their hands at all key times compared with women with children three to five years (69.3%). However, women with children under two years (74.9%) were most likely to practice handwashing at key times. Pregnant women were more likely to report the presence of a handwashing station; however, the overall difference was minor across respondent types and also low overall, with less than a third of women reporting the presence of proper handwashing station. No differences between respondents were found for toilet ownership.

Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Region

Comprehensive knowledge of all key times was low across all regions (14.4%), as shown in Table 75. Figure 3.45 demonstrates low handwashing knowledge in Tigray, with only 24.7% of women knowing three or more key times for handwashing. Self-efficacy differed between regions. While over a third of women (36%) had strong self-efficacy, women in SNNP were less likely to report high self-efficacy (24.9%) compared with women in Tigray (49.2%). Strong outcome expectancy was found (46.3% of women in the study sample); however, Tigray had 69.7% of women reporting strong self-efficacy.

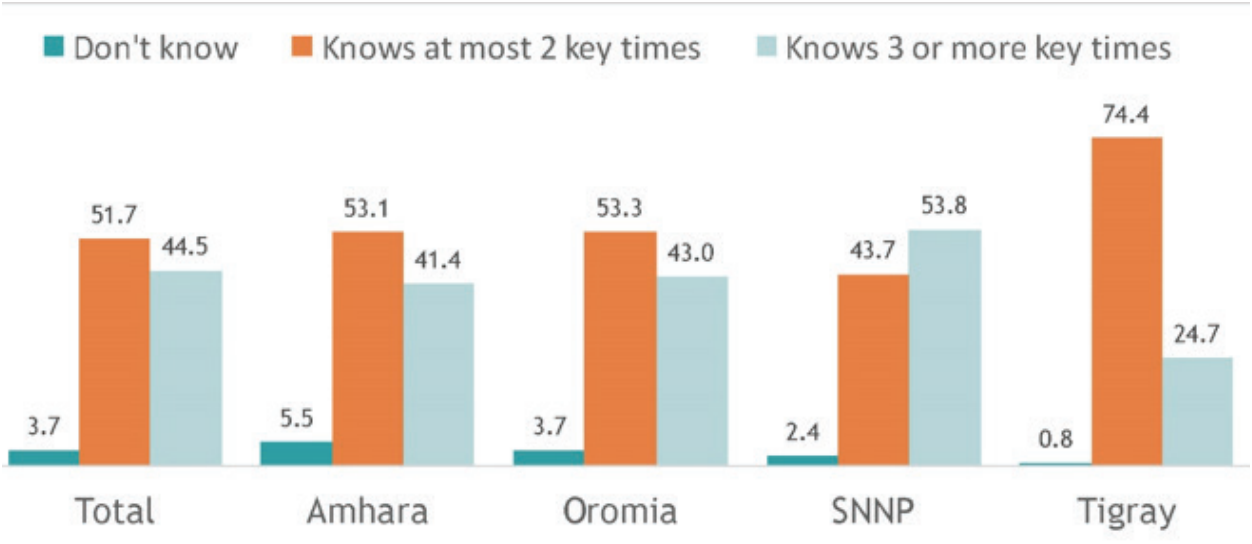

Figure 3.45 Knowledge of Key Times for Handwashing

Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability Indexindex

Table 76 shows that women with high vulnerability were less likely to report three or more key handwashing times (18.8%) compared with those with low vulnerability (13.6%). Differences between self-efficacy was strong, with women with high vulnerability being significantly less likely to report strong self-efficacy (23.5%) compared with those with low vulnerability (42.0%). Although not as drastic, similar differences were found among women with strong outcome expectancy, with those with high vulnerability being less likely to have strong outcome expectancy compared with those with low vulnerability (38.6% versus 48.5%).

Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Respondent Type

While knowledge of all key handwashing times was low overall, it was greater among women with children under two years (19.9%) compared with other respondent types (Table 77). No major differences by respondent type was found for self-efficacy and outcome expectancy.

Factors Influencing Key WASH Behaviors (Logistic Regression Analysis)

Three behaviors were explored for the health area of WASH: ownership of a household toilet, handwashing at all key times, and observation of a proper handwashing station at the household.

WASH Behavior: Ownership of a Household Toilet

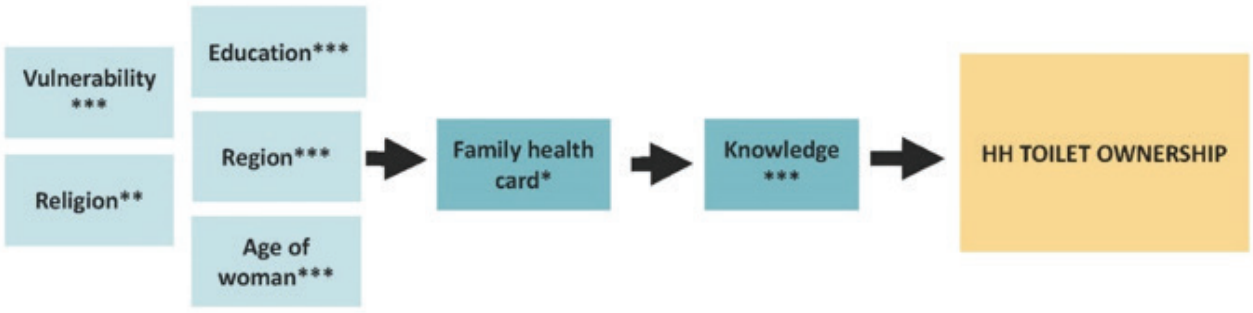

Figure 3.46 Household (HH) Toilet Ownership, * p < 0.05; ** p < 0.01; *** p < 0.001

Ownership of a household toilet was measured by the woman reporting whether they had either a pit latrine or pour/flush toilet. Table 91 in the appendix shows the odds ratios for predictors related to the ownership of a household toilet. The logistic regression model was controlled for knowledge of at least three or more key handwashing times, religion, region, and vulnerability (described in Section 2.7 Measurements). Having an FHC was also found to be significantly related to the ownership of a household toilet, similar to two models focused on handwashing behavior at key times and having a proper handwashing station in the household (discussed below); this relationship is depicted in Figure 3.46.

Regionally, women in SNNP were two times as likely [AOR 2.85, 95% CI = 1.94–4.19] as women in Oromia to have a household toilet. In contrast, women in Tigray were less likely to have a household toilet compared with women in Oromia [AOR 0.25, 95% CI = 0.18–0.35]. Compared with women with high vulnerability, women with moderate vulnerability [AOR 1.94, 95% CI = 1.48–2.55] to low vulnerability [AOR 2.40, 95% CI = 1.85–3.11] were more likely to own a household toilet. Compared with Muslim households, Christian households were less likely to own a toilet [AOR 0.61, 95% CI = 0.46–0.81]. Older women ages 35–49 were two times as likely to live in a household with a toilet compared with younger women 15–24 years [AOR 2.36, 95% CI 1.74–3.21]. Lastly, women with a secondary education were four times as likely as nonliterate women with no formal education to own a household toilet [AOR 4.04, 95% CI = 2.52–6.49].

The ownership of an FHC was significantly associated with the ownership of a toilet. Women with an FHC were 1.4 times as likely to have a household toilet compared with women without an FHC [AOR 1.39, 95% CI = 1.01–1.91]. Women who knew three or more key handwashing times were 1.5 times as likely to have a toilet compared with women who knew at most two key handwashing times [AOR 1.52, 95% CI = 1.21–1.91].

WASH Behavior: Proper Hand Washing Station

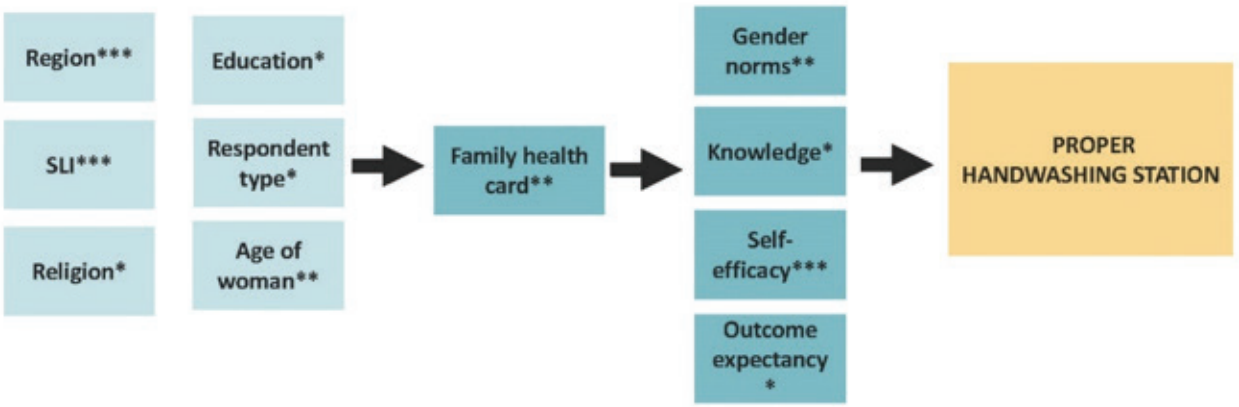

*Figure 3.47 Proper Handwashing Station, * p < 0.05; ** p < 0.01; *** p < 0.001*

The logistic regression model for the observation of a proper handwashing station in the household was controlled for age of respondent, education, religion, region, and SLI in appendix Table 92. A proper handwashing station was defined as having soap and water. Other significant predictors explored were ownership of an FHC and support of gender inequitable norms (measured by a GEM subscale on RHDP). Finally, the model also included comprehensive knowledge related to all key handwashing times, self-efficacy related to proper washing of hands at all key times, outcome expectancy related to the prevention of diseases (like diarrhea), and the practice of proper handwashing. In Figure 3.47, which demonstrates the logistic model visually, we see the relationship between the behavior practice of handwashing at all key times and having a proper handwashing station.

Older women ages 35–49 years were 53% less likely to have a proper handwashing station compared with younger women under 25 years [AOR 0.47, 95% CI = 0.30–0.73]. Education levels of women demonstrated that women with lower levels of education were less likely to have a proper handwashing station. Compared with women with no formal education (nonliterate), women with at least a primary education [AOR 0.61, 95% CI = 0.42–0.91] were 39% less likely to have a proper handwashing station. Women from Christian households were 42% less likely than women from Muslim households to have a handwashing station present [AOR 0.58, 95% CI = 0.36–0.93]. Having a handwashing station was also significantly more likely in SNNP compared with Oromia [AOR 32.66, 95% CI = 17.98–59.35]. Compared with pregnant women, women with a child under two were nearly half as likely to have a handwashing station [AOR 0.51, 95% CI = 0.28–0.91]. Handwashing stations were also more than three times as likely to be found in a woman's household if she had a moderate [AOR 3.32, 95% CI = 2.21–4.99] to high SLI [AOR 3.57, 95% CI = 2.28–5.57] compared to the household of a woman with low SLI.

The FHC and gender norms were key predictors for a household having a handwashing station. Women with an FHC were 1.9 times as likely to have a proper handwashing station compared with women without a FHC [AOR 1.89, 95% CI = 1.06–3.36]. Compared with women with high gender inequitable norms, women with moderate and low gender inequitable norms were, respectively, four times [AOR 4.49, 95% CI = 1.26–16.01] and nine times [AOR 9.18, 95% CI = 2.62–32.16] more likely to have a proper handwashing station.

Lastly, handwashing stations were more likely to be observed if women knew at least three or more key handwashing times [AOR 1.48, 95% CI = 1.09–2.02] compared with women who knew fewer than three. Women who felt they could practice proper handwashing (self-efficacy) were twice as likely to have a handwashing station compared with women who did not have handwashing self-efficacy [AOR 2.56, 95% CI = 1.74–3.76].

Compared with women who did not think that proper handwashing prevented diseases (outcome expectancy), women who felt strongly that proper handwashing prevented diseases were 1.7 times more likely to have a handwashing station [AOR 1.67, 95% CI = 1.12-2.46].

WASH Behavior: Handwashing at All Key Times

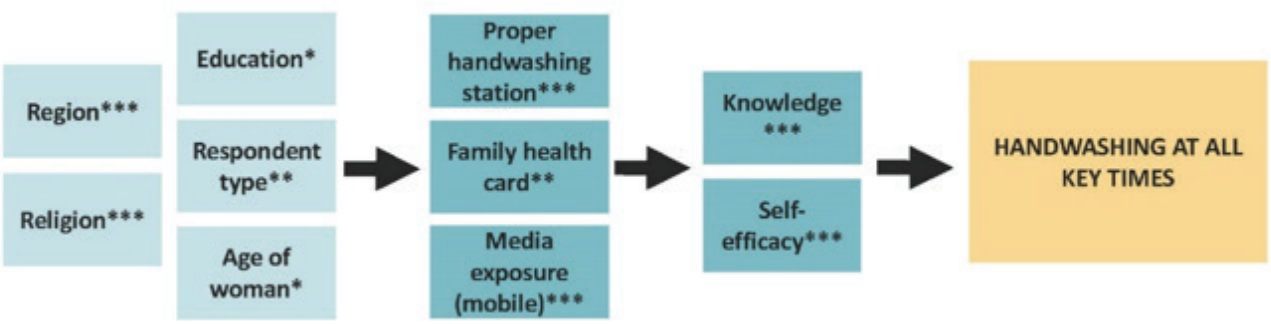

*Figure 3.48 Handwashing at All Key Times, * p < 0.05; ** p < 0.01; *** p < 0.001*

Table 93 in the appendix displays the multivariate logistic regression for handwashing at all key times. Key times of handwashing are described in the above section. The model was controlled for age of respondent, education, religion, region, and respondent type. Having a FHC, mobile phone ownership, and observation of a proper handwashing station was also observed as predictors to handwashing behavior. Lastly, knowledge of key handwashing times and self-efficacy related to handwashing at all key times were also explored. Figure 3.48 displays the pathway of the model on handwashing at key times.

Handwashing practices were more likely to be practiced by older women 35–49 years compared with younger women under 25 years [AOR 1.38, 95% CI = 1.07–1.77]. Education was also relevant, with women with at least a primary education being more likely to practice handwashing at all key times compared with those who were nonliterate [AOR 1.26, 95% CI = 1.01–1.57]. Additionally, Christians were 42% less likely to practice handwashing at all key times compared with Muslims [AOR 0.58, 95% CI = 0.46–0.72]. Regionally, women in Amhara [AOR 0.73, 95% CI = 0.57–0.94] and SNNP [AOR 0.57, 95% CI = 0.43–0.76] were 27% and 43%, respectively, less likely to practice handwashing compared with women in Oromia. Women with children under two were 58% more likely than pregnant women to wash their hands at all key times [AOR 1.58, 95% CI = 1.13–2.20]; however, other women 15–49 were 30% less likely to wash their hands at all key times [AOR 0.70, 95% CI = 0.51–0.96] compared with pregnant women.

Overall, women in households that had an FHC [AOR 1.49, 95% CI = 1.12–2.00], a mobile phone [AOR 1.42, 95% CI = 1.20–1.68], and a handwashing station [AOR 3.60, 95% CI = 2.56–5.08] were significantly more likely to practice handwashing at all key times. Knowledge of key handwashing times [AOR 2.72, 95% CI = 2.26–3.26] and self-efficacy of proper handwashing at all key times [AOR 1.65, 95% CI = 1.38–1.98] were significant predictors as well.

4. Conclusion & Recommendations

The baseline survey for the integrated Communication for Health Project was conducted in August to September 2016 in four regions of Ethiopia with a sample of 2,770 women (15–49 years). The findings of the survey inform the development of the health communication strategy for the project and also provide insight into behavioral determinants across six health areas. This section provides an overview of the detailed behavioral analysis of 16 health behaviors covering MNCH (including FP), WASH, nutrition, malaria, TB, and PMTCT.

The analysis included multivariate logistic regression to identify determinants for 16 health behaviors. Common determinants across behaviors and health areas were analyzed, and linkages across behaviors were established through the analysis. Most importantly, three gateway behaviors that can trigger the adoption of other health behaviors in the life cycle were identified. Among the determinants, region, economic vulnerability, gender inequitable norms, self-efficacy, and outcome expectancy were commonly associated predictors. The baseline survey did not measure social or relation variables such as social networks, social influence, couple communication, and so forth. These factors will be explored in a qualitative sociocultural study.

4.1 Conclusion

Regional Variation Influences 12 out of 16 Health Behaviors

The study was conducted in Amhara, Oromia, SNNP, and Tigray. These four regions differ by topography, language, access to health services, and size, resulting in varying levels of prevalence of behaviors. Out of 16 logistic regression models, region was a significantly ($p < .05$) associated with 12 behaviors in the areas MNCH, FP, WASH, nutrition, HIV, and so forth (Figure 4.1). Malaria prevention behaviors were not influenced by region, nor was exclusive BF.

Oromia had the lowest behavioral prevalence for most behaviors, followed by SNNP. These two regions consistently ranked lower than Amhara and Tigray. However, for the handwashing station logistic model, SNNP was the highest because the region implemented a WASH program a few years ago.

The data indicate that regional specific communication strategies will have to be developed under the umbrella of an overarching communication plan. The barriers and obstacles in terms of RMNCH and HIV behaviors will be further explored in the socio-cultural study.

Malaria behaviors, such as prompt treatment seeking for fever for children under five years and use of LLIN by women (15–49 years) and children (under five years), were more or less similar in all four regions, as was exclusive BF.

Current modern family planning (FP) use	**Immunization (penta 3)**
4 or more antenatal care (ANC) visits	**Handwashing at all key times**
Early registration for ANC	**Handwashing station**
Institutional delivery	**Household (HH) toilet ownership**
HIV test during pregnancy	Use of long lasting insecticidal net (LLIN) women 15-49
Early initiation of breastfeeding (BF)	Use of LLIN for under 5 children
Minimum diet diversity	Early treatment for fever (<24 hrs)
Minimum acceptable diet	**Family health card**

Figure 4.1 The 12 out of 16 behaviors related to regional variation

Early ANC registration (<12 weeks), FHC, and handwashing station were identified as three gateway behaviors for the Hulu Betena (integrated communication intervention).

