

ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
DEPARTMENT OF COMMUNITY HEALTH

ASSESSMENT OF THE IMPACT OF LATRINE UTILIZATION ON DIARRHOEAL
DISEASES IN THE RURAL COMMUNITY OF HULET EJJU ENESSIE DISTRICT,
AMHARA REGIONAL STATE.

BY

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Assessment of the impact of latrine utilization on diarrhoeal disease in
the rural community of Hulet Ejju Enessie district, East Gojjam Zone,
Amhara Regional state.

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Declaration

I the undersigned, declare that this thesis is my original work, has never been presented in this or any other University, and that all the resources and materials used for the thesis, have been duly acknowledged.

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Abstract

Background: While household access is important, community sanitation coverage is even more important to improve health around the world. This is best achieved through regular use of a well-maintained sanitation facility. The proper use of latrines can reduce the risk of diarrhea to almost the same extent as improved water supplies.

Objective: The study was designed to assess the impact of latrine utilization on diarrhoeal diseases in the rural community of Hulet Ejju Enessie district.

Method: A community based cross-sectional study was conducted. All 824 households with latrines from 10 selected kebeles were interviewed about latrine utilization and 370 households with < 5 children were interviewed about diarrhoeal diseases. A structured and pre-tested questionnaire and checklist were used to collect data.

Results: Most (60.7%) households observed that their latrine utilization was satisfactory. The extent of latrine utilization was significantly associated with presence of primary or secondary school children in the house [AOR: 1.47, 95%CI: (1.04-2.06), perceived reasons for latrine construction like self initiation [AOR: 2.89, 95%CI: (1.24-6.72) and seeing others [AOR: 10.07, 95%CI: (1.97-51.56), Climatic zone of 'Kolla' [AOR: 0.47, 95%CI: (0.29-0.74) and 'Woyna-Dega' [AOR: 0.55, 95%CI: (0.38-0.81), and duration of owning latrines by the households [AOR: 2.13, 95%CI: (1.57-2.89). The occurrence of childhood diarrhoea was statistically associated with the extent of latrine utilization in the bivariate analysis [AOR: 0.38, 95%CI: (0.17-0.87) but not significant in the multivariate analysis [AOR: 0.63, 95%CI: (0.22-1.81). The occurrence of childhood diarrhoea was also significantly associated with the duration of owning latrines by the households both in the bivariate [AOR: 0.29, 95%CI: (0.13-0.65) and final step of multivariate analysis [AOR: 0.28, 95%CI: (0.12-0.66).

Conclusions and recommendations: The presence of primary or secondary school children in the house, perceived reasons for latrine construction and duration of owning latrines are factors affecting latrine utilization. Rather than the extent of latrine utilization, duration of owning latrines had impacts on the occurrence of childhood diarrhoea. Using role model sanitation intervention, well maintained and functional latrines, target oriented and regular hygiene education promotion programs are very important strategies to bring about behavioral change on latrine utilization as well to reduce the risk of the occurrence of childhood diarrhoea.

Keywords: Impact, latrine utilization, extent of latrine utilization, childhood diarrhoeal disease, factors affecting latrine utilization

1. Introduction

1.1. Background

Over 50 infections can be transferred from a diseased person to a healthy one by various direct or indirect routes involving excreta (1). Poor excreta disposal practices are responsible for a significant proportion of the world's infectious disease burden. Sanitation facilities interrupt the transmission of faecal-oral disease at its most important source by preventing human faecal contamination of water and soil. (2, 3, 4).

The construction of latrines is a relatively simple technology that may be used to control the spread of infectious diseases. While household access is important, community sanitation coverage is even more important to improve health around the world. Studies have shown that latrine coverage has to reach 90% of a population to have an impact on community health (5). However, 2.4 billion people, 40% of the total world population, lack improved sanitation worldwide and 80% of these people live in rural areas (5-8). In the WHO Africa Region, a total of 44% of the 631 million people of the region had no access to adequate sanitation in 1999 (9). In Ethiopia, according to Ethiopian Demographic and Health Survey 2005, about 62% of the households (12% Urban and 70% Rural) have no access to latrine facilities (10)

Health improvement comes from the proper use of sanitation facilities, not simply their physical presence (4). This is best achieved through regular use of clean and well maintained latrines. The proper use of latrines can reduce the risk of diarrhea to almost the same extent as improved water supplies, but the greatest benefit occurs when improvements in sanitation and water supply are combined and education is given on hygienic practices (11, 12).

Odor and insect problems are often quoted as deterrents to use (5, 10,13). A KAP study by Ministry of health (MOH) in Ethiopia in 1997 indicated that the major reasons for not using latrines were lack of superstructure, poor hygiene and poor maintenance of latrines (14)

1.2. Rationale of the study

Construction of sanitation facilities were widely started in all parts of Ethiopia particularly by giving due attention to rural community since the start of health extension program by the Ministry of Health because improving sanitation facilities are one of the main components of health extension program. However, the impact of latrine utilization on the health of the community, particularly on under 5 children was not assessed in a way that help to improve the health of the community.

This study will, therefore, help to show how to maximize benefits of latrine utilization for the health of the community so that the policy makers and concerned bodies could take appropriate measures.

2. Literature review

Determinants of diarrhoeal diseases:

1. Latrine

The hygienic disposal of excreta is important because the infective organisms for many diseases leave through faeces and some through urine (12). One gram of faeces may contain 10million viruses, 1 million bacteria, a 1000 parasite cysts and a 100 worm eggs (15). The chief source of infection resulting in diarrhoeal disease is other people's excreta, including child-excreta (5, 7). The etiological factors associated with diarrhea disease in children include microbial agents which are usually transmitted through food and water contaminated with human feces (16, 17). It seems clear therefore, that human excreta should be managed as a potentially dangerous material (5).

The promotion of sanitation facilities and behaviors can dramatically effect the number of deaths from diarrhoeal disease in children under 5 (7). Various studies conducted in Bangladesh, Burma, Philippines, and Papa New Guinea were consistent with an association between a particular hygiene behavior and an increased risk of diarrhea, such behaviors include hand washing before food preparation, open defecation of children, inattention to proper disposal of faeces, the method used by mothers to clean children after defecation, the manner of disposing of the faeces of children and compound hygiene (18)

Young children are frequently infected with enteric pathogens and their stools are actually an important source of infection for others. Therefore, hygienic disposal of the faeces of all young children is an important aspect of diarrhea prevention (11).The report in Kenya showed that children begin to use the latrine as early as 2 years but most of them start at the age of 5. The means of disposal of faeces for children under 5 varied among the respondents with 53%

disposing in latrines, 35% burying while 12% either threw in the garden or in the bush (19). Reported usage of latrine in Lesotho by adults was 99%; however, the use of latrines for the disposal of children's faeces was only 50 % (20); and only 39% disposed children's faeces in the latrine in Philippines (21). Studies have shown that hygienic disposal of children's faeces is associated with 30-40% less risk of diarrhoea (7). Maintenance and use of latrines at household level are related each other. The better they are maintained, the better they are used (22).

2. Hand washing practices

Good hand-washing requires the use of soap (or a local substitute like ash, soil, leaves etc), plenty of water, and careful cleaning of all parts of the hands (4, 11, 16). Simple hand washing with soap and water reduces diarrhea transmission by 35 % (2, 4, 23). A review of other available evidence suggests that hand washing with soap could reduce diarrhea incidence by 47% and save at least one million lives per year (3, 15, 24).

3. Water supply

Families that have ready access to adequate and clean water for drinking and preparing food have less diarrhea than families whose access to water is difficult or heavily contaminated (11). Studies have shown that improvements in sanitation facilities have greater impacts on diarrhea prevalence than improvements in water supply (23). Well-designed water supply and sanitation interventions typically reduce diarrhoea incidence by about 25% (25). Children from homes with water supplies over 500 meters from the house had incidence rates of diarrhoea 34% higher than those of children from houses with their own water supply (26). The study in Accra, Ghana, showed that the presence of drinking water at a household level had a negative association with

the incidence of childhood diarrhea ($r = -0.34$, $p < 0.0001$). Therefore, lack of or inadequate access to potable water is associated with high incidence of diarrhea (27)

4. Animal rearing

Domestic animals should be kept away from households since their excreta contain pathogens that can contaminate food and water. Preferably, animals should be kept in compounds of at least 100 meters from water sources and 10 meters from houses (4).

5. socio-economic factors

Socio-economic factors do not directly affect the risk of diarrhea, but rather, influence family behaviors that alters the child's exposure to pathogens or susceptibility to infection (20, 21). The impact of latrines on diarrhea was greater where the mothers had a higher level of education or worked outside the home (20). The distributions of diarrhea cases were most in areas where the living standard is poor, unhygienic, with no latrine and inadequate water supply (28, 29). A study in Accra, Ghana, showed the incidence of childhood diarrhea is negatively correlated with the household economic status ($r = -0.26$, $p < 0.05$), and the mother's education ($r = -0.33$, $p < 0.0001$) (27).

6. Improved feeding practice

Mothers should be aware of feeding the baby with a clean spoon, from a cup, or with a special feeding spoon to minimize the risk of bacterial contamination. Feeding bottles should never be used (11, 23). Infants who are not breast fed have a 2-3 times greater risk of diarrhea than breast fed infants and a 3 to 5 risk than those who are exclusively breast fed (21,23). A review of studies showed breast-feeding promotion can reduce diarrhea morbidity rates by 8-20% and

mortality rates by 24-27% in the first 6 months of life; and for children aged 0-59 months, morbidity rates would be reduced by 1-4 % and mortality rates by 8-9% (30).

7. Neighborhood sanitation condition

Neighborhood outdoor defecation creates potential dangers of infections from fecal pathogens in contaminated grounds. Children who play on grounds contaminated with fecal matter will have the risk of contracting diarrhea. Studies found that more than two-fold increase in childhood diarrhoeal prevalence due to neighborhood outdoor defecation (27)

Magnitude of diarrhoeal disease:

Approximately 4 billion cases of diarrhea per year cause 2.2 million deaths, most-1.7 million-under 5 children, about 15% of all under 5 deaths in developing countries(2). World Health Organization (WHO) estimated that for every 100 children 0-5 years of age, there are an average of 220 diarrhea episodes and 1.4 deaths from diarrhea every year (31, 32, 33). An estimated 88% of this burden is attributable to unsafe drinking water supply, inadequate sanitation, and poor hygiene. (5, 24).

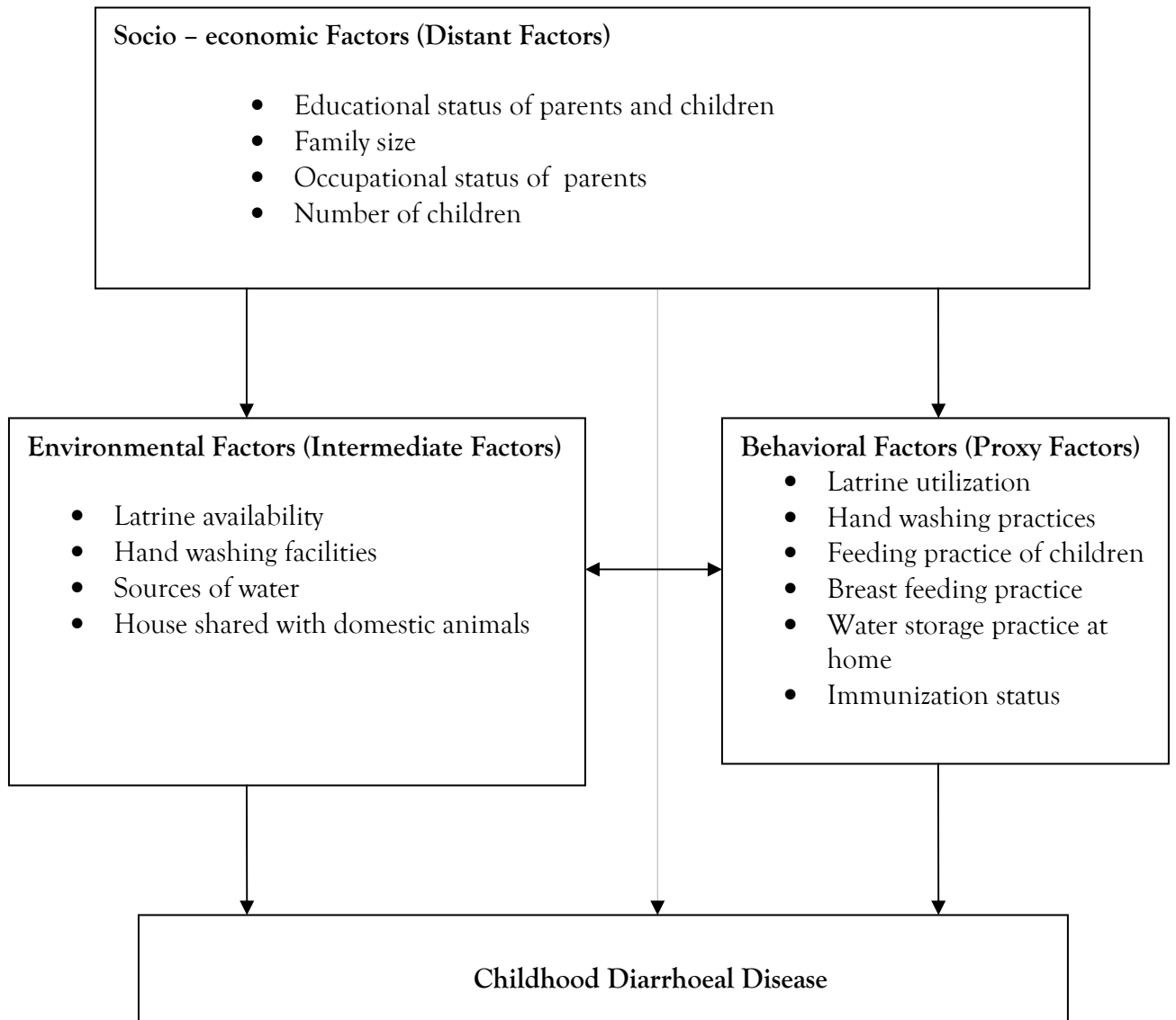
Studies in the developing world estimate that diarrhea accounts for 21% of all deaths of < 5 children and causes 2.5 million deaths per year. A report by the WHO (1996) stated that 0.8 million children die from diarrhea each year in Sub-Saharan Africa. Diarrhea has been estimated to account for 25-75% of all childhood illnesses in Africa. (16,17,34,35,36). The 2005 Ethiopia Demographic and Health Survey (EDHS) reported that 18% of < 5 children experienced diarrhea in the two weeks prior to survey (10). Various studies conducted in Ethiopia also revealed that a two weeks diarrhoeal incidence rate of 16% (37), 25% of < 5 children in SNNPR (30) and 33.5% of <5 children in Jimma zone (37).

