Baseline Report: Findings from a Water, Sanitation, Hygiene and Nutrition Survey in the Mopti, Bandiagara and Bankass Districts in the Mopti Region of Mali

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ABOUT WASHPLUS

The WASHplus project supports healthy households and communities by creating and delivering interventions that lead to improvements in water, sanitation, and hygiene (WASH) and household air pollution (HAP). This multi-year project (2010-2016), funded through USAID's Bureau for Global Health and led by FHI 360 in partnership with CARE and Winrock International, uses at-scale programming approaches to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under age 5 globally.

RECOMMENDED CITATION

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ACRONYMS

CARE	Cooperative for Assistance and Relief Everywhere
Chi2	Chi Square
CHW	Community Health Worker
CLTS	Community Led Total Sanitation
CHS	Community Health Center
GCPH	General Census of Population and Housing
RHC	Reference Health Center
df	degrees of freedom
FHI 360	Family Health International
HDP	Human Driven Pump Drive
HRC	Health Reference Center
MAD	Minimum Acceptable Diet
NS	Not significant
NGO	Non-governmental Organization
S	Significant
VS	Very significant
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, sanitation and hygiene
WA-WASH	West Africa Water, Sanitation, and Hygiene Initiative
WHO	World Health Organization

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ABSTRACT

This report presents the findings of a baseline survey conducted in three districts in the Mopti Region in Mali: Mopti, Bandiagara and Bankass. The survey was conducted to better understand the situation in the mentioned districts of Mali in regards to water, sanitation, hygiene, and nutrition and obtain information that will help inform future investments prior to the implementation of WASHplus intervention in the area.

More specifically, the baseline survey was used to assess the prevalence of exclusive breastfeeding of children under 6 months and dietary supplementation in children 6 to 24 months. The survey targeted mothers or guardian of children under 2 years of age and was used to ultimately provided invaluable information on drinking water sources of households, knowledge of methods of treating drinking water at home and their uses, as well as the level of sanitation and hygiene and nutrition practices. Overall, only 28.7% (26.4% in the intervention area against 30.9% in the control area) of children under 6 months of age are exclusively breastfed. The proportion of children aged 6 to 23 months who have access to a minimum acceptable diet is 7.7% overall, 6.2% for the intervention area against 9.3% in the control area.

Data from this survey indicate that the populations of both the intervention and the control areas have less than optimal access to basic sanitation and hygiene. Fifty-three percent in the control villages and 58% in the intervention villages practice open defecation. Those that have a latrine tend to have to access to unimproved sanitation, 30% in control villages and almost 23% in intervention villages.

Although households recognize the importance of handwashing to prevent certain diseases, the act of washing hands with soap and water at key times, is far from habitual. Findings indicate that about 25.5% households in both study groups have a handwashing device with essential supplies to wash hands (soap and water) - 6.3% near the kitchen and 22.4% (23.4% in intervention zone against 21.5% in control area) near the latrine.

Regarding water supply, 30.5% of households use an unprotected drinking water source (27.6% in the intervention area and 33.4% in the control area), 22.6% use a borehole with a hand pump (20.7% in intervention against 24.6% in control areas) and 20.2% use large-diameter open wells (23.1% in the intervention area against 17.3% in control area). Only a minority of households drink water from other water sources.

Forty-three point seven percent of households reported treating their drinking water, with only 19% of households reporting the use of chlorine. In addition, a minority of households reported mixing treated with untreated water when they refill the container holding the treated water. Both of these findings are indicative of the low level of compliance with proper drinking water treatment in general.

Regarding the storage of water, 25.7% of visited households properly stored drinking water, 7% of households in areas of intervention against 26.2% for the control areas. The study detected many geographic variations across indicators discussed. Details can be found in the body of the report. To reduce health vulnerability of households in the study population, appropriate interventions need to be implemented in those communities. Relays, community health workers, health centers, and radio agents, appear to be the most suitable channels for information and awareness messages that can be used to support those interventions.

1 INTRODUCTION

Diarrhea, malaria, and pneumonia are responsible for about 20% of infant mortality in Mali, however, the World Health Organization (WHO) estimates that 88% of diarrhea is caused by unhealthy water, lack of sanitation, and poor hygiene practices. Diarrhea can be reduced by established interventions in the areas of water, sanitation and hygiene (WASH).

Poor hygiene and inappropriate feeding practices also contribute to child malnutrition. These practices are attributable to a number of factors:

- Lack of information on appropriate hygiene and food practices
- Poverty or a lack of resources
- Lack of supplies and critical essential services
- Cultural practices and social norms, such as the dynamics of the extended family and unequal gender relations which affect the allocation of food in the family

In addition to mortality, undernourishment delays children's physical and mental growth with lifelong effects of lost potential. Improving access and use of water and sanitation infrastructure and improving hygiene practices at the household level, can lead to direct improvements in other key areas of development including food, education, environment, economic growth and governance. WHO estimates that every dollar invested in sanitation brings benefits of $9, including greater productivity and lower costs incurred for diarrhea treatment. [1]

The national policy framework in Mali contains the National Sanitation Policy adopted in 2009, which includes both sanitation and the quality of drinking water. In addition, the Malian Ministry of Health issued a National Strategy for Hygiene Behavior Change in 2010 to reduce diarrheal diseases through a series of mechanisms, including social mobilization, communication for behavior change, public-private partnerships, and advocacy. Among the key hygiene practices promoted include

[1] Hutton, G, Haller, L, Bartram, J (2007). Economic and health effects of increasing coverage of low cost household drinking-water supply and sanitation interventions to countries off-track to meet MDG target 10. Support document to "Human Development Report 2006." New York and Geneva, United Nations Development Program and WHO.

handwashing with soap, use of basic sanitary facilities and secure treatment and storage of household water.

The WASHplus project, centrally-funded by USAID and implemented by FHI 360 with CARE USA and Winrock International as main partners, creates and supports interventions that lead to improvements in WASH and explores and encourages innovation in the WASH sector, including the integration of WASH in related sectors such as nutrition. USAID/Mali has provided funds for WASHplus to carry out activities in Mali. Through this investment, USAID/Mali is focusing resources on WASH activities at the community and household level in selected sites where CARE was implementing Keneya Ciwara II[2] and other WASH and food and nutrition security initiatives.

WASHplus is implemented in three circles (Mopti, Bandiagara, and Bankass) within the region of Mopti, which are also priority areas for both USAID's Feed the Future and Global Health Initiatives. WASHplus benefits from the presence of CARE in these three circles; however, the municipalities selected are new ones that had not yet been trained in community-led total sanitation (CLTS) and where CLTS+ will be introduced. WASHplus promotes learning from other CARE programs and programs with other prime contractors. WASHplus focuses on reaching a population of 187,000 women of reproductive age (WRA) with an income of less than a daily income of $1.25/per capita- and about 6,000 of their children 0-23 months. [3]

CARE manages long-term programs which are composed of projects that target a common impact group and exploits synergies across projects. The overall objective of WASHplus relates directly to two of CARE/Mali's four long-term programs, the Health and Governance program, and the Food Security and Climate Change Adaptation program, allowing teachings, technologies and mechanisms to move between impact groups and target areas and taking advantage of shared senior shared management between complementary projects. Both programs (generally) work for equality of opportunity, participation, and status of women, with the first focused on achieving positive health outcomes for women of childbearing age and the second focusing on the ability of women to achieve and maintain food and nutritional security for themselves, their children and their families.

Brief description of the WASHplus intervention in Mali

WASHplus approaches this as an opportunity to build on existing networks and activities of Keneya Ciwara II and other CARE WASH and nutrition programs - including school WASH interventions funded by Dubai Cares and engaging the private sector through the USAID West Africa (WA)-WASH Initiative. We also see it as an opportunity to associate with others to promote improved sanitation and essential hygiene behaviors, working with multiple channels of the community.

[2] Keneya Ciwara II was a community health program funded by USAID and implemented in 13 districts from 2008-2012 aiming to increase access, quality and use of health services and the adoption of child survival practices at the household level.

[3] See Table 1 for the distribution of the population de Mopti by district, sex, children under 2 years and children under 5 years.

2 GOALS AND OBJECTIVES OF THE STUDY

The study has three goals:

- To gain a general understanding of the WASH and nutrition situation in areas visited;
- To obtain information that will help define the targets of the WASHplus project consistent with the desired indicators;
- To establish baseline results to determine changes that may occur due to the project's intervention.

The study has the following objectives:

- To understand the degree of access of households with children under 2 years in the intervention area to secure drinking water, improved sanitary facilities, and to hygiene;
- To determine the prevalence of the practices of exclusive breastfeeding and minimum acceptable diet;
- To determine the prevalence of diarrheal diseases in children under 2 years in the intervention and control areas.

The indicators at the household level this research seeks to measure are listed in the following table.

Table 1: Distribution of indicators by area

Domain	Indicators
Health	% of households with children under two years with diarrheal disease (among this age group) reported in the two weeks before the survey group
Water	% of households with children under two years and have access to improved drinking water source
Sanitation	% of households with children under two years using improved latrines
	% of households with children under two years who dispose hygienically of children's feces
Hygiene	% of households with children under two years with functional handwashing facilities near the latrine
	% of households with children under two years with a functional handwashing device in or near the area where complementary foods for weaned children are prepared
	% of households with children under two years with a functional handwashing device used by family members somewhere (else) in the household
	% of households that treat drinking water in accordance with the suggested methods
	% of households that practice conservation of treated drinking water
Nutrition	% of children under six months who were exclusively breastfed
	% of children 6-23 months receiving a minimum acceptable diet (MAD)

3 METHODOLOGY

4.1 Study framework

The study was conducted in the districts of Bandiagara, Bankass, and Mopti in the Mopti region, in northern Mali, which has an estimated 1.5 million inhabitants. The region is divided into eight districts. The region is arid but has a large water network and a chain of small lakes dominated by the Niger River which has several distribution networks. The Mopti Region is divided into a flood zone (4 districts) and a dry zone (4 districts). WASHplus is implemented in three health districts: Mopti (flood zone), Bandiagara and Bankass (dry zone).

4.2 Design

This was a cross-sectional study, with intervention and control groups. It took place from December 2013 to February 2014.

4.3 Data collection methods

The study is a household survey. The field survey was carried out based on a questionnaire that includes questions related to housing and family characteristics, breastfeeding and minimum acceptable diet in children less than 2 years, water access, hygiene and access to sanitation, , psychosocial determinants of owning a latrine and psychosocial determinants of handwashing, households' exposure to information about handwashing, treatment of drinking water, information on sanitation and diarrhea, as well as the respective sources of such information. The questions were read and some of them were reformulated in order to facilitate better understanding. Also, the questionnaire was translated into four local languages of the region: the Dogon languages (Donoso and Tomoso); Fulfulbé, and Bambara.

Table 2 lists the topics covered in the questionnaire. The instrument used may be found as an Annex.

Table 2: Topics Addressed in the Questionnaire by Theme

1. Theme	2. Topic
Eligibility Criteria and Identification Variables, Confirmation	• Child under 24 months in household • Study participant, child caretaker • Identification variables: study group, district, sub-district, commune, village, household, enumerator and supervisor
Socio-demographic Variables	• Physical characteristics of house • Family characteristics • Sociodemographic characteristics of person interviewed
Intervention Exposure Variables	• Access to improved water source and improved sanitation • Support services: water source operator, sanitation installation and repair services, access to lending services/microfinance services
Variables to Measure Behavioral Determinants	Knowledge, beliefs, attitudes, intentions
Behavior Measures	Objective measure of handwashing practices
	Exclusive breastfeeding practices
	Minimum acceptable diet variables
Diarrheal Prevalence Variable	Recall of diarrheal disease for index child in the two weeks prior to the survey

4.4 Study population and sampling

The study population were 18+ year-old mothers or primary caretakers (guardians) of children less than 2 years. In the targeted rural areas in Mali, this role is primarily played by the mother of the children of interest. The primary caretakers of children are responsible for dealing with household WASH activities. They are also responsible for preparing food for children, feeding them and managing children's diarrhea, when it occurs.

In the northern part of Mali, families can live in a concession. A concession is described as a series of independent structures that may be within a partition wall or fence. A family is usually a group of individuals, related or not by blood ties who live under the authority of a person recognized as the head of the family. A family may include a man, his wife or wives if he is polygamous, and their unmarried children. We interviewed only one family per concession, chosen randomly. All eligible children in this family were listed.

The sample was selected following a two-step cluster sampling approach. There was a random selection of communes in the districts, and then of villages in the communes. The number of households per district was proportional to its size. In the context of this study, a cluster is a village. The study includes an intervention and a control group. The calculation of the sample size assumed an increase in sanitation coverage from 80% to 90% between the baseline and the endline of the study, a sampling error estimated at +/-5%, a design effect of 2, and a probability of 95%. This calculation is obtained by application of C-Survey. For each group 43 cluster (with 20 households per cluster) were selected. Thus, 860 interviews were conducted per study group, with a total of 1,720 households for the whole study. ..

We used the census figures from the 2009 General Census of Population and Housing (GCPH) to establish that there were 947,000 residents in the three districts where WASHplus operates in the region of Mopti. Of these districts, 39% live in Mopti district, 33% in the Bandiagara district, and 28% in Bankass district. Therefore, 17 clusters were drawn from Mopti, 14 from Bandiagara and 12 clusters from Bankass for the intervention and the same number of clusters for the control zone.