A gateway behavior is a behavior that can lead to the adoption of several healthy behaviors in the life cycle. Early ANC registration (<12 weeks) ensures early detection of a pregnancy and brings the woman into care at an early stage of her pregnancy, thereby ensuring that important antenatal behaviors such as four visits are completed.

Data provide evidence that early registration is significantly associated with four ANC visits (Table 81). Having four ANC checkups significantly predicts institutional delivery (Table 82), which in turn predicts complete penta 3 vaccine coverage (see Figure 4.2). If the campaign ensures that more women register their pregnancy within 12 weeks, the woman is motivated to keep returning for her ANC visits, institutional delivery, and even immunization for the newborn child. With this evidence and the fact that Hulu Betena is a multi-behavioral integrated intervention, it is essential to look at behaviors as existing on a continuum and being amenable to triggering ripple effects.

The Hulu Betena intervention can make strategic use of the gateway behavior of early registration to trigger a chain reaction of important antenatal and intranatal behaviors for women.

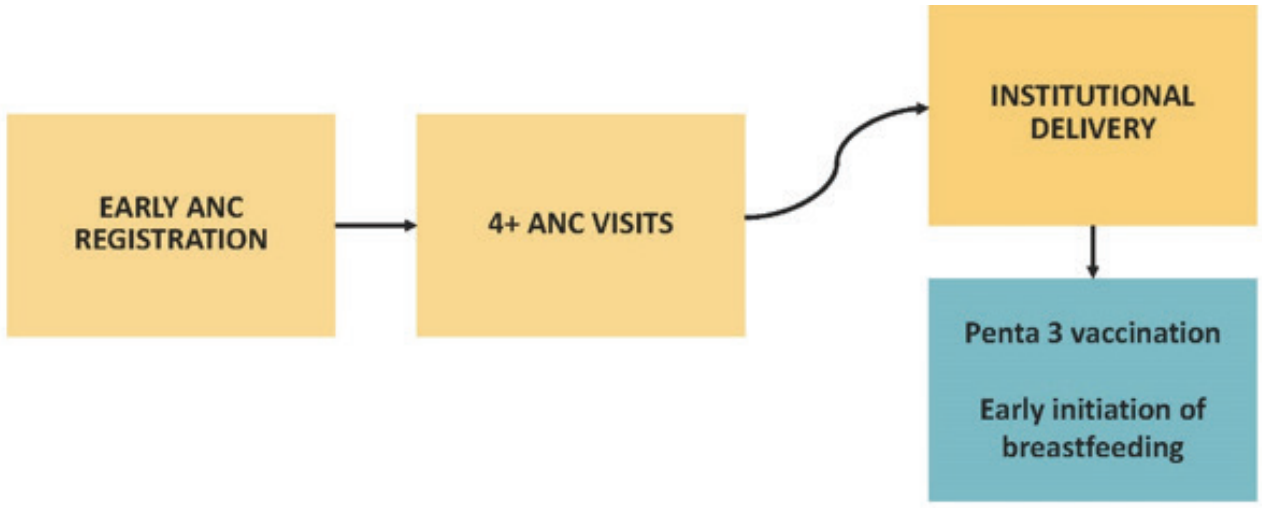

Figure 4.2 Relationship between Early ANC, Four or More ANC Visits, and Institutional Delivery

The second gateway behavior identified in the overview analysis of 16 behaviors is having an FHC. The government of Ethiopia strongly endorses the FHC and has scaled it up nationally. However, baseline data indicate that ownership of an FHC, which is distributed to each household, is very low (9.5%). Despite the low prevalence of FHC ownership, it significantly predicts four behaviors including the three WASH behaviors and HIV testing during pregnancy.

If the FHC is widely promoted and used, it could become a very good interactive tool to initiate dialogue between household members and the one-by-five HDA as well as the HEWs. In addition, because the FHC is part of accepted government policy, its sustainability is ensured. It can be used as an SBCC tool by the HEWs and HDA workers at the household level. It also has provisions for monitoring and can be used to record behaviors, referrals, and treatment adherence. We strongly recommend the ownership and use of an FHC as a gateway behavior with triggering actions in all six areas of health.

The third gateway behavior is handwashing station, which predicts handwashing with soap at key times. If the Hulu Betena intervention promotes establishing handwashing stations that have both soap and water, it will probably increase the proportion of women washing their hands at key times. The sociocultural study will identify locally feasible and sustainable handwashing stations.

Norms of Gender Inequity Adversely Impact 10 out of 16 Health Behaviors

The baseline study included 21 items to measure gender inequitable norms in women and men (women's perceptions of their husbands or partners) in addition to items related to decision-making. Gender inequitable norms were associated with current use of FP, five MNCH behaviors, one WASH behavior, and all three malaria behaviors (Figure 4.3). Gender norms were developed into an overall gender inequitable scale and five subscales. The subscales include a decision-making subscale, RHDP subscale, PV subscale, a DCDL subscale, and a sexual relationships subscale.

Current modern family planning (FP) use	Immunization (penta 3)
4 or more antenatal care (ANC) visits	Handwashing at all key times
Early registration for ANC	**Handwashing station**
Institutional delivery	Household (HH) toilet ownership
HIV test during pregnancy	**Use of long lasting insecticidal net (LLIN) women 15-49**
Early initiation of breastfeeding (BF)	**Use of LLIN under 5 children**
Minimum diet diversity	**Early treatment for fever (<24 hrs)**
Minimum acceptable diet	Family health card

Figure 4.3 The 10 out of 16 Behaviors Related to Gender Inequity

The social construction of gender results in women harboring a bias against themselves. [45] Women's self-perceptions are a key factor in their undervaluing their own health and reproductive needs.[46] Women harbor gender unequal norms because of forces operating at household, community, and societal levels that reinforce a value system that gives men a superior status in society.

The baseline study provides strong evidence for addressing gender inequitable norms in women and men in the four regions of rural Ethiopia. Manifestation of these inequitable norms occurs as low decision-making, PV, daily chores, and so forth, and it is usually at the household level. A woman's ability to adopt healthy behaviors is impinged in households where her decision-making is limited, her voice is squashed, and she experiences physical violence.

Of the 10 behaviors that are adversely influenced by gender inequitable norms, seven occur within the micro-environment of the household. It is the same micro-environment in which women face constant subjugation and compromised decision-making. The Hulu Betena intervention can perhaps address the micro-environment of the household by

promoting couple communication, respect for women, and the role of women in decision-making for right choices for themselves and their children's health. These processes can be modelled in radio episodes, role model testimonies, and community events. The campaign needs to promote community dialogue on how men can support the main 16 behaviors in the Hulu Betena intervention.

High Vulnerability/Low Standard of Living in Women Leads to Low Levels of Adoption for Nine Behaviors

Women's high economic vulnerability and low standard of living also adversely affect three behaviors related to health services, ANC visits, institutional delivery, and HIV testing during pregnancy. In addition, economic vulnerability and low standard of living influence two nutrition behaviors, two WASH behaviors, and two malaria prevention behaviors (Figure 4.4).

The baseline data also indicate that low economic status groups have the least media exposure and access to resources. The Hulu Betena intervention can identify clusters that are low income and vulnerable. These clusters can be prioritized as a significant audience for the campaign.

Current modern family planning (FP) use	Immunization (penta 3)
4 or more antenatal care (ANC) visits	Handwashing at all key times
Early registration for ANC	**Handwashing station**
Institutional delivery	**Household (HH) toilet ownership**
HIV test during pregnancy	**Use of long lasting insecticidal net (LLIN) women 15-49**
Early initiation of breastfeeding (BF)	**Use of LLIN under 5 children**
Minimum diet diversity	Early treatment for fever (<24 hrs)
Minimum acceptable diet	Family health card

Figure 4.4 The Nine out of 16 Behaviors Related to Vulnerability and Standard of Living

Self-Efficacy Is Associated with Six of the 16 Health Behaviors

Self-efficacy is a person's confidence that she can accomplish a specific task or behavior. The higher the woman's self-efficacy, the more likely she will be to adopt the specific task or behavior. High self-efficacy is linked to current FP use, handwashing at key times, owning a handwashing station, child under five years sleeping under an LLIN, woman 15–49 sleeping under an LLIN, and prompt treatment seeking for fever for children under five years. All six behaviors are related to women either for themselves or in their

role as caretakers of their children. Data indicate that a large proportion of women have moderate self-efficacy for most behaviors. The campaign needs to convert the moderate levels of self-efficacy to high levels for a larger number of women to adopt healthy behaviors.

Self-efficacy can be incorporated into the campaign by demonstrating a woman's confidence in adopting the above five behaviors. Additionally, one of the campaign subthemes can be, "I have confidence in ...," maybe using the closest Ethiopian construct to self-confidence.

Knowledge Is Related to 10 out of 16 Health Behaviors

The evidence indicates that specific aspects of knowledge related to a certain behavior predicts the adoption of the behavior. These include current FP use, four ANC visits, institutional delivery, handwashing at key times, having a handwashing station, toilet use, LLIN use among children under five years and among women, HIV testing during pregnancy, and early ANC registration.

Superficial knowledge, such as whether a person has heard of FP or malaria, often does not predict the associated behaviors. For example, knowledge of four ANC visits predicts the behavior. Four ANC visits need to be strategically promoted, instead of detailed information on maternal health being provided, which women with low literacy may not understand on the radio. Also knowledge of four ANC visits predicts institutional delivery. Once a woman enters the health system, she receives the necessary detailed information to move her along the continuum of antenatal, intranatal, and postnatal behaviors. Similarly, a composite index of malaria prevention predicts the use of LLINs.

What knowledge needs to communicated to a low-literacy audience has to be strategically considered because too much knowledge will hinder comprehension or retention.

Media Exposure Influences Five Health Behaviors

Overall, media exposure was low in the baseline sample of 2,770 women. Despite low levels of exposure, media influenced five health behaviors. Listening to radio once a week significantly predicted FP use and four ANC visits, listening to one health message in the past three months influenced HIV testing during pregnancy, and owning a mobile phone was associated with handwashing at critical times and use of LLIN by women.

The campaign needs to ensure that audiences in the four regions have exposure to campaign activities and events. Program coverage needs to be high because exposure to media can influence behavior.

Since almost 50% of the households reported ownership of at least one mobile phone, a campaign strategy of narrow casting radio episodes via secure digital cards or memory cards could substantially increase media exposure.

4.2 Recommendations

The recommendations section is divided into two parts, overarching recommendations and specific recommendations. The overarching recommendations pertain to the integrated campaign, while the specific recommendations refer to the six health areas of the project.

Overarching Recommendations

Low Behavioral Prevalence in Oromia and SNNP (Regional Differences)

a. Regional specific communication strategies are required.
b. Identification of health system weaknesses and additional capacity strengthening of HEWs and health providers are needed.
c. A slightly more "intensive" dose of the intervention should be considered, if feasible.
d. A robust monitoring system to track implementation should be established.

Gateway Behaviors

a. The program campaign needs to prioritize the three gateway behaviors including early ANC registration (<12 weeks), ownership of an FHC, and having a proper handwashing station
b. The behaviors need to be promoted extensively.
c. The gateway behaviors can be the project's entry point into communities.

Overarching Communication Strategy

a. The overarching communication strategy should not be knowledge focused.
b. Social factors, such as social norms, social identity, and social relationships, need to be incorporated.
c. Cultural constructs, such as trust, respect, and values, need to be included in the communication media and materials.
d. Emotional elements, such as compassion, well-being, and happiness, should also be included in every communication interaction with the audiences (community engagement, IPC, mass media, advocacy).
e. Behavioral action to be expected from the audience MUST be included with every interaction or message.

Gender Inequitable Norms

a. Gender inequitable norms must be included in every aspect of the integrated communication interventions.
b. Positive gender role models should be identified in communities and modeled in materials.
c. Behavioral action to be undertaken by "gender equitable" women and men need to be promoted widely.
d. Male involvement for support of 16 health behaviors needs to be integrated in the campaign.
e. Couple communication needs to be promoted in the radio drama, in print materials, and by HEWs and one by five HDA/WDA workers.

High Vulnerability and Low Standard of Living

a. Clusters of women with high vulnerability should be identified by the HEWs.
b. Program exposure could lead to uptake of behaviors in this group because SBCC programs do not reach these groups routinely.

Knowledge and Self-Efficacy

a. Knowledge should be portioned to include the absolute essential aspect that is relevant to low-literacy audiences.
b. Knowledge should be behaviorally focused and linked to the expected behavior.
c. The program can promote self-efficacy by development of a theme of a confident and empowered woman.

Media Exposure

a. Since 50% of the respondents own a mobile phone, an mHealth strategy is recommended.
b. The mHealth approach can narrowcast the radio episodes via mobile phones to villagers.
c. Mobile phones will amplify the radio drama and other media content.

Specific Recommendations

Specific recommendations are provided for six health areas.

Family planning

- Women with children under two years and other women (who do not have a child three to five years) should be a priority audience for FP.
- FP services and use need to be prioritized in Oromia and SNNP.
- FP services and use of long-acting methods should be promoted.
- Identification and audience prioritization of low-income clusters should be included in HEW capacity development.
- Gender inequitable norms need to be addressed.

Maternal, Neonatal, and Child Health

- Nurses and midwives were the main providers of delivery in this study. TBAs were also seen as assisting with deliveries as well. Nurses and midwives, HEWs, and HDA workers can be trained in SBCC, specifically for recognition of danger signs and birth preparedness.
- Early ANC registration (<12 weeks) needs to be prioritized in the SBCC intervention for pregnant women by HEWs and HDA workers.
- SBCC related to postnatal care should be provided by HEWs for home deliveries and by government health staff for institutional deliveries.
- Low income and vulnerable clusters should be provided with regular SBCC home visits.
- Gender inequitable norms need to be addressed.

Prevention of Mother-to-Child Transmission

- The program needs to focus on knowledge of PMTCT.
- SBCC on PMTCT focusing on self-efficacy and outcome expectancy needs to be strengthened in Oromia and SNNP.
- Gender inequitable norms need to be addressed.

Nutrition and Immunization

- Use of local constructs and cultural imagery should be explored for development of penta 3 vaccine messages.
- Exclusive BF is actually low. A focus on the duration of six months for exclusive BF is needed, with exploration of local constructs and imagery.
- Local (emic) categories of food types should be used for development of nutrition communication.
- Gender inequitable norms need to be addressed.

Malaria

- The SBCC program should focus on the cause of malaria and prompt treatment-seeking behavior for fever (<24 hours).
- The staff at the government health center, HEWs, and HDA/WDA workers should be trained in malaria prevention SBCC.
- Women with high vulnerability can also be prioritized for early treatment seeking for fever and for LLIN ownership.
- High self-efficacy and outcome expectancy should be promoted in Oromia and SNNP.
- Gender inequitable norms need to be addressed.

Tuberculosis

- Knowledge of TB transmission, symptoms, and curability needs to be strengthened.
- Self-efficacy for early screening should be promoted in a culturally appropriate manner.

Water, Sanitation, and Hygiene

- The FHC should be widely promoted because it was associated with all three WASH behaviors (handwashing at critical times, having a proper handwashing station, and toilet ownership).
- The first step for the WASH program should be to ensure proper handwashing stations for all households.
- Local models of handwashing stations need to be developed and promoted.

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6. Appendix

Bivariate Models Tables

Table 1 Demographics of Study Participants

	TOTAL N = 2,770 n (%)	AMHARA N = 674 n (%)	OROMIA N = 688 n (%)	SNNP N = 760 n (%)	TIGRAY N = 648 n (%)
Age of participant					
15–24	933 (32.7)	202 (28.7)	230 (33.4)	296 (37.1)	205 (31.2)
25–34	999 (36.0)	263 (38.9)	256 (36.0)	250 (32.8)	230 (35.5)
35–49	838 (31.2)	209 (32.3)	202 (30.6)	214 (30.1)	213 (33.3)
Type of participant					
Currently pregnant	235 (8.4)	39 (5.6)	80 (10.7)	60 (9.3)	56 (8.7)
With child under two years	724 (25.1)	172 (23.6)	170 (24.2)	192 (27.2)	190 (28.3)
With child three to five years	643 (22.8)	158 (23.5)	184 (25.5)	151 (19.2)	150 (23.4)
Other women 15–49 years	1,168 (43.7)	305 (47.3)	254 (39.6)	357 (44.2)	252 (39.5)
Education					
No formal education	1,637 (57.9)	414 (57.4)	481 (68.9)	321 (46.3)	421 (64.7)
Primary	863 (32.6)	191 (32.1)	168 (25.4)	344 (41.9)	160 (24.7)
Secondary or higher	270 (9.5)	69 (10.5)	39 (5.7)	95 (11.8)	67 (10.6)
Religion					
Christian (Orthodox, Protestant, Catholic, etc.)	1,944 (60.8)	439 (53.0)	214 (40.8)	687 (82.5)	604 (93.2)
Muslim	824 (39.1)	235 (47.0)	474 (59.2)	71 (17.1)	44 (6.8)
Other (traditional)	2 (0.1)	--	--	2 (0.4)	--
Income (monthly)					
Low(<500 birr)	907 (28.7)	101 (12.0)	289 (39.4)	315 (37.5)	202 (30.6)
Middle (501–1,300 birr)	1,074 (39.1)	363 (51.2)	214 (30.5)	239 (32.9)	258 (40.4)
High (>1,300 birr)	789 (32.2)	210 (36.8)	185 (30.1)	206 (29.6)	188 (29.0)
Marital status					
Married or cohabitating	2,059 (75.1)	515 (77.0)	566 (80.3)	511 (68.6)	467 (71.2)
Divorced, widowed, or single	711 (24.9)	159 (23.0)	122 (19.7)	249 (31.4)	181 (28.8)
Vulnerability index[a]					
Low	1,343 (50.0)	354 (55.6)	399 (58.9)	321 (36.5)	269 (41.1)
Moderate	825 (28.9)	178 (27.9)	188 (27.6)	239 (30.3)	220 (33.8)
High	602 (21.1)	142 (16.5)	101 (13.5)	200 (33.2)	159 (25.0)
Standard living index (SLI)[b]					
Low	1,186 (37.9)	332 (45.0)	211 (28.5)	198 (32.3)	445 (68.5)
Moderate	986 (38.6)	267 (43.4)	237 (34.7)	312 (39.4)	170 (26.4)
High	598 (23.5)	75 (11.6)	240 (36.7)	250 (28.3)	33 (4.9)

Notes:
a.) Vulnerability index was constructed using the following four items: lacked enough food to eat, lacked shelter/house to stay in, not able to afford to send children school, and lacked money to buy medicines/medical treatment (experienced by the participant in the past 12 months). Low was four or lower; moderate, five to seven; and high, eight to 12.
b.) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and four items of the vulnerability index mentioned above. Low was six or lower; moderate, seven to eight; and high, nine or higher.