Diarrhea morbidity rates were found to be highest in the 6-11 months age group, while the mortality rates were greatest in infants < 1 year of age and children 1 year old (17,38,39).

Summary table for the determinants of <5 diarrhoeal diseases morbidity

S. No	Determinants of diarrhoeal diseases	Reduction of <5 diarrhoea morbidity by % or correlation coefficient (r)
1	Hygienic disposal of children's faeces	30-40%
2	Simple hand washing with soap	35-47%
3	Adequate access to potable water(in Ghana)	r =-0.34
4	Well-designed water supply and sanitation intervention	25%
5	Mother's education (in Ghana)	r =-0.33
6	Household economic status (in Ghana)	r = -0.26
7	Breast feeding promotion	1-4%

Fig 1: A conceptual framework of the potential determinants of childhood diarrhoeal diseases



3. Objectives of the study:

3.1. General objective:

- ◆ To assess the impact of latrine utilization on diarrhoeal diseases in the rural community of Hulet Eju Enessie district.

3.2. Specific objectives:

- ◆ To determine the extent of latrine utilization
- ◆ To find out factors related with utilization of latrines
- ◆ To evaluate the impact of latrine utilization on diarrhoeal diseases

4. Research Methodology

4.1 Study Design

A descriptive community based cross-sectional study was conducted from December 2006 to January 2007 in the rural community of Hulet Ejju Enessie district, East Gojjam Zone.

4.2 Study Area

Hulet Ejju Enessie district was taken as a study area from 15 districts of East Gojjam Zone because of its high latrine coverage (90%) in 1998 E.C. The district is found in East Gojjam Zone of Amhara Regional State and located about 370 Km from Addis Ababa, 120 Km from Bahir Dar and 210 Km from Debre Markos. The total population of the district in 1998 E.C was about 287,546; of which the rural population accounts 250,876 (87.2%). The district had 6 urban and 41 rural kebeles with a total of 47 kebeles. The water supply coverage of the district was 19.2%. There were 2 Health Extension workers in each Kebele of the Woreda assigned in the Health Post. There are 1 technical school, 2 high schools and 53 elementary and primary schools in the Woreda.

4.3 Source population

All households with latrine facilities in the rural community of Hulet Ejju Enessie district.

4.4 Study population

Selected households with latrine facilities among ten selected kebeles of the rural community of Hulet Eju Enessie district were included in the study.

4.5 Sample Size Determination

The sample size (n) was determined using the following single population proportion formula based on the assumption of 90% proportion (p) that all latrine owners are utilizing latrines, 0.03 marginal error (d) to maximize the size of the sample, a standard Z score of 1.96 corresponding to 95% confidence interval ($Z_{\alpha/2}$), design effect of 2 to provide correction for the loss of sampling efficiency resulting from the use of stratified sampling and 10% non-response rate :

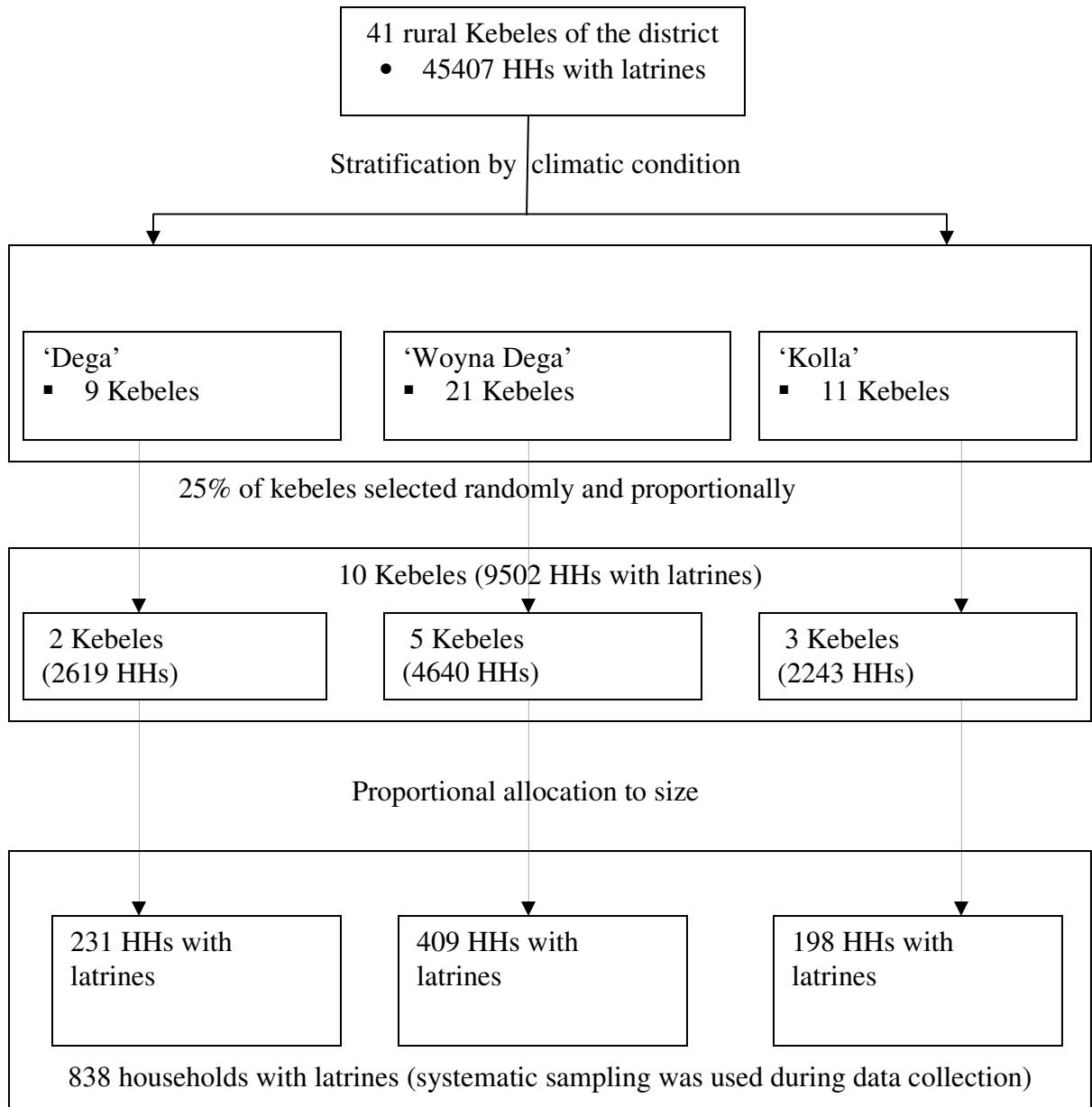
$$n = \frac{(Z_{\alpha/2})^2 P (1-P)}{d^2} = \frac{(1.96)^2 0.90(0.01)}{(0.03)^2} = 381$$

Accordingly the required sample size = 381 x 2 + 10% (381x2) = 838 households with latrines.

4.6 Sampling procedure

Hulet Ejju Enessie was selected from other districts of the zone because of its high latrine coverage (90%). The district was stratified by climatic condition in to 'Kolla', 'Woyna Dega' and 'Dega' assuming that diarrhoeal diseases vary with climatic zone. Ten Kebeles, 25% of 41 rural intervention kebeles of the district, were selected randomly and included in the study by lottery methods. Once the study kebeles were identified, 838 households with latrines were selected by using proportional allocation to size. Every 11th households with latrines in each climatic zone were selected by systematic sampling from the list of latrine owners registered by data collectors prior to the actual data collection date. The first house was selected randomly by lottery method from 1-11 households from list of latrine owners. All study subjects were interviewed about latrine utilization and only those with both latrines and under five children were interviewed about diarrhoeal diseases.

Fig.2. Schematic presentation of sampling procedure



4.7 Data Collection

A standardized and structured questionnaire was developed for the purpose of data collection after reviewing relevant literatures. Ten extension health workers who completed 10th or 12th grade for data collection and two sanitarians for supervision were recruited before data collection.

Training for data collectors and supervisors were given for three days by preparing and using training manual. Pre-test was conducted to identify the potential problems for the proposed study and also to reduce information bias related to measurement, misclassification, recall, interviewers, inter and intra-observer bias. 5% of the sample population, 40 households with latrines, was pre-tested in one of non-selected Kebeles of the district which had similar backgrounds as selected kebeles.

The pre-tested questionnaire was administered by a trained enumerator to a mother or guardian of the child. Two weeks recall interview to assess the two weeks prevalence of diarrhoea among under 5 children was conducted by considering that mothers may have difficulty of remembering exactly when diarrhoea began as well as the average duration of diarrhoeal diseases. Interview and observation checklist were used to assess latrine utilization.

4.8 Operational definition

1. Latrine utilization is satisfactory – households with functional latrines and at least if the family disposes the faeces of their <5 children in the latrine, no observable faeces in the compound, observable fresh faeces through the squat hole and the foot-path to the latrine is uncovered with grasses.
2. Impact - the effect of latrine utilization on the occurrence of childhood diarrhoeal diseases

3. Critical time for hand washing practice – hand washing practices mainly after visiting latrines or cleaning bottom's of children, before preparing food and before feeding children including breast feeding
4. Functional latrine- latrine that provides services at the time of data collection even if the latrine requires maintenance
5. Status of latrine – condition of latrine at the time of data collection whether it needs or needs no reconstruction or maintenance.
6. Occurrence of childhood diarrhoea – the presence of diarrhoea affected <5 children in the house with in two weeks period prior to survey, as reported by the mothers/caretaker of the child.
7. Sanitation and Hygiene education – education given on hand washing practices, latrine maintenance, proper utilization of latrine facilities and its benefit on the health of the community in order to develop good hygiene behavior or practice among the community to prevent excreta borne diseases.

4.9 Variables of the study

- ✓ Dependent variable – childhood diarrhoeal disease
- ✓ Independent variables:-
 - Socio-economic Variables:- family size , number of children , educational status, occupational status
 - Environmental variables – Availability of latrine, sources of water , hand washing facilities, houses shared with domestic animals
 - Behavioral variables - latrine utilization, hand washing practices, feeding practice , breast feeding practice, water storage practice at home, immunization status

4.10 Data Quality

The questionnaire was prepared originally in English and then translated in to Amharic and back to English to ensure reliable information. Data collection guideline was prepared and given for data collectors and supervisors. Pre-test of questionnaire and training of data collectors and supervisors were conducted to ensure the quality of data. Written pre-test feed back was given for data collectors and supervisors before the start of actual data collection. Data collectors and supervisors reviewed every questionnaire for completeness and for logical consistency, and counter checked by the principal investigator at the end of each day in the field. Rating and recoding of the extent of latrine utilization was made after data collection by the principal investigator to avoid introduction of social desirability bias by data collectors. Data coding and data entry were checked at the beginning and in between of the work. 5% of the data were re-entered and compared with the already entered data to maintain its quality. Data cleaning was conducted at the end of data entry.

4.11 Ethical consideration

The ethical approval and clearance was obtained from Medical Faculty of Addis Ababa University ethical committee. Permission was also obtained from the concerned bodies of East Gojjam Zonal Health Department and Hulet Ejju Enessie Woreda Health Office. The necessary ethical consideration was made before the actual data collection takes place. Interview was carried out only with full consent of the person being interviewed. Before each interview, clear explanation was given about the aim of the study was neither to evaluate the performance of the individual nor to blame any one for weakness but to gather information and opinions that may lead to eventual improvement in the situation. Each respondent was assured that the information provided by her would be confidential and used only for the purpose of research. Advising about

home made therapy or appointment to bring their child to the health post was made when a child with diarrhoea obtained during data collection by the Health extension workers

4.12 Data Analysis

Data were entered in to EPI info software version 6.04 and cleaning and analysis were conducted with SPSS software version 11 for windows. Frequency distribution, percentages, and odds ratio with 95% confidence interval were calculated to ascertain the association between dependent and independent variables as appropriate and displayed using tables and figures.

4.13 Dissemination of findings

The findings of this study will be disseminated to Ministry of Health, Amhara Regional Health Bureaux, East Gojjam Zonal Health Department and Hulet Ejju Enessie Woreda Health Office. The findings will also be disseminated to different organizations that will have contributions to improve the health condition of the community. In addition, effort will be exerted to publish the paper and critiques that will be written based on the practical exposure.

5. Results

A. Descriptive results

Socio-economic characteristics

A total of 824 (98.3 %) households with latrines were included in the study. The remaining 14(1.7%) households with latrines were non-respondents because of unavailability of the respondents by changing their residence, going to holly water and going to holidays.

Four hundred ninety four (60.0%) households had a family size of ≤ 5 persons, with a mean household family size of 4.96 (± 1.99 S.D). There was only one under-five children in 305 (82.4%) households. Majorities (94.3 %) of respondents were Orthodox Christian and almost all (99.9%) were Amhara in ethnicity. Six hundred nineteen (75.1%) mothers and 512 (71.4%) fathers were illiterate. Five hundred thirty three (64.7%) households had children who are primary or secondary school level. Majority, 710 (86.2%), of respondents were married. Seven hundred seventeen (87.0%) households were predominantly headed by fathers.