4.5 Practical implementation of the survey

Informing authorities and populations

Before the implementation of field activities, WASHplus informed all stakeholders that the research was going to be conducted in selected communities. Thus, local authorities (prefects, sub-prefects and village heads) of the selected villages were informed formally about the research that was going to be conducted in their communities as well as the arrangements that the team wanted them to make vis-à-vis the population.

Various approaches to inform and sensitize communities covered by the survey were also implemented by facilitators and supervisors of local NGO partners to encourage acceptance of the fieldwork, which greatly limited the reluctance of people when the interviewers visited communities to collect data.

Recruitment of data collectors

The data collection team included thirty-one data collectors (men and women) selected from an initial pool of fifty applicants. All had at least Baccalaureate (BAC) + 2 years and fluency in the languages spoken in the three circles covered by the study.

Regarding team leaders, they had a level of at least BAC + 4 and were identified during training based on proven experience in similar studies. An interview was held with each of them by the Head of Mission to ensure their availability for the duration of the study.

Training of data collectors and pre-testing the questionnaire

The training of data collectors took place in Sevaré over seven days under the supervision of the principal investigators with support from Orlando Hernandez, Senior Advisor for WASHplus, and

Alhassane Sow, Technical Monitoring and Evaluation Advisor for the CARE implemented Nutrition and Hygiene Project. The training schedule included sessions where the following issues were addressed: background and context for the survey, the household sampling procedures at the cluster level, the methodology for collecting data, full understanding of the questionnaire (questions, responses and skip pattern), and instrument pre-test which was done in site not covered by the study. The first four days of training were devoted to methodological and ethical aspects, studying the questionnaires, practicing questionnaires individually and in pairs, translating questions into local languages (Fulfulbè, Dogon, and Bambara). At this stage, the questionnaires were carefully studied to enable participants to become familiar with the content.

A pre-test in the field of all procedures of the study was scheduled on the fifth and sixth days of training in three villages.[4] All participants in this exercise were previously divided into three different groups according to their tasks in the field (data collector or team leader). During the pre-test, the three villages were identified and household members of the selected clusters were surveyed. Each team worked to seek the selected households, conducted interviews and applied the methodological procedures established. After the pre-test, the length of time to administer the questionnaire was reassessed.

The seventh and final day of training was devoted to debriefing the pre-test, integrating of the comments on the questionnaires for their finalization, the final selection of the 31 collection agents and the practical arrangements for starting the field study. Apart from the documents presented at this training, other materials, such as interviewer's manual, the supervisor's manual, and maps of villages, facilitated the understanding of the various presentations made by the WASHplus team.

Organization and logistics of field teams

The Bandiagara and Bankass field teams had nine enumerators and one supervisor, and the Mopti field team had 10 enumerators and the one supervisor.

The role of the supervisors was to:

- inform local authorities of the arrival of his team in the area
- ensure that the data collectors had the necessary supplies (questionnaires and accessories) to do their work
- serve as interface between enumerators and the study coordinator
- coordinate team travel
- set the daily agenda in line with the travel plan and field difficulties
- assign each enumerator the area to investigate
- supervise the collection to see how the enumerator conducts the interviews and irons out any difficulties encountered in the field
- ensure that the enumerators remained within the areas to investigate
- check the questionnaires and manage the daily debriefing
- report to the study coordinator on the progress of his team and difficulties encountered

[4] These villages were not part of the villages selected for the study.

As for data collectors, it is their responsibility to:

- find the households to be surveyed
- administer questionnaires to households in the cluster
- follow the instructions of the supervisor
- participate in daily meetings
- contact the supervisor; in case of problems
- follow the specified methodology for the study
- ensure the completeness of the questionnaire
- collect the data

Identification of and location study zones

Administrative and traditional authorities (prefect, mayor, village chiefs) from the selected sites were notified about plans for the study in order to obtain their agreement. A list of study villages was given to supervisors. Once they arrived in the village after the customary greetings to village authorities, concessions were correctly identified, under the guidance of the supervisor. Once this step was completed, the team conducted a count of households. To do this, the village was divided between the team members, who visited each compound to identify the number of households living there. Each team member collected the following information: Number of concessions, name of the head of the compound, number of households, and extent to which concession met eligibility criteria for inclusion in the study. After this operation, the supervisor was able to compose an exhaustive list of concessions from the village. Then he proceeded to randomly draw the households to interview.

Only when the study area (cluster of 20 households) is clearly identified by data collectors, can they conduct interviews according to the guidelines they've been requested to respect. Thus, they are distributed among the selected households in the enumeration area, which they will interview one after the other. Each data collector has the responsibility to interview on average four households per day. This rule was generally respected.

Field travel procedure for data collectors

The members of a field team travelled and stayed in villages together. For each village, once the household list was finalized, they were required to complete the collection of data in the selected households before moving on to another village.

Administration of the questionnaire

The aim was to complete a structured interview with the households once in the household, the enumerator approached the head of household or his representative to obtain authorization to conduct the interview in the concession. If the authorization was given, the enumerator obtained informed consent for the person to be interviewed. Only when consent was granted, did the enumerator proceed with the interview and fill out the questionnaire.

To be eligible for this survey, respondents had to meet the following conditions:
- Being a mother or a guardian of at least one child under 24 months
- Be at least 18 years
- Living in one of the villages selected for the study

For increased reliability of results in the field, everything was done so that the selected households were interviewed. At least two visits are made if all selected study participants in a household were absent, before any replacement.

Data management and quality control

Each data collection staff member was given a unique identifier. Each team was given a list of all the villages visited. The list and maps identified the precise boundaries of each cluster to visit. Data were collected as per the questionnaire. At the end of each interview, the data collector checks the completeness of information and compliance with skips. The households surveyed have a unique identifier to ensure confidentiality of data. Every evening, a debriefing of the day's work was done and completed questionnaires were sent to supervisors for review.

Questionnaires from each cluster were put together, packaged and sent to the coordination during supervision. We have audited 15% of questionnaires by district and made recommendations to supervisors, whom in turn had them implemented by their teams.

Ethical considerations

This study was conducted in accordance with fundamental ethical principles, such as respect, beneficence, justice, and anonymity of participants. The protocol was submitted and received approval from the ethics and technical committee of FHI 360 and the National Ethics Committee of the National Institute of Public Health Research of Mali.

The survey data are treated anonymously and confidentially. They were captured and stored in our database with access strictly limited by the use of a password that is known only by the principal investigators. Also, it has been ensured that the special participation of all respondents in this study was strictly voluntary. Those visited were free to accept or refuse to participate in the administration of the questionnaire.

During the training of field staff, the emphasis was put on the need to obtain permission from the head of the concession; administering the informed consent of the respondent by household and to avoid any form of coercion. With the support of supervisors and supervision of the project team, the confidentiality of interviews was ensured. The Circular and the consent form were read in the language of the respondent and a copy was systematically provided to households.

Data entry and cleaning

For the entire entry process of the collected data, the data entry template was developed with the Sphinx software. To avoid certain types of data entry errors, multiple controls with error messages were integrated into the data entry template.

For data entry, four (4) people were screened. They received one day of training. During training, trials were made to test not only the template, but also to familiarize the workers to the data entry template designed for this purpose. For quality control purposes, a double data entry approach was used. The actual data entry operation itself (first and second entry) lasted seventeen (17) days. At the end of the double entry, the two databases were compared to highlight differences. Then the two computer databases were compared to actual responses on questionnaires and errors were corrected upon verification. The same process was followed each time the questionnaire was recorded differently in the two databases.

The Sphinx software cleaning module "Compare response files" was applied to the database and the differences between the two files were detailed, cleared and corrected.

Data analysis

Data analysis followed several steps to correctly inform the needs of the study. We examined the socio-demographic characteristics of primary caretakers of children under two years who responded to the questionnaire. This allowed us to know their profiles and household characteristics. After analyzing socio-demographic variables, key project indicators were calculated. These indicators were then cross-tabulated by study group (intervention and control).

The variables of interest were also analyzed according to their relevance to understanding the situation of access to drinkable water, sanitation facilities, hygiene and nutrition of children in the study groups.

The results are presented in five sections: socio-demographic characteristics of household; nutritional practices associated with exclusive breastfeeding and the minimum acceptable diet for young children, the household access to improved drinking water, access to sanitation facilities and the relevant knowledge and psycho-social determinants of handwashing and possession of latrines.

Limitations of the study and problems encountered

The methodological limitations of the study concerned:
- The chlorine test was not performed in households to check if people used the chlorination for water treatment;
- The lack of enthusiasm for those surveyed regarding certain questions;
- The delay in conducting the study in flooded area;
- The difficulties of estimating the time spent collecting water by the person responsible for the water supply of the household;
- Cultural and religious considerations in some villages so that investigators were not been in direct contact with the woman who answered because of a wall that separated them. In these instances, the husband communicated his wife's response.

4 RESULTS OF THE BASELINE STUDY

5.1 The Socio-demographic characteristics

The socio-demographic characteristics of respondents addressed in this report include age, school attendance, level of formal education, and housing characteristics, as well as means of production, access to services, and consumer goods owned by households. The objective is to present a profile of the female respondents and certain characteristics of the socio-economic environment of households targeted by the study.

Structure by age and marital status

The age structure shows that 6.7% of participants are under age 20 and 5.9% are over 40 years old. These results show the majority of respondents (87.3%) are aged between 20-39 years.

The average age was about 27.8 years, with a minimum of 18 and a maximum of 49 years.

In both areas (intervention and control) almost all (99%) mothers or caregivers were married. Of this, 65.5 (64.3% in intervention and 63% in control zones) were in monogamous marriages, compared to 34.5% (35.7% in intervention area and 33.3% in the control area) in polygamous marriages.

Approximately 2.2% of household heads had three wives in the intervention area compared to 3.2% in the control area. The majority (80.8%) of respondents was the first wife.

Table 3: Distribution of Respondents by Age and marital Status

Variable	Intervention (n=860)	Control (n=860)	Total (n=1720)	Chi2	df	p
Age intervals						
Under 20	7.0%	6.4%	6.7%			
20-24 years	26.2%	26.0%	26.1%			
25-29 years	25.5%	27.0%	26.2%	**0.77**	**5**	**.90 (NS)**
30-34 years	22.7%	22.6%	22.6%			
35-39 years	12.8%	12.1%	12.4%			
40 years and over	5.9%	5.9%	5.9%			
Marital status						
Married	99.0%	99.1%	99.0%	3.2		.40 (NS)
Other	1.0.	1.0	1.0%			
Widow	.7%	.2%	.5%			
Number of wives husband has						

1	64.3%	66.6%	65.5%	1.23	3	.70 (NS)
2	32.3%	3.1%	31.2%			
3	3.0%	3.0%	3.0%			
4	0.4%	0.2%	0.3%			
Spouse ranking of study participant						
First wife	81.1%	8.5%	8.8%	.46	2	.80 (NS)
Second wife	16.9%	17.1%	17.0%			
Third wife	2.0%	2.5%	2.2%			

Level of education

During the study, information about the level of education achieved and the highest grade completed was collected. The education of mothers or caretakers is an important determinant of living conditions of households, health behaviors and hygiene and nutrition habits.

The educational level of the surveyed population is very low. Indeed, overall, more than nine out of ten five women (92%) never had any education.

Just a little over 2% of women completed primary level while 5.1% did not complete the cycle. Less than 1% had any secondary or higher education: 0.6% of women reported having completed secondary school or reached higher level education, while 0.2% had some (not complete) secondary education.

Table 4: Distribution of Study Participants by Educational Level

Educational Level	Intervention	Control	Total
Never attended school	93.4%	90.6%	92.0%
Incomplete elementary	3.5%	6.6%	5.1%
Complete elementary	2.4%	2.1%	2.3%
Incomplete secondary	.2%	.1%	.2%
Complete secondary	.5%	.5%	.5%
Incomplete university	.0%	.1%	.1%
Complete university	.0%	.0%	.0%

Table 4 shows that the vast majority of respondents never attended school and among those that did, the majority did not go beyond the elementary school level.

Occupational status of the respondents

During the last 12 months preceding the survey, 67.0% of the women surveyed had an income generating activity. During the current month 60.6% of respondents had jobs that allowed them to earn money. The table below shows the socio-professional profile of those respondents.

Table 5: Distribution of Respondents According to Their Professional Activity in the 12 months prior to the survey

Professional Activity	Intervention	Control	Total
Vendor in informal sector	36.6%	36.8%	36.7%
Farmer	37.1%	32.7%	34.9%
Artisans	11.6%	14.8%	13.2%
Shepard	3.9%	2.8%	3.3%
Small shop owner	1.9%	4.6%	3.3%
Hairdresser	2.3%	4.1%	3.2%
Fisherman	4.4%	1.9%	3.1%
Laborer	0.9%	1.0%	1.0%
Artist	0.4%	0.3%	0.3%
Teacher	0.2%	0.3%	0.3%
NGO employee	0.2%	0.3%	0.3%
Guard	0.4%	0.0%	0.2%
Business owner	0.2%	0.0%	0.1%
Sharecropper	0.0%	0.2%	0.1%

p = 0.02; chi 2 = 24.83; df = 13 The relationship is significant.