Table 2 Baseline Indicators at a Glance

	Total	Amhara	Oromia	SNNP	Tigray
FP and MNCH					
FP (N = 2,535)					
Contraceptive prevalence (among married women; N = 1,799) [KB]	41.0	54.4	29.6	36.3	37.9
Contraceptive prevalence (among all women) [KB]	53.2	66.1	36.5	54.9	50.5
% of women who know about modern contraceptive methods [K]	92.9	97.1	91.5	88.2	98.6
% of women who believe they are able to use modern contraceptive methods [SE]	37.3	47.8	24.0	30.9	70.5
% of women who believe their use of modern contraceptive methods improved quality of family life [OE]	41.6	53.0	32.0	32.2	67.1
ANC, Delivery, PNC (N = 745)					
% of women having at least four ANC visits (given birth in past two years) [KB]	47.2	55.3	30.0	53.9	47.4
% of women who delivered in a health facility (institutional delivery) [KB]	46.6	63.4	30.4	42.0	54.2
Early postnatal care coverage (within seven days of delivery) [KB]	26.3	32.0	10.9	26.2	40.1
Level of knowledge with danger signs during pregnancy and delivery [K]					
Low	45.4	39.9	39.8	55.4	53.6
Medium	40.9	51.2	37.5	32.3	40.7
High	13.7	8.9	22.8	12.2	5.6
% of women who feel that they can attend four or more ANC visits beginning in the first trimester [SE]	40.1	39.8	37.4	23.4	60.3
% of women who believe that four or more ANC visits during pregnancy will lead to good birth outcomes [OE]	50.0	50.9	45.6	33.7	66.9
PMTCT (N = 2,770)					
% of women who received an HIV test during her most recent pregnancy (N = 2,209) [KB]	49.1	65.4	32.1	41.6	67.1
% of pregnant women who received an HIV test (N = 235) [KB]	36.1	60.4	18.6	30.8	75.7
Level of PMTCT knowledge [K]					
Low	28.8	17.9	35.3	34.8	21.0
Medium	46.6	48.8	42.9	49.7	38.0
High	24.6	33.3	21.8	15.5	41.0
% of women who feel they are able to be tested for HIV and take ARVs [SE]	29.4	40.3	25.6	18.3	50.0
% of women who believe that testing for HIV and adhering to ARVs can reduce the risk of HIV transmission to their babies [OE]	26.2	33.2	27.1	15.1	42.4
Child Health: Immunization (Four to 23 months, N = 610) and Nutrition (Children Six to 23 Months)					
Penta 3 coverage with vaccination card [KB]	34.5	43.4	14.0	40.2	46.0
% of exclusive BF in the first six months [KB]	63.7	67.2	62.4	62.4	60.2
% of children eating minimal acceptable diet [KB]	9.8	7.6	14.2	6.9	17.3
% of women who have knowledge about minimal acceptable diet for their children [K]					
Children should have at least four food groups a day	43.3	51.4	40.9	32.0	66.1
Children should eat two to four meals (one to two snacks) a day	42.5	50.2	42.3	31.1	59.5
% of women who feel they can provide minimal acceptable diet for their children [SE]	29.3	27.9	35.7	21.4	49.2
% of women who believe that minimal acceptable diet will enhance child survival [OE]	40.5	50.3	34.8	31.3	57.0
% of women who believe that exclusive BF in the first six months will lead to healthy neonatal outcomes [OE]	52.9	57.7	56.3	39.4	79.3
Malaria (Malaria Sites Only N = 1,817)					
LLINs					
% of pregnant women who slept under LLINs the previous night (own at least one LLIN) (N = 235) [KB]	58.9	75.1	52.2	50.5	65.2
% of women whose children under five slept under LLINs the previous night [KB]	43.3	40.5	56.7	37.4	49.6
% of pregnant women who know how to protect against malaria (N = 235) [K]	23.2	16.5	25.7	25.1	23.1
% of pregnant women who feel they are able to have children under five sleep under an LLIN each night (N = 235) [SE]	20.0	21.1	15.7	19.1	44.9
% of pregnant women who feel they are able to sleep under an LLIN each night during pregnancy (N = 235) [SE]	21.8	26.3	20.0	15.7	46.4
% of women who believe that if their child under five sleeps under an LLIN each night, it will prevent malaria [OE]	40.0	43.4	41.7	32.3	62.9
Treatment seeking for fever					
% of women whose children under five sought treatment within 24 hours onset fever [KB]	19.2	12.0	28.1	25.0	11.1
% of women who know that they should seek treatment for their child under five within 24 hours of onset fever [K]	35.0	48.4	27.1	24.1	54.2
% of women who feel they can take their child to treatment within 24 hours of onset fever [SE]	39.3	51.4	38.1	26.6	50.6
% of women who believe that seeking treatment for their child under five within 24 hours of onset of fever improves their chances of recovery and survival [OE]	44.0	54.5	39.9	34.1	59.3
TB					
% of women who recognize three or more key symptoms of TB [K]	18.3	19.6	16.7	19.1	14.7
% of women who feel they are able to get immediate screening on suspecting TB [SE]	34.8	43.3	30.0	27.4	45.6
% of women who believe early screening of TB leads to full recovery [OE]	34.1	40.2	29.8	28.8	45.9
WASH (N = 2,770)					
% of women who practice handwashing with soap at key times [KB]	65.0	65.2	70.5	59.2	65.5
% of women who have comprehensive knowledge of handwashing [K]	14.4	7.7	21.4	17.2	5.9
% of women who feel they can practice proper handwashing [SE]	36.0	41.9	37.4	24.9	49.2
% of women who believe proper handwashing prevents diseases such as diarrhea [OE]	46.3	49.5	44.5	39.3	69.7

KB = Key Behavior, **K** = Knowledge, **SE** = Self-Efficacy, **OE** = Outcome Expectancy

Table 3 Gender Inequality by Region

GEM scale***	TOTAL N = 2,586	AMHARA N = 658	OROMIA N = 648	SNNP N = 680	TIGRAY N = 600
High	16.6	14.5	21.6	11.6	28.7
Moderate	64.2	62.6	50.6	82.6	53.1
Low	19.1	22.9	27.9	5.8	18.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) GEM scale includes 21 items on topics such as violence, sexual relationships, homophobia, DCDL, and RHDP.

Table 4 Gender Inequality by Vulnerability Index

GEM scale***	LOW N = 1,228	MODERATE N = 775	HIGH N = 583
High	15.8	18.8	15.6
Moderate	63.6	59.8	71.5
Low	20.6	21.4	12.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) GEM scale includes 21 items on topics such as violence, sexual relationships, homophobia, DCDL, and RHDP.

Table 5 Gender Inequality by Respondent Type

GEM scale***	PREGNANT WOMEN N = 229	WOMEN WITH CHILD UNDER TWO YEARS N = 706	WOMEN WITH CHILD THREE TO FIVE YEARS N = 628	OTHER WOMEN 15–49 YEARS N = 1,023
High	15.8	18.5	18.8	14.4
Moderate	63.2	67.5	66.7	61.0
Low	21.0	14.1	14.5	24.6

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) GEM scale includes 24 items on topics such as violence, sexual relationships, homophobia, DCDL, and RHDP.

Table 6 Economic Characteristics by Region

	TOTAL N = 2,059	AMHARA N = 515	OROMIA N = 566	SNNP N = 511	TIGRAY N = 467
Woman's income is less than husband's or partner's* **	72.0	69.7	59.1	87.8	81.0
Woman home or land ownership* **	8.2	8.6	7.0	5.8	22.7
Husband decides how a woman's cash earnings are used[c]* **	25.4	13.7	38.1	21.7	22.10
Husband household chores assistance* **					
At least once a week	19.4	30.5	12.0	13.1	21.5
Rarely/never	80.6	69.5	88.0	86.9	78.5
Woman's household decision-making[d]* **					
High	21.9	22.4	27.8	15.5	17.6
Moderate	43.7	60.3	31.9	33.6	52.3
Low	34.3	17.3	40.4	50.9	30.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Among married women who have an income (excluded those with no husband/partner and no income): Total, N = 1,706; Amhara, N = 373; Oromia, N = 502; SNNP, N = 444; Tigray, N = 387.
d.) Nine-point scale constructed from who makes decisions in regards to woman's health, major household purchases, and visits to family and relatives (three points are given if the respondent is the main decision maker, two points if the decision is made jointly, and one point is given if the husband/partner makes the decision).

Table 7 Economic Characteristics by Vulnerability Index

	LOW N = 978	MODERATE N = 638	HIGH N = 443
Woman's income is less than husband's or partner's* **	69.6	76.1	71.8
Woman home or land ownership* **	8.2	7.5	9.2
Husband decides how a woman's cash earnings are used[c]* **	24.9	30.3	20.5
Husband household chores assistance* **			
At least once a week	23.6	16.1	14.4
Rarely/never	76.4	83.9	85.6
Woman's household decision-making[d]* **			
High	23.6	21.3	18.8
Moderate	47.0	39.4	42.4
Low	29.4	39.3	38.8

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Among married women who have an income (excluded those with no husband/partner and no income): Total, N = 1,706; Low vulnerability, N = 830; Moderate vulnerability, N = 486; High vulnerability, N = 390.
d.) Nine-point scale constructed from who makes decisions in regards to a woman's health, major household purchases, and visits to family and relatives (three points are given if the respondent is the main decision maker, two points if the decision is made jointly, and one point is given if the husband/partner makes the decision).

Table 8 Economic Characteristics by Respondent Type

	PREGNANT WOMEN N = 229	WOMEN WITH CHILD under two YEARS N = 691	WOMEN WITH CHILD three to five YEARS N = 598	OTHER WOMEN 15–49 YEARS N = 541
Woman's income is less than husband's or partner's* **	73.7	76.4	68.3	70.2
Woman home or land ownership* **	7.0	6.7	10.1	8.4
Husband decides how a woman's cash earnings are used[c]* **	27.1	26.7	25.3	23.1
Husband household chores assistance* **				
At least once a week	15.3	20.4	19.0	20.5
Rarely/never	84.7	79.6	81.0	79.5
Woman's household decision-making[d]* **				
High	17.1	17.6	25.3	25.3
Moderate	33.0	46.6	41.2	47.3
Low	50.0	35.9	33.5	27.5

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Among married women who have an income (excluded those with no husband/partner and no income): Total, N = 1,706; Pregnant women, N = 187; Women with children under two years, N = 542; Women with children three to five years, N = 506; other women, N = 471.
d.) Nine-point scale constructed from who makes decisions in regards to woman's health, major household purchases, and visits to family and relatives (three points are given if the respondent is the main decision maker, two points if the decision is made jointly, and one point is given if the husband/partner makes the decision).

Table 9 Family Health Card by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Heard of FHC* **	22.6	29.7	20.7	12.2	40.5
Has FHC at home* **	9.5	12.9	7.2	5.0	22.8
Frequency use of FHC* **					
Never	92.9	89.8	94.4	97.4	82.6
Sometimes	5.4	8.0	3.8	2.3	13.0
Often	1.7	2.2	1.9	0.4	4.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.

Table 10 Family Health Card by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Heard of FHC* **	22.9	20.0	25.3
Has FHC at home **	10.0	7.7	10.8
Frequency use of FHC			
Never	91.6	94.1	94.3
Sometimes	6.1	4.8	4.6
Often	2.3	1.2	1.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 11 Family Health Card by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Heard of FHC* **	29.0	22.6	26.6	19.2
Has FHC at home **	11.4	11.0	11.4	7.4
Frequency use of FHC				
Never	89.9	92.2	92.4	94.1
Sometimes	6.2	5.8	6.1	4.6
Often	3.8	2.0	1.4	1.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.

Table 12 Access, Topics, and Source of Health Information by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Heard or seen health information in past 3 months*	28.3	32.9	34.6	12.8	46.3
Topics of health messages* **					
FP	6.4	6.7	8.5	3.4	8.5
ANC	3.5	4.0	3.6	2.7	5.0
PNC	2.0	1.8	2.9	1.2	3.5
Delivery	1.7	1.1	2.6	1.3	3.1
Malaria	2.2	1.7	2.5	1.7	5.9
Nutrition	5.7	4.9	9.8	2.1	7.6
TB	1.2	1.2	1.6	0.4	2.7
PMTCT	3.2	5.7	2.1	1.3	2.8
Handwashing	11.5	10.4	16.6	5.3	24.1
WASH	16.3	20.6	21.9	5.0	20.4
Other	7.1	7.8	9.1	2.6	15.2
Don't know	71.8	67.4	65.4	87.2	53.9
Source of health message* **					
Radio	6.4	6.2	10.2	3.7	3.1
TV	1.7	1.9	2.9	0.2	1.5
Newspaper or magazine	0.1	0.2	0.1	0.1	0.0
Pamphlet/poster/leaflets	0.2	0.2	0.1	0.2	0.1
Community event/conversation	4.6	5.2	7.3	1.1	4.9
Health facility	5.2	5.9	7.0	2.0	8.0
HEW	13.3	14.7	16.8	5.7	25.2
HDA	2.9	2.3	4.9	1.1	5.5
Family/friends/relatives	5.1	3.4	11.2	0.4	7.9
Mobile text	1.3	2.8	0.2	0.7	0.3
Other	0.8	1.0	0.7	0.5	1.4
Don't know	71.8	67.1	65.4	87.2	54.1
Sources of message category* **					
Mass media	5.1	4.9	7.7	3.4	2.7
Community level	5.4	6.2	7.8	1.2	10.0
Health system	15.6	17.9	18.2	7.1	31.5
Mobile/text	1.3	2.8	0.2	0.7	0.3
Others	0.8	1.0	0.7	0.5	1.4
Don't know	71.8	67.1	65.4	87.2	54.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.
c.) Community level: Community event, HDA, and family/friends/relatives.

Table 13 Access, Topics, and Source of Health Information by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Heard or seen health information in past 3 months*	30.6	30.9	19.2
Topics of health messages* **			
FP	7.7	6.3	3.3
ANC	4.1	3.8	1.9
PNC	2.6	1.7	1.1
Delivery	2.2	1.4	1.0
Malaria	2.1	2.8	1.5
Nutrition	5.9	6.7	3.7
TB	1.5	1.0	0.5
PMTCT	3.2	4.1	2.0
Handwashing	13.7	11.8	6.2
WASH	18.6	17.3	9.7
Other	7.1	9.0	4.5
Don't know	69.6	69.1	80.8
Source of health message* **			
Radio	8.9	4.1	3.9
TV	2.9	0.7	0.1
Newspaper or magazine	0.2	0.1	0.0
Pamphlet/poster/leaflets	0.1	0.4	0.0
Community event/conversation	4.7	5.8	2.8
Health facility	5.7	6.0	2.8
HEW	13.1	16.1	10.0
HDA	2.9	3.3	2.4
Family/friends/relatives	5.5	5.4	3.5
Mobile text	1.3	1.3	1.0
Other	0.8	0.5	1.1
Don't know	69.4	69.2	80.8
Sources of message by category* **			
Mass media	7.4	3.5	2.0
Community level	5.4	6.4	4.0
Health system	15.6	19.1	11.1
Mobile/text	1.3	1.3	1.0
Others	0.8	0.5	1.1
Don't know	69.4	69.2	80.8

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.
c.) Community level: Community event, HDA, and family/friends/relatives.

Table 14 Access, Topics, and Source of Health Information by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Heard or seen health information in past 3 months*	32.4	26.3	27.0	29.3
Topics of health messages***				
FP	8.2	7.6	6.2	5.4
ANC	7.1	3.4	3.8	2.8
PNC	5.2	1.9	2.1	1.5
Delivery	2.7	1.9	1.8	1.4
Malaria	2.0	2.4	1.9	2.3
Nutrition	8.5	4.9	6.3	5.2
TB	1.0	0.8	1.3	1.3
PMTCT	2.7	2.9	2.2	4.0
Handwashing	8.6	10.5	13.7	11.6
WASH	13.7	14.6	17.6	17.2
Other	11.5	6.6	4.5	7.9
Don't know	67.6	73.7	73.1	70.9
Source of health message***				
Radio	5.9	4.1	4.3	9.0
TV	1.1	1.5	1.9	1.8
Newspaper or magazine	0.0	0.0	0.0	0.3
Pamphlet/poster/leaflets	0.9	0.0	0.1	0.1
Community event/conversation	4.5	4.0	5.4	4.5
Health facility	7.3	6.7	6.0	3.5
HEW	18.7	14.7	13.6	11.3
HDA	4.3	2.6	3.5	2.5
Family/friends/relatives	4.6	4.4	4.1	6.0
Mobile text	1.7	0.6	0.7	1.9
Other	1.1	0.6	0.8	0.8
Don't know	67.6	73.7	73.1	70.7
Sources of message by category***				
Mass media	5.7	3.3	3.8	6.7
Community level[c]	2.1	3.6	5.7	7.0
Health system	21.8	18.1	15.9	12.9
Mobile/text	1.7	0.6	0.7	1.9
Others	1.1	0.6	0.8	0.8
Don't know	67.6	73.7	73.1	70.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.
c.) Community level: Community event, HDA, and family/friends/relatives.

Table 15 Media Exposure by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Newspaper readership*					
Almost every day	0.4	0.2	0.2	1.0	0.0
At least once a week	2.5	1.2	1.7	4.8	1.9
Less than a week	3.9	3.1	1.9	5.9	8.7
Not at all	93.2	95.5	96.2	88.3	89.4
Radio listenership * **					
Almost every day	7.9	5.9	10.4	8.5	4.1
At least once a week	12.7	10.7	16.2	13.0	5.5
Less than a week	9.1	7.3	12.2	7.7	10.9
Not at all	70.4	76.2	61.2	70.7	79.4
TV viewership * **					
Almost every day	3.1	4.3	4.6	0.5	1.7
At least once a week	1.6	2.0	0.6	2.1	1.8
Less than a week	5.0	3.7	10.1	1.9	3.4
Not at all	90.3	90.0	84.7	95.5	93.1
Preferred radio/TV program* **					
None	62.3	63.6	56.8	68.7	50.1
Sport	3.1	1.1	5.7	3.3	1.2
Music	16.6	10.7	29.4	12.7	9.5
Drama	16.1	17.0	21.5	12.4	4.5
Talk show	4.9	5.3	4.2	6.0	1.2
News	18.5	16.1	25.0	16.2	12.1
Other	9.1	13.3	0.8	7.5	31.4

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.