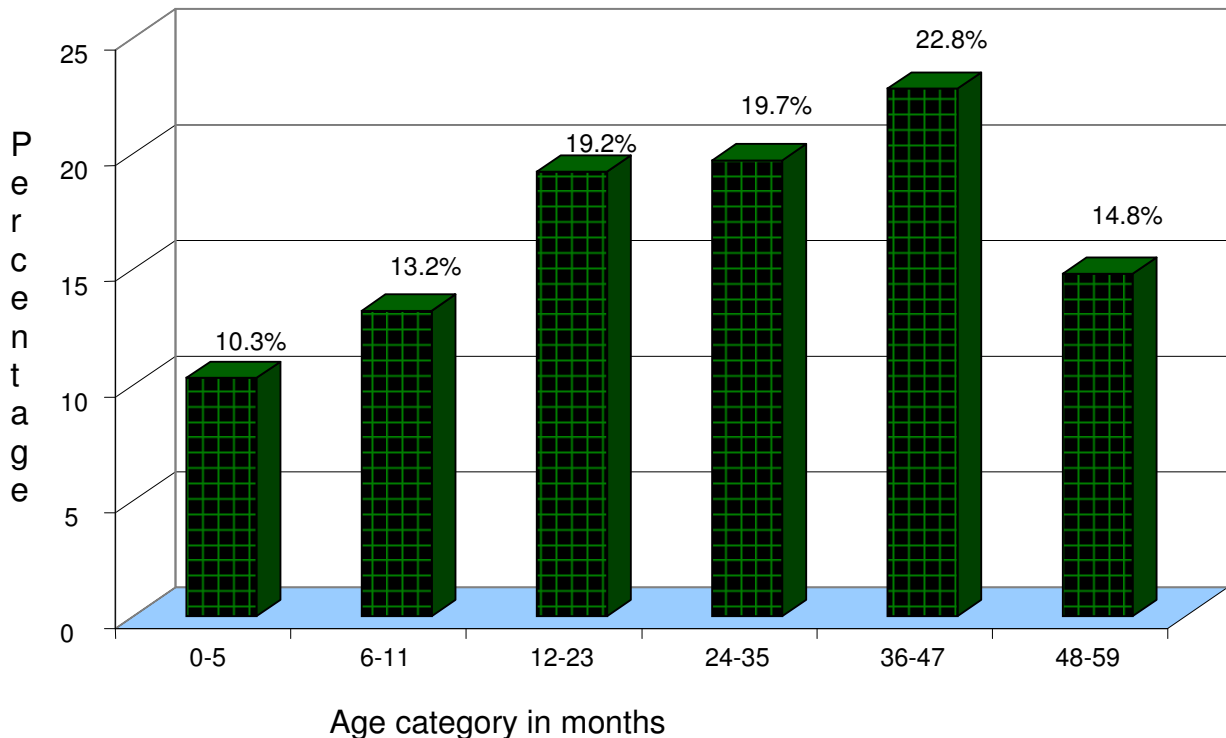
Majority of fathers, 704(98.3%), were engaged in farming and 454(55.1%) mothers were housewives. Majority of the households (89.3%) had domestic animals. Five hundred seventy five (59.5 %) households had 1-2 hectares of land, with a mean of 1.13hectars (± 0.57 S.D) and a median of 1 hectare for agricultural purpose (Table 1).

There were <5 children in 370 (44.9%) households with a total of 447 children. One hundred and two (22.8 %) <5 children were within 36-47 months age category (Figure 3) and 234(52.3 %) <5 children were females.

Table 1: Distribution of respondents by socio-economic characteristics in the rural community of Hulet Ejju Enessie district, September 2006

Characteristics	Frequency	Percent
Family Size (n=824)		
≤5	494	60.0
>5	330	40.0
Religion (n=824)		
Orthodox Christian	777	94.3
Muslim	47	5.7
Educational status of mothers (n=824)		
Illiterate	619	75.1
Read and write	140	17.0
Literate	65	7.9
Educational status of the Father(n=717)		
Illiterate	512	71.4
Read and write	140	19.5
Literate	65	9.1
HHs with primary or secondary school children (n=824)		
Yes	533	64.7
No	291	35.3
Marital status (n=824)		
Married	710	86.2
Unmarried	14	1.7
Divorced/separated	76	9.1
Widowed	40	4.9
Occupational status of mothers (n=824)		
House wife	454	55.1
Farmer	349	42.4
Others	21	2.6
Occupational status of father (n=717)		
Farmer	705	98.3
Others	12	1.7
Head of households (n=824)		
Father	717	87.0
Mother	106	12.9
Others	1	0.1
Size of household land holding (n=824)		
None	15	1.8
<1 hectare	226	27.4
1-2 hectares	490	59.5
2-3 hectares	93	11.3
No. of <5 children in the household(n=370)		
One	305	82.4
Two	63	17.0
Three	2	0.5

Figure 3: Age category of <5 children by months in the rural community of Hulet Ejju Enessie district, September 2006 (n=447).



Sanitation facilities

Promotion of Latrine construction was facilitated in the Woreda by the Woreda Health Office with the help of UNICEF and Carter Center Ethiopia. The superstructure and the floor (slab) of the pit latrine was designed to be constructed by locally available materials like wood and mud that initiate the acceptance, affordability and sustainability of the project by the community (Photo 1). The pit of the latrine was circular with a diameter of 1 meter and a depth of 3 meters. Height of the superstructure was 2 meters with 1.5 meters X 1.5 meters width and length. Size of the squat hole was designed to be 25 cms width and 30 cms length. Hand washing facilities from locally available materials like gourd, pot, Jerry can etc was designed to be available near to latrines to remind users to wash their hands after visiting latrines (Photo 1).

Photo 1: Typical household pit latrine constructed from locally available materials with jerry can hand washing facility



Photo 2: Household pit latrine with wall and door cover that needs maintenance



Photo 3: Household 1 pit latrine with hand washing stand but had no hand washing facility



Almost all (99.8%) types of available latrines were pit latrines. Majority (63.5%) of latrines were constructed before 2 years and longer since the time of the study, with a mean of 29.01(\pm 10.05 S.D) months. Seven hundred fourteen (86.7%) latrines were functional. Of the functional latrines, 389 (54.5%) latrines required maintenance, of which 59.4% of superstructure and 51.4% of roof of the latrines required maintenance predominantly. The remaining non-functional, 110(13.3%), latrines required reconstruction. Only 6(0.8 %) latrines had no superstructure. Majority (93.4 %) of latrine slabs were sealed with mud or cemented but 66.1% of latrines had no cover for squatting hole. About 57% of latrines were \geq 6 meters far away from houses. Four hundred ninety four (69.2%) households with latrine had no any kind of hand washing facilities (Table 2). Even though house flies population varies from house to house, there were observed house flies in or around most of the pit latrines.

Table2: Distribution of respondents by environmental factors in the rural community of Hulet Ejju Enessie district, September 2006.

Characteristics	Frequency	Percent
Years since latrines constructed (n=824)		
<2 yrs	301	36.5
2-3yrs	345	41.9
≥ 3 yrs	178	21.6
Functional latrines (n=824)		
Yes	714	86.7
No	110	13.3
Status of latrines (n=824)		
Need reconstruction	110	13.3
Need no maintenance	325	39.4
Need maintenance	389	47.2
Parts of latrine need maintenance (n=389)		
Superstructure	231	59.4
Slab	53	13.6
Roof	200	51.4
Latrine pit	17	4.4
Condition of latrine superstructure (n= 714)		
No superstructure	6	0.8
Only with wood	53	7.4
Wood plastered with mud	652	91.3
Other	3	0.4
Sealed or cemented latrine slabs (n= 714)		
Yes	667	93.4
No	47	6.6
Location of hand washing facilities from latrine (n=714)		
Next to latrine	176	24.6
Within walking distance	15	2.1
Inside the house	29	4.1
No facility	494	69.2
Distance of latrine from the house (n=714)		
<6 meters	307	43.0
6-10 meters	365	51.1
≥10 meters	42	5.9

Behavioral Factors

Perceived reasons of latrine construction by respondents

Most, 627(76.1%), of the respondents who had latrines explained that they were advised by health workers to construct latrines but only 43 (5.2%) respondents complained that they were imposed by other bodies like local administrators (Figure 4).

Use of latrines by family members

Most, 689(96.5%), respondents explained that all their family members of ≥ 5 years old were using latrines. Majority (93.0%) of the respondents explained that they were always using latrines. There were observable faeces in the compound of 14.7% of the households. Six hundred fifty seven (92.0%) households were observed that there were fresh faeces in the pit of the latrine and only 13.6% of the foot-paths to the latrines were covered with grasses. The extent of latrine utilization among 500 (60.7%) households with latrines was satisfactory. Only 46(12.4 %) households responded that there were < 5 children who used latrines. About One-third of them began to use the latrine by the age of three years and two-third by the age of four years. One hundred and eight (38.9%) households disposed their children's faeces improperly by throwing out of houses somewhere either in the garden or in the bush (Table 3).

The major reasons given by respondents for why < 5 children did not use the latrines were they didn't use properly since they are kids (38.1%), large squat hole (17.4%) and floor was not safe to stand on (15.5%) (Figure 7).

Perceived reasons for latrine use

Majority of the respondents, 559(84.2%), explained that they were always using latrines because they knew that excreta are dangerous to the health (Figure 5). Among the reasons given by the respondents, staying out for work, 10 (7.3%), was the second reason for not using the latrines next to latrines were not functional, 110 (80.3%), (Figure 6).

Table 3: Distribution of respondents by the behavioral factors in the rural community of Hulet Ejju Enessie district, September 2006

Characteristics	Frequency	Percentage
Latrine use by ≥ 5 years old (n=714)		
Males only	20	2.8
Females only	5	0.7
All family members	689	96.5
Frequency of latrine use (n=714)		
Rarely	27	3.8
Mostly	25	3.5
Always	662	92.7
Observable faeces in the compound (n=824)		
Yes	121	14.7
No	703	85.3
Presence of fresh faeces in the pit of latrine (n=714)		
Yes	657	92.0
No	57	8.0
Latrine foot-path covered with grass (n=714)		
Yes	97	13.6
No	617	86.4
Extent of latrine utilization (n=824)		
Satisfactory	500	60.7
Unsatisfactory	324	39.3
Latrine use by <5 children (n=370)		
Yes	46	12.4
No	324	87.6
Starting age of latrine use by <5 children (n=46)		
At 2 years old	1	2.2
At 3 years old	14	30.3
At 4 years old	31	67.4
Disposal system of faeces of children (n= 340)		
Pit latrine disposal	224	65.9
Disposal by burying	8	2.3
Throwing faeces out of houses	108	31.8

Figure 4: Perceived reasons for latrine construction in the rural community of Hulet Ejju Enessie district, September 2006 (n=824)

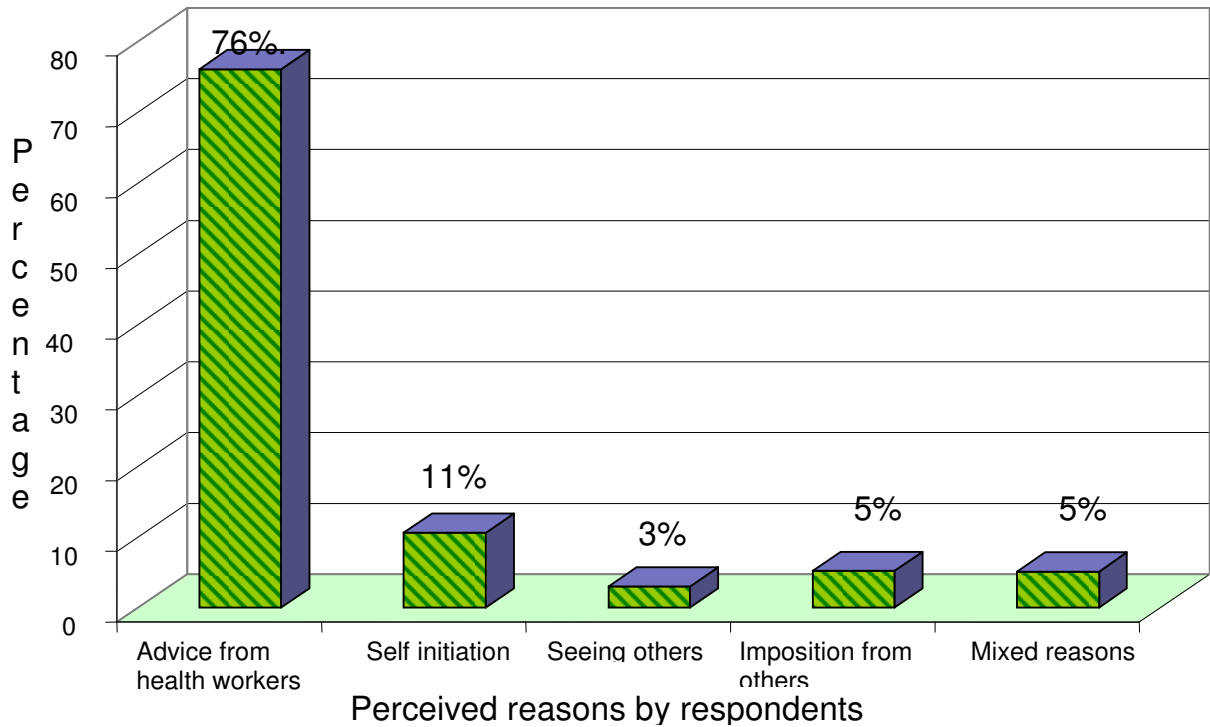


Figure 5: Perceived reasons for always latrine use by ≥ 5 years old in the rural community of Hulet Eju enessie district, September 2006 (n=664).