Just over a third of the women interviewed in the survey are informal sector vendors (36.7%) and farmers (34.9%), followed by artisans (13.2%), shepherdesses (3.3%), small traders (3.3%), hairdressers and fishermen (3.2 each). Other trades were recorded in very low proportions.

Regarding the largest contributor to family income, 82.1% of households reported that husbands hold that position, 4.1% of households reported that the position is held by wives, and 8.6% of households reported that it is held by another member of the household. 5.2% of the study participants indicated that they did not know the answer to this question.

Table 6: Distribution of Households by Highest Income Earner

Highest income earner	Intervention	Control	Total
Head of family (husband of respondent)	82.7%	81.4%	82.1%
Wife	4.0%	4.2%	4.1%
Somebody else in family	9.5%	7.8%	8.6%
Does not know	3.9%	6.5%	5.2%

p = 0.06; chi 2 = 7.44; df = 3 The relationship is not significant.

Socio-economic characteristics of households

Living standards of households were estimated from the possession of means of production, certain consumer goods (e.g., radio, television, and telephone) and sources of water and household energy. Predefined coefficients established for Mali by another research study for each item were used to multiply by the number of items owned and then added up to create three socio-economic groups (high, medium or low level). The coefficient was multiplied by the number of items owned by households and then added up[5].

Table 7: Distribution of Possessions, Goods, and services Characterizing Visited Households by Study Group

Possessions /Services		Intervention	Control	Total	p	Chi^2	df	S
Means of Production	Owns agricultural plot	94.8%	96.3%	95.5%	.02	2.30	1	PS
	Owns cattle	72.8%	78.6%	75.7%	.00	7.90	1	TS
	Owns donkeys	7.5%	72.7%	71.6%	.01	1.03	1	NS
	Owns sheep, goats	84.7%	88.6%	86.6%	.01	5.80	1	S
	Owns a wagon	59.9%	67.8%	63.8%	.00	11.6	1	TS
	Cultivates commercial crop	37.3%	42.4%	39.8%	.03	4.57	1	S
Sources of Energy	Has electricity	.5%	4.0%	2.2%	.00	24.2	1	TS
	Has solar panel	31.9%	39.2%	35.5%	.02	9.96	1	TS
Consumer goods	TV	19.0%	24.9%	21.9%	.00	8.76	1	TS
	Radio	63.8%	68.0%	65.9%	.06	3.42	1	PS
	Mobile phone	84.7%	84.2%	84.5%	.70	.10	1	NS
	Landline phone	4.7%	3.8%	4.2%	.40	.71	1	NS
	Lamp	74.0%	68.0%	71.0%	.07	7.56	1	TS
	Fixed improved cookstove	34.0%	29.4%	31.7%	.04	4.15	1	S
	Mobile improved cookstove	1.8%	13.5%	12.2%	.09	2.85	1	PS
	Generator ;	1.2%	2.8%	2.0%	.01	5.86	1	S
Means of transportation	A bicycle	47.1%	48.8%	48.0%	.4	.52	1	NS
	A motorbike or scooter	55.0%	6.1%	57.6%	.03	4.61	1	S
	A car or truck	1.0%	2.3%	1.7%	.03	4.24	1	S
	A horse or mule to transport people	13.2%	14.8%	14.0%	.3	.95	1	NS

[5] R. G DAVIDSON «Socio-Economic differences in health, Nutrition and Population, Mali. Country reports on HNP (Health Nutrition and Population) and Poverty». HNP, April 2007

Differences in some items owned by households in the two areas = - electrification and possession of at least one phone, solar panel, TV, lamp, cow or ox and cart - were highly statistically significant. The consumer good most frequently owned in households is the mobile phone (84.5%). The radio and TV are respectively available in just over three out of five households (65.1%) and one in five (21.9%).

Regarding transportation possessions, we see that 57.6% of households own a motorcycle, 48% a bicycle, 14.0% a horse for transporting people and 1.7%, a car or truck. For cooking, improved fixed stoves are owned by 31.7% of households against 12.2% for the improved mobile stove.

For household lighting, 71.0% of households have lamps, and electricity at only 2.0% total with a statistically significant difference between the intervention area and control area. Other goods such as solar panels (35.5%), generator (2.0%) and landline phones (4.2%) are owned by households.

Home ownership and typology

The vast majority (97.1%) of the households surveyed owned the houses in which they live and a small portion (2.9%) rent.

The house types are mostly (72.8%) located in a common enclosure against 7.2% of homes in a separate enclosure.

Table 8: Distribution of Households by Status and Type of Home

Home ownership and classification	Intervention	Control	Total
Owner	97.60%	96.60%	97.10%
Tenant	2.40%	3.40%	2.90%
Type			
Individual home (no fence/separating walls)	27.1%	27.3%	27.2%
Part of concession (with fence/separating walls)	72.9%	72.7%	72.8%
Total	10.0%	10.0%	10.0%

Ownership: p = .2; chi2 = 1.31; ddl = 1. The relationship is not significant.
Type of home: p = .9; chi2 = .01; ddl = 1. The relationship is not significant.

5.2 Breastfeeding and complementary feeding for children aged 0 to 23 months

Feeding practices are the determinants of nutritional status of children which in turn affects their morbidity and mortality. Among these practices, exclusive breastfeeding is particularly important. Indeed, because of its special properties (it is sterile and transmits antibodies from the mother and all the necessary nutrients to children in early life), breast milk prevents nutritional deficiencies and

limits the appearance of diarrhea and other diseases. Given the importance of breastfeeding practices, we asked mothers whether they had breastfed their children under 24 months.

Exclusive breastfeeding

As recommended by UNICEF and WHO, all children should be exclusively breastfed from birth until the age of six months. The premature introduction of complementary foods is not recommended as it exposes children to pathogens, thus increasing their risk of contracting diseases, especially diarrhea. Moreover, it decreases the milk intake by the child, and therefore the suction, which reduces the production of milk. Finally, among the economically poor, complementary foods are often nutritionally inadequate.

However, starting at six months, breastfeeding should be complemented by the introduction of other appropriate foods to satisfy the nutritional needs of the child and allow him to have the best possible growth. Information on complementary feeding was obtained by asking the mother if her child was breastfed and what type of foods (solids or liquids) the child received in the last 24 hours. Questions about breastfeeding and complementary food were asked for all children under 24 months.

Overall, for children 0-six months, 28.7% (26.4% in the intervention area against 30.9% in the control area) of children were reportedly exclusively breastfed. A high percentage (60.6% - 61.7% in the intervention area against 59.6% in the control area) receive, in addition to breast milk, only water and 9.2% (10. 2% for the intervention area against 8.3% for the control area) receive other milks. A small proportion of children are still breastfed and are given complementary foods already - 1.5% (1.7% for the intervention area against 1.3% in the control area).

Table 9: Distribution of Children by type of Breastfeeding for Children under six months

Breastfeeding typology[6]	Intervention N=303	Control N=314	Total N=617
Exclusive	26.4%	3.9%	28.7%
Predominant	61.7%	59.6%	6.6%
Another type of milk as supplement	1.2%	8.3%	9.2%
Other non dairy supplements	1.7%	1.3%	1.5%
Total	**10.0%**	**10.0%**	**10.0%**

p = 0.58; chi 2 = 1.99; df = 3 The relationship was not significant.

Types of complementary foods

Information relating to types of food given to children under 24 months are presented in following table.

[6]A 24-hour recall period is used to track exclusive breastfeeding. Children classified as 'breastfed and water only' do not include any complementary feeding. The categories 'exclusively breastfed', 'predominantly breastfed (water and another liquid)', « another milk», and 'complementary foods (solids and semi-solids) » are hierarchical and mutually exclusive.

Table 10: Distribution by Type of Food Received by Children 6 to 23 months

Foods	Intervention N=569	Control N=556	Total N=1125	P	X2	df	S
Cereals	32.2%	32.7%	32.4%	.8	.04	1	NS
Legumes and nuts	15.6%	18.9%	17.3%	.1	2.11	1	PS
Dairy	25.0%	26.3%	25.6%	.6	.28	1	NS
Animal protein	22.3%	23.2%	22.8%	.7	.12	1	NS
Eggs	4.7%	6.3%	5.5%	.3	1.30	1	NS
Fruits and Vitamin A rich vegetables	7.7%	11.0%	9.3%	.1	3.48	1	PS
Roots and tubers	8.5%	12.8%	1.6%	.0	5.54	1	S
Other fruits and vegetables	18.8%	17.4%	18.1%	.6	.35	1	NS

WHO recommends the introduction of solid foods into the diet of children at the age of 6 months, because from this age, breast milk alone is no longer sufficient to ensure optimal child growth.

The results of table 10 show a sizeable proportion of children consume, in addition to breast milk, solid and semi-solid foods sufficiently varied and rich in protein and minerals: 32.4% cereals (32.2% in zone intervention against 32.7% in control area), 17.3% (of legume and nuts 15.6% in the intervention area against 18.9% in the control area), 9.3% fruits and/or vegetables rich in vitamin A (7.7% in response zone against 11.0% in control area) , 10.6% of roots and tubers(8.5% in intervention area against 12.8% in control area) , 22.8% of meat and fish (22.3% in the intervention area against 23.2% in the control area), and 5.5% eggs (4.7% in intervention area against 6.3% in control area).

The only significant difference between the project area and the control area is for roots and tubers. The differences were not significant between the two areas when comparing the proportion of receiving grains and nuts and fruits and vegetables rich in vitamin A.

Only 7.7% (6.2% in the intervention area against 9.3% in the control area) of children have a minimum acceptable diet.[7] See following table.

Table 11: Distribution of Children aged 6 to 23 months that have a Minimum Acceptable Diet

	Intervention	Control	Total
6-23 month old children having a minimum acceptable diet	6.2%	9.3%	7.7%
6-23 month old children not having a minimum acceptable diet	93.8%	9.7%	92.3%

p = 0.05; chi 2 = 3.97; df = 1 The relationship is significant.

[7] Children from six to 23 months who consumed foods belonging to at least four distinct food groups during the previous 24 hours.

Prevalence of diarrhea

Because of their consequences, especially dehydration and malnutrition, diarrheal diseases are, directly or indirectly, a leading cause of death for young children in Mali. Mothers were asked if their child under 2 had diarrhea during the two weeks preceding the survey in order to measure the prevalence of diarrheal diseases in the under 2 year cohort.

Examining the data in the table below, it appears that more than three under 2-year children in ten (34.1%) suffered from diarrhea during the two weeks preceding the survey. The prevalence of diarrhea was slightly, but not significantly higher, 34.5% in the intervention area against 34.1% in the control area.

Table 12: Proportion of Households with Diarrheal Disease reported in the two weeks preceding the Survey

	Intervention	Control	Total
No	65.3%	66.2%	65.8%
Yes	34.5%	33.6%	34.1%
Does not know	0.1%	0.2%	0.2%

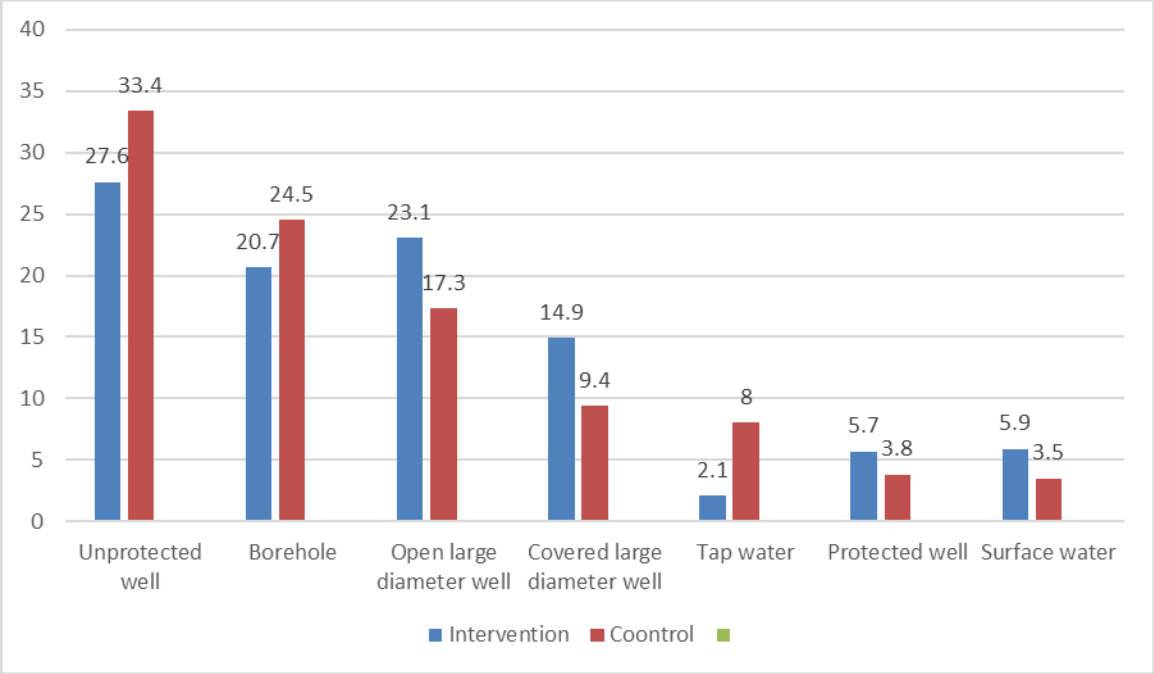
p = 0.8; chi 2 = 0.49; df = 2 The relationship was not significant.