Table 16 Media Exposure by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Newspaper readership* **			
Almost every day	0.7	0.0	0.4
At least once a week	2.7	2.6	1.7
Less than a week	4.9	3.0	2.8
Not at all	91.6	94.4	95.0
Radio listenership * **			
Almost every day	11.2	5.6	3.0
At least once a week	15.6	12.0	6.6
Less than a week	10.6	7.7	7.3
Not at all	62.6	74.6	83.1
TV viewership * **			
Almost every day	5.5	1.3	0.1
At least once a week	2.5	0.4	1.2
Less than a week	7.3	3.4	1.7
Not at all	84.8	94.9	97.1
Preferred radio/TV program* **			
None	51.0	69.7	78.9
Sport	4.3	2.7	0.9
Music	22.8	13.2	6.7
Drama	23.7	9.7	6.9
Talk show	6.8	3.7	2.1
News	24.5	16.0	7.6
Other	10.1	7.3	9.0

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.

Table 17 Media Exposure by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD under two YEARS N = 724	WOMEN WITH CHILD three to five YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Newspaper readership* **				
Almost every day	--	--	--	1.0
At least once a week	--	1.0	0.2	4.9
Less than a week	1.1	2.1	2.4	6.3
Not at all	98.9	96.9	97.5	87.7
Radio listenership* **				
Almost every day	3.5	7.3	6.7	9.6
At least once a week	11.2	10.7	10.1	15.4
Less than a week	9.6	7.2	5.0	12.1
Not at all	75.6	74.7	78.1	62.9
TV viewership* **				
Almost every day	2.6	1.9	4.3	3.3
At least once a week	1.8	1.3	0.1	2.5
Less than a week	3.9	3.4	3.7	6.7
Not at all	91.7	93.4	91.8	87.4
Preferred radio/TV program* **				
None	71.2	67.1	66.0	55.8
Sport	1.0	2.3	1.8	4.7
Music	11.8	13.3	11.9	22.0
Drama	11.7	12.5	12.7	20.9
Talk show	3.1	4.4	3.7	6.2
News	11.4	15.9	16.9	22.1
Other	9.1	9.5	10.5	8.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0. 05; ** p < 0.01; *** p < 0.001.

Table 18 Ownership of Household Media Items

Household item ownership	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Working radio	26.3	21.2	37.0	24.5	13.3
Working television	3.9	6.2	5.2	0.5	2.1
Nonmobile telephone	0.4	--	0.4	0.6	1.0
Mobile telephone	51.5	58.8	48.3	46.1	51.5

Table 19 Knowledge of Family Planning Methods by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
FP knowledge* **					
Pills	66.4	54.2	83	59.4	89.8
Injectable	60.6	42.3	83	53.5	90.8
Emergency contraception	7.1	9	6.6	6.2	3.4
Male condoms	57.5	63.4	49.3	57	65.7
Female condoms	12.8	12.4	8.8	17.8	9.7
Diaphragm/foam/jelly	1.5	1.9	2.1	0.6	0.8
IUD/loop/coil	34.8	41.7	33.2	28.9	32.2
Implants	59.4	53.3	69.4	52.3	80.6
Female sterilization	21.6	29	16.8	19.8	11.1
Male sterilization	7.8	10.7	6.2	6.9	3.3
Lactation amenorrhea/currently breastfeeding	24.4	23.7	26.3	23.2	24.8
Withdrawal	8.6	9.4	4	13	4
Rhythm/calendar method	17.4	24.2	10.5	17.6	10.7
Standard days method/cycle beads	3.8	2.8	2.9	1.4	24.2
Other	--	--	--	0.1	--
Don't know	6.9	2.8	8.4	11.5	1.4
Any FP method * **	93.1	97.2	91.5	88.2	98.6
Any FP modern methods* **	92.9	97.1	91.5	88.2	98.6
Any modern short-acting method* **	90.2	92.5	88.9	87.3	97.9
Any modern long-acting method* **	73	77	74.1	65.1	83.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 20 Family Planning Knowledge Index

	ONE TO THREE METHODS	FOUR TO EIGHT METHODS	NINE OR MORE METHODS	NO FP KNOWLEDGE
Total	39.8	50.5	2.7	7.0
Region* **				
Amhara	48.7	46.2	2.3	2.8
Oromia	30.4	57.1	4	8.5
SNNP	41.1	45.4	1.8	11.8
Tigray	27.7	67.5	3.4	1.4
Respondent type* **				
Currently pregnant	43.9	47.0	1.2	7.9
With child under two years	37.6	55.4	2.1	4.8
With child three to five years	40.2	51.7	3.1	5.0
Other women 15–49 years	40.0	47.6	3.1	9.2
Vulnerability index				
Low	38.5	51.5	3.3	6.7
Moderate	38.0	54.3	1.9	5.8
High	45.2	42.9	2.3	9.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Total, N = 2,770, Region: Amhara n = 674, Oromia n = 688, SNNP n = 760, Tigray n = 648.
d.) Respondent type: Pregnant, n = 235; women with child under two years, n = 724; women with child under five years, n = 643; other women 15–49, n = 1,168.
c.) Vulnerability index: low, n = 1,343; moderate, n = 825; high, n = 602.

Table 21 Family Planning Use and Services Received

	EVER USED FP METHOD N = 2,770	RECEIVED FP SERVICES N = 2,770	CURRENT USE FP METHODS N = 2,535
Total	57.8	42.0	41.0
Region* **			
Amhara	75.6	55.5	54.4
Oromia	48.5	30.7	29.6
SNNP	46.1	37.2	36.3
Tigray	57.2	41.9	37.9
Respondent type* **			
Currently pregnant	55.7	25.4	-
With child under two years	65.7	51.3	49.3
With child three to five years	75.6	61.4	59.1
Other women 15–49 years	44.3	29.7	26.8
Vulnerability index* **			
Low	58.9	44.7	44.1
Moderate	61.3	42.6	40.5
High	50.3	34.7	34.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Received FP services in past 12 months.
d.) FP methods refer to modern methods.

Table 22 Reasons for Not Using Family Planning Methods by Region

	TOTAL N = 1,750	AMHARA N = 351	OROMIA N = 509	SNNP N = 475	TIGRAY N = 415
Not currently having sex	46.0	44.8	37.1	57.3	42.8
Want to get pregnant/currently pregnant	23.3	26.3	25.5	16.6	31.8
Menopausal/had hysterectomy	9.7	11.5	9.6	7.4	13.5
Not familiar with any methods	3.6	0.9	6.9	3.1	0.7
Health concerns	3.2	3.1	4.7	2.0	1.1
Fear of side effects	2.7	2.6	3.5	1.9	2.8
Religion doesn't allow it	2.2	0.8	4.9	0.7	0.9
Partner doesn't allow it	1.1	0.8	0.4	2.2	0.2
Family doesn't allow it	0.6	-	1.3	0.4	-
Preferred method not available	0.6	1.1	-	0.8	-
Clinic too far away	0.6	0.9	0.6	0.4	-
Not effective	0.3	-	0.9	-	-
Too expensive	0.1	-	0.3	-	0.2
Other	7.7	9.5	6.4	7.9	5.8

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 23 Family Planning Self-Efficacy and Outcome Expectancy

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
FP self-efficacy* **					
Disagree	17.1	4.7	35.3	16.7	2.9
Agree	45.7	47.5	40.7	52.4	26.7
Strongly Agree	37.3	47.8	24	30.9	70.5
FP outcome expectancy* **					
Disagree	12.1	3.7	20.7	15.8	2.0
Agree	46.3	43.3	47.4	52.1	30.9
Strongly Agree	41.6	53	32	32.2	67.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Self-efficacy: Confident I can use family planning to avoid unwanted pregnancies.
d.) Outcome Expectancy: Use of modern family planning methods improves quality of family life.

Table 24 Antenatal Care Services by Region

	TOTAL N = 745	AMHARA N = 177	OROMIA N = 176	SNNP N = 196	TIGRAY N = 196
Type of ANC provider* **					
Doctors	4.4	3.4	7.5	3.7	0.5
Nurses/midwives	47.0	59.1	37.2	40.3	59.3
HEWs	30.2	22.3	29.1	38.5	33.2
Others	1.5	1.8	2.2	0.8	0.9
No one	16.9	13.4	24.0	16.7	6.2
Any skilled provider	75.3	77.5	66.0	79.5	82.8
Location for ANC services* **					
Government hospital	4.8	3.6	6.0	4.8	5.6
Government health center	50.7	67.2	29.9	50.5	58.0
Government health post	21.0	12.9	25.2	23.9	28.6
Other	3.6	2.3	5.9	3.4	1.2
No hospital visit	19.9	14.0	33.0	17.4	6.6
Number of ANC Visits * **					
No visit	20.2	14.0	33.7	17.4	7.2
One to three visits	32.7	30.7	36.4	28.6	45.5
Four or more visits	47.2	55.3	30.0	53.9	47.4
Time of ANC Visit * **					
No visit	24.0	23.6	34.6	18.5	8.4
One to 12 weeks	30.4	35.1	31.7	20.9	46.5
13+ weeks	45.6	41.3	33.7	60.6	45.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Skilled providers refers to doctors, nurses, or HEWs..

Table 25 Institutional Delivery and Postnatal Care Services by Region

	TOTAL N = 745	AMHARA N = 177	OROMIA N = 176	SNNP N = 196	TIGRAY N = 196
Type of delivery provider* **					
Doctors	3.6	3.2	3.3	4.9	1.6
Nurses/midwifes	43.2	57.3	28.8	37.5	61.1
HEWs	7.7	7.2	5.4	10.4	6.6
TBAs	21.4	15.2	37.9	15.5	10.8
Others	11.7	9.7	2.1	22.7	9.3
Don't know	12.4	7.5	22.6	9.0	10.7
Any skilled provider	50.5	61.7	32.9	51.0	66.4
Place of last delivery* **					
Home	53.4	36.6	69.6	58.0	45.8
Government health facility	43.9	59.9	26.8	40.3	53.1
Mission/private hospital	1.1	0.0	2.4	1.3	0.6
Other	1.6	3.5	1.2	0.4	0.5
Institutional delivery	46.6	63.4	30.4	42.0	54.2
Received postnatal care (PNC) within seven days of birth *(all women with children under two)*	26.3	32.0	10.9	26.2	40.1
Received postnatal care (PNC) within seven days of birth *(all women with children under two who delivered in a health facility)*	47.8	48.6	31.6	51.8	65.8

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Skilled providers refers to doctors, nurses, or HEWs.
d.) Uptake of PNC services among women delivered at health facility: Total, N = 343; Amhara, N = 98; Oromia, N = 48; SNNP, N = 93; Tigray N = 104.

Table 26 Institutional Delivery and Postnatal Care Services by Vulnerability Index

	LOW N = 356	MODERATE N = 223	HIGH N = 166
Type of delivery provider			
Doctors	3.8	4.1	2.7
Nurses/midwives	47.1	45.8	31.9
HEWs	7.3	11.0	4.4
TBAs	21.3	19.0	24.3
Other	10.6	11.4	14.3
Don't know	9.9	8.8	22.3
Place of last delivery*			
Home	49.4	47.8	68.6
Government health facility	47.5	50.5	27.9
Mission/private hospital	1.3	0.9	1.0
Others	1.8	0.7	2.5

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 27 Reasons for Not Delivering in a Health Facility by Region

Reasons for not delivering in a health facility***	TOTAL N = 402	AMHARA N = 79	OROMIA N = 128	SNNP N = 103	TIGRAY N = 92
Inconvenient hour	34.6	34.3	29.8	57.3	23.2
Too far/ no transport	23.1	23.5	30.2	19.0	23.2
I didn't think it was necessary	10.2	8.1	22.2	8.5	0.0
No one to accompany	9.7	12.7	6.9	6.9	12.8
Not customary	4.7	5.1	8.2	3.8	1.5
Not the first child	3.5	0.0	8.6	4.6	0.0
Baby's father didn't think it was necessary	1.7	2.0	3.7	0.7	0.0
Afraid to go	1.5	1.1	1.4	1.1	1.2
Facility not open	1.0	1.5	3.1	0.0	0.0
Don't trust facility	1.0	2.3	0.8	1.5	0.0
Husband's family didn't allow	1.0	0.0	0.8	1.2	0.0
Other	4.7	3.7	7.6	2.9	2.0
Don't know	17.9	25.7	0.0	5.0	43.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 28 Reasons for Not Delivering in a Health Facility by Vulnerability Index

Reasons for not delivering in a health facility***	LOW N = 181	MODERATE N = 108	HIGH N = 113
Inconvenient hour	37.1	43.4	41.4
Too far/ no transport	18.7	28.3	29.7
I didn't think it was necessary	20.7	7.6	5.6
No one to accompany	11.7	6.8	5.2
Not customary	4.5	1.0	11.1
Not the first child	6.4	5.4	1.8
Baby's father didn't think it was necessary	2.4	3.0	0.7
Afraid to go	0.8	1.5	1.5
Facility not open	0.7	1.2	2.8
Don't trust facility	1.5	1.2	1.1
Husband's family didn't allow	1.0	0.6	0.5
Other	3.9	5.3	5.7
Don't know	6.9	12.3	11.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 29 Knowledge of Danger Signs during Pregnancy and Delivery by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Knowledge of danger signs* **					
Vaginal bleeding or discharge	48.6	49.3	41.7	43.6	58.6
High blood pressure	26.5	19.0	28.4	35.3	17.7
Fast or difficulty breathing	22.7	20.4	21.9	23.7	25.1
Severe headaches, dizziness, or blurred vision	21.4	21.0	43.9	13.8	11.3
Extreme swelling of hands, feet, or face	19.8	27.1	29.7	20.3	5.7
Prolonged labor (>12 hours)	16.3	20.3	24.4	14.3	11.4
Placenta not delivered within one hour after delivery	11.4	8.9	15.5	15.7	6.1
Fevers, chills, vomiting	10.6	9.7	19.9	10.6	4.1
Decreased/absent fetal movement	9.0	8.7	8.1	3.1	16.0
Severe abdominal pain/contractions before 37 weeks	4.7	3.7	12.2	2.1	1.3
Other	8.4	18.2	2.2	6.6	13.5
Don't know	17.5	10.5	15.4	25.0	16.7
Knowledge index					
Low	45.4	39.9	39.8	55.4	53.6
Medium	40.9	51.2	37.5	32.3	40.7
High	13.7	8.9	22.8	12.2	5.6

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 30 Knowledge of Danger Signs during Pregnancy and Delivery by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Knowledge of danger signs* **			
Vaginal bleeding or discharge	47.1	46.4	42.8
High blood pressure	27.6	27.6	22.3
Fast or difficulty breathing	23.6	23.9	16.3
Severe headaches, dizziness, or blurred vision	26.2	27.7	18.2
Extreme swelling of hands, feet, or face	23.8	25.8	24.3
Prolonged labor (more than 12 hours)	18.1	25.0	13.6
Placenta not delivered within one hour after delivery	12.5	14.5	10.7
Fevers, chills, vomiting	14.7	14.3	5.4
Decreased/absent fetal movement	8.0	7.9	5.0
Severe abdominal pain/contractions before 37 weeks	5.5	6.4	4.6
Other	8.5	11.2	10.7
Don't know	15.9	15.4	19.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 31 Antenatal Care Knowledge, Self-Efficacy, and Outcome Expectancy by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
ANC knowledge (number of visits)* **	84.3	78.4	82.2	89.9	87.3
ANC knowledge (timing of visit)* **					
Disagree	3.8	1.2	4.0	5.4	4.0
Agree	52.2	51.7	54.8	68.0	34.4
Strongly agree	44.0	47.2	41.1	26.6	61.6
ANC self-efficacy* **					
Disagree	7.4	5.1	10.1	12.3	3.6
Agree	52.6	55.	52.5	64.3	36.1
Strongly agree	40.1	39.8	37.4	23.4	60.3
ANC outcome expectancy* **					
Disagree	2.9	1.1	4.1	2.7	3.5
Agree	47.1	48.0	50.3	63.7	29.6
Strongly agree	50.0	50.9	45.6	33.7	66.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Skilled providers refers to doctors, nurses, or HEWs.
d.) ANC knowledge (number of visits) measured by whether the woman correctly reported four or more ANC visits as the recommended number of ANC visits a pregnant woman should have.
e.) ANC knowledge (timing of visit) measured with the following statement: It is important for pregnant women to have at least one ANC visit by skilled provider (doctor, nurse, or HEW) within three months.
f.) ANC self-efficacy: Attending ANC at least four times during pregnant beginning in the first trimester is possible.
g.) ANC outcome expectancy: Pregnant women who visit the ANC.

Table 32 Antenatal Care Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
ANC knowledge (number of visits)* **	80.7	85.0	88.0
ANC knowledge (timing of visit)			
Disagree	8.4	8.8	8.6
Agree	54.8	55.3	59.3
Strongly agree	36.7	35.9	32.1
ANC self-efficacy* **			
Disagree	8.4	8.8	8.6
Agree	54.8	55.3	59.3
Strongly agree	36.7	35.9	32.1
ANC outcome expectancy* **			
Disagree	2.8	2.2	2.6
Agree	48.8	52.9	59.2
Strongly agree	48.4	45.0	38.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Skilled providers refers to doctors, nurses, or HEWs.
d.) ANC knowledge (number of visits) measured by whether the woman correctly reported four or more ANC visits as the recommended number of ANC visits a pregnant woman should have.
e.) ANC knowledge (timing of visit) measured with the following statement: It is important for pregnant women to have at least one ANC visit by skilled provider (doctor, nurse, or HEW) within 3 months.
f.) ANC self-efficacy: Attending ANC at least four times during pregnant beginning in the first trimester is possible.
g.) ANC outcome expectancy: Pregnant women who visit the ANC.