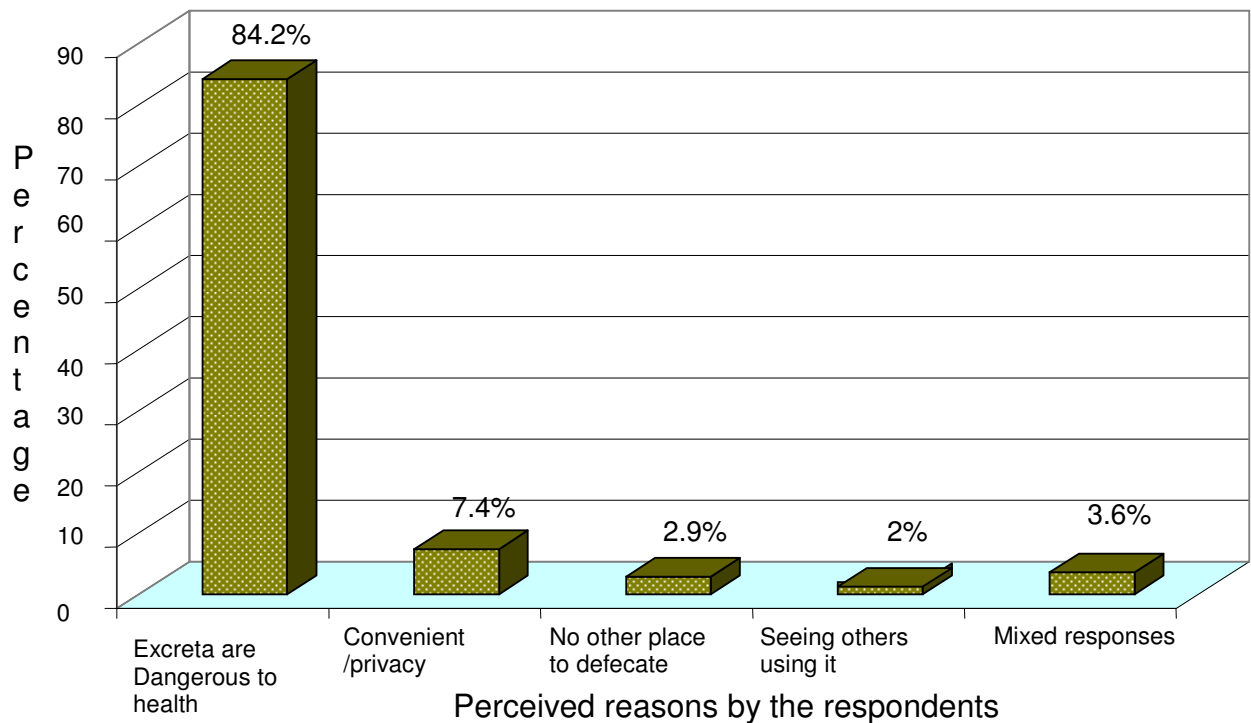


Figure 6: Perceived reasons for not using latrines by ≥ 5 years old in the rural community of Hulet Eju Enessie district, September 2006 (n=137)

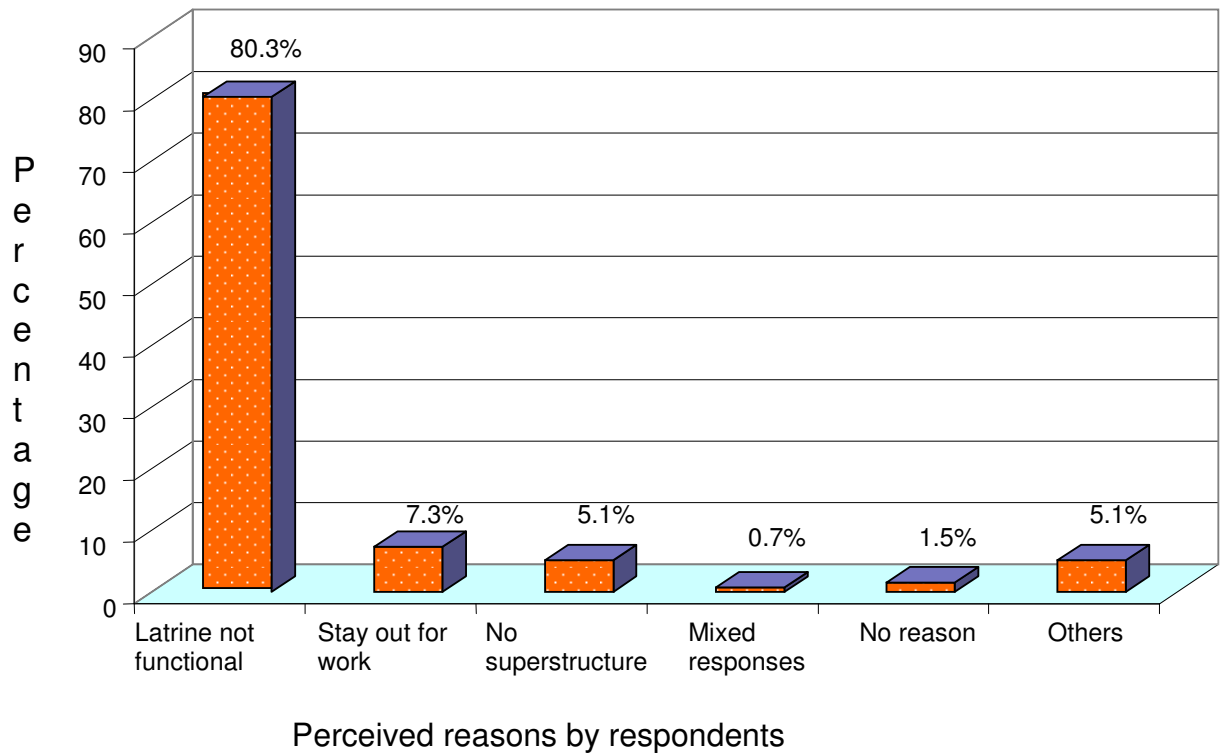
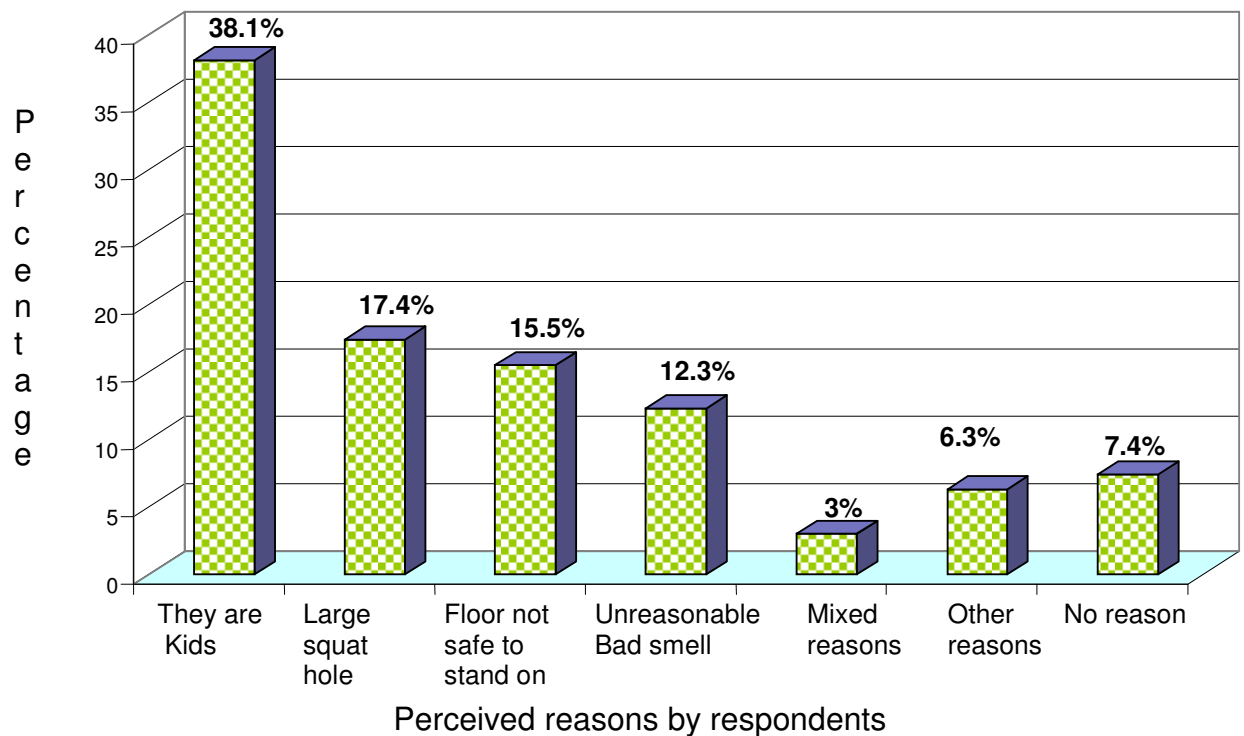


Figure 7: Reasons for not using latrine by < 5 children in the rural community of Hulet Eju Enessie district, September 2006 (n=367).



B. Bivariate analysis

The extent of latrine utilization

Several variables might be expected to be associated with the extent of latrine utilization and questions about these were therefore deliberately included in the questionnaire.

The extent of latrine utilization was more likely satisfactory [OR: 1.35, 95%CI: (1.01-1.81)] in the house with primary or secondary school children than houses with no primary or secondary school children. However, the educational status of mothers was not found to be significantly associated with the extent of latrine utilization.

The extent of latrine utilization was associated with the reasons given for latrine construction. The extent of latrine utilization in the houses that constructed latrines by seeing others was about 5 times [OR: 4.57, 95%CI: (1.34-15.55)] more satisfactory than houses imposed by other bodies to construct latrines.

The extent of latrine utilization was also significantly associated with duration of latrine owned by household. The extent of latrine utilization was about 2 times [OR: 1.99, 95%CI: (1.49-2.66)] more satisfactory in households with owning latrines for ≥ 2 years than owning latrines for less than two years

The extent of latrine utilization was less likely satisfactory in 'Kolla' [OR: 0.31, 95%CI: (0.20-0.47)] and 'Woyna-Dega' [OR: 0.50, 95%CI: (0.35-0.72)] than 'Dega' climatic Zone (Table 4)

Table 4: Selected predictors of the extent of latrine utilization in the rural community of Hulet Ejjju Enessie district, September 2006 (n= 824)

Characteristics	Extent of latrine utilization		Crude OR (95% CI)
	Satisfactory	Unsatisfactory	
Educational status of mother			
Illiterate	369(59.6%)	250(40.4%)	0.83(0.60-1.16)
Literate	131(63.9%)	74(36.1%)	1.00
Households with primary or secondary school children			
Yes	337(63.2%)	196(36.8%)	1.35(1.01-1.81)*
No	163(56.0%)	128(44.0%)	1.00
Reasons given for latrine construction			
Advise from health workers	385(61.4%)	242(38.6%)	1.38(0.74 -2.57)
Self initiation	60(69.0%)	27(31.0%)	1.93(0.91-4.10)
Seeing others	21(84.0%)	4(16.0%)	4.57(1.34-15.55)*
Mixed reasons	11(26.2%)	31(73.8%)	0.31(0.11-0.84)
Imposition from others	23(53.5%)	20(46.5%)	1.00
Duration of owning latrine by households			
≥2 yrs	349(66.7%)	174(33.3%)	1.99(1.49-2.66)**
<2yrs	151(50.2%)	150(49.5%)	1.00
Climatic zone			
'Kolla'	94(47.5%)	104(52.5%)	0.31(0.20-0.47)**
'Woyna Dega'	242(59.6%)	164(40.4%)	0.50(0.35-0.72)**
'Dega'	164(74.5%)	56(25.5%)	1.00

Significant at $p < 0.05$ * ; $p < 0.001$ **

Occurrence of <5 children diarrhoeal diseases

Several variables might be expected to be associated with the risk of diarrhoea occurrence in under five children. Therefore, the effects of variables likely to increase or decrease the risk of occurrence of diarrhoea have been examined

Socio-economic determinants of diarrhoea

The occurrence of childhood diarrhoea had no statistically significant association with family size, educational status of mothers and children, and occupation of mothers. Number of <5 children in the house was significantly associated and the occurrence of childhood diarrhoea in the house with more than one child was 2.4 times [OR: 2.42, 95%CI: (1.04-5.62)] higher than the presence of one child (Table 5).

Table 5: The occurrence of childhood diarrhea by the selected socio-economic characteristics in the rural community of Hulet Ejju Enessie district, September 2006(n=370)

Characteristics	Occurrence of diarrhoea		Crude OR (95% CI)
	Yes	No	
Family size of the household			
≤5 members	10(5.3%)	178(94.7%)	0.51(0.23-1.14)
>5members	18(9.9%)	164(90.1%)	1.00
Educational status of mothers			
Illiterate	20(8.0%)	230(92.0%)	1.22(0.52-2.85)
Literate	8(6.7%)	112(93.3%)	1.00
Households with primary or secondary school children			
Yes	21(9.0%)	212(91.0%)	1.84(0.76-4.45)
No	7(5.1%)	130(94.9%)	1.00
Occupational status of mother			
House wife	11(7.9%)	128(92.1%)	1.08(0.49-2.38)
Other	17(7.4%)	214(92.6%)	1.00
Number of < 5 children in a house			
> 1 children	9(13.8%)	56(86.2%)	2.42(1.04-5.62)*
One child	19(6.2%)	286(93.5%)	1.00

Significant at P= 0.05*

Environmental determinants of diarrhoea

An attempt was made to examine the risk of diarrhoea in households with functional and non-functional latrines. There was significant association and the occurrence of childhood diarrhea was more likely to be protected [OR: 0.37, 95%CI: (0.15-0.89)] in households with functional latrines than non-functional latrines.