5.3 Household drinking water

Drinking water sources

Access to improved drinking water is one of the important conditions for good hygiene in households. Household drinking water in households surveyed in the study came from several sources that are not considered safe by international standards (Figure 1)

Figure 1: Distribution of Households by Source of Water Supply



p = 0.001; chi 2 = 63.79; df = 6 The relationship is highly significant.

Three sources of water are frequently used by households: unprotected wells - 30.5% (27.6% in the intervention area against 33.4% in control area), a borehole equipped with a human-powered pump (HPP) 22.6% (20.7% in intervention against 24.6% in control zones) and large-diameter open wells 20.2% (23.1 % by area of intervention against 17.3% in control area). Other sources of water, including large diameter covered wells 12.2% (14.9% in the intervention area against 9.4% in control area), tap water from a publicly-supplied network 5.1% (2.1% in intervention area against 8.0% in control area), protected well protected 4.8% (5.7% in intervention area against 3.8% in control area) and surface water 4.7% (5.9% in intervention area against 3.5% in control area) are also used by households.

These sources of water are used in 86.3% of households in all periods of the year. Nevertheless 13.7% change drinking water source depending on the time of year. When they change, these sources are surface water 32.3%, unprotected wells (19.0%), large diameter open wells (13.7%), drilled well with HPP (10.5%), protected wells (8.1%). rainwater (6.9%) and the large diameter covered well (6.5%).

In households, other sources of water are used for other purposes than drinking (for example, washing hands, cooking, and other household chores). Of the more than eight sources cited by households, water from unprotected wells (38.8%), large diameter open wells (24.4%), surface water (22.6%), and drilled well with HPP (21.7%) are the most used for non-drinking purposes.

Table 13: Distribution of Water Sources Used for Purposes Other than Drinking

Water source	Intervention	Control	Total
Unprotected well	35.7%	41.9%	38.8%
Large diameter uncovered well	26.3%	22.6%	24.4%
Surface water	26.2%	19.0%	22.6%
Borehole with pump	19.2%	24.3%	21.7%
Large diameter covered well	13.7%	11.4%	12.6%
Rainwater	1.0%	8.7%	9.4%
Tap water	2.1%	7.9%	5.0%
Protected well	5.2%	3.4%	4.3%

p = 0.1; chi 2 = 11.76; df = 7 The relationship is not significant.

In order to make water safe to drink, 43.8%) households treat it at home. The distribution of household water treatment practices are presented in Table 14.

Table 14: Drinking Water Treatment Practices by Water Source

Main source of drinking water in the household	Practices Water Treatment	
	No	Yes
Protected well	42.7%	57.3%
Unprotected well	55.9%	44.1%
Tap water	66.7%	33.3%
Open large diameter well	57.8%	42.2%
Covered large diameter well	47.8%	52.2%
Borehole with pump	61.2%	38.8%
Surface water	51.9%	48.1%

p = 0.01; chi 2 = 16.58; df = 6 The relationship is significant.

The study found that only 4.1% of households have a source of drinking water at home and that 67.6% take less than 30 minutes to fetch water (go to the source, wait in line and come back home with container filled). While the percentage of households with a water source on the premises was relatively similar in the two areas, (3.9% of households have an on-site source of supply against 4.9% in control area), we found considerable differences in distances travelled to fetch water by study. As such, 62.5% of households in the in intervention group reported spending up to 30 minutes for the trip, compared with 72.8% in the control group. By the same token, 30.8% of the visited households in the intervention group reported that the trip takes over 30 minutes compared to 19.3% in the control area.

Table 15: Estimated Time to Fetch Water

Estimated time invested in fetching water	Intervention	Control	Total
Over 30 minutes	3.8%	19.3%	25.1%
30 minutes or less	62.5%	72.8%	67.6%
On premises	3.3%	4.9%	4.1%
Difficult to estimate	3.4%	3.0%	3.2%

p = 0.001; chi 2 = 32.37; df = 3 The relationship is highly significant.

The results in Table 15 also show that, when water is not available on the premises, it is primarily women (93.8% for females aged 15 or more and 4.9% for females below that age threshold) who are responsible for collecting water. Water fetching is done by men in 1.4% of households (1% for males 15 years or more and less than one percent for younger males). No statistically significant variations across study groups was detected.

Table 16: Person in charge of Water Supply

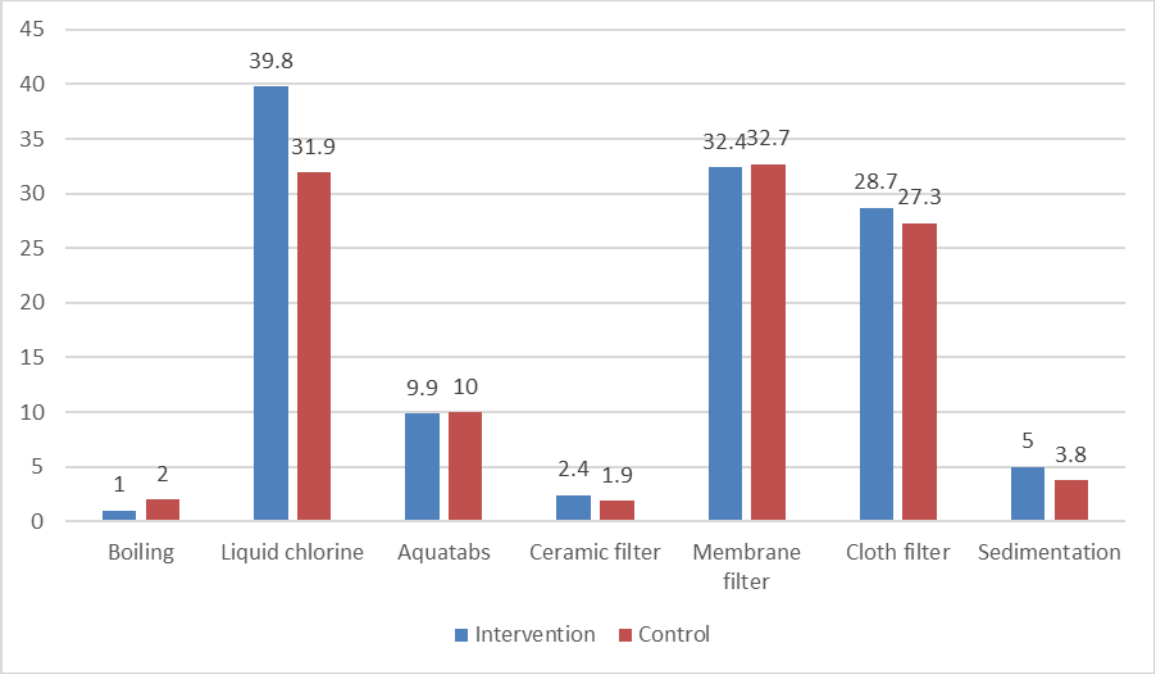
Gender and age of individual in charge of fetching water	Intervention	Control	Total
Male 15+ years old	0.7%	1.3%	1.0%
Male 15 years old or younger	0.5%	0.3%	0.4%
Females 15+ years old	93.5%	93.8%	93.7%
Females less than 15 years	5.4%	4.5%	4.9%

p = 0.5 -; chi 2 = 2.20; df = 3. The relationship was not significant.

Knowledge of methods of water treatment at home

In order to measure knowledge, study participants were asked to state the water treatment methods they are acquainted with. Figure 2 below shows the distribution of responses to this question. Multiple responses were possible.

Figure 2: Distribution of Respondents according to their knowledge of the Methods of Treating Drinking Water



p = 0.04; chi 2 = 16.58; df = 8 The relationship is significant.

The data from Figure 2, show that the three most frequently mentioned water treatment methods are: liquid chlorine (bleach) 35.5%, the membrane (sieve) filter (32.6%) and the cloth filter (28.0%). Methods such as Aquatabs (9.9%), decanting (4.4%), the ceramic filter and boiling water are known in relatively low proportions.

Water treatment at home

Improving water quality through certain treatments can help reduce the risk of disease. During the baseline survey questions were to determine whether drinking water was treated and the method used to do so. Just over four in ten households 43.4% (44.8% in the intervention area against 42.1% in control area) treated water. Approximately 56.6% of households reported not using any form of water treatment. The distribution of treatment methods used is presented in Table 17.

Table 17: Water Treatment at Home, among Total Sample

Household water treatment method used	Intervention	Control	Total
Liquid chlorine	15.2%	13.1%	14.2%
Aquatabs	4.9%	4.8%	4.8%
Cloth filter	34.4%	32.4%	33.4%
Ceramic filter	1.5%	1.4%	1.5%
Sedimentation	.5%	.5%	.5%
Solar disinfection	.2%	.3%	.3%
No treatment	55.7%	57.8%	56.7%

p = 0.02; chi 2 = 16.20; df = 7 The relationship is significant.

The two most commonly mentioned water treatment methods used across study groups are chlorination (19% total when liquid and pills are added together) and membrane filtration 34.9%). The proportion of households who use sedimentation and solar disinfection (combined) is very low: 0.8% (0.7% in the intervention area against 0.8% in the control area). Differences across study group, however, are statistically significant, with water treatment being more frequently practiced in the intervention area.

Findings indicate that the average number of hours during which households continue to drink treated water is 11.7 hours. In a minority of households (4.3%), bad water treatment practices were also reported as in these cases households indicated mixing treated and untreated water each time that they refill the water container.

Reasons provided by these households to explain why they treat their drinking water include: exposure to health promotion campaign messages/training 47.4% (50.9% in the intervention area against 43.8% in the control area); the perception that water treatment is a normal household held by 20.0% of respondents (19.4% for the intervention area against 20.7% for the control area); availability at home of water treatment product 5.9 % (5.2% in the intervention area against 6.6% in the control area);and the perception that the source of water available is not fit for drinking consumption thus requiring water treatment at the household level: 26.7% (25.2% for the intervention area against 28.4% in the control area).

Table 18: Distribution of Households by Factors Motivated Treating Water at Home

Motivations to Treat Water at Home	Intervention	Control	Total
Exposure to hygiene promotion activity or training in subject matter	5.9%	43.8%	47.4%
« Treating water at home is a normal thing to do »	19.4%	2.7%	2.0%
Availability of water treatment methods at home	5.2%	6.6%	5.9%
Water from our source is contaminated	25.2%	28.4%	26.7%
Someone is now sick in the family and we have to use treated water	0.0%	0.6%	0.3%

p = 0.2; chi 2 = 5.50; df = 4 The relationship is not significant.

In contrast, on the flip side the reasons mentioned by study participants from households which do not treat water include: lack of knowledge that drinking water had to be treated 34.9% (33.0% in the intervention area against 36.8% for the control area); not a previously held practice by household 10.1% (10.2% in the intervention area against 10.1% for the control area), not having available necessary supplies 33 8% (37.6% in the intervention area against 30.2% in the control area), the water source being considered safe to need any treatment before drinking it 36.7% (34.0% in the intervention area against 39.2% in the control area), and there being no family member that is sick at the time of the interview to make water treatment necessary 4.6% (5.2% inn in the intervention area compared to 4.0% in the control area). Differences in study groups detected are not statistically significant.

Table 19: Distribution of Households by Unfavorable Factors to Home Water Treatment

Reasons provided for not treating drinking water	Intervention	Control	Total
Ignored that drinking water had to be treated	33.0%	36.8%	34.9%
Not previously held practice	1.2%	1.1%	1.1%
Not having at home needed water treatment supplies	37.6%	3.2%	33.8%
Source is not risky to merit treatment	34.0%	39.2%	36.7%
Nobody at home, thus no need to treat water available	5.2%	4.0%	4.6%

p = 0.1; chi 2 = 7.54; df = 4 The relationship is not significant.

Transport and storage of drinking water in households

All efforts to make water potable water is wasted if it is not properly transported, stored or handled. During the study, information was collected on the conditions of transport, storage and handling of drinking water.

Containers used to transport drinking water from the source to place the storage place are buckets 64.6% (62.0% in the intervention area against 67.1% in the control area), plastic canisters 22 5% (25.3% in the intervention area against 19.6% in the control area) or a pail 11.2% (11.6% in the

intervention area against 11.2% for the area control). Other containers, such as barrels and clay pots, are mentioned by a much smaller proportion of households.

Table 20: Distribution of Containers used to Transport Drinking Water from Source to Household

Water Container Typology	Intervention	Control	Total
Bucket	62.0%	67.1%	64.6%
Plastic canister	25.3%	19.6%	22.5%
Clay pot	0.5%	0.4%	0.4%
Pail	1.7%	11.6%	11.2%
Barrel	1.5%	1.1%	1.3%
Others	0.0%	0.2%	0.1%

p = 0.06; chi 2 = 10.84; df = 5 The relationship is not significant.