Table 33 Human Immunodeficiency Virus Prevention Practices by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Ever tested for HIV* **	59.7	77.6	39.1	56.7	70.5
Most recent HIV test* **					
Within past six months	13.1	17.5	7.6	10.9	24.1
More than six months	46.6	60.1	31.4	45.8	46.4
Never been tested	40.3	22.4	60.0	43.3	29.5
HIV test during recent pregnancy* **	49.1	65.4	32.1	41.6	67.1
HIV test among currently pregnant women* **	36.1	60.4	18.6	30.8	75.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) HIV test during recent pregnancy: among women who have ever been pregnant: Total, N = 2,209; Amhara, n = 555; Oromia, n = 572; SNNP, n = 541; Tigray, n = 541
d) HIV test among currently pregnant women: Total, N = 235; Amhara, n = 39; Oromia, n = 80; SNNP, n = 60; Tigray, n = 56

Table 34 Human Immunodeficiency Virus Prevention Practices by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Ever tested for HIV	61.7	59.1	55.9
Most recent HIV test			
Within past six months	13.3	14.0	11.3
More than six months	48.4	45.1	44.6
Never been tested	38.3	40.9	44.1
HIV test during recent pregnancy*	54.7	47.3	39.4

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) HIV test during recent pregnancy: Among women who have ever been pregnant: Total, N = 2,209; Low vulnerability, n = 1,010; Moderate vulnerability, n = 683; High vulnerability, n = 516.

Table 35 Human Immunodeficiency Virus Prevention Practices by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Ever tested for HIV* **	53.9	68.6	64.7	53.1
Most recent HIV test* **				
Within past six months	25.5	14.8	8.5	12.1
More than six months	28.4	53.8	56.2	41.0
Never been tested	46.1	31.4	35.3	46.9
HIV test during recent pregnancy* **	36.1	57.9	56.7	37.0

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) HIV test during recent pregnancy: Among women who have ever been pregnant: Total, N = 2,209; pregnant women, n = 235; women with children under two, n = 724; women with children three to five, n = 643; other women 15–49, n = 607.

Table 36 Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Region

	TOTAL N = 2,581	AMHARA N = 546	OROMIA N = 658	SNNP N = 744	TIGRAY N = 633
PMTCT knowledge* **					
Low	28.8	17.9	35.3	34.8	21.0
Medium	46.6	48.8	42.9	49.7	38.0
High	24.6	33.3	21.8	15.5	41.0
PMTCT self-efficacy* **					
Disagree	10.4	2.9	19.0	10.4	5.2
Agree	60.2	56.7	55.4	71.4	44.8
Strongly agree	29.4	40.3	25.6	18.3	50.0
PMTCT outcome expectancy* **					
Disagree	19.6	11.9	19.9	28.8	10.4
Agree	54.2	54.9	53.0	56.2	47.3
Strongly agree	26.2	33.2	27.1	15.1	42.4

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Knowledge of PMTCT is considered high if a participant agrees or strongly agrees with the following statements: a pregnant woman with HIV can transmit it to her baby and a pregnant woman can prevent transmitting it to her baby if she takes ARVs. The maximum score is three; low ≤ 1.5; medium = 2; and high = 2.5–3.
d.) PMTCT self-efficacy measured according to the statement: I am able to be tested for HIV and take ARVs if needed.
e.) PMTCT outcome expectancy was measured according to the statement: Believes that testing for HIV and adhering to ARV can reduce risk of HIV transmission.

Table 37 Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability Index

	LOW N = 1,233	MODERATE N = 785	HIGH N = 563
PMTCT knowledge **			
Low	26.3	27.9	35.7
Medium	48.4	44.7	45.0
High	25.3	27.4	19.3
PMTCT self-efficacy **			
Disagree	10.0	8.7	13.5
Agree	56.7	62.6	64.8
Strongly agree	33.3	28.7	21.7
PMTCT outcome expectancy* **			
Disagree	16.4	18.3	28.6
Agree	54.5	53.6	54.5
Strongly agree	29.1	28.1	16.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Knowledge of PMTCT is considered high if a participant agrees or strongly agrees with the following statements: a pregnant woman with HIV can transmit it to her baby and a pregnant woman can prevent transmitting it to her baby if she takes ARVs. The maximum score is three; low ≤ 1.5; medium = 2; and high = 2.5–3.
d.) PMTCT self-efficacy measured according to the statement: I am able to be tested for HIV and take ARVs if needed.
e.) PMTCT outcome expectancy was measured according to the statement: Believes that testing for HIV and adhering to ARV can reduce risk of HIV transmission.

Table 38 Prevention of Mother-to-Child Transmission Knowledge, Self-Efficacy, and Outcome Expectancy by Respondent Type

	PREGNANT WOMEN N = 224	WOMEN WITH CHILD UNDER TWO YEARS N = 671	WOMEN WITH CHILD THREE TO FIVE YEARS N = 598	OTHER WOMEN 15–49 YEARS N = 1,088
PMTCT knowledge				
Low	32.8	30.6	28.7	27.1
Medium	45.0	45.6	46.4	47.5
High	22.1	23.9	24.9	25.4
PMTCT self-efficacy*				
Disagree	15.8	8.1	10.9	10.4
Agree	62.3	63.1	60.6	57.9
Strongly agree	21.9	28.9	28.5	31.7
PMTCT outcome expectancy				
Disagree	21.7	18.9	17.8	20.5
Agree	52.1	55.3	55.8	53.2
Strongly agree	26.1	25.9	26.4	26.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Knowledge of PMTCT is considered high if a participant agrees or strongly agrees with the following statements: a pregnant woman with HIV can transmit it to her baby and a pregnant woman can prevent transmitting it to her baby if she takes ARVs. The maximum score is three; low ≤ 1.5; medium = 2; and high = 2.5–3.
d.) PMTCT self-efficacy measured according to the statement: I am able to be tested for HIV and take ARVs if needed.
e.) PMTCT outcome expectancy was measured according to the statement: Believes that testing for HIV and adhering to ARV can reduce risk of HIV transmission.

Table 39 Pentavalent 3 Coverage (Source of Information) by Region

	TOTAL N = 737	AMHARA N = 173	OROMIA N = 174	SNNP N = 194	TIGRAY N = 196
Penta 3 for children under two years					
Vaccination card***	29.6	37.2	11.2	36.0	39.0
Mother's report***	19.6	25.6	16.6	13.3	31.3
Either source***	49.2	62.8	27.8	49.3	70.3
Penta 3 children four to 23 months old					
Vaccination card	34.5	43.4	14.0	40.2	46.0

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Women with children four to 23 months: Total, N = 610; Amhara, n = 144; Oromia, n = 137; SNNP, n = 165; Tigray, n = 164.

Table 40 Breastfeeding Practices by Region

	TOTAL N = 737	AMHARA N = 173	OROMIA N = 174	SNNP N = 194	TIGRAY N = 196
Early initiation of BF	68.0	71.0	62.8	69.4	69.1
Exclusive BF	63.7	67.2	62.4	62.4	60.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Early initiation was measured among women with children under two years who put a child to a breast within an hour after birth.
d.) Among women with children under six months: Total, N = 206; Amhara, n = 46; Oromia, n = 61; SNNP, n = 49; Tigray, n = 50.

Table 41 Exclusive Breastfeeding among Children under Two Years

	TOTAL N = 737	AMHARA N = 173	OROMIA N = 174	SNNP N = 194	TIGRAY N = 196
Age (months)**					
0–1	79.2	82.7	70.1	85.4	77.5
2–3	62.6	69.3	51.5	75.0	42.5
4–5	52.9	47.7	69.6	36.0	60.5
6–8	12.3	10.8	18.5	9.50	12.2
9–11	5.7	9.4	9.0	--	--
12–17	0.8	1.1	1.7	--	--

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) "—" indicates no exclusive breastfeeding practiced.
d.) No children 18–23 months in the study sample were exclusively breastfed.

Table 42 Nutrition Practices among Children Age Six to 23 Months by Region

	TOTAL N = 531	AMHARA N = 127	OROMIA N = 113	SNNP N =145	TIGRAY N = 146
Minimum dietary diversity*	18.5	13.6	25.4	16.4	26.4
Minimum meal frequency*	58.4	67.1	60.3	47.8	59.9
Minimum acceptable diet*	9.8	7.6	14.2	6.9	17.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Minimum dietary diversity is met when children consume four or more food groups in the past 24 hours of the interview.
d.) Minimum meal frequency is met when children receive solid or semisolid food at least twice a day for breastfed infants six to eight months, at least three times a day for breastfed children nine to 23 months, and at least four times a day for non-breastfed children 6-23 months.
e.) Minimum acceptable diet is met when children age six to 23 months meet minimum standards of meal frequency (per day) and diet diversity (four or more food groups) according to their age and breastfeeding status.

Table 43 Nutrition Self-Efficacy and Outcome Expectancy by Region

	TOTAL N = 531	AMHARA N = 127	OROMIA N = 113	SNNP N =145	TIGRAY N = 146
Minimum diet diversity knowledge* **					
Disagree	0.8	--	2.4	0.5	--
Agree	55.9	48.6	56.7	67.5	33.9
Strongly agree	43.3	51.4	40.9	32.0	66.1
Minimum meal frequency knowledge* **					
Disagree	0.5	0.5	1.4	--	--
Agree	57.0	49.3	56.3	68.9	40.5
Strongly agree	42.5	50.2	42.3	31.1	59.5
Minimum acceptable diet self-efficacy* **					
Disagree	20.0	22.2	22.3	20.3	0.6
Agree	50.7	49.9	42.0	58.3	50.3
Strongly agree	29.3	27.9	35.7	21.4	49.2
Minimum acceptable diet outcome expectancy* **					
Disagree	6.8	11.6	8.5	2.1	--
Agree	52.8	38.1	56.7	66.6	43.0
Strongly agree	40.5	50.3	34.8	31.3	57.0
Exclusive BF outcome expectancy* **					
Disagree	2.5	0.4	4.4	3.3	1.7
Agree	44.6	41.9	39.2	57.2	19.1
Strongly agree	52.9	57.7	56.3	39.4	79.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) "--" indicates none.
d.) Knowledge regarding minimum diet diversity was measured by whether the respondent, agreed, disagreed. or strongly disagreed with the following statement: Children should have at least four food groups a day.
e.) Knowledge regarding minimum meal frequency was measured by whether the respondent, agreed, disagreed, or strongly disagreed with the following statement: Children should eat two to four meals (one to two snacks) a day.
f.) Minimum acceptable diet self-efficacy was measured with the following statement: Feel they can provide minimal acceptable diet for their children.
g.) Minimum acceptable diet outcome expectancy was measured with the following statement: Believe that minimal acceptable diet will enhance child survival.
h.) Exclusive BF outcome expectancy was measured with the following statement: Believe that exclusive BF in the first six months will lead to healthy neonatal outcomes.

Table 44 Children under Five Years with Fever in Past Two Weeks and Treatment Seeking by Region

	TOTAL N = 276	AMHARA N = 50	OROMIA N = 57	SNNP N = 88	TIGRAY N = 81
Child with reported fever in past two weeks* **	22.8	20.5	17.6	29.2	27.2
Child with reported fever in past two weeks (malaria sites)	24.5	21.0	19.2	30.1	29.1
Child with fever who sought advice/treatment for fever**	63.4	54.0	70.2	71.6	55.6
Timing of advice/treatment seeking					
Within 24 hours or less	19.2	12.0	28.1	25.0	11.1
More than 24 hours	44.2	42.0	42.1	46.6	44.4
No treatment sought for fever	36.6	46.0	29.8	28.4	44.4
Location of advice/treatment* **					
Government hospital	3.3	--	3.5	1.1	7.4
Government health center	29.0	32.0	22.8	36.4	23.5
Government health post	13.0	12.0	19.3	5.7	17.3
Private facility	14.9	10.0	24.6	25.0	--
Other	3.3	--	--	3.4	7.4
No treatment sought for fever	36.6	46.0	29.8	28.4	44.4
Child who sought treatment received medicine for fever* **	67.0	46.0	75.4	84.1	55.6

Notes
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) For child with reported fever in past two weeks sample included all women with children under five: Total, N = 1,273; Amhara, n = 291; Oromia, n = 335; SNNP, n = 353; Tigray, n = 294.
d.) For child with reported fever in past two weeks (malaria sites) sample included all women with children under five who reside at malaria sites: Total, N = 841; Amhara, n = 202; Oromia, n = 185; SNNP, n = 293; Tigray, n = 161.
e.) Government center also includes HEW.

Table 45 Children under Five Years with Fever in Past Two Weeks and Treatment Seeking by Vulnerability Index

	LOW N = 82	MODERATE N = 106	HIGH N = 88
Child with reported fever in past two weeks* **	15.5	29.3	29.2
Child with fever who sought advice/treatment for fever	65.9	65.1	59.1
Timing of advice/treatment seeking* **			
Within 24 hours or less	15.9	30.2	9.1
More than 24 hours	50.0	34.9	50.0
No treatment sought for fever	34.1	34.9	40.9
Location of advice/treatment			
Government hospital	2.4	4.7	2.3
Government health center	28.0	31.1	27.3
Government health post	14.6	14.2	10.2
Private facility	15.9	13.2	15.9
Other	4.9	1.9	3.4
No treatment sought for fever	34.1	34.9	40.9
Child who sought treatment received medicine for fever	69.5	67.0	64.8

Notes
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) For child with reported fever in past 2 week sample included all women with children under five: Total, N = 1,273; Amhara, n = 291; Oromia, n = 335; SNNP, n = 353; Tigray, n = 294.
e.) Government center also includes HEW.

Table 46 Knowledge of Malaria by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Ever heard of malaria* **	93.3	94.5	82.6	97.1	99.1
Knowledge of signs and symptoms of malaria* **					
Feeling cold	74.3	76.8	64.0	80.5	79.1
Fever	45.0	50.0	35.6	47.3	49.8
Headache	43.4	42.8	38.5	50.5	36.6
Nausea and vomiting	29.7	29.0	22.7	35.5	38.6
Body ache or joint pain	19.8	28.5	8.4	20.7	19.3
Loss of appetite	19.7	21.1	14.9	22.4	21.6
Dizziness	10.4	8.2	12.2	11.8	7.5
Feeling weak	7.9	5.0	9.7	9.7	6.5
Diarrhea	5.9	6.1	5.4	5.8	6.8
Pale eyes	2.2	2.1	0.9	3.4	2.9
Refusing to drink	1.8	0.5	0.7	4.6	1.5
Salty tasting palms	1.6	1.0	1.4	2.4	1.3
Knowledge of causes of malaria*					
Mosquito bite	29.7	34.3	28.6	26.6	23.7
Other causes (misconceptions)	70.3	65.7	71.4	73.4	76.3
Knowledge of prevention of malaria* **					
Less than three preventative actions	52.3	67.2	34.2	49.6	66.0
Three or more preventative actions	28.5	20.5	31.6	35.4	27.0
No preventative actions known	19.1	12.3	34.2	15.0	7.0

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 47 Knowledge of Malaria by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Ever heard of malaria**	90.5	94.6	89.0
Knowledge of signs and symptoms of malaria**			
Feeling cold	73.3	74.8	76.0
Fever	43.5	48.3	43.9
Headache	38.8	48.4	47.6
Nausea and vomiting	28.1	30.4	32.4
Body ache or joint pain	18.4	22.6	19.1
Loss of appetite	19.5	19.8	20.2
Dizziness	10.3	10.5	10.4
Feeling weak	6.4	9.4	9.2
Diarrhea	5.5	6.1	6.3
Pale eyes	2.3	1.5	2.9
Refusing to drink	1.4	2.1	2.5
Salty tasting palms	1.8	0.6	2.3
Knowledge of causes of malaria**			
Mosquito bite	29.9	33.0	24.8
Other causes (misconceptions)	70.1	67.0	75.2
Knowledge of prevention of malaria**			
Less than three preventative actions	49.9	54.0	55.7
Three or more preventative actions	29.9	30.7	22.5
No preventative actions known	20.3	15.3	21.8

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 48 Knowledge of Malaria by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Ever heard of malaria	91.9	91.1	92.1	91.4
Knowledge of signs and symptoms of malaria* **				
Feeling cold	73.2	74.0	76.2	73.8
Fever	43.2	47.8	44.1	44.1
Headache	43.2	43.9	43.9	42.9
Nausea and vomiting	20.3	32.6	32.0	28.6
Body ache or joint pain	18.0	19.7	16.6	21.8
Loss of appetite	18.5	21.2	21.1	18.3
Dizziness	12.5	11.7	9.8	9.6
Feeling weak	5.8	8.2	8.6	7.7
Diarrhea	5.1	7.8	4.4	5.6
Pale eyes	2.8	1.6	1.9	2.5
Refusing to drink	4.1	2.0	0.9	1.7
Salty tasting palms	2.2	1.4	1.2	1.7
Knowledge of causes of malaria				
Mosquito bite	32.9	28.0	29.5	30.1
Other causes (misconceptions)	67.1	72.0	70.5	69.9
Knowledge of prevention of malaria				
Less than three preventative actions	50.7	51.6	50.9	53.8
Three or more preventative actions	23.2	29.0	30.0	28.5
No preventative actions known	26.2	19.5	19.1	17.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 49 Knowledge of Malaria by Region (Malaria Sites)

	TOTAL N = 1,817	AMHARA N = 457	OROMIA N = 367	SNNP N = 631	TIGRAY N = 362
Ever heard of malaria	94.7	95.0	91.2	96.0	100
Knowledge of signs and symptoms of malaria					
Feeling cold	78.3	77.1	77.4	80.2	78.3
Fever	48.9	51.5	42.7	49.7	52.9
Headache	46.2	40.8	48.0	51.9	35.6
Nausea and vomiting	32.3	27.5	28.2	38.3	41.6
Body ache or joint pain	20.8	19.3	18.3	23.4	24.4
Loss of appetite	20.5	29.0	8.3	21.0	16.7
Dizziness	10.7	7.4	13.4	12.9	7.0
Feeling weak	8.4	3.5	12.8	10.8	4.7
Diarrhea	6.3	5.3	7.3	6.2	9.3
Pale eyes	2.6	1.9	1.1	4.2	2.8
Other	2.4	0.3	2.4	4.8	0.5
Don't know	10.2	8.2	16.4	7.9	11.2
Knowledge of causes of malaria					
Mosquito bite	31.9	35.2	35.1	27.6	24.6
Other causes (misconceptions)	68.1	64.8	64.9	72.4	75.4
Knowledge of prevention of malaria					
Less than three preventative actions	54.6	67.9	40.2	49.4	65.1
Three or more preventative actions	32.3	21.3	40.7	37.9	29.6
No preventative actions known	13.2	10.8	19.1	12.7	5.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 50 Knowledge of Malaria by Vulnerability Index (Malaria Sites)