Statistical significant association was found between the status of latrine and the occurrence of childhood diarrhoea and the risk was 6 times higher [OR: 5.73, 95%CI: (1.64-19.96)] in households with latrines that need reconstruction than need no maintenance.

The occurrence of childhood diarrhoea was also more likely to be reduced [OR: 0.29, 95%CI: (0.13-0.65)] in a household that owned latrine for more than 2 years than owning latrine for less than 2 years.

The occurrence of childhood diarrhoea in the ‘Kolla’ was about 5 times higher [OR: 4.94, 95% CI: (1.05-23.26)] than ‘Dega’ but had no significant association with ‘Woyna-Dega’ zone.

From the environmental variables included, distance of latrine from house, households shared with domestic animals, the proximity of the animal shed to the house and to the water well, sources of water, access to the water source, presence and location of hand washing facilities did not show significant association with under-five diarrhoea morbidity (Table 6).

Table 6: The occurrence of childhood diarrhoea by the selected environmental factors in the rural community of Hulet Ejju Enessie district, September 2006 (n=370)

Characteristics	Occurrence of diarrhoea		Crude OR (95% CI)
	Yes	No	

Functional latrine			
Yes	20(6.3%)	298(93.7%)	0.37(0.15-0.89) ^a
No	8(15.4%)	44(84.6%)	1.00
Status of latrine			
Need reconstruction	8(15.4%)	44(84.6%)	5.73(1.64-19.96) ^b
Need maintenance	16(8.5%)	172(91.5%)	2.93(0.96-8.98)
Need no maintenance	4(3.1%)	126(96.9%)	1.00
Yrs of owning latrines by house			
≥2yrs	10(4.3%)	224(95.7%)	0.29(0.13-0.65) ^c
<2yrs	18(13.2%)	118(86.8%)	1.00
Water source for domestic purpose			
Protected	11(6.8%)	150(93.2%)	0.83(0.38-1.82)
Unprotected	17(8.1%)	192(91.9%)	1.00
Distance for collecting water			
≤15 minutes	14(7.9%)	163(92.1%)	0.97(0.41-2.33)
16-30 minutes	9(8.1%)	102(91.9%)	1.32(0.46-3.80)
>30 minutes	5(6.1%)	77(93.9%)	1.00
Houses shared with domestic animals			
Yes	22(9.0%)	223(91.0%)	1.96(0.77-4.96)
No	6(4.8%)	119(95.2%)	1.00
Presence of hand washing facilities			
Yes	8(8.1%)	91(91.9%)	1.10(0.47-2.59)
No	20(7.4%)	251(92.6%)	1.00
Location of hand washing*			
Next to latrine	4(5.3%)	71(94.7%)	0.28(0.07-1.23)
Other place	4(16.7%)	20(83.3%)	1.00
Distance of latrine from house			
<6 meters	11(7.7%)	132(92.3%)	1.71(0.65-4.55)
6-10 meters	7(4.6%)	144(95.4%)	0.92(0.19-4.42)
> 10 meters	2(8.3%)	22(91.7%)	1.00
Distance of domestic animals from houses			
<10 meters	27(7.8%)	321(92.2%)	1.76(0.23-13.58)
10 meters and above	1(4.5%)	21(95.5%)	1.00
Climatic zone			
‘Kolla’	10(11.1%)	80(88.9%)	4.94(1.05-23.26) ^a
‘Woyna Dega’	16(8.0%)	183(92.0%)	3.45(0.78-15.78)
‘Dega’	2(2.5%)	79(97.5%)	1.00

*n=99 significant at p<0.05^a; p<0.05^b; p=0.005^c

Behavioral determinants of diarrhoea

Analysis has been undertaken to compare the occurrence of <5 diarrhoea with selected behavioral factors. An association has been found between the extent of latrine utilization and

the occurrence of diarrhoea among <5 children and households with satisfactory latrine utilization had a more likely protective effect [OR: 0.38, 95%CI: (0.17-0.87)] on the risk of the occurrence of childhood diarrhoea than households with unsatisfactory latrine utilization.

The presence of observable faeces in the backyard of the household and also in the neighborhood yard had significant association with the occurrence of childhood diarrhoea. The risk of the occurrence of childhood diarrhoea was 3 times [OR: 2.61, 95%CI: (1.15-5.94)] higher in the households with observable faeces in their yards than households with no observable faeces in their yards. The risk of diarrhoea in the houses with observable faeces in the neighborhood yard was also two and a half times [OR: 2.47, 95%CI: (1.06-5.75)] higher than households with no observable faeces in the neighborhood yard.

The use of latrines by the children in the household, per capita water consumption, condition and cleanliness of water dipper, cleanliness of water storage, hand washing practices by mothers were not associated with the risk of childhood diarrhoea (Table 7). The occurrence of childhood diarrhoea also had no significant association with feeding practice and immunization status of children (Table 8).

Table 7: The occurrence of childhood diarrhoea by excreta disposal, water supply and hand washing practice in the rural community of Hulet Ejju Enessie district, September 2006 (n=370)

Characteristics	Occurrence of diarrhoea		Crude OR (95% CI)
	Yes	No	
Extent of latrine utilization			
Satisfactory	9(4.5%)	189(95.5%)	0.38(0.17-0.87)*
Unsatisfactory	19(11.0%)	153(89.0%)	1.00
Observable faeces in the compound			

Yes	10(14.3%)	60(85.7%)	2.61(1.15-5.94)*
No	18(6.0%)	282(94.0%)	1.00
Observable faeces in the neighborhoods yard			
Yes	9(14.1%)	55(85.9%)	2.47(1.06-5.75)*
No	19(6.2%)	287(93.8%)	1.00
Latrine use by <5 children			
Yes	1(2.2%)	45(97.8%)	0.24(0.03-1.84)
No	27(8.3%)	297(91.7%)	1.00
Per capita water consumption (liters)			
<10	24(9.1%)	240(90.9%)	2.55(0.86-7.54)
≥10	4(3.8%)	102(96.2%)	1.00
Condition of water dipper			
Any	11(7.2%)	141(92.8%)	0.90(0.41-1.99)
Separate	17(7.9%)	197(92.1%)	1.00
Cleaned water storage			
Yes	25(7.2%)	323(92.8%)	0.49(0.14-1.77)
No	3(13.6%)	19(86.4%)	1.00
Cleaned water dipper			
Yes	18(7.2%)	232(92.8%)	0.82(0.37-1.84)
No	10(8.6%)	106(91.4%)	1.00
Hand washing practice by mothers			
At all critical times	15(10.2%)	132(89.8%)	1.62(0.64-4.13)
After defecation	6(5.2%)	110(94.8%)	0.78(0.25-2.40)
Mixed practices	7(6.5%)	100(93.5%)	1.00
Hand washing practice with			
Water only	23(7.4%)	288(92.6%)	0.86(0.31-2.36)
Soap/Ash	5(8.5%)	54(91.5%)	1.00

Significant at P<0.05*

Table 8: The occurrence of childhood diarrhoea by the feeding practice and immunization status of children in the rural community of Hulet Ejju Enessie district, September 2006 (n=370)

Characteristics	Occurrence of diarrhoea		Crude OR (95% CI)
	Yes	No	
Start of supplementary feeding			
<6 months	2(7.1%)	26(92.9%)	1.59(0.25-10.08)
At 6 months	3(4.6%)	62(95.4%)	1.88(0.55-6.46)
After 6 months	23(8.3%)	253(91.7%)	1.00
Supplementary feeding practices*			
Bottle feeding	2(4.1%)	47(95.9%)	0.43(0.10-1.87)

Cup feeding	26(9.0%)	267(91.0%)	1.00
Starting time of breast feeding			
Within 1 hour	10(6.4%)	147(93.6%)	0.74(0.33-1.64)
After 1 hour	18(8.5%)	195(91.5%)	1.00
Colostrums breast feeding			
Yes	6(5.1%)	111(94.9%)	0.57(0.22-1.44)
No	22(8.7%)	231(91.3%)	1.00
Measles vaccinated children			
Yes	23(7.7%)	277(92.3%)	1.08(0.40-2.95)
No	5(7.1%)	65(92.9%)	1.00
Vitamin A supplemented Children			
Yes	27(8.2%)	303(91.8%)	3.47(0.46-26.29)
No	1(2.5%)	39(97.5%)	1.00

*n=337

B. Multivariate analysis

Extent of latrine utilization

Variables that were significantly associated at the bivariate analysis were further examined in the logistic regression to see their relative effects on the extent of latrine utilization.

The extent of latrine utilization remained significantly associated with the existence of primary or secondary school children in the household, perceived reasons of seeing others to construct

latrine, duration of owning latrine by household and climatic zone after adjusting other predictor variables in the logistic regression.

The presence of primary or secondary school children in the house more likely increased the satisfactory latrine utilization than house with no primary or secondary school children [OR: 1.43, 95%CI: (1.05-1.95)]. The extent of latrine utilization was 5 times more satisfactory in the house that constructed latrine by seeing others than being imposed by other bodies [OR: 5.38, 95%CI: (1.53-18.94)]. Even though perceived reason of self initiation to construct latrine by the household had no significant association in the bivariate analysis, its association appeared in the multivariate analysis and the extent was 2 times [OR: 2.20, 95%CI: (1.01-4.76)] more satisfactory than being imposed by other bodies to construct latrine

The extent of latrine utilization was about 2 times more satisfactory in the households owning latrines for 2 years and longer than owning less than 2 years [OR: 1.82, 95%CI: (1.33-2.51)]. The extent of latrine utilization was also less likely satisfactory both in ‘Kolla’ [OR: 0.47, 95%CI: (0.29-0.74)] and ‘Woyna-Dega’ [OR: 0.55, 95%CI: (0.38-0.81)] than ‘Dega’ Zone (Table 9).

Table 9: Summary of logistic regression of predictors of the extent of latrine utilization in the rural community of Hulet Ejju Enessie district, September 2006

Characteristics	Crude OR (95% C.I)	Adjusted OR (95% C.I)

Existence of primary or secondary school children		
Yes	1.35(1.01-1.81)*	1.43(1.05-1.95)*
No	1.00	1.00
Reasons given for latrine construction		
Advise from health workers	1.38(0.74 -2.57)	1.44(0.76-2.74)
Self initiation	1.93(0.91-4.01)	2.20(1.01-4.76)*
Seeing others	4.57(1.34-15.55)**	5.38(1.53-18.94)**
Imposition from others	1.00	1.00
Duration of owning latrine by household		
≥2 yrs	1.99(1.49-2.66) ***	1.82(1.33-2.51)***
<2yrs	1.00	1.00
Climatic zone		
'Kolla'	0.31(0.20-0.47) ***	0.47(0.29-0.74)**
'Woyna Dega'	0.50(0.35-0.72) ***	0.55(0.38-0.81)**
'Dega'	1.00	1.00

Significant at p<0.05*; p<0.005**; p<0.001***

Occurrence of childhood diarrhoea

The multivariate analysis was done by considering the conceptual framework (Fig.1) and SPSS Enter method was used hierarchically to assess the relative effect of the explanatory factors on the outcome variable. To avoid an excessive number of variables and unstable estimates in the subsequent model, only variables with p-value < 0.3 were kept in the subsequent analysis (41)

The overall effect of the selected socioeconomic variables (Table 5) on childhood diarrhoeal disease was assessed in the first step. In the second step of the analysis, the environmental variables (Table 6) were added, and their effect was assessed in the presence of socioeconomic variables that had p-value < 0.3. Behavioral factors (Table 7&8) were entered in third step. In this step, the effect of the selected behavioral factors was assessed in the presence of both socioeconomic and environmental factors that had p-value <0.3.

From all variables entered in all steps of analysis, only duration of owning latrine by the household remained significant after adjusting socioeconomic, other environmental and behavioral factors. Households owning latrines for 2 years and longer had a more likely protective effect of the occurrence of childhood diarrhoea in the second [OR: 0.34, 95%CI: (0.15-0.78)] and final model [OR: 0.28, 95%CI: (0.12-0.66)] of multivariate analysis than households owning latrines with in 2 years. Even though functional latrines, status of latrine, extent of latrine utilization, and observable faeces in the compound and in the neighborhoods yard showed significant association in the bivariate analysis, their significance disappeared in all steps of the multivariate analysis. Number of <5 children in the house showed significant association in the second step [OR: 2.78, 95%CI: (1.15-6.77)] after adjusting environmental variables but had no association in the final step of the multivariate analysis (Table 10).

Table 10: Summary of hierarchical logistic regression of the relative effect of socio-economic, environmental and behavioral factors on the occurrence of childhood diarrhoea in the rural community of Hulet Ejju Enessie district, September 2006.

Characteristics	Crude OR (with 95% C.I)	Adjusted OR (with 95% C.I)		
		Model 1	Model 2	Final Model
Model 1(socio-economic variables) #				
Family size of the household ≤5 members/ >5members*	0.51(0.23-1.14)	0.69(0.26-1.88)		
Households with primary or secondary school children Yes /No*	1.84(0.76-4.45)	1.38(0.47-4.08)		
Occupational status of mother House wife/Other*	1.08(0.49-2.38)	1.16(0.52-2.59)		
Number of < 5 children in a house > 1 children/One child*	2.42(1.04-5.62)**	2.18(0.92-5.21)	2.78(1.15-6.77)**	2.31(0.91-5.86)
Model 2(socio-economic + environmental variable) #				
Functional latrines Yes/No	0.37(0.15-0.89)**		0.47(0.18-1.23)	0.69(0.23-2.07)
Status of latrine Need/ No need of reconstruction*	2.71(1.13-6.52)**		—	—
Duration of owning latrine by household ≥2/<2 yrs*	0.29(0.13-0.65)**		0.34(0.15-0.78)**	0.28(0.12-0.66)***
House shared with domestic animals Yes/No*	1.96(0.77-4.96)		1.58(0.60-4.18)	
Climatic zone 'Kolla'/'Dega'*	4.94(1.05-23.26)**		1.31(0.55-3.12)	
Model 3(socio-economic + environmental + behavioral variables) #				
Extent of latrine utilization Satisfactory/Unsatisfactory*	0.38(0.17-0.87)**			0.63(0.22-1.81)
Observable faeces in the compound Yes/No*	2.61(1.15-5.94)**			1.40(0.48-4.09)
Observable faeces in the neighborhood yard Yes/No*	2.47(1.06-5.75)**			1.51(0.58-3.96)
Latrine use by <5 children Yes/No*	0.24(0.03-1.84)			0.23(0.03-1.88)
Per capita water consumption <10lits/≥10 lit*	2.55(0.86-7.54)			2.72(0.87-8.46)
Supplementary feeding practices Bottle/cup feeding*	0.43(0.10-1.87)			0.43(0.09-2.05)
Vit,A supplemented children Yes/No*	3.48(0.46-26.29)			3.25(0.40-27.26)

Only variables with p-value < 0.3 were kept in the subsequent analysis and displayed in the table.