Table 21 presents findings concerning the type of containers used for storing drinking water. Clay pots 80.0% (77.7% in the intervention area against 82.4% in the control area), jerry cans 11.6% (13.2% in the intervention area against 10.0% for the control area) and the clay jar 8.0% (8.5% for the intervention area against 7.5% in the control area) are the containers use by most households for storage of drinking water. Much less commonly used are buckets and barrels as less than 1% of study participants mentioned either of these containers.

Table 21: Distribution of Households by the Storage Containers for Drinking Water

Water containers	Intervention	Control	Total
Clay pot	77.7%	82.4%	8.0%
Jerry can	13.2%	1.0%	11.6%
Jar	8.5%	7.5%	8.0%
Bucket	0.5%	0.1%	0.3%
Barrel	0.2%	0.0%	0.1%

p = 0.06; chi 2 = 9.20; df = 4 The relationship is not significant.

From the results of the observation made by interviewers in households, presented in Tale 22, it is clear that in the overwhelming majority of cases, the containers used for drinking water storage are closed / covered 90.0% (89.5% in the intervention area against 90 5% in the control area), that frequently they are covered with well-adjusted covers 66.2% (66.4% in the intervention area against 66.0% in the control area), out of reach of animals 65.8% (65 , 5% for the intervention area against 66.0% in the control area) and children 38.6% (37.7% in the intervention area against 39.5% in the control area). Only 0.1% of all containers observed had a tap.

Table 22: Distribution of Households by the Results of Observation on Container Covers and Place Where Water is Stored

Characteristics of drinking water storage receptacles	Intervention	Control	Total	P	X2	ddl	S
Containers have lids	89.5%	9.5%	9.0%	.2	2.95	2	NS
Tightly fitting lid	66.4%	66.0%	66.2%	.1	4.12	2	PS
Container has spigot	0.1%	0.1%	0.1%	.1	3.90	2	PS
Located away from animals	65.5%	66.0%	65.8%	.1	3.91	2	PS
Located away from children	37.7%	39.5%	38.6%	.05	5.94	2	PS

A separate analysis was done integrating the different elements associated with proper drinking water storage. Results of this analysis are not illustrated in a table. But when looking at households where the container used to store water is at the same time closed with a tight fitting lid, out of reach of children and away from pets, 25.7 % of households in areas of interventions against 26.2% for the control areas properly store water to drink.

5.4 Hygiene practices to measure behavioral outcomes

Availability of soap in households

The practices of hand hygiene are central in general household hygiene. The characteristic behavior of hand hygiene is handwashing, especially with soap. Within households visited, data were collected on the availability and variety of uses of soap. Thus 92.0% of the households visited had soap available at the time of the interview.

Table 23: Identity of the Person Who Decides to Buy Soap for the Family

Decision maker for soap purchase	Control	Intervention	Total
Husband	59.9%	58.3%	59.1%
Wife	37.3%	40.2%	38.8%
Somebody else	1.6%	0.9%	1.3%
Daughter	0.8%	0.5%	0.6%
Son	0.4%	0.1%	0.3%

p = 0.4; chi 2 = 4.09; df = 4 The relationship is not significant.

In households, soap used is purchased in the majority (59.1%) of cases by the husband and 38.8% by the wife. When asked what is soap is commonly used for, study participants indicated that it is used for washing clothes (90.6%), washing the body (88.8%), washing kitchen utensils 70.3%, washing children (68.0%), washing hands after leaving the toilet (11.7%), washing hands after anal cleaning of a child (10.4%), washing children's hands (9.7%), washing hands before eating (7.9%), washing hands

before feeding the children (6.6%), and washing hands before preparing food (6.0%). These data are presented in Table 24 below.

Table 24: Occasions when Respondent Generally uses Soap

Occasions reported	Intervention	Control	Total
Washing habits	90.9%	90.3%	90.6%
Washing the body	88.5%	89.1%	88.8%
Washing cooking utensils	70.9%	69.8%	70.3%
Washing infants	66.2%	69.9%	68.0%
Washing hands after using the toilet	11.5%	11.9%	11.7%
Washing hands after changing diapers	10.5%	10.3%	10.4%
Washing your child's hands	9.8%	9.5%	9.7%
Washing hands before eating	8.3%	7.6%	7.9%
Washing your hands before feeding your child	5.9%	7.3%	6.6%
Washing your hands while preparing food	5.9%	6.0%	6.0%
Other occasions	0.3%	0.3%	0.3%

p = 0.9; chi 2 = 2.47; df = 10 The relationship is not significant.

Regarding handwashing, the questionnaire made the distinction between rinsing and handwashing with soap. Prompting different occasions, enumerators asked study participants to indicate how frequently they rinse or use soap at each one of these occasions. The prompted occasions included the five junctures where handwashing with soap should be practiced to avoid the risk of having diarrhea: before preparing food, eating or feeding a child and after visiting the toilet or cleaning a child that has defecated,

Table 25 presents the responses provided to both types of questions. The data in this table show that at the key junctures indicated hand rinsing is reported as a more frequently performed practice than handwashing with soap. For example, whereas 56.5% of respondents indicated to always rinse their hands before preparing food, only 11.4% indicated to use soap. The same pattern is observed regarding handwashing prior to eating as 81.8% indicated to always rinse compared to only 14.3 who indicated to always handwash with soap. The same is true for hand cleanliness before feeding a child where 55.2% declared to always rinse compared to 1.2% who declared to always handwash with soap. The pattern is the same when the juncture proposed is 'after cleaning a child that has defecated" as 61.7% said that they always rinse compared to 19.1% who said that they always handwash with soap. The tendency is only different after visiting the toilet as 7.8% declared to always rinse compared to 17.6% who declared to always handwash with soap.

Table 25: Frequency of Hand Rinsing and Handwashing with Soap by Junctures for All Respondents

Junctures	Supplies used for hand cleansing	Never	Frequently	Very frequently	Always
When washing your face after you get up	Rinse	4.4%	4.9%	3.3%	87.5%
	Handwash with soap	76.3%	11.4%	5.8%	6.5%
After going to the toilet	Rinse	7.8%	12.1%	9.3%	7.8%
	Handwash with soap	47.5%	25.2%	9.6%	17.6%
Before eating	Rinse	3.3%	7.8%	7.1%	81.8%
	Handwash with soap	55.4%	21.3%	9.0%	14.3%
Before cooking	Rinse	9.5%	19.0%	15.0%	56.5%
	Handwash with soap	61.4%	2.4%	6.9%	11.4%
Before feeding a child	Rinse	9.2%	2.8%	14.9%	55.2%
	Handwash with soap	58.9%	23.0%	7.8%	1.2%
After working with my hands	Rinse	15.1%	27.3%	16.3%	41.4%
	Handwash with soap	54.7%	28.2%	1.9%	6.2%
After touching an animal	Rinse	34.3%	22.4%	16.5%	26.8%
	Handwash with soap	72.2%	15.6%	6.1%	6.2%
After cleaning a child that has defecated	Rinse	9.1%	18.5%	1.7%	61.7%
	Handwash with soap	44.9%	25.2%	1.9%	19.1%
After cleaning a toilet	Rinse	28.4%	18.7%	1.4%	42.6%
	Handwash with soap	58.5%	21.6%	6.6%	13.2%
After touching a person that is sick	Rinse	34.3%	24.0%	14.4%	27.2%
	Handwash with soap	65.8%	19.0%	7.6%	7.6%

Note: The proportions in green are the answers of handwashing with soap

Availability of a handwashing device in the household

In fact, about 25.5% households in both study groups have a handwashing device with essential supplies to wash hands (soap and water) - 6.3% near the kitchen and 22.4% (23.4% in intervention zone against 21.5% in control area) near the latrine.

The device most commonly used for handwashing was a kettle 56.5% (51.4% in the intervention area against 62.2% in control area), followed by tin can at 30.3% (36.2% in the intervention area against 23.7% in control area).

Table 26: Breakdown of households by handwashing device most used

Handwashing device	Intervention	Control	Total
Tap	0.0%	1.4%	0.7%
Plastic kettle	51.4%	62.2%	56.5%
Tin can	36.2%	23.7%	3.3%
Bucket	7.1%	7.2%	7.2%
Pail	2.5%	1.4%	2.0%
Plastic container	2.5%	3.4%	2.9%
Other	0.3%	0.7%	0.5%
Total	10.0%	10.0%	10.0%

p = 0.01; chi 2 = 17.39; df = 6 The relationship is highly significant.

In order to understand the importance attributed to handwashing with soap, respondents were asked to indicate spontaneously which were the most important junctures when hands should be washed using soap. Multiple responses were accepted. The responses provided to this question are summarized in Table 27.

Table 27: Distribution of interviewees by the most important times for handwashing

Important times for handwashing	Intervention	Control	Total
After going to the toilet	33.0%	36.4%	34.7%
After defecating	65.9%	65.2%	65.6%
Before eating	59.5%	61.6%	6.6%
After cleaning a child that has defecated	28.8%	25.5%	27.2%
After cleaning latrines	2.9%	16.4%	18.7%
After completing any domestic chore	35.8%	34.2%	35.0%
After cleaning a potty	19.4%	17.8%	18.6%
Before cooking	22.1%	19.2%	2.6%
Before feeding a child	2.2%	19.2%	19.7%
After touching an animal	1.6%	7.3%	9.0%
After eating	19.9%	18.0%	19.0%

p = 0.2; chi 2 = 16.72; df = 12 The relationship is not significant.

The two responses most frequently mentioned were "after defecation" (66%) and "before eating" (61%). When asked why makes people wash their hands with soap or detergent, they respond by the following factors:

Table 28: Distribution of respondents by reasons for washing hands with soap/ash

Reasons mentioned	Intervention	Control	Total
Get rid of germs	6.3%	61.2%	6.8%
Prevent illness	51.4%	51.3%	51.3%
Ensure that unclean products do not come into contact with the mouth	26.9%	26.4%	26.6%
Prevent germs from getting into food	25.7%	25.0%	25.3%
Prevent diarrhea	24.4%	21.2%	22.8%
Smells good	12.3%	13.0%	12.7%
Does not know	5.8%	4.8%	5.3%
Other reasons	0.2%	0.3%	0.3%

p = 0.9; chi 2 = 3.09; df = 7 The relationship was not significant.

The reason mentioned for washing hands with soap and/or ash by the most respondents was the removal of germs 60.8% (60.3% in the intervention area against 61.2% in control area), followed by 51.3% of respondents (51.4% in the intervention area against 51.3% in control area) saying to prevent disease, to prevent dirt from reaching the mouth 26.6% (26.9% in the intervention area against 26.4% in the control area), prevent dirt from reaching the food 25 3% (25,7% by area of

intervention against 25,0% in control area), and the prevention of diarrhea 22.8% (24.4% in the intervention area against 21.2% in the control area).

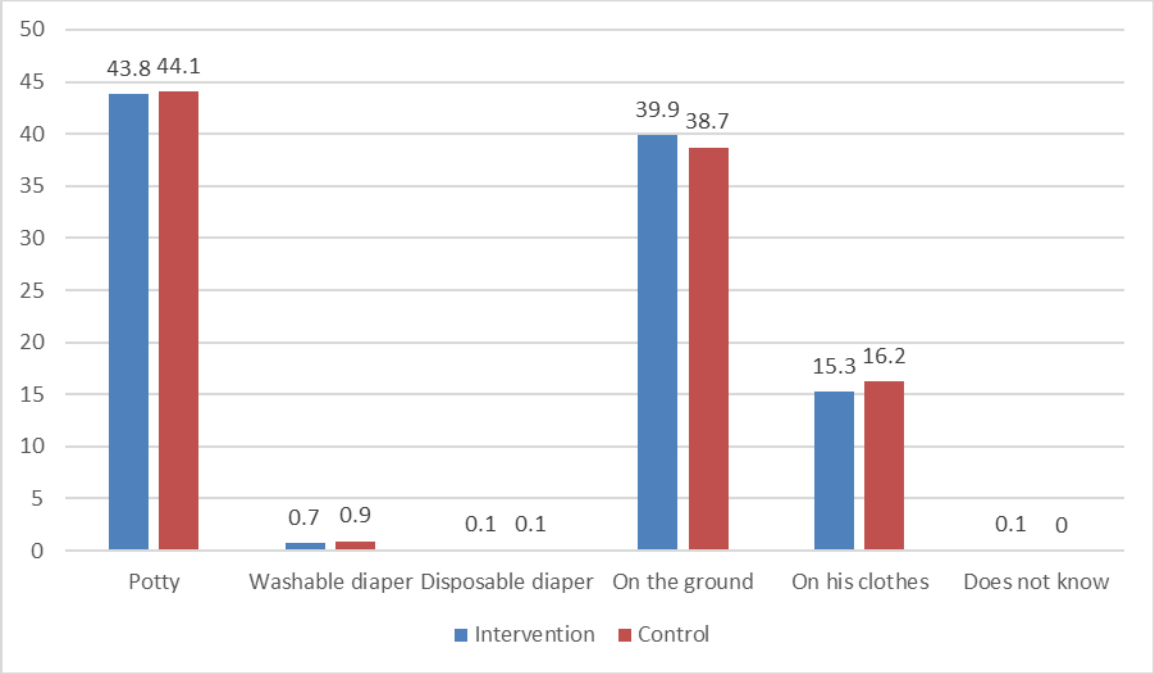
5.5 Sanitation

Sanitation in households largely depends on the accessibility of households to sanitary infrastructure (latrine) in the household. This is particularly important when the household has young children, especially children younger than two years, when the vulnerability of children is greater.