	LOW N = 842	MODERATE N = 573	HIGH N = 402
Ever heard of malaria	93.2	98.6	92.5
Knowledge of signs and symptoms of malaria			
Feeling cold	78.9	78.3	77.0
Fever	47.5	52.4	46.8
Headache	41.8	51.5	49.1
Nausea and vomiting	28.3	35.5	37.0
Loss of appetite	20.2	20.4	22.7
Body ache joint pain	19.5	24.6	16.9
Dizziness	10.0	11.2	12.0
Feeling weak	6.1	10.5	10.7
Diarrhea	5.6	7.2	6.7
Pale eyes	2.6	1.9	3.6
Other	2.9	3.5	4.5
Don't know	11.4	7.9	11.5
Knowledge of causes of malaria			
Mosquito bite	31.5	35.7	27.2
Other causes (misconceptions)	68.5	64.3	72.8
Knowledge of prevention of malaria			
Less than three preventative actions	52.6	56.3	56.7
Three or more preventative actions	32.5	34.8	28.1
No preventative actions known	14.9	8.9	15.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 51 Knowledge of Malaria by Respondent Type (Malaria Sites)

	PREGNANT WOMEN N = 165	WOMEN WITH CHILD under two YEARS N = 484	WOMEN WITH CHILD three to five YEARS N = 413	OTHER WOMEN 15–49 YEARS N = 755
Ever heard of malaria	93.6	95.8	95.2	94.0
Knowledge of signs and symptoms of malaria				
Feeling cold	78.6	79.0	79.4	77.3
Fever	47.4	50.7	48.8	48.1
Headache	48.9	46.0	46.9	45.4
Nausea and vomiting	23.8	36.7	32.8	31.0
Loss of appetite	19.8	22.0	23.2	19.0
Body ache joint pain	18.7	20.4	16.0	23.4
Dizziness	12.9	12.5	9.6	9.9
Feeling weak	6.2	9.5	8.6	8.1
Diarrhea	7.1	8.1	4.9	5.8
Pale eyes	3.2	1.7	1.9	3.3
Others	5.8	3.3	1.8	3.9
Don't know	9.0	9.1	10.7	10.9
Knowledge of causes of malaria				
Mosquito bite	34.5	31.4	31.8	31.7
Other causes (misconceptions)	65.5	68.6	68.2	68.3
Knowledge of prevention of malaria				
Less than three preventative actions	55.7	55.1	53.2	54.7
Three or more preventative actions	24.2	32.4	33.8	33.1
No preventative actions known	20.1	12.5	13.0	12.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Misconceptions included: eating immature sugarcane, eating cold food, eating other dirty food, drinking dirty water, getting soaked with rain, cold or changing weather, and witchcraft.

Table 52 Malaria Prevention Behaviors by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Household owns mosquito nets for sleeping* **	49.6	51.3	34.2	60.7	59.1
Reported number of mosquito nets* **					
One	15.8	16.6	12.7	17.8	16.6
Two	24.0	24.3	15.8	31.4	25.0
Three or more	9.6	10.0	5.6	11.5	17.2
None	50.6	49.1	65.9	39.3	41.2
Observed mosquito nets* **					
Nets present	34.3	38.2	22.7	38.6	45.7
Nets not present	65.7	61.8	77.3	61.4	54.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 53 Malaria Prevention Behaviors by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Household owns mosquito nets for sleeping*	47.4	53.1	50.2
Reported number of mosquito nets			
One	16.3	15.6	15.0
Two	21.5	27.1	25.6
Three of more	9.6	10.1	9.0
None	52.6	47.2	50.3
Observed mosquito nets**			
Nets present	37.3	35.3	25.8
Nets not present	62.7	64.7	74.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 54 Malaria Prevention Behaviors by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Household owns mosquito nets for sleeping	48.9	57.1	48.9	45.8
Reported number of mosquito nets				
One	13.4	20.3	16.9	13.1
Two	27.3	28.3	23.9	20.9
Three of more	8.1	8.2	7.9	11.7
None	51.1	43.2	51.2	54.4
Observed mosquito nets				
Nets present	30.1	39.0	34.8	32.1
Nets not present	69.9	61.0	65.2	67.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 55 Malaria Prevention Behaviors by Region (Malaria Sites)

	TOTAL N = 1,817	AMHARA N = 457	OROMIA N = 367	SNNP N = 631	TIGRAY N = 362
Household owns mosquito nets for sleeping	59.4	63.4	42.4	65.7	66.8
Reported number of mosquito nets* **					
One	19.4	20.2	18.1	19.5	19.0
Two	28.7	29.3	20.4	33.7	28.8
Three of more	11.1	13.6	3.7	12.4	18.6
None	40.8	36.9	57.8	34.3	33.7
Observed mosquito nets* **					
Nets present	40.0	45.7	27.7	41.1	51.6
Nets not present	60.0	54.3	72.3	58.9	48.4
Family members who slept under an LLIN last night* **					
Respondent	58.8	58.8	71.6	52.4	65.5
Husband/spouse	43.6	40.7	44.3	46.3	41.7
All children under five	42.0	37.6	57.0	38.6	50.6
Other	40.3	49.2	27.7	39.4	24.6

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) Family members who slept under an LLIN last night include households who own at least one LLIN.
d.) Other refers those who have an LLIN, 12.1% not used by any family member.

Table 56 Malaria Prevention Behaviors by Vulnerability Index (Malaria Sites)

	LOW N = 842	MODERATE N = 573	HIGH N = 402
Household owns mosquito nets for sleeping*	56.1	63.3	61.6
Reported number of mosquito nets			
One	19.1	18.8	15.0
Two	32.6	30.9	25.6
Three of more	11.3	11.6	9.0
None	37.0	38.7	50.3
Observed mosquito nets**			
Nets present	41.6	29.1	25.8
Nets not present	58.4	70.9	74.2
Family members who slept under an LLIN last night***			
Respondent	36.1	31.0	25.3
Husband/spouse	27.4	22.8	18.9
All children under five	24.7	21.0	17.2
Other	26.8	27.1	20.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Family members who slept under an LLIN last night include households who own at least one LLIN.
d.) Other refers those who have an LLIN, 12.1% not used by any family member.

Table 57 Malaria Prevention Behaviors by Respondent Type (Malaria Sites)

	PREGNANT N = 165	WOMEN WITH CHILD UNDER TWO YEARS N = 484	WOMEN WITH CHILD THREE TO FIVE YEARS N = 413	OTHER WOMEN 15–49 YEARS N = 755
Household owns mosquito nets for sleeping	57.4	66.3	60.0	55.2
Reported number of mosquito nets				
One	17.7	24.6	21.0	15.7
Two	31.1	32.9	29.6	25.3
Three of more	8.6	8.9	9.2	13.9
None	42.6	33.7	40.2	45.0
Observed mosquito nets				
Nets present	32.5	44.6	41.4	38.1
Nets not present	67.5	55.4	58.6	61.9
Family members who slept under an LLIN last night				
Respondent	53.4	62.2	64.6	54.3
Husband/spouse	43.8	41.5	50.8	41.0
All children under five	29.9	67.1	65.0	13.2
Other	46.4	29.6	30.7	52.1

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Family members who slept under an LLIN last night include households who own at least one LLIN.
d.) Other refers those who have an LLIN, 12.1% not used by any family member.

Table 58 Malaria Self-Efficacy and Outcome Expectancy by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
LLIN self-efficacy (woman)* **					
Disagree	24.8	15.5	43.7	20.0	11.2
Agree	48.8	54.0	34.5	59.1	37.4
Strongly agree	26.4	30.5	21.8	20.9	51.4
LLIN self-efficacy (child under five)* **					
Disagree	25.5	15.0	43.9	22.1	14.4
Agree	49.8	57.0	36.5	57.4	34.8
Strongly agree	24.8	28.0	19.6	20.5	50.8
Fever treatment self-efficacy (child under five)* **					
Disagree	6.8	2.5	9.6	9.0	7.4
Agree	59.5	54.4	60.6	68.7	39.5
Strongly agree	33.7	43.1	29.9	22.3	53.1
Ability to seek fever treatment self-efficacy (child under five)* **					
Disagree	10.4	3.5	14.0	15.4	8.3
Agree	52.4	49.3	50.2	60.1	43.6
Strongly agree	37.2	47.1	35.9	24.5	48.1
LLIN outcome expectancy (woman)* **					
Disagree	10.9	6.0	21.6	8.2	1.4
Agree	52.0	51.7	44.5	64.4	29.7
Strongly agree	37.1	42.3	34.0	27.4	69.0
LLIN outcome expectancy (child under five)* **					
Disagree	12.1	7.4	23.2	8.6	3.8
Agree	53.0	54.1	44.9	62.7	38.0
Strongly agree	34.9	38.6	31.9	28.7	58.3
Treatment survival outcome expectancy (child under five)* **					
Disagree	2.6	1.1	4.0	2.3	6.3
Agree	56.4	49.6	58.7	66.1	37.4
Strongly agree	41.0	49.4	37.4	31.6	56.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 59 Malaria Self-Efficacy and Outcome Expectancy by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
LLIN self-efficacy (woman)			
Disagree	24.4	23.1	28.2
Agree	46.9	51.9	49.0
Strongly agree	28.7	25.0	22.9
LLIN self-efficacy (child under five)*			
Disagree	25.0	23.7	28.9
Agree	48.0	53.1	49.4
Strongly agree	27.0	23.2	21.7
Fever treatment self-efficacy (child under five)**			
Disagree	5.6	6.0	10.9
Agree	56.1	60.4	66.4
Strongly agree	38.3	33.7	22.6
Ability to seek fever treatment self-efficacy (child under five)***			
Disagree	7.1	12.0	16.1
Agree	50.1	52.3	58.0
Strongly agree	42.9	35.7	25.9
LLIN outcome expectancy (woman)*			
Disagree	12.3	9.6	9.3
Agree	48.1	54.3	58.0
Strongly agree	39.5	36.2	32.7
LLIN outcome expectancy (child under five)*			
Disagree	13.2	10.5	11.6
Agree	50.7	54.0	56.8
Strongly agree	36.0	35.4	31.6
Treatment survival outcome expectancy (child under five)			
Disagree	2.5	2.2	3.3
Agree	53.8	55.2	64.1
Strongly agree	43.7	42.6	32.6

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 60 Malaria Self-Efficacy and Outcome Expectancy by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
LLIN self-efficacy (woman)				
Disagree	36.7	24.3	25.5	22.5
Agree	41.6	46.4	46.4	52.7
Strongly agree	21.8	29.3	28.1	24.8
LLIN self-efficacy (child under five)				
Disagree	39.7	24.3	23.3	24.6
Agree	40.3	47.5	50.7	52.4
Strongly agree	20.0	28.2	26.1	23.0
Fever treatment self-efficacy (child under five)				
Disagree	11.1	5.8	6.5	6.8
Agree	59.8	57.7	58.9	60.8
Strongly agree	29.2	36.5	34.6	32.5
Ability to seek fever treatment self-efficacy (child under five)				
Disagree	9.9	9.2	9.7	11.6
Agree	52.0	50.5	52.9	53.3
Strongly agree	38.1	40.4	37.3	35.1
LLIN outcome expectancy (woman)				
Disagree	18.6	12.3	12.0	8.0
Agree	47.9	50.7	48.7	55.2
Strongly agree	33.5	37.0	39.3	36.7
LLIN outcome expectancy (child under five)				
Disagree	19.4	12.5	12.9	10.1
Agree	50.2	51.1	50.4	55.9
Strongly agree	30.3	36.4	36.6	34.0
Treatment survival outcome expectancy (child under five)				
Disagree	4.2	1.4	1.8	3.4
Agree	56.7	56.8	56.2	56.2
Strongly agree	39.0	41.8	42.0	40.5

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 61 Malaria Self-Efficacy and Outcome Expectancy by Region (Malaria Sites)

	TOTAL N = 1,817	AMHARA N = 457	OROMIA N = 367	SNNP N = 631	TIGRAY N = 362
LLIN self-efficacy (woman)					
Disagree	20.2	11.1	37.4	19.2	11.0
Agree	49.6	52.0	37.1	57.9	34.0
Strongly agree	30.2	36.9	25.6	22.9	55.0
LLIN self-efficacy (child under five)					
Disagree	21.7	11.4	39.6	21.1	14.1
Agree	50.3	55.0	37.6	56.8	32.5
Strongly agree	27.9	33.5	22.8	22.1	53.4
Fever treatment self-efficacy (child under five)					
Disagree	6.0	2.4	7.4	8.2	8.9
Agree	59.0	49.1	65.5	67.7	36.9
Strongly agree	35.0	48.4	27.1	24.1	54.2
Ability to seek fever treatment self-efficacy (child under five)					
Disagree	10.3	3.9	13.6	14.4	10.4
Agree	50.4	44.7	48.3	59.0	39.0
Strongly agree	39.3	51.4	38.1	26.6	50.6
LLIN outcome expectancy (woman)					
Disagree	6.0	4.2	8.0	7.2	1.3
Agree	52.0	48.5	47.4	62.1	26.7
Strongly agree	42.0	47.2	44.7	30.8	72.0
LLIN outcome expectancy (child under five)					
Disagree	7.4	6.1	9.9	7.6	4.0
Agree	52.5	50.6	48.4	60.1	33.0
Strongly agree	40.0	43.4	41.7	32.3	62.9
Treatment survival outcome expectancy (child under five)					
Disagree	2.1	1.0	2.7	2.2	6.8
Agree	53.8	44.4	57.4	63.7	33.9
Strongly agree	44.0	54.5	39.9	34.1	59.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 62 Malaria Self-Efficacy and Outcome Expectancy by Vulnerability Index (Malaria Sites)

	LOW N = 842	MODERATE N = 573	HIGH N = 402
LLIN self-efficacy (woman)			
Disagree	18.5	18.5	26.9
Agree	49.5	53.3	44.4
Strongly agree	31.9	28.2	28.7
LLIN self-efficacy (child under five)			
Disagree	20.4	19.5	28.4
Agree	50.0	54.3	45.3
Strongly agree	29.6	26.2	26.3
Fever treatment self-efficacy (child under five)			
Disagree	5.7	4.7	8.7
Agree	55.3	60.4	65.9
Strongly agree	39.0	34.9	25.4
Ability to seek fever treatment self-efficacy (child under five)			
Disagree	7.6	11.1	15.6
Agree	49.0	51.5	51.9
Strongly agree	43.3	37.3	32.6
LLIN outcome expectancy (woman)			
Disagree	6.9	4.0	6.8
Agree	48.8	56.2	53.2
Strongly agree	44.2	39.8	40.0
LLIN outcome expectancy (child under five)			
Disagree	8.2	5.3	8.6
Agree	50.7	55.2	53.0
Strongly agree	41.1	39.5	38.4
Treatment survival outcome expectancy (child under five)			
Disagree	2.5	1.3	2.6
Agree	50.8	55.0	59.4
Strongly agree	46.7	43.7	38.0

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 63 Malaria Self-Efficacy and Outcome Expectancy by Respondent Type (Malaria Sites)

	PREGNANT WOMEN N = 165	WOMEN WITH CHILD UNDER TWO YEARS N = 484	WOMEN WITH CHILD THREE TO FIVE YEARS N = 413	OTHER WOMEN 15–49 YEARS N = 755
LLIN self-efficacy (woman)				
Disagree	29.3	18.7	20.7	19.1
Agree	44.6	49.1	47.0	52.3
Strongly agree	26.1	32.2	32.4	28.6
LLIN self-efficacy (child under five)				
Disagree	31.0	19.0	18.3	23.3
Agree	44.7	48.8	50.6	52.3
Strongly agree	24.3	32.2	31.1	24.4
Fever treatment self-efficacy (child under five)				
Disagree	5.2	5.2	4.8	7.3
Agree	62.8	57.0	59.7	59.1
Strongly agree	32.0	37.7	35.5	33.6
Ability to seek fever treatment self-efficacy (child under five)				
Disagree	7.3	8.7	8.9	12.6
Agree	53.1	48.7	51.2	50.4
Strongly agree	39.6	42.6	39.9	37.0
LLIN outcome expectancy (woman)				
Disagree	8.6	8.3	5.4	4.4
Agree	53.3	50.4	48.4	54.5
Strongly agree	38.1	41.3	46.2	41.1
LLIN outcome expectancy (child under five)				
Disagree	9.8	8.5	7.5	6.3
Agree	53.8	49.6	49.9	55.4
Strongly agree	36.5	41.9	42.6	38.3
Treatment survival outcome expectancy (child under five)				
Disagree	1.4	0.7	1.2	3.7
Agree	58.0	53.3	54.6	52.9
Strongly agree	40.6	46.0	44.2	43.5

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
c.) LLIN self-efficacy (woman) was measured using the statement: I am able to sleep under an LLIN each night.
d.) LLIN self-efficacy (child under five) was measured using the statement: I am able to have children under five years sleep under an LLIN each night.
e.) Fever treatment self-efficacy (child under five) was measured using the statement: I should seek treatment for children under five years within 24 hours of onset of fever.
f.) Ability to seek fever treatment self-efficacy (child under five) was measured using the statement: I can take my child to treatment within 24 hours of onset fever.
g.) LLIN outcome expectancy (woman) was measured using the statement: Sleeping under an LLIN will prevent malaria.
h.) LLIN outcome expectancy (child under five) was measured using the statement: Having my children sleep under an LLIN each night will prevent malaria for them.
i.) Treatment survival outcome expectancy (child under five) was measured using the statement: Seeking treatment for my under-five children within 24 hours of onset fever improves chances of recovery and survival.