* Reference group P< 0.05** P<0.005***

6. Discussion

The findings of this study revealed that reported usage of latrine by adults was about 97% which is nearest to the report in Lesotho (99%) (20). Children began to use latrine at the age of 3 years. In Kenya even if children began to use the latrine as early as 2 years, most of them start at the age of 5 which is consistent with this study. The means of disposal of <5 children faeces varied among respondents with 65.9% throwing faeces in the latrine, 2.3 % burying while 31.8% threw away from the house either in the bush or in the garden. The use of latrine for safe disposal of children faeces is better when compared with the reports in Kenya (53%) (19), Lesotho (50%) (20) and Philippines (39%) (21), however throwing faeces out of the house are higher than the report in Kenya (12%) (19).

The existence of primary or secondary school children in the house was associated with the extent of latrine utilization. This might be due to the fact that students are more exposed to latrine utilization than others because of accessibility of latrine facilities at the school that enhances good behavior as explained by Woreda Health Office that all 13 schools in the selected study Kebeles and 2 secondary schools found in the district had functional latrines; or there might be hygiene/health education related to sanitation given for students at school level in a curricular or co-curricular activity.

There was no association of literacy of mothers with the extent of latrine utilization even if a less likely increase of latrine utilization was observed in literate mothers than illiterate mothers. This might be due to either there were no sanitation and hygiene education program along with the intervention of latrine facilities or even if there were promotion program, especial attention might not be given to mothers who spend most of their time in the vicinity of the house and who are also responsible for the caring of their child.

Among the perceived reasons for constructing latrines by households, seeing others was associated with the extent of latrine utilization. This is due to the fact that people can accept, adopt and utilize latrine facilities easily by following role model individuals and seeing model latrine facilities than mere advice and enforcement. Duration of owning latrine by household was associated with the extent of latrine utilization. This might be people can outweigh the benefits of latrine after using or being exposed for a longer period of time.

The extent of latrine utilization was also significantly different among different climatic zones. This might be people are encouraged to defecate openly due to the far distance of the farming area from their home, their latrines are non-functional or have no superstructure in 'Kolla' and 'Woyna Dega' than 'Dega' zone.

Knowing that excreta are dangerous to health and latrine facility is a convenient place for defecation, particularly for girls and women in a community that defecation during day time is shame, were the major reasons that facilitated latrine use by the households. Major reasons that deter latrine use by the households were non-functional latrines, stay out for farming and no superstructure; which is similar to the study conducted in Ethiopia by Ministry of Health in 1997 except staying out for farming (14). Among the major reasons that deter latrine use, maintenance problem of the latrine i.e. the presence of non-functional latrines and latrine with no superstructure is also similar to other study (22).

In this study the two week prevalence rate of <5 diarrhoeal diseases was 6.5%, which is much below the 2005 Ethiopia DHS report (22%) having similar study units (i.e. households with latrine facilities) (10),. This might be due to the difference in sample size or the difference in the background of study areas. Diarrhea morbidity rates were found to be highest (65.5%) in the 6-

23 months age than other age groups which is consistent with the 2005 EDHS (57.6%) and other studies (17, 38, 39).

Studies in Nepal have showed that an apparent increased risk of diarrhoea in children of literate mothers, probably due to improved recognition of the condition in the child (40) which is consistent with this study. Even if the risk of the occurrence of childhood diarrhoea did not differ among the occupation of mothers statistically, the occurrence was reduced in the housewives than other occupation of mothers. This might be housewives spent their time more on caring of children than mothers who had other occupations.

Even though it was not statistically significant in the multivariate analysis, the occurrence of childhood diarrhoea was 2.3 times higher when the number of <5 children in the house was two or more than only one child. Similar findings (2.07 times higher) were observed in Guragie zone of Meskanena Mareko Woreda except its significant association (42)

The occurrence of childhood diarrhoea was not also statistically significant with observable faeces in the backyard as well as in the neighborhoods in multivariate analysis; however the risk of the occurrence of childhood diarrhoea was 1.4 and 1.5 times higher than no observable faeces in the compound and in the neighborhoods respectively. This might be related with the nature of children playing on the ground contaminated with faecal matter, or poor household sanitation or hygiene behaviors also create conducive environment that attract houseflies as observed in this study which is similar to the risk studied in Accra, Ghana except its significance (27).

The occurrence of childhood diarrhoea was statistically associated with the extent of latrine utilization in the bivariate analysis [OR: 0.38, 95%CI: (0.17-0.87)] but not in the multivariate analysis [AOR: 0.63, 95%CI: (0.22-1.81)]. This might be because of being confounded by

environmental variables like duration of owning latrines by the households, status of latrine and functionality of latrine, and behavioral variables like observable faeces in the compounds or neighborhoods.

The occurrence of childhood diarrhoea was statistically associated with the duration of owning latrines by households for longer periods of time in the bivariate as well as in all steps of multivariate analysis. This might be having latrines for longer periods of time promote the practice of using latrines and this in turn bring impacts on the occurrence of childhood diarrhoea

Water source of the household had no association with the occurrence of childhood diarrhoea. This might be due to the fact that there should be mixed use of water from both protected and unprotected sources or homogeneity of using.

Hand washing practices by the respondents were not related to the risk of childhood diarrhoea. In practice due to social-desirability bias this is difficult to investigate a straight question such as 'do you wash your hands after visiting latrine?' is likely to elicit a positive answer, whatever the actual practice. The question used here about 'when do you wash your hands?' in the event produced different and combined answers that it has not proved possible to demonstrate a protective effect from hand washing at certain times. Responses to the question about what do you use during hand washing indicate that children with diarrhoea in the last two weeks came from households who spent more on average on soap than the households of children without diarrhoea in the last two weeks. This might also probably be related with the literacy of mothers since literate mothers recognize the condition and respond the interview than illiterate mothers.

7. Strengths and limitations of the study

7.1. Strengths of the study

This study will be a clue to the Ministry of Health for the extension health package to develop strategies and policies related with sanitation particularly among rural community having the following strengths:

- ✓ The study was community based particularly addressing the rural community
- ✓ Response rate was high (98.3%)
- ✓ Data collectors were similar in sex with the respondents

7.2. Limitations of the study

- ✓ As being cross-sectional study in nature, it might have drawbacks on the actual situation of the seasonal difference of the occurrence of diarrhoeal diseases.
- ✓ Recall bias by the respondents during interview of two weeks occurrence of childhood diarrhoea
- ✓ The definition of diarrhoea given by mothers might share difference in perception, even though this was considered and tried to give the definition to mothers during the design and during data collection.
- ✓ The time span of latrine construction was short to result behavioral changes in defecation
- ✓ Lack of documented information on latrine utilization

8. Conclusions and recommendations

8.1. Conclusions

This study concluded that most of the households with latrines were observed that their latrine utilization were satisfactory. The presence of primary or secondary school children, duration of owning latrines by the households, seeing others and self initiation to construct latrines were the major factors affecting utilization of latrines.

The study has also shown that among the perceived reasons for latrine use by family members were mainly awareness of the dangerous effect of excreta on health and latrine facilities are convenient place to defecate

It was also concluded that Latrine utilization had no impact on the occurrence of childhood diarrhoeal diseases after adjusting other factors, but owning latrines for longer period of times by the household had impact on the occurrence of childhood diarrhoeal diseases.

8.2. Recommendations

As shown in this study, acceptance of latrine facilities by the community, sustainability of latrine use, functionality and status of latrine are the major problems related with diarrhoeal diseases. To solve these problems, the following recommendations are forwarded based on the findings of the study.

1. Latrine facilities has to be accepted first by the community to be used sustainably and hence using a role model approach to promote hygiene and sanitation behavior among the community is more important than influencing or even advising individuals.
2. Sanitation and hygiene education promotion should be done regularly, repeatedly and continuously to adopt behavior or practice on latrine utilization among the community particularly to mothers who can spend most of their time on the caring of their children and families at home.
3. Promotion activities among the community should be done by focusing on maintenance and reconstruction of latrine facilities to have sustainable utilization and to bring about positive impacts on childhood diarrhoea
4. Monitoring activities by the extension health workers and others is very crucial to sustain the project and to bring about impacts on the health of the community.

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Annex I: English questionnaire

Household Identification Code _____

Name of Kebele _____

Annex A: Verbal Consent Letter

Dear interviewee, I extend my greeting to you. I / we are here to collect health related data for the purpose of research from Addis Ababa University of Medical Faculty. The aim of this study is to assess the impact of latrine utilization on diarrhoeal disease in the rural community of Hulet Ejju Enessie district, East Gojjam Zone. We are requesting your permission to participate in an interview on issues related to the impact of latrine utilization on diarrhoeal disease.

This information will help the policy makers and other responsible bodies as background to improve the health status of the rural community related with proper utilization of latrines. We assure you that whatever information you provide will only be used for the purpose of this research and will not be made available to anyone outside of the research team.

Your willingness and support to respond the interview is very much appreciated. We also assure that the interview process will not bring any harm to you and your family. It is also your right to withdraw any time from the process when your feeling is uncomfortable with it.

Please make (X) mark to indicate the respondents' decision regarding participation in the study. The purpose of the study and confidentiality procedures has been explained to me and I on my own consent: a) Agree _____ b) Disagree _____

Interviewer name _____ Signature _____

Date of interview _____ Time started _____ Time completed _____

Result of interview: 1. Completed 2. Respondent not available
3. Refused 4. Incomplete

Checked by supervisor: Name _____ Signature _____ Date _____

Additional instructions to the Interviewers:

1. The interview will continue only after the respondent will agree on the consent
2. Fill the questionnaire only with pen
3. Circle the answer from the options of possible responses
4. Strictly follow the skipping pattern

Thank you!!

QUESTIONNAIRE FOR THE ASSESSMENT OF THE IMPACT OF LATRINE UTILIZATION ON DIARRHOEAL DISEASE

No	Questions	Possible responses	Skipping	Response Code
Socio Demographic Factors				
001.	How many family members do you have?	_____		
002	What is your religion?	1. Orthodox 99. Others/specify__ 2. Muslim		
003	What is your ethnicity	1. Amhara 3.Tigrie 2.Oromo 99. Others/specify__		
004	What is your education level (mother)?	1. Illiterate 2. Able read and write 3. If grade specify _____		
005	What is your children level of education? (write the numbers of children in the space provided)	1. Illiterate ____ 2. Able read and write ____ 3. primary(grade 1-8)____ 4.Secondary & above____		
006	Who is the head of the family?	1. Husband 2. Wife 99.Other/specify__	If wife skip to Q009	
007	What is your husband education level?	1. Illiterate 2. Able read and write 3. If grade specify _____		
008	If you have husband, What is your husband's job?	1. Farmer 2. Daily laborer 3. Merchant 99.Other/specify __		
009	What is your job (mother)?	1. Housewife 99 Other/specify_____ 2. Daily laborer 3. Farmer 4. "Tella"/alcohol seller		
010	Marital status of the mother?	1. Married 4. Widowed 2.Unmarried 5. Separated 3. Divorced		
Economic Indicator				
101	Do you have domestic animals?	1. Yes 2. No	If no, skip to Q103	
102	Which one of the following do you have? And how much?	1. Cattle____ 4. Donkey____ 2. Goat ____ 5. Hen ____ 3. Sheep____ 99. Other /specify __		
103	Which one of the following do you have? And how much (in sack) per	1. Food crops (teff, barley,wheat)____ _		

	year?	2. Corn (maize,sorgum) ___ ___ 3. Cereal (Beans, peas, 'Guaya') ___ ___ 99.Others/specify _____		
104	What is the size of land holding of the family?	Specify in Hectar/ 'Timad' _____		
105	Do you have other sources of income?	Specify in Birr/ year _____		
Excreta disposal system				
201	What type of latrine do you have?	1. pit latrine 2. VIP latrine 99. others/specify _____		
202	How many years since latrine is constructed	Specify in month/ year ___/___		
203	What are your reasons to construct latrines?	1. Advice from health workers 2. Self initiation 3. Seeing others 4. Imposition from others 99.Others/specify ___		
204	Is the latrine functional?	1. Yes 2. No		
205	What is the status of latrine?	1. Maintained 2. Need maintenance	If maintained, Skip to Q207	
206	Which parts of the latrine need maintenance?	1. Superstructure 2. Slab 3. Roof 4. Latrine pit 99. others/specify _____		
207	Do you have water well in the compound?	1. Yes 2. No	If no, skip to Q 210	
208	Where is the location of latrine from well (if only well is available)? (observation)	1. Downward 2. on the same level 3. Uphill		
209	How far is the distance between latrine and well?(in meters) (observation)	1. <15 2. 15-30 3. >30		
210	What is the condition of latrine superstructure (observation)?	1. No superstructure 2. Only with wood 3. Wood plastered with mud 99. Others/ specify _____		
211	Is the slab sealed with mud or cemented (observation)?	1. yes 2.No		
212	Does the squatting have cover (observation)?	1. yes 2.No		
213	Are there visible signs of flies in or around the latrine?	1. yes 2.No		
214	How close are hand-washing facilities to the latrine (Observation)?	1. next to the latrine 2. Within walking distance 3. inside the house 4.No facilities		
215	How far is the distance between the latrine and the house?	Specify in meters _____		
Utilization of latrines by family members above 5 years old				