Management of feces

During the survey, respondents were asked the location where their child under two years defecated the last time he passed a stool. 44.0% indicated that a potty was used, 39.0% indicated that the child defecated on the ground, 15.8% said that it was done in their clothes, and 0.8% reported that the child used a washable diaper, and 0.1% indicated that the child used a disposable diaper. These data, broken down by study group, are presented in Figure 3.

Figure 3: Place of defecation of children less than 2 years old

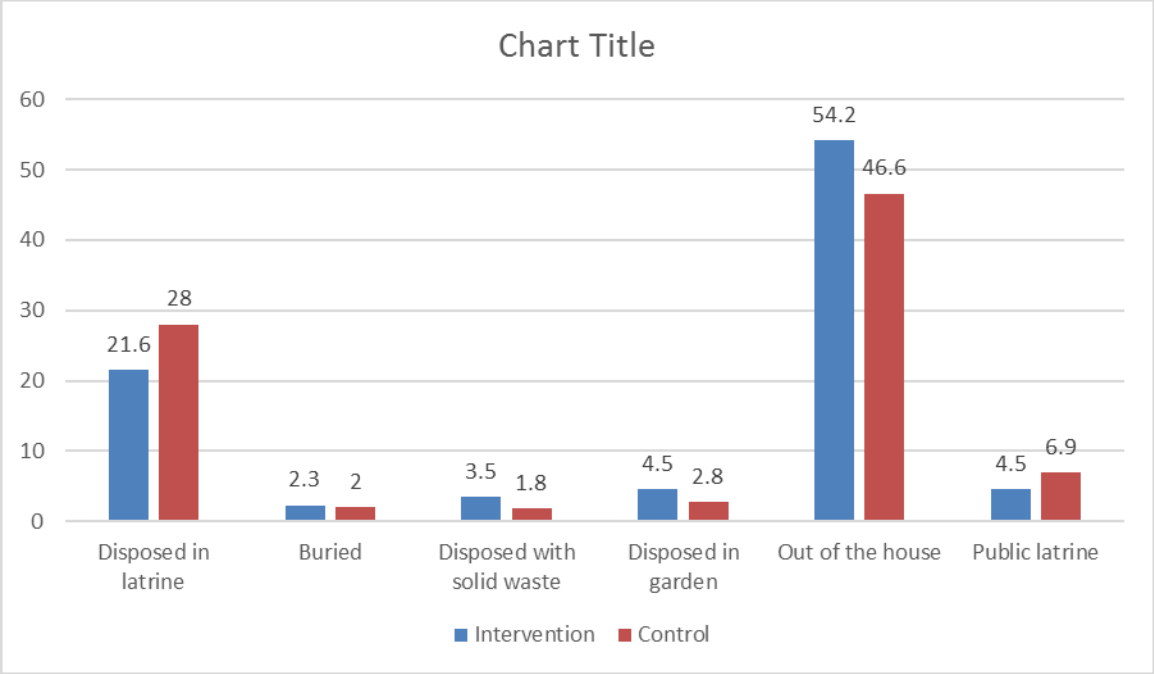


p = 0.9; chi 2 = 2.56; df = 6 The relationship was not significant.

After a child defecates, child caretakers must dispose of the feces. Interviewed caretakers reported using different disposal options. The most frequent response was to throw them outside of the house (50.4%), followed by disposing them in latrines which is the hygienically recommended alternative (30.5%), and putting them with the rest of the house's solid waste (12.6%). Other

responses included throwing them into the yard of the house (4.3%) or burying them underground (2.2%). The hygienic method of removing or flushing the stool of a child is that of throw them in a toilet or latrine. This practice is more common among mothers in the control area (34.9%) than among those in the intervention area (26.2%). See Figure 4.

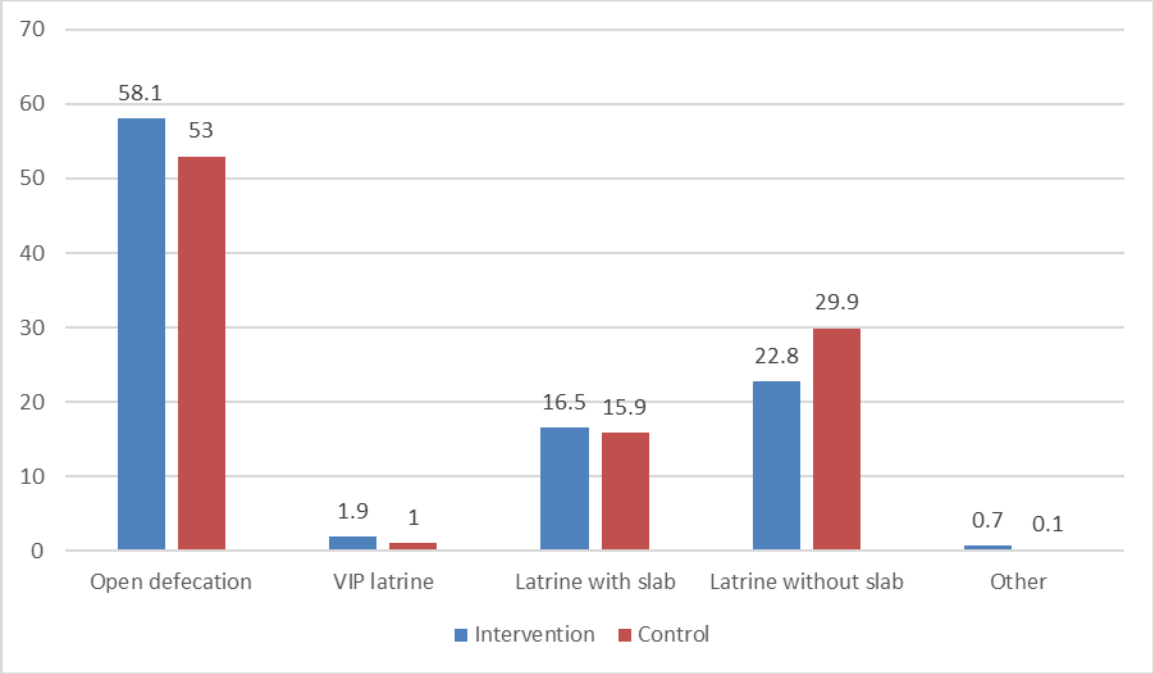
Figure 4: Distribution of households by the management of the stools of children under 2 years



p = 0.002; chi 2 = 16.60; df = 4 The relationship is highly significant.

Figure 5 summarizes the survey findings regarding the household's access to sanitation facilities.

Figure 5: Access to sanitation facilities



p = 0.003; chi 2 = 15.86; df = 4 The relationship is highly significant.

Open defecation is widely practiced and about 44% in both study groups use latrines, all types combined. If one has access to a latrine, the most common type is a latrine without a slab. Latrines with slabs and VIP latrines are used by about 18% of households visited. For anal cleansing, water is used by all households in the sample.

Sanitation coverage

Information was collected during the survey regarding which household member who decided where to install the latrine and for constructing it. Responses obtained to these separate issues are presented in Table 29.

Table 29: Distribution of households by the decision-maker to install a latrine, where to place it and who actually installed it

	Intervention	Control	Total
Person who decided the installation of latrine			
Wife	1.9%	.5%	1.2%
Husband	86.1%	88.6%	87.4%
Person responsible for constructing latrine			
Husband	81.1%	82.6%	81.9%
Somebody else in the concession	1.0%	8.4%	9.2%
Person out of family who financed it	5.0%	6.5%	5.8%

Does not know	1.4%	1.7%	1.6%
Somebody else	2.5%	.7%	1.6%
Person who decided where to set up latrine			
Wife	8.1%	7.2%	7.6%
Daughter	.0%	.0%	.0%
Husband	77.8%	81.4%	79.7%
Son	.8%	.0%	.4%
Does not know	2.8%	3.2%	3.0%
Somebody else	1.6%	8.2%	9.3%

The person who decided to install latrines: p = 0.2; chi 2 = 3.69; df = 2. The relationship is not significant.
The person responsible for the construction of latrines: p = 0.3; chi 2 = 5.13; df = 4 The relationship is not significant.
The person who decided the location of latrines: p = 0.9; chi 2 = 0.68; df = 3 The relationship is not significant.

Among households owning latrines, the decision to install the latrine was made mostly 87.4% by the husband (86.1% in the intervention area against 88.6% in the control area. The person responsible for the construction of latrines was also the husband in 81% of households visited (81.1% in the intervention area against 82.1% in the control area). The location of the latrines was determined by husbands as well in 79.7% of visited households (77.8% in the intervention area against 81.4% in the control area).

Table 30: Location of latrine

Location	Intervention	Control	Total
Inside home or immediately close to it	91.4%	9.6%	91.0%
Outside the concession	6.9%	7.7%	7.3%
Public latrine	1.7%	1.7%	1.7%

p = 0.9; chi 2 = 0.16; df = 2 The relationship was not significant.

Per data presented in Table 30, latrines are located within or adjacent to the household in 91.0% of the cases, (91.4% in the intervention area against 90.6% in the control area), and with 7.3% of households (6.9% in area intervention against 7.3% in control area) reporting that it is outside the compound.

Less than a third 28.7% (25.6% in the intervention area against 31.1% in the control area) of household toilets visited have had some maintenance work done since construction. Of these, 42.4% (47.8% by area of intervention against 38.4% in control area) changed an element of the ground fixture, 28.6% (29.3% by area of Intervention against 28.0% in control area) built a new pit, and 3.7% (7.6% in intervention area against 0.8% in the control area) built a wall.

Regarding sharing of toilets, 65.9% (60.6% in the intervention area against 44.7% in control area) share their toilets with other households. The average number of households sharing the same toilet is 2.89 (2.84 in intervention area against 2.96 in control area).

Principal Reasons for installing or not installing a toilet

We asked households with toilets, the three main reasons why the toilets were built. Table 31 shows the responses of households interviewed. The three most commonly cited reasons are privacy, safety and comfort. Disease prevention comes in fourth position, but is relatively higher in importance that the other three most commonly mentioned reasons. Thus, a distinction between frequency and relative importance of the reasons proposed seems an interesting way of getting a better sense of where families stand on these issues.

Table 31: Main reasons for latrine construction (among latrine owners)

Main reasons	Intervention		Control		Total	
	Proportion	Importance	Proportion	Importance	Proportion	Importance
Privacy	31.6%	1.79	35.2%	1.79	33.4%	1.79
Safety	19.3%	.79	2.5%	.73	19.9%	.76
Comfort	17.4%	.96	18.8%	.85	18.1%	.9
Disease prevention	16.9%	.66	17.1%	.64	17.0%	.65
Convenience	11.3%	.48	13.4%	.52	12.3%	.5
Not sharing with others	1.5%	.51	11.0%	.47	1.8%	.49
Status/pride	8.4%	.43	9.5%	.48	9.0%	.46
Shameful of environmental contamination	7.9%	.31	1.0%	.36	9.0%	.34
No precision	.7%	.03	2.0%	.1	1.3%	.07
Help community development	.2%	.01	.2%	.01	.2%	.01

Percentages add up to 100 due to multiple responses
The importance ranges from 0-3; it is calculated as the average rank of how often each modality was cited.

In contrast with households which have toilets, those which do not have evoke the following reasons, presented in Table 32 below.

Table 32: Main reasons for not building latrines (among non-owners)

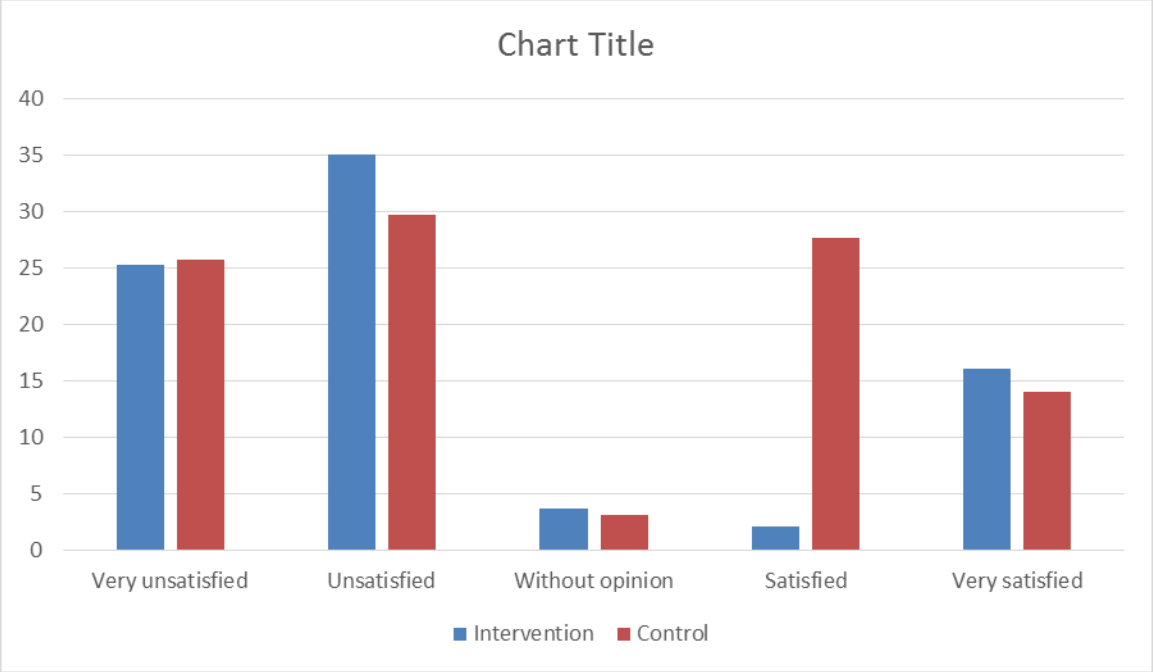
Reasons	Intervention	Control	Total
High construction costs	48.1%	43.3%	45.7%
Soil characteristics	3.0%	26.2%	28.1%
Inadequate construction materials available	29.1%	24.9%	27.0%
Lack of skills for self-installation	13.1%	14.3%	13.7%
No one available to construct it (masons included)	12.3%	11.6%	12.0%
No room to construct it	11.9%	9.3%	1.6%
Family has other priorities	1.3%	1.1%	1.2%
No resources to construct latrine	3.1%	4.8%	4.0%
Other reasons	1.6%	1.7%	1.7%
Unable to get construction permit from local authorities	.3%	.6%	.5%
Open defecation possible not far from home	.2%	.8%	.5%
Does not know	.5%	.3%	.4%

p = 0.05; chi 2 = 21.21; df = 12 The relationship is significant.