Table 64 Long-Lasting Insecticidal Net Ownership and Use by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
LLIN ownership and use					
Does not own LLIN	50.4	48.7	65.8	39.3	40.9
Owns LLIN but not used	14.9	16.4	8.3	19.9	14.4
Has LLIN and used	34.7	34.9	25.8	40.9	44.7

Table 65 Long-Lasting Insecticidal Net Ownership and Use by Region (Malaria Sites)

	TOTAL N = 1,817	AMHARA N = 457	OROMIA N = 367	SNNP N = 631	TIGRAY N = 362
LLIN ownership and use					
Does not own LLIN	40.6	36.6	57.6	34.3	33.2
Owns LLIN but not used	18.4	22.0	9.9	20.7	16.7
Has LLIN and used	41.0	41.4	32.5	44.9	50.2

Table 66 Knowledge of Tuberculosis by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Ever heard of TB* **	75.3	77.3	67.2	79.4	81.9
Knowledge that TB can be cured through medical treatment* **	68.2	72.2	58.5	71.3	76.8
Knowledge of modes of TB transmission* **					
Through the air when coughing or sneezing	40.6	38.9	34.7	47.3	46.7
Other response (incorrect)	45.5	49.2	49.7	39.	36.8
Don't know	13.8	11.9	15.7	13.7	16.5
Knowledge of TB symptoms* **					
Knows less than three symptoms	54.2	56.1	45.3	58.7	63.9
Knows three or more symptoms	18.3	19.6	16.7	19.1	14.7
None	27.5	24.3	38.1	22.2	21.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c) Other responses include: through touching a person with TB, through sharing utensils, through sexual contact, through food, through drinking unboiled milk, through mosquito bites, and exposure to cold.

Table 67 Knowledge of Tuberculosis by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Ever heard of TB* **	73.5	78.1	75.6
Knowledge that TB can be cured through medical treatment* **	66.5	71.8	67.3
Knowledge of modes of TB transmission* **			
Through the air when coughing or sneezing	39.3	44.6	38.3
Other response (incorrect)	47.4	41.2	47.0
Don't know	13.3	14.2	14.7
Knowledge of TB symptoms* **			
Knows less than three symptoms	53.0	55.8	54.8
Knows three or more symptoms	17.3	19.8	18.5
None	29.6	24.4	26.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c) Other responses include: through touching a person with TB, through sharing utensils, through sexual contact, through food, through drinking unboiled milk, through mosquito bites, and exposure to cold.

Table 68 Knowledge of Tuberculosis by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Ever heard of TB* **	76.6	75.0	73.0	76.3
Knowledge that TB can be cured through medical treatment* **	67.5	66.4	68.6	69.2
Knowledge of modes of TB transmission* **				
Through the air when coughing or sneezing	36.6	40.4	39.5	42.1
Other response (incorrect)	44.3	44.0	49.3	44.6
Don't know	19.0	15.6	11.1	13.2
Knowledge of TB symptoms* **				
Knows less than three symptoms	54.1	52.9	52.8	55.8
Knows three or more symptoms	16.0	18.9	17.6	18.7
None	29.8	28.2	29.6	25.5

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c) Other responses include: through touching a person with TB, through sharing utensils, through sexual contact, through food, through drinking unboiled milk, through mosquito bites, and exposure to cold.

Table 69 Tuberculosis Self-Efficacy and Outcome Expectancy by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
TB self-efficacy					
Disagree	27.3	23.5	37.5	23.5	19.3
Agree	37.9	33.2	32.5	49.1	35.1
Strongly agree	34.8	43.3	30.0	27.4	45.6
TB outcome expectancy					
Disagree	28.3	25.2	38.5	23.5	20.2
Agree	37.6	34.7	31.7	47.7	33.9
Strongly agree	34.1	40.2	29.8	28.8	45.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) TB self-efficacy was measured using the statement: I can go be immediately screened on suspected TB.
d.) TB outcome expectancy was measured using the statement: Early screening of TB may lead to full recovery.

Table 70 Tuberculosis Self-Efficacy and Outcome Expectancy by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
TB self-efficacy			
Disagree	29.2	23.6	27.9
Agree	36.3	38.0	41.3
Strongly agree	34.5	38.4	30.7
TB outcome expectancy**			
Disagree	31.1	24.0	27.4
Agree	34.5	37.9	44.4
Strongly agree	34.4	38.1	28.2

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) TB self-efficacy was measured using the statement: I can go be immediately screened on suspected TB.
d.) TB outcome expectancy was measured using the statement: Early screening of TB may lead to full recovery.

Table 71 Tuberculosis Self-Efficacy and Outcome Expectancy by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
TB self-efficacy				
Disagree	28.9	28.1	28.9	25.7
Agree	39.1	39.0	34.7	38.7
Strongly agree	32.1	32.9	36.4	35.7
TB outcome expectancy				
Disagree	29.0	28.7	30.2	26.9
Agree	37.9	39.1	33.6	38.7
Strongly agree	33.0	32.2	36.2	34.4

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) TB self-efficacy was measured using the statement: I can go be immediately screened on suspected TB.
d.) TB outcome expectancy was measured using the statement: Early screening of TB may lead to full recovery.

Table 72 Key Handwashing Practices by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Women who practice handwashing at all key times* **	65.0	65.2	70.5	59.2	65.5
Presence of a proper handwashing station* **	26.5	5.3	13.0	52.5	8.8
Household having any type of toilet* **	85.6	90.2	83.8	89.2	51.3

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key times included after defecation, after contact with child stool, before preparing food, before eating, and before feeding a child.
d.) Reported handwashing station with soap detergent or other cleansing agent present: Total, N = 914; Amhara, n = 242; Oromia, n = 152; SNNP, n = 454; Tigray, n = 66.
e.) Types of toilet include flush/pour toilet or pit latrine.

Table 73 Key Handwashing Practices by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Women who practice handwashing with soap at all key times* **	68.7	64.1	57.4
Presence of a proper handwashing station* **	31.9	20.2	26.9
Household having any type of toilet* **	89.8	86.2	74.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key times included after defecation, after contact with child stool, before preparing food, before eating, and before feeding a child.
d.) Reported handwashing station with soap detergent or other cleansing agent present: Total, N = 914; Low vulnerability, n = 422; Moderate vulnerability, n = 333; High vulnerability, n = 159.
e.) Types of toilet include flush/pour toilet or pit latrine.

Table 74 Key Handwashing Practices by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Women who practice handwashing with soap at all key times* **	64.0	74.9	69.3	57.2
Presence of a proper handwashing station **	35.1	24.5	28.0	25.5
Household having any type of toilet **	82.7	82.6	86.4	87.4

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key times included after defecation, after contact with child stool, before preparing food, before eating, and before feeding a child.
d.) Reported handwashing station with soap detergent or other cleansing agent present: Total, N = 914; pregnant women, n = 75; women with children under two years, n = 219; women with children three to five years, n = 181; other women 15–49 years, n = 439.
e.) Types of toilet include flush/pour toilet or pit latrine.

Table 75 Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Region

	TOTAL N = 2,770	AMHARA N = 674	OROMIA N = 688	SNNP N = 760	TIGRAY N = 648
Comprehensive knowledge of handwashing at key times* **					
All key times	14.4	7.7	21.4	17.2	5.9
Three or more key times	30.2	33.8	21.7	36.7	18.9
Less than three key times	55.5	58.6	57.0	46.2	75.2
Proper handwashing self-efficacy * **					
Disagree	6.9	3.5	4.3	13.9	4.2
Agree	57.2	54.6	58.3	61.2	46.6
Strongly agree	36.0	41.9	37.4	24.9	49.2
Proper handwashing outcome expectancy* **					
Disagree	1.5	1.6	2.4	0.9	0.7
Agree	52.2	48.9	53.1	59.8	29.6
Strongly agree	46.3	49.5	44.5	39.3	69.7

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key handwashing times include after defecation, after contact with child's stool, handwashing after toilet use, before preparing food, before eating, and before feeding a child.
d.) Proper handwashing self-efficacy was measured using the statement: Feel they can practice proper handwashing.
e.) Proper handwashing outcome expectancy was measured using the statement: Believe proper handwashing prevents diseases such as diarrhea.

Table 76 Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Vulnerability Index

	LOW N = 1,343	MODERATE N = 825	HIGH N = 602
Comprehensive knowledge of handwashing at key times* **			
All key times	13.6	12.5	18.8
Three or more key times	34.5	27.1	23.9
Less than three key times	51.8	60.4	57.3
Proper handwashing self-efficacy* **			
Disagree	3.7	5.9	15.6
Agree	54.2	59.5	60.9
Strongly agree	42.0	34.6	23.5
Proper handwashing outcome expectancy			
Disagree	1.9	1.3	1.1
Agree	49.6	50.7	60.3
Strongly agree	48.5	48.0	38.6

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key handwashing times include after defecation, after contact with child's stool, handwashing after toilet use, before preparing food, before eating, and before feeding a child.
d.) Proper handwashing self-efficacy was measured using the statement: Feel they can practice proper handwashing.
e.) Proper handwashing outcome expectancy was measured using the statement: Believe proper handwashing prevents diseases such as diarrhea.

Table 77 Key Handwashing Knowledge, Self-Efficacy, and Outcome Expectancy by Respondent Type

	PREGNANT WOMEN N = 235	WOMEN WITH CHILD UNDER TWO YEARS N = 724	WOMEN WITH CHILD THREE TO FIVE YEARS N = 643	OTHER WOMEN 15–49 YEARS N = 1,168
Comprehensive knowledge of handwashing at key times* **				
All key times	16.1	19.9	17.2	9.4
Three or more key times	23.4	26.2	29.6	34.0
Less than three key times	60.5	53.9	53.3	56.6
Proper handwashing self-efficacy				
Disagree	11.3	7.7	5.2	6.4
Agree	57.4	56.8	59.2	56.2
Strongly Agree	31.3	35.5	35.6	37.4
Proper handwashing outcome expectancy				
Disagree	3.4	0.5	2.1	1.5
Agree	51.2	53.1	50.6	52.6
Strongly Agree	45.5	46.3	47.4	45.9

Notes:
a.) Weighted percentages.
b.) Significance based on chi-square test; * p < 0.05; ** p < 0.01; *** p < 0.001.
c.) Key handwashing times include after defecation, after contact with child's stool, handwashing after toilet use, before preparing food, before eating, and before feeding a child.
d.) Proper handwashing self-efficacy was measured using the statement: Feel they can practice proper handwashing.
e.) Proper handwashing outcome expectancy was measured using the statement: Believe proper handwashing prevents diseases such as diarrhea.

1.2. Multivariate Model Tables

Table 78 Model: Determinants of the Availability of a Family Health Guide in a Household

Target Group: Women ages 15–49 years in Amhara, Oromia, SNNP, and Tigray (N = 2,770)
Behavior: Having family health guide in a household

Indicators	Yes (%)	AOR	CI (95%)
Age			
15–24	7.0	1	
25–34	12.6	2.00***	1.44–2.80
35–49	8.7	1.73**	1.19–2.51
Education			
Nonliterate	10.0	1	
At least primary	8.9	1.51**	1.12–2.02
Region			
Oromia	7.2	1	
Amhara	12.9	1.67**	1.15–2.43
SNNP	5.0	0.53**	0.33–0.84
Tigray	22.8	3.74***	2.65–5.28

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.052 Hosmer and Lemeshow test = 0.883.

Table 79 Model: Determinants for Current Use of Modern Family Planning Methods among Married Women

Target Group: Married women ages 15–49 in Amhara, Oromia, SNNP, and Tigray (N = 1,830)
Behavior: Use of modern family planning methods

Indicators	FP user (%)	AOR	CI (95%)
Knowledge on modern FP			
Knows at most two methods	38.9	1	
Knows three or more methods	57.7	2.18***	1.69–2.81
Self-efficacy to use modern FP methods			
Low/moderate	44.5	1	
High	65.4	2.05***	1.63–2.58
Number of under five children			
No	46.2	1	
Has one child	62.2	1.70***	1.33–2.18
Has two or more children	40.9	1.03	0.77–1.38
Age of women			
15–24	60.8	1	
25–34	58.3	1.02	0.76–1.36
35–49	42.0	0.60**	0.44–0.82
Education			
Nonliterate	45.9	1	
At least primary level education	67.1	1.48**	1.16–1.88
Religion			
Muslim	45.6	1	
Christian	58.0	1.47**	1.13–1.90
Radio listening habit			
Never have listening habit	50.7	1	
Heard at least once a week	58.2	1.45**	1.14–1.85
Gender inequality (DCDL)			
High	42.8	1	
Moderate	54.4	1.38*	1.06–1.78
Low	57.2	1.48*	1.07–2.06
Region			
Oromia	36.0	1	
Amhara	65.5	2.96***	2.16–4.05
SNNP	54.5	2.23***	1.59–3.13
Tigray	49.9	1.11	0.78–1.58

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.158 Hosmer and Lemeshow test = 0.445.
b) Gender inequality subscale DCDL was measured using five items: changing diapers, giving a bath, and feeding kids are the mother's responsibilities; a woman's role is taking care of her home and family; the husband should decide to buy the major household items; a man should have the final word about decisions in his home; a woman should obey her husband in all things.
c) Self-efficacy was measured by "I feel confident that I can use family planning to avoid unwanted pregnancies."

Table 80 Model: Determinants for Early Registration for Antenatal Care among Women with Child under Two Years

Target Group: Women with children under two years in Amhara, Oromia, SNNP, and Tigray (N = 745)
Behavior: Early registration for ANC services within 12 weeks of pregnancy

Indicators		Early ANC (%)	AOR	CI (95%)
Knowledge on number ANC visits a pregnant woman should go to				
	Less than four	18.9	1	
	At least four	34.4	2.48***	1.64–3.77
Outcome expectancy on ANC services				
	Low/moderate	28.9	1	
	High	32.3	0.87	0.60–1.24
Gender inequality (DCDL)				
	High	24.7	1	
	Moderate	28.5	1.34	0.87–2.08
	Low	42.4	2.55**	1.50–4.31
Region				
	Oromia	31.7	1	
	Amhara	35.1	1.17	0.73–1.87
	SNNP	20.9	0.58*	0.35–0.96
	Tigray	46.5	1.99**	1.26–3.14

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.078 Hosmer and Lemeshow test = 0.335.
b) Gender inequality subscale DCDL was measured using five items. Changing diapers, giving a bath, and feeding kids are the mother's responsibilities; a woman's role is taking care of her home and family; the husband should decide to buy the major household items; a man should have the final word about decisions in his home; a woman should obey her husband in all things.
c) Outcome expectancy was measured by "Pregnant women who visit ANC at least four times during pregnancy will have better birth outcomes."

Table 81 Model: Determinants for Four or More Antenatal Care Visits among Women with Child under Two Years

Target Group: Women with children under two years in Amhara, Oromia, SNNP, and Tigray (N = 745)
Behavior: 4 Plus ANC visits to a health facility during pregnancy

Indicators	Four or more ANC (%)	AOR	CI (95%)
Knowledge on number ANC visits a pregnant woman should go to			
Less than four	11.3	1	
At least four	59.9	5.35***	3.39–8.45
Early registration for ANC			
First visit after 12 weeks	38.9	1	
First visit within 12 weeks	66.1	2.93***	2.04–4.19
Radio listening habit			
Never have listening habit	43.3	1	
Heard at least once a week	59.0	1.65*	1.09–2.51
Education			
Nonliterate	38.8	1	
At least primary level education	60.4	1.60**	1.13–2.26
Religion			
Muslim	49.6	1	
Christian	45.3	0.54**	0.34–0.85
SLI			
Low	43.0	1	
Moderate	45.5	1.23	0.8–1.83
High	57.5	1.83*	1.10–3.04
Region			
Oromia	30.0	1	
Amhara	55.3	3.74***	2.11–6.64
SNNP	53.9	3.64***	2.03–6.51
Tigray	47.3	3.12***	1.66–5.85

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.22 Hosmer and Lemeshow test = 0.392.
b) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine and four items of the vulnerability index mentioned above. Low was ≤6; Moderate, 7–8; and High, ≥9.

Table 82 Model: Determinants for Institutional Delivery at Health Facility among Women with Child under Two Years

Target Group: Women with children under two years in Amhara, Oromia, SNNP and Tigray (N = 745)
Behavior: Institutional delivery at a health facility

Indicators	Health facility delivery (%)	AOR	CI (95%)
Knowledge on number ANC visits a pregnant woman should go to			
Less than four	29.3	1	
At least four	50.6	2.12***	1.40–3.20
Number of ANC visits attended			
Less than four visits	30.9	1	
Attended four or more visits	60.8	1.99***	1.42–2.78
Education			
Nonliterate	35.5	1	
At least primary level education	59.9	1.65**	1.17–2.32
Religion			
Muslim	43.4	1	
Christian	46.2	1.03	0.67–1.59
Vulnerability			
High	29.0	1	
Moderate	51.5	2.49***	1.58–3.93
Low	48.8	2.28***	1.48–3.51
Gender inequality (sexual relationships)			
High	48.6	1	
Moderate	41.0	0.79	0.57–1.10
Low	87.3	3.61*	1.15–11.30
Region			
Oromia	29.2	1	
Amhara	59.9	3.00***	1.78–5.07
SNNP	41.6	2.03*	1.16–3.57
Tigray	53.7	2.88***	1.63–5.09

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.16 Hosmer and Lemeshow test = 0.143.
b) Gender inequality subscale sexual relation was measured using five items: men are always ready to have sex; men need sex more than women do; you don't talk about sex, you just do it; a woman should not initiate sex; a woman who has sex before she marries does not deserve respect.
c) Vulnerability index was constructed using the following four items: lacked enough food to eat, lacked shelter/house to stay in, not able to afford to send children to school, and lacked money to buy medicines/medical treatment (experienced by the participant in the past 12 months). Low was ≤4; Moderate, 5–7; and High, 8–12.