301	Who uses the latrine?	1.Males only 2.Females only 3. All family members	If all, skip to Q 303	
302	If users are males or females only, why?	1.Both sexes do not share 2.Males can go for open defecation 3.Males stay out for work 4. No reason 99.Others/specify_____		
303	How frequently is the latrine used?	1.Rarely 2.Mostly 3.Always	If rarely, skip to Q305	
304	If latrine is used always, why?	1.Excreta are dangerous to health 2.Convenient/privacy 3.No other place to defecate 99. Others /specify_____		
305	If latrine is used rarely, why?	1. No superstructure 2. Bad smell 3. Open field is convenient 4. Stay out for work 99. Other/specify_____		
306	Does the track to the latrine indicate its being used or uncovered with grass (observation)?	1. yes 2.No		
307	Is there fresh faeces seen through the latrine squat hole (observation)?	1. yes 2.No		
308	Are there observable faeces in the compound?	1. yes 2.No		
Utilization of latrines by under 5 children				
401	Do you have under 5 children in the house?	1. Yes 2. No	If no, skip to the next house	
402	If the answer in Q 201 is yes, how many?	<u>Age group</u> M F 1. 0-5 months ___ ___ 2. 6-11 months ___ ___ 3. 12-23 months ___ ___ 4. 24-35 months ___ ___ 5. 36-47 months ___ ___ 6. 48-59 months ___ ___		
403	Do <5 children use latrine?	1. Yes 2. No	If yes skip to Q405	
404	At what age do children start using latrine?	_____years		
405	What are the reasons for not using the latrine by <5 children?	1.Floor not safe to stand on 2. Large squat hole 3. Latrine not clean 4. Unreasonable bad smell 99. Others/specify_____		
406	Where do you dispose faeces of children who do not start using latrines?	1. Left in the house 2. Disposal in the compound 3. Disposal out side the compound 4. Pit latrine disposal 99. Others/specify_____		
Health Indicators of <5 children				
501	Do your children affected with diarrhoea in the past two-weeks?	1. Yes 2. No	If no, skip to Q503	

502	Which age group affected?	<u>Age group</u> M F 1. 0-5 months ___ ___ 2. 6-11 months ___ ___ 3. 12-23 months ___ ___ 4. 24-35 months ___ ___ 5..36-47 months ___ ___ 6. 48-59 months ___ ___		
503	Do your <5 children vaccinated with measles?	1. Yes 2. No	If no, skip to Q505	
504	Which age group vaccinated with measles?	<u>Age group</u> M F 1 6-11 months ___ ___ 2. 12-23 months ___ ___ 3. 24-35 months ___ ___ 4..36-47 months ___ ___ 5. 48-59 months ___ ___		
505	Do your <5 children supplemented with Vitamin A?	1. Yes 2. No	If no, skip to Q601	
506	How many children supplemented with Vitamin A?	<u>Age group</u> M F 1 6-11 months ___ ___ 2. 12-23 months ___ ___ 3. 24-35 months ___ ___ 4..36-47 months ___ ___ 5. 48-59 months ___ ___		
Feeding practice of infants and children				
601	When did children start supplementary feeding?	1. Before 6 months 2. At 6 month 3. After 6 months		
602	How did you provide supplementary feeding to your children?	1. Bottle feeding 2. Cup feeding		
603	When infants did start breast feeding after delivery?	1. within 1 hour 2. After 1 hour		
604	Did you feed infants with colostrums of breast milk?	1. yes 2. No		
605	Which age groups were fed with colostrums of breast milk?	<u>Age group</u> M F 1. 0-5 months ___ ___ 2. 6-11 months ___ ___ 3. 12-23 months ___ ___ 4. 24-35 months ___ ___ 5..36-47 months ___ ___ 6. 48-59 months ___ ___		
Water supply				
701	What is the main source of water for the household?	1. Protected well /spring 2. Unprotected well/spring 3. River water 4. Rain water 5. Protected and unprotected		
702	How much minutes are needed to collect water (to go back and forth)?	1. <15 2. 15-30 3. 30 and more		
703	What is the volume of the container used to fetch water?	1. <5 liters 4. 16-20 liters 2. 5-10 liters 5. >20 liters		

		3. 11-15 liters		
704	How frequent do you fetch water each day for the family?	1. Once 3. Three times 2. Twice 4. >3 times		
705	How much water is consumed per day on average for the family?	In pots or 20 liters jerrican__		
Water storage at home				
801	What container is used for water storage at home (observation)?	1. Pot /bucket 3. Jerrican 2. Guard 99.others/specify	If no pot/bucket skip to Q804	
802	If the water storage container is pot, what about scooper or dipper?	1. Any 2. Separate	If any skip to Q804	
803	If scooper used is separate, is it clean?	1. Yes 2. No		
804	Is the container used for water storage of water at home clean (observation)?	1 Yes. 2. No		
805	Does the container used for storage of water have cover?(observation)	1 Yes. 2. No		
806	If the source of water is unprotected, how do they treat at home?	1.Used with no treatment 2.Settling for sometime 3.Used after boiling 99. Other/specify__		
Hand washing practices				
901	When do you wash your hand?	1.After defecation 2. After cleaning child's bottom 3.Before handling food 4.Before feeding children (including breast feeding) 99. other/specify__		
902	What do you usually use during hand washing especially after defecation, after cleaning child's bottom, before feeding children and before handling food?	1.Only water 2.With soap 99. Others/specify__		
903	What is the condition of the mother's fingernails? (observation)	1. Short trimmed 2.Clean but not short trimmed 3.Not clean and not short trimmed		
904	What do you usually use to wash the hands of children after they start feeding themselves?	1.Only water 2.With soap 3. do not wash		
Community Sanitation				
1001	Are you keeping domestic animals with you in the same house?(observation)	1. Yes 2. No	If yes, skip to Q1003	
1002	If the answer of Q801 is no, how far from the house (in meters)?(observation)	1. <10 2. 10 and above		
1003	If there is water well, how far is the distance between shelters of domestic animal from water well (in meters)? (observation)	1. <100 2. 100 and above	Skip if no water well	
1004	Where do you dispose	1. Open field 3. Burning		

	house hold/solid wastes?	2. Dumping 4.composting 99. Other /specify__		
1005	Are there observable faeces in the neighborhood yard (observation)?	1. Yes 2. No		

Thank you!

Annex II: Amharic questionnaire

የቤቱ መስፍ ኮድ _____

የቀበሌ ገበሬ ማህበረ ሥሞ _____

በመጠቀሚያ ቤት አጠቃቀም ምክንያት በተቀማጭ በሽታ ሳይ የሚመጣውን ፍጹድ ሰማጥናት የተዘጋጁ መጠደቅ

ቃሰ መጠደቅን ከማድረግ በፊት የተሳተፈዎቻችሁ ፈቃደኝነት መጠየቅ ቅጽ

ጤና ደስጥሰኝ፤ እኔ _____ አባላቸው። እዚህ የመጣሁት ደህንን ጥናት በሚያካሂደው የአዲስ አበባ ዩኒቨርሲቲ ሕክምና ፍካራት የሕብረተሰብ ጤና ትምህርት ክፍል ቡድን አባል ሆኜ ነው። የዚህ ጥናት ዋና ዓላማ በቤት ስጦት ስጦት እንዲ ወረዳ የገጠረ ነዋሪ የሰራውን መጠቀሚያ ቤት በትክክል በመጠቀሙ ወይም ባለመጠቀሙ በተቀማጭ በሽታ ሳይ ያመጣውን ፍጹድ ሰማጥናት የተዘጋጁ ነው። በመሆኑም ደህንን መረጃ ሰማጥናት ቤት ስቤት መጠደቅ በማካሄድ ሳይ እንገኛለን።

ደህ ጥናት ሲጠናቀቅ የህብረተሰቡን ጤና ሰማሻሻል በሚደረገው ጥረት ከፍተኛ እገዛ ደኖረዎልኩ። በጥናቱ የምናሳትፍዎት የእርስዎን ሙሉ ፈቃደኝነት ስናገኝ ብቻ ነው። ከእርስዎ የምናገኘውን ማንኛውንም መሰከር በሚሰማህር እንጠብቃለን። ስለሙሉ ፈቃደኝነትዎና ስለሚያደርጉት ድጋፍ ሁሉ ከፍተኛ ምስጋና እያቀረብን፤ ከሁሉም በላይ ደህ ጥናት በእርስዎና በህብረተሰብዎ ሳይ ምንም ዓይነት ጉዳት እንደማያስከትል ማረጋገጥ እወደዳለሁ ። በወይምም ጊዜ የማይሰማማዎ ነገር ካለ የማቋረጥ መብትዎ በማንኛውም ሰዓት የተጠበቀ ነው።

የጥናቱ ዓላማና ተግባር ከተብራራልኝ በኋላ ጥያቄውን ሰማሰተናገድ ተጠደቁ :-

ሀ. ተስማምቻለሁ ለ. አልተስማማሁም

የጠያቂው ስምና ፊርማ _____

መጠደቅ የተሞላበት ቀን _____ የተጀመረበት ወጣት _____ የተጠናቀቀበት ወጣት _____

- ውጤት: - 1. ተሟልቷል 2. ተጠያቂው አልተገኘም
3. ተቃውሞ 4. በከፊል ተሞልቷል

የአረጋገጠው ሱፐርቫይዘር ስም _____ ፊርማ _____ ቀን _____

መጠደቅ አቅራቢዎች በተወሰኑ ሰዓቶች የሚገባ መመሪያ፤

1. ወይምም ሰዓታት የሚገባው ተጠያቂዎች መጠደቅን ሰማካሂድ ከተስማሙ ብቻ ይሆናል
2. መጠደቅ የሚሞላው በእስክርቤት ብቻ ይሆናል
3. በሚሰጠው መሰከር መሰረት በተገቢው መሰከር የምርጫ መሰከርን ማክበብ

4. መታሰብ ያስባቸውን ጥያቄዎች በትክክል ማሰባዎን ማረጋገጥ

5. መጠደቃ የሚመለከታቸው የመጠደቃ ቤት ካላቸው ቤተሰቦች ውስጥ ከ18 ዓመት ልዩሚ በላይ ያሉ የቤተሰቡ ተጠሪ የሆኑ ስኅተት ወይም ሴቶች ሲሆኑ ይገባሉ።

አመሰግናለሁ!!

ተ.ቁ	ጥያቄዎች	አማራጭ መሰሪያ	ደረጃ	የመሰረተ ድጋግ
የማህበራዊና የሥነ-ሕዝብ ገጽታዎች				
001	የቤተሰብ አባላት ብዛት			
002	በይማኖትዎ ምንድነው?	1. ኦርቶዶክስ 2. ሙስሊም 99. ሲሳ/ደጠቀስ		
003	ብሄረሰብዎ ምንድነው?	1. አማራ 3. ትግሬ 2. ኦሮሞ 99. ሲሳ/ደጠቀስ		
004	የትምህርት ደረጃዎ?	1. ያስተማሪ 2. ማኅበብ መጻፍ 99. መደበኛ ትምህርት/ክፍሉ ደጠቀስ		
005	የሰጠዎት የትምህርት ደረጃ? (ብዛታቸው በተሰጠው ቦታ ሳይደጠቀስ)	1. ያስተማሪ _____ 2. ማኅበብ መጻፍ _____ 3. የመጻጠሪያ ደረጃ(1-8) _____ 4. ጊዥ ደረጃና ክዚያ በላይ _____		
006	የቤቱ ኃላፊ/አስተዳዳሪ ማን ነው?	1. አባት 2. ስኅተት 99. ሲሳ/ደጠቀስ	ስኅተት ከሆኑ ወደ ጥያቄ 009 ይሰጡ	
007	የባለቤትዎ የትምህርት ደረጃ?	1. ያስተማሪ 2. ማኅበብ መጻፍ 99. መደበኛ ትምህርት/ክፍሉ ደጠቀስ		
008	የባለቤትዎ ሥራ ምንድነው?	1. ግብርና 2. የቀን ሥራ 3. ንግድ 99. ሲሳ/ደጠቀስ		
009	ሥራዎት ምንድነው?	1. የቤት ስመቤት 2. የቀን ሥራ 3. ግብርና 99. ሲሳ/ደጠቀስ 4. ጠላት ሲሳ መጠጥ በመሸጥ		
010	የጋብቻ ሁኔታ?	1. ያገቡ 4. ባለ የሞተባት 2. ያላገቡ 5. ተስደደተው የሚኖሩ 3. የፊት		
ስነ-ምግባራዊ ገጽታዎች				
101	የቤት ስንሰሳት ስሟቸው?	1. ስዎ 2. የሰዎ	ከሲስ ወደ ጥያቄ 103 ይሰጡ	
102	የትኞቹ የቤት ስንሰሳቶች ስሟቸው? (በቁጥር ይገልጹ)	1. ክብት 2. ፍየሰ 3. በግ 4. ስህያ 5. ዳሮ 99. ሲሳ/ደጠቀስ		
103	በዓመት ውስጥ ምን ያህል የሰላምና ጥራጥራ ምርት ታመርታላቸው? (በኩንታል ይገልጹ)	1. ስህል (ጠፍ፤ገብ፤ጠፍ፤ጠፍ) _____ 2. በቆሎ፤ማሸላ _____ 3. ጥራጥራ (ባቁላ፤ጠፍ፤ጠፍ፤ጠፍ) _____ 99. ሲሳ/ደጠቀስ		
104	የመሬት ደብታ መጠን ምን ያህል ነው?	_____ ጥማድ		
105	ሲሳ የገቢ ምንጭ ካስ ምን ያህል ነው?	_____ ብር/ በዓመት		
የመጠደቃ ቤት ሁኔታ				
201	የመጠደቃ ቤቱ ዓይነት ምንድነው?	1. የተሰጠ 2. ሽታ ስልባ 99. ሲሳ ካስ ደጠቀስ		
202	መጠደቃ ቤቱ ከተሰራ ምን ያህል ጊዜ ሆነው?	_____ ዓመት ከ _____ ወራት		
203	መጠደቃ ቤት ስመስራት ያነሳላቸው ምክንያት ምንድነው?	1. ከጤና ባስጠጥዎቻቸው በመሰማት 2. በራሱ ተነሳሽነት 3. ሲሳውን በማየት 4. በቀጠሎ በመገደድ 5. የጉዳዩ ክዳን ስለተሰጠን 99. ሲሳ/ደጠቀስ		
204	መጠደቃ ቤቱ ስገልግሎት መስጠት ይችላል? (ስደታ)	1. ስዎ 2. ስይችሉም		