The high cost of construction cost latrines (45.7%) is by far the reason most cited by households to justify not building latrine. The soil characteristics (28.1%) and the lack of materials needed for the construction of latrines (27.0%) are the next most frequently cited reasons. Other reasons have been listed also in smaller proportions as shown in Table 32 above. Regarding the "Other" category (1.7%), the reasons given are either being a (semi)-nomadic household, who usually do not use latrines, and a clear preference for open defecation.

We asked whether household were satisfied with their current sanitation condition. Thus, a perception of satisfaction or dissatisfaction about the place of defecation was recorded. Findings indicate that 25.5% of households were very dissatisfied with the place where they defecate, 32.3% were dissatisfied, 3.4% had no opinion, 23.8% were somewhat satisfied and 15.0% were very satisfied. See Figure 6.

Figure 6: Satisfaction with access to sanitation by study group



p = 0.003; chi 2 = 15.69; df = 4 The relationship is highly significant.

The level of satisfaction is associated with the place of defecation. In the scale used the higher the number the higher the level of satisfaction, with a score of 1 meaning 'very unsatisfied' and 5 meaning 'very satisfied'. When both study groups are considered, the mean level of satisfaction is 1.72 among households practicing open defecation and ranges from 3.92 to 4.0 among households that have access to a latrine (F = 580.92, p =.000). The relationship is also found in each one of the study groups when considered separately. In the intervention area, for example, the mean satisfaction level among open defecating households is 1.74 and ranges from 3.91 to 4.19 among households with access to any type of latrine (F=256.4, ==.000). And in the control area, equivalent values are 1.71 among open defecating households and they range from 3.67 to 3.93 among latrine owners (F= 262.5, p=.000). The level of satisfaction is not necessarily higher depending on the quality of the latrine installed (improved or unimproved).

The ways in which households would like to change their current sanitation situation are summarized in Table 33.

Table 33: Mechanisms households may adopt to change sanitation conditions of household

Mechanisms Proposed by Study Participants to Improve Sanitary Conditions	Intervention	Control	Total
Build private latrine	58.8%	53.7%	56.3%
Improve current latrine owned by family	19.3%	24.2%	21.7%
Help to build communal/public latrine	3.6%	3.7%	3.7%
Request government/external assistance for building	5.5%	5.7%	5.6%

latrine			
Does not know	3.8%	2.6%	3.2%
Other reasons	0.1%	0.1%	0.1%

p = 0.1; chi 2 = 9.59; df = 6 (PS). The relationship is not significant.

In order to change the current situation, the planned measures are: the construction of private latrines (56.3%), improved private latrines that the household owns (21.7%), help the community to build latrines (3.7%), and request assistance from the government and/or the outside to improve the situation (5.6%). Just over 3% of respondents did not specify how they would improve their current situation. Half or 50.1% (50.0% in the intervention area against 50.2% in control area) of households interviewed in the survey (when asked when) said they intend to install or change their sanitary infrastructure in next 6 months.

Observations of household toilets, among household with sanitation facilities

Condition of toilets

Enumerators observed toilets where owners allowed the observation to occur. 96.3% of latrines owners allowed the observation. Findings of the observations are presented in Table 34. Those data indicate that 66.4% of toilets are on the premises (inside or adjacent to the concessions), 23.2% are within 20 meters from the house, and 4.4% more than 20 meters away.

Of the toilets observed, 96.7% (95.1% in the intervention area against 98.0% in the control area) have walls, 90.1% had a clear path to it (90.8% in the intervention area against 89.4% in the control area), 68.2% (64.8% in the intervention area against 71.3% in control area) allow privacy, 7.8% (6.6% in intervention area against 8.8% in control area) have a roof, 55.0% (55.7% in the intervention area against 54.4% in the control area) have a covered hole, and 71.0% (69.1% in the intervention area against 72.8% in control area) have a hole that is safe for a child to use.

Table 34: Observed characteristics of latrine superstructure (among latrine owners)

Observed characteristics	Intervention	Control	Total
Clear path to latrine	90.8%	89.4%	90.1%
Latrine has walls	95.1%	98.0%	96.7%
Latrine has roof	6.6%	8.8%	7.8%
Latrine permits privacy	64.8%	71.3%	68.2%
Latrine squat hole child-friendly	69.1%	72.8%	71.0%
Covered squat hole	55.7%	54.4%	55.0%

In latrines observed, feces were detected in the hole using a flashlight in 58.8% (59.7% in the intervention area against 57.9% in the control area) of latrines observed, anal cleansing products were seen (15.3% ,13.1% in the intervention area against 17.1% in control area), wet slab were observed (41.0%, 42.6% in the intervention area against 39.5% in control area), a gray slab (23.8%, 2.28.0% in the intervention area against 20.2% in the control area), smelly latrines (32.8%, 32.9% in

intervention area against 32.7% in control area), the existence of flies (14.1%, 14.6% in intervention area against 13.6% in control area).

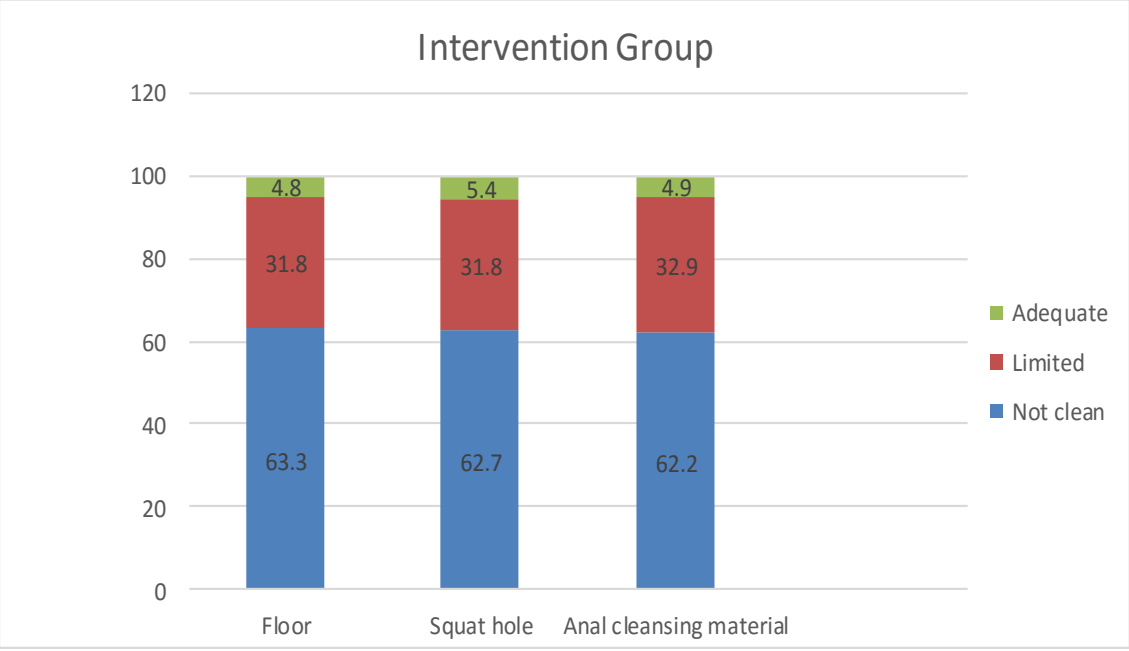
Table 35: Inside latrine conditions (among latrine owners)

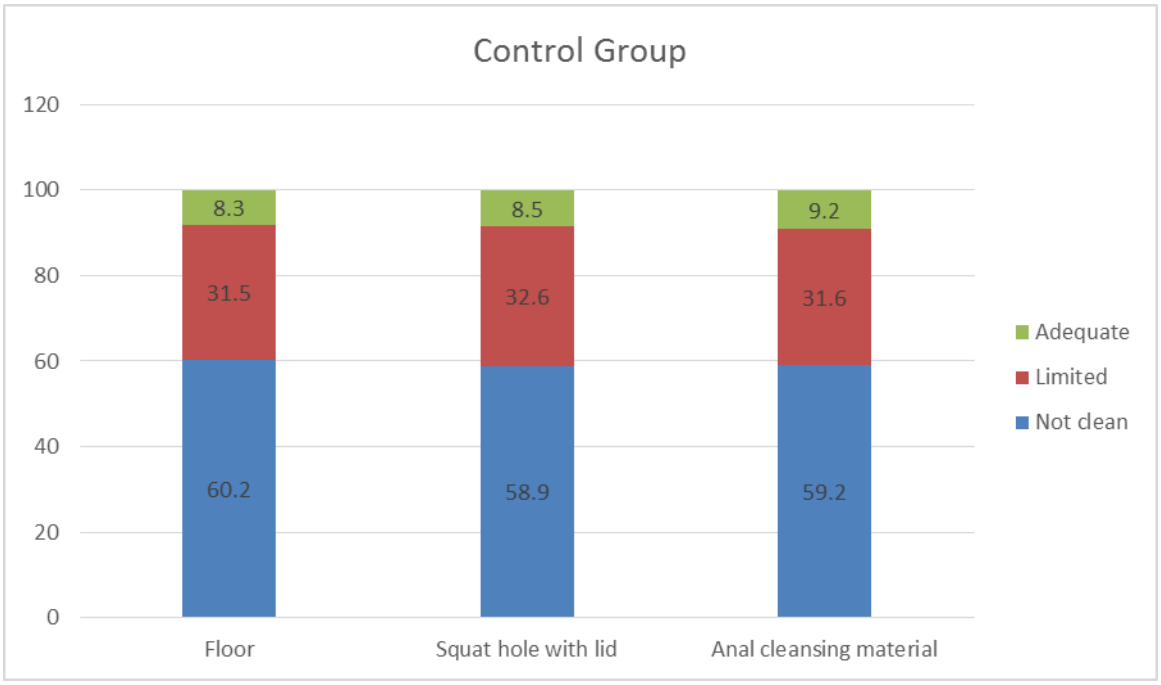
Inside conditions	Intervention	Control	Total
Feces in pit	59.7%	57.9%	58.8%
Anal cleansing products inside latrine	13.1%	17.1%	15.3%
Wet latrine slab	42.6%	39.5%	41.0%
Gray slab	28.0%	20.2%	23.8%
Bad odors	32.9%	32.7%	32.8%
Flies	14.6%	13.6%	14.1%

p = 0.4; chi 2 = 7.67; df = 7 (NS). The relationship is not significant.

Also during the observation, enumerators looked at different elements of the facilities, including the cleanliness of the floor, whether the squat hole had a tight fitting cover and amount of observable dispersed anal cleansing material on the latrine's floor. The stacked bars in the figure below shows the results of the maintenance of the observed toilets, Figure 7.

Figure 7: Distribution of households by components of latrines observed, among those with latrines




Control Group
120
100
80
60
40
20
0
8.3
31.5
60.2
8.5
32.6
58.9
9.2
31.6
59.2
Floor
Squat hole with lid
Anal cleansing material
Adequate
Limited
Not clean

The figure shows that none of the components of the latrine has been adequately cleaned among all latrines visited. About one-third of each component are most often subject to limited cleaning, respectively in the intervention and control area: 31.8% and 31.5% for soil, 31.8% and 32.6% for covering the hole and 32.9% and 31.6 for item related to anal cleansing. It is further observed in one in four households (25.9%) with latrines, a broom was present near the toilet.

Existence of handwashing station near the toilet

Among households with latrines, only 22.4% had a handwashing device. Only 33.8% of these handwashing devices contained water at the time of interview. The container used by the most households to hold water to wash hands was a kettle (96.0%), followed by a bucket (1.5%). An overwhelming majority (85.7%) of handwashing devices observed had no soap during the visit, a little over one in ten with a handwashing place had soap (12.3%) had soap, and 0.2%, another cleansing agent. The handwashing device had water in 49.5% of households; which means that there is no individual who is responsible for the water supply of handwashing containers. In 45.6% of households, its water is supplied by the wife of the head of household, in 3.2% of households by the daughter of the head of household, and in 0.9% of households by the head of the household. Other people also supply, but in relatively small levels.