Table 83 Model: Determinants for Human Immunodeficiency Virus Testing during Recent Pregnancy among Women with Child under Two Years

Target Group: Women with children under two years in Amhara, Oromia, SNNP, and Tigray (N = 745)
Behavior: Uptake of PMTCT services

Indicators		HIV test (%)	AOR	CI (95%)
Knowledge on PMTCT				
	Low	38.7	1	
	Moderate	62.2	2.16***	1.42–3.28
	High	71.8	2.08*	1.18–3.64
Had at least one ANC visits				
	No	24.0	1	
	Yes	66.6	4.70***	2.87–7.69
Early initiation of ANC check				
	>12 weeks	51.8	1	
	≤12 weeks	69.0	1.14	0.76–1.71
Outcome expectancy on PMTCT				
	No	50.4	1	
	Yes	75.4	2.27**	1.36–3.79
Education				
	Nonliterate	49.9	1	
	At least primary level education	68.3	1.45	0.98–2.15
Households having FHC				
	No	55.0	1	
	Yes	73.0	1.90*	1.03–3.52
Heard/seen health messages in three months				
	No	52.4	1	
	Yes	70.0	1.77*	1.15–2.72
SLI				
	Low	54.0	1	
	Moderate	56.3	1.60*	1.03–2.48
	High	63.8	2.28**	1.35–3.85
Gender inequality (DCDL)				
	High	46.0	1	
	Moderate	57.6	1.80*	1.11–2.90
	Low	66.2	3.19***	1.68–6.08
Region				
	Oromia	35.3	1	
	Amhara	74.1	3.70***	2.12–6.47
	SNNP	52.7	2.40**	1.40–4.09
	Tigray	83.9	10.80***	5.82–20.05

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.30 Hosmer and Lemeshow test = 0.14.
b) Gender inequality subscale DCDL was measured using five items. Changing diapers, giving a bath, and feeding kids are the mother's responsibilities; a woman's role is taking care of her home and family; the husband should decide to buy the major household items; a man should have the final word about decisions in his home; a woman should obey her husband in all things.
c) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and four items of the vulnerability index mentioned above. Low was ≤6; Moderate, 7–8; and High, ≥9.

Table 84 Model: Determinants to Complete Pentavalent 3 Vaccination among Children Ages Four to 23 Months

Target Group: Children ages four to 23 months in Amhara, Oromia, SNNP, and Tigray (N = 610)
Behavior: DPT3-HepB3-Hib3 (Pentavalent third dose) immunization coverage

Indicators		Penta 3 (%)	AOR	CI (95%)
Institutional delivery				
	No	27.4	1	
	Yes	40.7	1.46*	1.02–2.11
Radio listening habit				
	Never/rarely	36.3	1	
	At least once a week	30.0	0.76	0.49–1.18
Religion				
	Muslim	28.4	1	
	Christian	39.5	1.36	0.84–2.21
Region				
	Oromia	14.2	1	
	Amhara	43.7	4.31***	2.22–8.39
	SNNP	40.3	3.93***	2.00–7.74
	Tigray	46.1	4.36***	2.15–8.86

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.095 Hosmer and Lemeshow test = 0.593.

Table 85 Model: Determinants for Early Initiation of Breastfeeding for Women with Child under Two Years

Target Group: Children ages six to 23 Months in Amhara, Oromia, SNNP, and Tigray (N = 737)
Behavior: Early initiation of BF within an hour of birth

Indicators		Early initiation (%)	AOR	CI (95%)
Institutional delivery				
	No	60.4	1	
	Yes	73.3	1.71**	1.23–2.38
Outcome expectancy on exclusive BF				
	Low/moderate	62.9	1	
	High	71.4	1.45	0.99–2.12
Outcome expectancy on minimum acceptable diet				
	Low/moderate	64.8	1	
	High	71.3	1.24	0.84–1.82
Gender inequality (RHDP)				
	High	52.3	1	
	Moderate	67.0	2.02*	1.11–3.70
	Low	70.1	2.09**	1.21–3.62
Region				
	Oromia	60.9	1	
	Amhara	68.8	1.16	0.73–1.85
	SNNP	72.7	1.47	0.93–2.32
	Tigray	67.9	0.96	0.61–1.53

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.043 Hosmer and Lemeshow test = 0.666.
b) Gender inequality subscale RHDP was constructed from three items: It is a woman's responsibility to avoid getting pregnant; only when a woman has a child is she a real woman; a real man produces a male child.
c) Outcome expectancy on exclusive BF in the first six months will lead to improve child health status.
d) Outcome expectancy on minimal acceptable diet: minimal acceptable diet will enhance child survival.

Table 86 Model: Determinants to Meet Minimum Dietary Diversity among Children Ages Six to 23 Months

Target Group: Children ages six to 23 Months in Amhara, Oromia, SNNP and Tigray (N = 531)
Behavior: Minimum dietary diversity

Indicators		Yes (%)	AOR	CI (95%)
Education				
	Nonliterate	13.2	1	
	At least primary level education	27.1	2.38***	1.49–3.81
Religion				
	Muslim	13.0	1	
	Christian	22.6	1.98*	1.03–3.84
Standard of living				
	Low	13.8	1	
	Moderate	19.8	1.94*	1.13–3.32
	High	24.8	1.69	0.89–3.21
Gender inequality (PV)				
	High	9.4	1	
	Moderate	15.8	2.72*	1.01–7.34
	Low	23.6	2.93*	1.00–8.57
Gender inequality (GEM)				
	High	16.7	1	
	Moderate	14.9	0.78	0.40–1.51
	Low	39.5	1.46	0.60–3.56
Region				
	Oromia	25.4	1	
	Amhara	13.6	0.42*	0.19–0.89
	SNNP	16.4	0.36*	0.17–0.80
	Tigray	26.4	0.76	0.34–1.71

a) *p < 0.05 **p < 0.01 *** p < 0.001 Cox and Snell pseudo r2 = 0.091 Hosmer and Lemeshow test = 0.085.
b) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, and chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and four items of the vulnerability index mentioned above. Low was ≤6; Moderate, 7–8; and High, ≥9.
c) Gender inequality subscale PV was measured using six items including: there are times when a woman deserves to be beaten; woman should tolerate violence to keep her family together; it is alright for a man to beat his wife if she is unfaithful; a man can hit his wife if she won't have sex with him; if someone insults a man, he should defend his reputation with force; if the man using violence against his wife is a private matter that shouldn't be shared to other people.
d) Gender inequality scale (GEM) includes 21 items on topics such as PV, sexual relationships, homophobia, DCDL, and RHDP.

Table 87 Model: Determinants to Meet Minimum Acceptable Diet among Children Ages Six to 23 Months

Target Group: Children ages six to 23 Months in Amhara, Oromia, SNNP, and Tigray (N = 531)
Behavior: Minimum acceptable diet

Indicators		Yes (%)	AOR	CI (95%)
Education				
	Nonliterate	5.9	1	
	At least primary level education	16.2	2.72***	1.55–4.76
Standard of living				
	Low	8.1	1	
	Moderate	8.6	1.38	0.71–2.68
	High	15.0	2.28*	1.09–4.78
Region				
	Oromia	14.2	1	
	Amhara	7.6	0.51	0.22–1.21
	SNNP	6.9	0.37*	0.17–0.84
	Tigray	17.4	1.34	0.64–2.82

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.091 Hosmer and Lemeshow test = 0.085.
b) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and four items of the vulnerability index mentioned above. Low was ≤6; Moderate, 7–8; and High, ≥9.

Table 88 Model: Determinants to Use of Long-Lasting Insecticide-Treated Nets for Children under Five Years

Target Group: Children under five years live in malaria endemic area of Amhara, Oromia, SNNP and Tigray (N = 1,017)
Behavior: LLIN use

Indicators		LLIN use (%)	AOR	CI (95%)
Comprehensive knowledge on malaria				
	Low/moderate	29.1	1	
	High	44.8	1.42*	1.06–1.89
Outcome expectancy to use of LLIN				
	Low/moderate	29.8	1	
	High	54.1	1.06	0.75–1.50
Self-efficacy to use LLIN				
	Low/moderate	29.9	1	
	High	62.2	3.87***	2.69–5.59
Households having FHC				
	No	39.3	1	
	Yes	43.9	1.17	0.77–1.79
Mother's education				
	Nonliterate	35.8	1	
	Primary	44.1	1.33	0.99–1.80
	Secondary	69.7	1.94	0.96–3.90
Vulnerability				
	High	31.1	1	
	Moderate	40.1	1.39	0.96–2.01
	Low	43.6	1.68**	1.18–2.40
Gender inequality (DM)				
	High	38.6	1	
	Moderate	41.4	1.65*	1.11–2.45
	Low	38.6	1.31	0.90–1.93
Region				
	Oromia	35.8	1	
	Amhara	43.4	0.83	0.55–1.26
	SNNP	37.7	1.06	0.72–1.55
	Tigray	50.0	0.84	0.54–1.30

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.125 Hosmer and Lemeshow test = 0.602.
b) Outcome expectancy: having my children sleep under an LLIN each night will prevent malaria.
c) Self-efficacy: I am able to have children under five years sleep under an LLIN each night.
d) Gender inequality subscale decision-making was constructed from three scales including: decisions about health care for respondent; major household purchases; and visits to respondent's family/relatives.

Table 89 Model: Determinants for Use of Long-Lasting Insecticide-Treated Nets among Women 15-49 Years

Target Group: Women ages 15–49 years live in malaria endemic area in Amhara, Oromia, SNNP, and Tigray (N = 1,817)
Behavior: LLIN use

Indicators	LLIN use (%)	AOR	CI (95%)
Comprehensive knowledge on malaria			
Low/moderate	27.6	1	
High	38.4	1.12	0.87–1.44
Knowledge on malaria prevention			
Don't know any preventative method	17.2	1	
Know two preventative methods	38.8	1.70**	1.15–2.50
Know three or more preventative methods	35.6	1.21	0.78–1.87
Outcome expectancy use of LLIN			
Low/moderate	27.6	1	
High	45.0	1.09	0.85–1.41
Self-efficacy to use LLIN			
Low/moderate	25.7	1	
High	56.3	3.74***	2.89–4.85
Availability of mobile phone at household			
No	33.1	1	
Yes	36.7	1.27*	1.03–1.57
Marital status			
Single/divorced/widowed	26.6	1	
Married/cohabitating	37.8	1.52**	1.14–2.03
Vulnerability			
High	31.0	1	
Moderate	36.1	1.30	0.97–1.73
Low	35.8	1.48**	1.13–1.95
Gender inequality (DCDL)			
High	35.6	1	
Moderate	36.3	1.54**	1.17–2.02
Low	30.6	1.11	0.78–1.58
Region			
Oromia	30.4	1	
Amhara	37.2	0.81	0.59–1.12
SNNP	34.4	1.19	0.88–1.60
Tigray	43.8	1.10	0.79–1.53
Respondent type			
Pregnant	30.7	1	
Women with children under two	41.2	1.61*	1.08–2.39
Women with children three to five	38.8	1.50*	1.01–2.25
Other women 15–49	30.0	1.21	0.84–1.82

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.122 Hosmer and Lemeshow test = 0.794.
b) Outcome expectancy on LLIN use: sleeping under an LLIN will prevent malaria.
c) Self-efficacy on use of LLIN: I am able to sleep under an LLIN each night.
d) Gender inequality subscale DCDL was measured using five items. Changing diapers, giving a bath, and feeding kids are the mother's responsibilities; a woman's role is taking care of her home and family; the husband should decide to buy the major household items; a man should have the final word about decisions in his home; a woman should obey her husband in all things.

Table 90 Model: Determinants for Early Treatment Seeking for Children under Five Years with Fever
Target Group: Women ages 15–49 years whose under five children had fever in Amhara, Oromia, SNNP, and Tigray (N = 276)
Behavior: Early treatment seeking within 24 hours of fever

Indicators	Yes (%)	AOR	CI (95%)
Comprehensive knowledge on malaria			
Low/moderate	40.1	1	
High	46.1	1.04	0.54–2.02
Knowledge on malaria prevention			
Don't know any preventative method	30.	1	
Know two preventative methods	46.1	1.66	0.67–4.10
Know three or more preventative methods	47.6	1.82	0.64–5.15
Self-efficacy on early treatment			
Low/moderate	36.1	1	
High	60.8	3.36***	1.91–5.90
Education			
Nonliterate	35.2	1	
At least primary	62.1	1.99*	1.14–3.48
Gender inequality (GEM)			
High	36.3	1	
Moderate	41.1	1.46	0.76–2.80
Low	69.3	3.53**	1.36–9.15

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.136 Hosmer and Lemeshow test = 0.609.
b) Comprehensive knowledge on malaria refers knowledge on causes, transmission, and prevention of malaria.
c) Self-efficacy on early treatment assessed with a statement: I can take my child to treatment within 24 hours of onset fever.
d) Gender inequality scale includes 21 items on topics such as PV, sexual relationships, homophobia, DCDL, and RHDP.

Table 91 Model: Determinants for Ownership of Household Toilet

Target Group: Women ages 15–49 years in Amhara, Oromia, SNNP, and Tigray (N = 2,770)
Behavior: Having any kind of toilet (flush or pit)

Indicators	Yes (%)	AOR	CI (95%)
Knowledge of key handwashing times			
At most two key times	82.4	1	
Three or more key times	89.5	1.52***	1.21–1.91
Households having FHC			
No	85.1	1	
Yes	85.6	1.39*	1.01–1.91
Age			
15–24	85.8	1	
25–34	83.8	1.34	1.02–1.76
35–49	87.5	2.36***	1.74–3.21
Education			
Nonliterate	82.5	1	
Primary	88.6	1.70***	1.30–2.23
Secondary	93.7	4.04***	2.52–6.49
Religion			
Muslim	89.3	1	
Christian	83.2	0.61**	0.46–0.81
Vulnerability index			
High	74.7	1	
Moderate	86.2	1.94***	1.48–2.55
Low	89.8	2.40***	1.85–3.11
Region			
Oromia	83.8	1	
Amhara	90.2	1.32	0.95–1.83
SNNP	89.2	2.85***	1.94–4.19
Tigray	51.3	0.25***	0.18–0.35

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.172 Hosmer and Lemeshow test = 0.06.
b) Household ownership of a toilet refers those having either flush or pit latrine.
c) SLI was constructed from household ownership of the 13 following items: electricity, working radio, working television, nonmobile telephone, mobile telephone, iron, refrigerator, table, chair, a bed with cotton/sponge/spring mattress, flush/pour flush toilet, pit latrine, and four items of the vulnerability index mentioned above. Low was ≤6; Moderate, 7–8; and High, ≥9.

Table 92 Model: Determinants for Presence of a Proper Handwashing Station
Target Group: Women ages 15–49 years in Amhara, Oromia, SNNP, and Tigray (N = 2,770)
Behavior: Having proper handwashing station

Indicators	Yes (%)	AOR	CI (95%)
Knowledge of key times			
At most two key times	8.4	1	
Three or more key times	13.4	1.48*	1.09–2.02
Self-efficacy			
Low/moderate	9.7	1	
High	12.2	2.56***	1.74–3.76
Outcome expectancy			
Low/moderate	9.7	1	
High	11.6	1.67*	1.12–2.46
Age			
15–24	13.7	1	
25–34	10	0.80	0.54–1.19
35–49	7.9	0.47**	0.30–0.73
Education			
Nonliterate	8.3	1	
At least primary	13.8	0.61*	0.42–0.90
Religion			
Muslim	6.0	1	
Christian	13.6	0.58*	0.36–0.93
Standard of living			
Low	5.4	1	
Moderate	12.7	3.32***	2.21–4.99
High	15.6	3.57***	2.28–5.57
Households having FHC			
No	10.8	1	
Yes	8.7	1.89**	1.06–3.36
Gender inequality (RHDP)			
High	2.0	1	
Moderate	10.2	4.49*	1.26–16.01
Low	11.5	9.18**	2.62–32.16
Region			
Oromia	2.9	1	
Amhara	2.4	0.90	0.44–1.85
SNNP	29.8	32.66***	17.98–59.35
Tigray	0.9	0.59	0.23–1.46
Respondent type			
Pregnant women	14.0	1	
Women with children under two	9.5	0.51*	0.28–0.91
Women with children under five	9.0	0.76	0.42–1.37
Other women 15–49	11.4	0.87	0.50–1.52

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.23 Hosmer and Lemeshow test = 0.298.
b) Self-efficacy on handwashing was measured as "I can practice proper handwashing."
c) Proper handwashing station refers to a handwashing station with soap and water.
d) Gender inequality subscale RHDP was constructed from three items: It is a woman's responsibility to avoid getting pregnant; only when a woman has a child is she a real woman; a real man produces a male child.

Table 93 Model: Determinants of Handwashing at All Key Times

Target Group: Women ages 15–49 years in Amhara, Oromia, SNNP, and Tigray (N = 2,770)
Behavior: Handwashing at key times

Indicators	Yes (%)	AOR	CI (95%)
Knowledge of key handwashing times			
At most two key times	55.6	1	
Three or more key times	76.6	2.72***	2.26–3.26
Self-efficacy			
Low/moderate	63.4	1	
High	67.8	1.65***	1.38–1.98
Having a proper handwashing station			
No	63.3	1	
Yes	79.5	3.60***	2.56–5.08
Age			
15–24	61.1	1	
25–34	68.1	1.22	0.97–1.54
35–49	65.4	1.38*	1.07–1.77
Ownership to mobile telephone			
No	59.7	1	
Yes	70.0	1.42***	1.20–1.68
Households having FHC			
No	63.7	1	
Yes	76.7	1.49**	1.12–2.00
Education			
Nonliterate	65.6	1	
Primary	65.2	1.26*	1.01–1.57
Secondary	60.0	1.02	0.73–1.44
Religion			
Muslim	71.7	1	
Christian	60.6	0.58***	0.46–0.72
Region			
Oromia	70.5	1	
Amhara	65.2	0.73*	0.57–0.94
SNNP	59.2	0.57***	0.43–0.76
Tigray	65.5	1.21	0.91–1.60
Respondent type			
Pregnant women	64.0	1	
Women with children under two	74.9	1.58**	1.13–2.20
Women with children under five	69.3	1.06	0.76–1.49
Other women 15–49	57.2	0.70*	0.51–0.96

a) *p < 0.05 **p < 0.01 ***p < 0.001 Cox and Snell pseudo r2 = 0.13 Hosmer and Lemeshow test = 0.462.
b) Self-efficacy on handwashing was measured as "I can practice proper handwashing."
c) Proper handwashing station refers to a handwashing station with soap and water.

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