The situation related to provision of soap at the handwashing area is basically the same as that of the availability of water at the handwashing area. Indeed, supplying soap or detergent to the handwashing areas done by no one in 56.9% of households, by the wife of the household head in 34.5% of households, and the by the head of household in 7.0% of households. It is provided by the mother-in-law, sister-in-law in 0.9% of households.

As for maintenance of toilets, it is provided mainly by the wife of the head of household (73.0%), with some provision by the daughter of the head of household (3.2%) and the head of household (1.8 %). It is also provided in a non-negligible proportion by domestic help and by the parents of the household head or his wife.

5.6 Psychosocial determinants of owning a latrine and practicing handwashing

Psychosocial determinants of owning a latrine

In order to measure psychosocial determinants of possession of latrines, respondents were asked a series of questions to get their opinion. The responses are presented in Table 36.

Table 36: Socio-psychological determinants of latrine ownership

Psychosocial determinants	Intervention	Control	Total	p	F	S
Modernity	3.4	3.42	3.41	.7	.13	NS
Respect from others in community	3.46	3.46	3.46	.9	.01	NS
Respect from visitors	3.57	3.58	3.57	.7	.13	NS
Popularity	3.18	3.22	3.2	.4	.85	NS
Pride	3.48	3.57	3.52	.04	4.21	S
Privacy for women 24/24	3.8	3.78	3.79	.6	.34	NS
Helps to keep concession clean	3.34	3.4	3.37	.2	1.63	NS
Less flies around	2.3	2.45	2.37	.01	6.39	S
Ease of defecation when ill	3.81	3.78	3.8	.4	.88	NS
Ease of defecation for elderly	3.83	3.82	3.83	.6	.26	NS
Reduces chance of disease for family members	3.38	3.43	3.41	.2	1.55	NS
Increased privacy for users	3.55	3.49	3.52	.1	2.35	PS
It is annoying to use latrine all the time to relieve oneself	2.16	2.31	2.24	.02	5.78	S
Reduces risks of open defecation at night	3.69	3.64	3.67	.2	1.75	NS
Too much effort to keep latrine permanently operational	2.74	2.83	2.78	.1	2.42	PS
Too much effort to keep latrine clean	2.72	2.84	2.78	4.60%	3.88	S

Values in scale: 4 full agreement, 3 partial agreement, 2 partial disagreement, 1 total disagreement, 0 no opinion/indifferent

Socio-psychological determinants of handwashing

In order to measure psychosocial determinants on the practice of handwashing, respondents were asked a series of questions to get their opinion. The responses are presented in Table 37.

Table 37: Socio-psychological determinants of handwashing

Socio-psychological determinants	Intervention	Control	Total	p	F	S
Wash hands only when they seem dirty or smelly	.83	.86	.85	.7	.18	NS
Soap and water are always available at home for handwashing after visiting toilet.	1.14	1.04	1.09	.05	3.77	S

Soap and water are always available at home for handwashing before eating	1.11	1.03	1.07	.1	2.09	PS
No need to wash hands with soap if you have not touched anything dirty	1	1.05	1.02	.3	.93	NS
Only soap can remove smell of fish and hard stains from the hands	.65	.68	.66	.5	.46	NS
I hate the odor in my hands if I do not wash after going to the toilet	.9	.87	.88	.5	.41	NS
I love how my hands smell after going to the toilet	.66	.67	.66	.9	.02	NS
People who do not wash their hands with soap after going to the toilet deserve to be criticized	1.52	1.38	1.45	.03	4.91	S
In most homes in my community, water and soap are available to wash hands after visiting the toilet	1.59	1.51	1.55	.2	1.5	NS
It is shameful to eat with dirty hands in front of my friends	.84	.82	.83	.8	.09	NS
Good mothers make sure that their hands are washed with soap before preparing food	.64	.7	.67	.3	1.17	NS
Good mothers make sure to wash their hands with soap after visiting the toilet	.58	.61	.59	.5	.54	NS
I am proud of my children and I am happy to wash my hands with soap to protect them	.55	.55	.55	1.0	.000	NS

Values in scale: 0 = full agreement, 1 = partial agreement, 2 = partial disagreement, 3 = full disagreement, 4 = indifferent, no opinion**.**

5.7 Exposure to information on hygiene and sanitation messages

The study also collected information on households' exposure to information on hygiene and sanitation practices and messages as well as on sources of information. Information sources are not mutually exclusive and respondents may have mentioned more than one source. Methodologically, enumerators probed for answers ("Anything any other source?") until all potential sources were exhausted. Answers then are unprompted.

The collected data shows that, 33.8% (35.8% in the intervention area against 31.9% in control area) of respondents declared having received information on handwashing in the month prior to the survey. Table 38 summarizes all sources of information mentioned by study participants. The denominator used for this calculation takes into account the full sample. The same procedure is used for all the following table regarding the source of information for different WASH topics.

As Table 38 illustrates, the sources of information on handwashing in the last month mentioned by the most respondents are the radio (16.1%), community relays (14.2%), followed by health centers (9.4%). The differences in reported sources for handwashing exposure between intervention and

control study groups for 1) health centers and 2) outreach workers presented in Table 38 are statistically significant at the p=.05 and p=.00 level, respectively. Whereas 23.5% of study participants reported exposure to this context through only one source, just over 10% of study participants overall reported exposure to this information through two or more sources.

Table 38: Sources of information regarding handwashing in month prior to survey

Sources	Intervention	Control	Total
Health center	10.7%	8.1%	9.4%
Outreach worker	17.4%	12.2%	14.8%
Public meeting with local leaders	3.8%	4.2%	4.0%
School children	1.0%	1.0%	1.0%
Radio	15.6%	16.6%	16.1%
Television	0%	0%	0.0%
Other sources	1.4%	1.9%	1.6%

Regarding exposure to drinking water messages, presented in Table 39, only 33.2% (34.9% in the intervention area against 31.5% in control area) of respondents declared having received information on water treatment in the month prior to the survey. The sources of this information are substantially the same as information on handwashing (Table 39):

Table 39: Sources of information regarding water treatment in month prior to survey

Sources	Intervention	Control	Total
Health center	9.8%	8.1%	9.0%
Outreach worker	17.0%	11.2%	14.1%
Public meeting with local leaders	4.9%	4.7%	4.8%
School children	0.9%	0.7%	0.8%
Radio	15.3%	16.5%	15.9%
Television	2.3%	4.7%	4.4%
Other sources	2.0%	2.4%	2.6%

As for sanitation, only one third 32.4% (37.1% in the intervention area against 27.8% in control area) of respondents reported having seen or heard about sanitation in the last month. The difference is highly significant (p = 0.001, chi 2 = 16.98). The distribution of information sources mentioned by all households are shown in Table 40. Radio and outreach workers are the two most frequently mentioned information sources for this topic, with 14.1% mentioning radio and 13.5% mentioning outreach workers. The difference between intervention and control study group presented in Table 39 was statistically significant in the case of outreach workers with Chi2=22.3, p=.000, and in the case of television with a Chi2=6.03 and -=.01.

One household may have received information from more than one source. Findings indicate that 9.2% households in fact reported being exposed to sanitation information from two to four sources.

Table 40: Sources of information about sanitation in the month prior to the survey

Sources	Intervention	Control	Total
Health center	8.7%	7.0%	7.8%
Outreach worker	17.4%	9.7%	13.5%
Public meeting with local leaders	6.2%	5.8%	6.0%
School children	0.7%	0.8%	0.8%
Radio	13.6%	14.7%	14.1%
Television	0.3%	1.5%	0.9%
Other sources	2.4%	1.9%	2.2%

Whether for information on handwashing, water treatment or environmental sanitation, the radio and community relay remain the top two most cited by household sources. Few respondent mothers or guardians of children under 2 years received visits from community volunteers for sensitization on the practice of open defecation 13.5% (1.0% in intervention area against 25.9%in control area) or the daily maintenance of toilets 12.8% (2.1% in intervention area against 23.6% in control area).

Only just over one in ten households 11.3% (2.0% in intervention area against 20.7% in the control area) are committed to stop defecating in the open and 4.2% (0.0% in the intervention area against 8.4% in control area) participated in the walk of shame. As far as CLTS is concerned, some of the households in control areas have been already exposed to triggering. In the endline questionnaire, we will inquire whether this experience happened during the village of residence at the time of the survey or elsewhere. Yet, he baseline measures will have to be kept in mind when doing the baseline-endline comparison. In that analysis, baseline values may be used as predictors of endline values using analysis of covariance.

As for information on diarrhea, only 22.3% (22.9% in the intervention area against 21.6% in control area) of respondents' households reported having received information about diarrhea in the last month. The sources of information most cited were the health center 9.9% (9.4% in the intervention area against 10.3% in the control area), community relay 9.5% (10.2% in intervention area against 8.8% in control area) and radio 9.8% (9.0% in the intervention area against 10.6% in control area). Television was not a major source of information with less than 1% mentioning it; however, the difference of reporting this source between intervention and the control areas is statistically significant. Over 8% of study participants heard this information over more than one source.

Table 41: Sources of information about diarrhea in the previous month

Sources	Intervention	Control	Total
Health center	9.4%	10.3%	9.9%
Outreach worker	10.2%	8.8%	9.5%
Public meeting with local leaders	3.6%	4.1%	3.8%
School children	0.3%	0.8%	0.6%
Radio	9.0%	10.6%	9.8%
Television	0.3 %	1.3%	0.8%**
Other sources	1.2%	0.8%	1.0%

** Statistically significant, p<.05

The content of this information was primarily how to avoid diarrhea (40.3%), treatment of diarrhea at home (27.6%) and signs of diarrhea (24.8%).

5.8. Summary table of indicators tracked by baseline

Table 42: A summary of the indicators was generated for both areas combined

Indicators	Intervention	Control	Total	p	X^2	df	S
Children 0-6 exclusively breastfed	26.4%	30.9%	28.7%	.2	1.52	1	NS
Children 6-23 month old fed with minimum acceptable diet (MAD)	6.2%	9.3%	7.7%	.05	.04	1	S
Access to safe water source	43.4%	45.8%	44.6%	.3	.01	1	NS
Treatment of drinking water following suggested procedures	14.3%	13.8%	14.1%	.8	.08	1	NS
Stores treated drinking water	2.1%	1.6%	1.9%	.5	.51	1	NS
Water and sop at handwashing station commonly used by family members	25.1%	25.3%	25.2%	.9	.01	1	NS
Handwashing station with supplies near area where food is prepared	6.2%	6.0%	6.1%	.9	.01	1	NS
Handwashing station with supplies near latrine	9.5%	9.9%	9.7%	.8	.06	1	NS
Device for child feces	44.7%	45.1%	44.9%	.8	.04	1	NS
Households with sanitation facilities	18.4%	17.0%	17.7%	.4	.58	1	NS
Reported diarrhea in children under five during two weeks prior to survey	34.5%	33.6%	34.1%	.7	.17	1	NS

p = 0.2; chi 2 = 8.51; df = 6 (NS). The relationship is not significant.

NS = Not Significant; PS = Not Significant; S = Significant

5 CONCLUSION

This study presents the status of the indicators tracked by WASHplus before project implementation. Based on the analyses conducted and the findings reached, it is clear that there is limited access to water in sufficient quantity and quality needed by families. Similarly, households have very little knowledge of effective methods of water treatment at home and very few practice water treatment. This demonstrates the major challenges in water supply in general and specifically in drinking water for the WASHplus project.

In addition, hygiene behaviors are dependent on access to safe drinking water. The low availability of latrines and handwashing devices make household sanitation and the practice of basic hygiene very difficult.

The current baseline situation requires the project to make strategic choices when implementing project activities.

WASHplus should:

- Prioritize households that will be need to be reached by sanitation and hygiene promotion activities including the construction and use of latrines, drinking water treatment options (including makes more popular the use of chlorine based products such as Aquatabs and chlorine solutions or simply chlorine) to make water safe for drinking
- Construct or rehabilitate water points in villages to facilitate access to water for households; this will have the advantage of reducing the time needed to collect water
- Develops local skills and improve the supply chain for services in order to make water point repairs possible at the village level
- Facilitate learning across villages so that neighboring communities learn to emulate each through various mechanisms including: the use of local radio to disseminate the results of latrine construction efforts, identifying champions (masons, community workers) in hygiene and sanitation. A participatory process to identify these champions would be set up through identification and follow-up sessions conducted by the facilitators and supervisors. The project could then support these champions (model masons, and workers) in a second phase to transfer their expertise to other villages in the same municipality.
- Focus on dissemination of information on exclusive breastfeeding of children under six months, the introduction of complementary feeding, use of latrines and handwashing practices - at the household level to enable them to be more involved in the process and to adopt positive behavior change in this area.

In short, these recommendations must be adapted to WASHplus's vision, strategic goal, and objectives as well as field conditions to expand people's access to water, hygiene, sanitation and the promotion of exclusive breastfeeding for children up to six months and complementary feeding for children 6-23 months.