205	የመጠቀሚያ ቤቱ ሁኔታ ምን ይመስላል?	1. ጥገና የሚያስፈልገው 2. ጥገና የሚያስፈልገው	ጥገና የሚያስፈልገው ከሆነ ወደ ጥያቄ 207 ይሰጥ
206	ጥገና የሚያስፈልገው የመጠቀሚያ ቤቱ ክፍል የትኛው ነው?	1. ክፍሉ 2. ወሰኑ 3. ጣርያው 4. ጉድጓዱ 99. ስላ/ደጠቀስ _____	
207	የወ.ሃ ጉድጓድ ስለምት?	1. ስሞ 2. የሰሞ	ክስስ ወደ ጥያቄ 210 ይሰጥ
208	የመጠቀሚያ ቤቱ ስቀማመጥ ከወ.ሃ ጉድጓዱ ምን ይመስላል? (ስደታ)	1. በዝቅተኛ ቦታ ላይ 2. በተመሳሳይ ክፍታ ላይ 3. በክፍታ ቦታ ላይ	
209	የመጠቀሚያ ቤቱ ከወ.ሃው ጉድጓድ ያለው ርቀት በሚትር ምን ያህል ነው?(ስደታ)	1. <15 2. 15-30 3. ከ30 በላይ	
210	የመጠቀሚያ ቤቱ ክስስ የተሰፈፈ ከምንድነው? (ስደታ)	1. የሰሞ 2. ክስስ/ወሰን ብቻ 3. በክስስ/ወሰን በሞቃ 99. ስላ/ደጠቀስ _____	
211	የመጠቀሚያ ቤቱ ወሰን በሚገኝ/ በሞቃ የተሰሰ ነው? (ስደታ)	1. ስሞ 2. ስደደሰም	
212	የመጠቀሚያ ቤቱ መቀመጫ ቀዳዳ ክዳን ስለው?(ስደታ)	1. ስለው 2. የሰሞ	
213	በመጠቀሚያ ቤት ውስጥ ዙሪያ የሚታዩ ዝንቦች ስሎን?	1. ስሞ 2. የሰሞ	
214	የሰጡ መታጠቢያ ስቃይ ከመጠቀሚያ ቤቱ ያለው ስቀማመጥ ምን ይመስላል? (ስደታ)	1. ከመጠቀሚያ ቤቱ ጋር የተያያዘ 2. ወደ መጠቀሚያ ቤቱ በሚወስደው መንገድ 3. በቤት ውስጥ 4. የሰሞ	
215	መጠቀሚያ ቤቱ ከመኖሪያ ቤት ያለው ርቀት ምን ያህል ነው?	_____ ሚትር	
ከ5 ዓመት ስደታ በላይ ስለሆኑ የመጠቀሚያ ቤት ስጠቃቀም			
301	ከቤተሰቡ ስባሳት መጠቀሚያ ቤት የሚጠቀሙ ስነሚናቸው?	1. ወንዶች ብቻ 2. ሴቶች ብቻ 3. ሁሉም የቤተሰብ ስባሳት	ሁሉም የሚጠቀሙ ከሆነ ወደ ጥያቄ 303 ይሰጥ
302	መጠቀሚያ ቤቱን የሚጠቀሙ ወንዶች ወይም ሴቶች ብቻ ከሆኑ ምክንያቱ ምንድነው?	1. ሴቶችና ወንዶች የመጠቀሚያ ክፍሉን ስለሚይዙ 2. ወንዶች ወይም መጠቀሚያ ስለሚፈልጉ 3. ወንዶች ስሞ በወጡበት ስለሚይዙ 98. ምክንያት የሰሞ 99. ስላ/ደጠቀስ _____	
303	መጠቀሚያ ቤቱን በየሰዓት ጊዜው ትጠቀሙበታላችሁ?	1. ስለጤ ስለጤ 2. በሰብዓዊው 3. ሁሉ ጊዜ	መሰሉ ስለጤ ስለጤ ከሆነ ወደ ጥያቄ 305 ይሰጥ
304	መጠቀሚያ ቤቱን ሁሉ ጊዜ የሚጠቀሙ ከሆነ ምክንያቱ ምንድነው?	1. ወገራ ስጠኛ ስደገኛ በመሆኑ 2. ክስሳ ስላለው 3. ስላ ስለመጠቀሚያ የሚሆን ቦታ ስለሌለ 4. ስሎች ስሞ ስጠቀሙ በማየት 98. ምንም ምክንያት የሰሞ 99. ስላ/ደጠቀስ _____	
305	መጠቀሚያ ቤቱን ስለጤ ስለጤ የሚጠቀሙ ከሆነ ምክንያቱ ምንድነው?	1. ክስሳ ስለሌለው 2. መኖሪያ ሸታ ስላለው 3. ሚዳ መጠቀሚያ ስለሚያስደስት 4. ስሞ ሚዳ ስለሚሞላ 98. ምንም ምክንያት የሰሞ 99. ስላ/ደጠቀስ _____	
306	ወደ መጠቀሚያ ቤት የሚወስደው መንገድ በላይ የተሸፈነ ነው? (ስደታ)	1. ስሞ 2. ስደደሰም	
307	መጠቀሚያ ቤቱን ስለመጠቀሚያ ስሚረጋገጥ በጉድጓዱ ውስጥ ትኩስ/የክስስ ወገራ ይታያል? (ስደታ)	1. ስሞ 2. ስደታደም	
308	በግቢ ውስጥ ሰገራ ይታያል? (ስደታ)	1. ስሞ 2. ስደታደም	
ከ5 ዓመት በታች ያሉ ህፃናት የመጠቀሚያ ቤት ስጠቃቀም			
401	ከ5 ዓመት በታች ህፃናት ስሎ?	1. ስሎ 2. የሰሞ	ክስሎ ወደሚቀጥለው ቤት ይሰጥ
402	የህፃናት ብዛት በስደታ ክስስ ይጠቀስ	የስደታ ክስስ ወይ ሲ 1. 0-5 ወራት — — 2. 6-11 ወራት — — 3. 12-23 ወራት — —	

		4. 24-35 ወራት 5. 36-47 ወራት 6. 48-59 ወራት		
403	ከ5 ዓመት በታች ያሉ ህፃናት መጠቀሚያ ቤት ደጠቀሙን?	1. አዎ 2. አይደለም	የመጠቀሚያ ክፍያ ወይንም ሌላ ወጪ	የመጠቀሚያ ክፍያ ከ15 ወይንም ሌላ ወጪ 405 ደብዳቤ
404	ሰዎች መጠቀሚያ ቤት መጠቀም የሚጀምሩት በየትኛው የሰዎች ክፍል ነው?	_____ በዓመት		
405	ሰዎች መጠቀሚያ ቤት የመጠቀሚያ ቤት ምክንያት ምንድነው?	1. ወሰን ስሜት ስለመጣ 2. ቀዳሚያ ስሜት ስለመጣ 3. ንጹህ ስለመጣ 4. መጠቀሚያ ቤት ስለመጣ 99. ሌላ/ደጠቀሰ _____		
406	መጠቀሚያ ቤት መጠቀም ያልጀመሩ ሰዎችን ሠገራ ስንዴት ታስባዎታል?	1. መጠቀሚያ ቤት ወይንም ሌላ 2. መጠቀሚያ ቤት ስሜት ስለመጣ 3. ከመጠቀሚያ ቤት ወይንም ሌላ የትም ቦታ 99. ሌላ/ደጠቀሰ _____		
ከ5 ዓመት በታች የህፃናት የጤና ሁኔታ				
501	ባሕሪ ሁኔታ ለሰዎች ስምንታት ወይንም በተቀማጭ የተጠቀሱ ከ5 ዓመት በታች ህፃናት ነበሩ?	1. አዎ 2. የሌላ		ከሌላ ወይንም ሌላ ወጪ 503 ደብዳቤ
502	በተቀማጭ የተጠቀሱ ህፃናት ብዛት በሰዎች ክፍል ደጠቀሰ	የሰዎች ክፍል _____ ወይንም _____ 1. 0-5 ወራት _____ 2. 6-11 ወራት _____ 3. 12-23 ወራት _____ 4. 24-35 ወራት _____ 5. 36-47 ወራት _____ 6. 48-59 ወራት _____		
503	የሚዘጋጁ (የአንድራሽ) ክትትል የወሰዱ ህፃናት ስሜት ወይንም?	1. አዎ 2. የሌላ		ከሌላ ወይንም ሌላ ወጪ 505 ደብዳቤ
504	የሚዘጋጁ (የአንድራሽ) ክትትል የወሰዱ ህፃናት ብዛት በሰዎች ክፍል ደጠቀሰ	የሰዎች ክፍል _____ ወይንም _____ 1. 6-11 ወራት _____ 2. 12-23 ወራት _____ 3. 24-35 ወራት _____ 4. 36-47 ወራት _____ 5. 48-59 ወራት _____		
505	የሚዘጋጁ ስሜት ስንክብር በባሕሪ 4-6 ወራት ወይንም የወሰዱ ህፃናት ነበሩ ወይንም?	1. አዎ 2. የሌላ		ከሌላ ወይንም ሌላ ወጪ 601 ደብዳቤ
506	የሚዘጋጁ ስሜት ስንክብር በባሕሪ 4-6 ወራት ወይንም የወሰዱ ህፃናት ብዛት በሰዎች ክፍል ደጠቀሰ	የሰዎች ክፍል _____ ወይንም _____ 1. 6-11 ወራት _____ 2. 12-23 ወራት _____ 3. 24-35 ወራት _____ 4. 36-47 ወራት _____ 5. 48-59 ወራት _____		
የህፃናት ስሜት የአመጋገብ ሁኔታ				
601	ህፃናት ተጨማሪ ምግብ (ወይንም ጨምሮ) የሚጀምሩት መቼ ነው?	1. ከ 6 ወራት በፊት 2. በ 6 ኛው ወር 3. ከ 6 ወራት በኋላ		
602	ህፃናት ተጨማሪ ምግብ የሚመገቡበት ዕቃ ምንድነው?	1. ጠጥ 2. በሰዎች/በኩባዎ 99. ሌላ/ደጠቀሰ _____		
603	ህፃናት ከተወለዱ በኋላ የሰዎች ጡት መጥባት የሚጀምሩት መቼ ነው?	1. ስከር 1 ሰዓት 2. ከ 1 ሰዓት በኋላ		
604	በጣ የሚመስሉ የሰዎች ጡት ወተት(ስንገር) ስህፃናቶች ስንክብር ያወጡ ወይንም?	1. አዎ 2. የሌላ		

605	እንገር አጥብተው ከሆነ ሰዩትዎቹ ህፃናት እንደሆነ ብዛታቸው በአድሚኒስትሬሽን ደብዳቤ	የሰዳሚ ክፍል 1. 0-5 ወራት 2. 6-11 ወራት 3. 12-23 ወራት 4. 24-35 ወራት 5. 36-47 ወራት 6. 48-59 ወራት	— — — — — — — — — — — —	
የዉሃ ስቅርቦት መረጃ				
701	በአብዛኛው ሰባት አገልግሎት የሚዉሰድ ዉሃ ክፍት ታገኛላችሁ?	1. ከተጠበቀ ምንጭ / ጉድጓድ 2. ካስተጠበቀ ምንጭ / ጉድጓድ 3. ከሠንዝ 4. ከተጠበቀም ካስተጠበቀም		
702	በአንድ ጊዜ ደርሶ መሰስ ዉሃ ስማምጣት ምን ያህል ደቁቃ ደሠሰዳል?	1. <15 2. 15-30 3. 30 ና ከዚያ በላይ		
703	በአንድ ጊዜ ደርሶ መሰስ የሚቀዳው የዉሃ መጠን በአማካይ በሲትር ምን ያህል ነው?	1.<5 2.5-10 3.11-15 4.16-20 5. >20		
704	በቀን ስንት ጊዜ ሰባት አገልግሎት የሚዉሰድ ዉሃ ደቀዳል?	1.አንድ ጊዜ 2. ሁለት ጊዜ 3.ሦስት ጊዜ 4.አምስት ጊዜ በላይ		
705	የቤተሰቡ የቀን የዉሃ ፍጆታ በአማካይ ምን ያህል ነው?	_____ እንስራ/20 ሲትር ጃራካን		
በቤት ዉስጥ የዉሃ ስጠባበቅ				
801	የቤት ዉስጥ የዉሃ ማጠራቀሚያ ስቃ ምንድነዉ?(ስደታ)	1. እንሥራ/ባሰዳ 2. ቀጠ 3. ጃራካን 99. ሲሳ/ደገስል _____		እንስራ/ባሰዳ ካሰሆነ ወደ ጥያቄ804 የሰፍ
802	የዉሃ ማጠራቀሚያዉ እንሥራ ከሆነ ዉሃ የሚጠሰቅበት ስቃ ምንድነዉ? (ስደታ)	1. በማንኛዉም ስቃ 2. በተሰየ ስቃ		
803	ዉሃ የሚጠሰቅበት ስቃ ንጋህና የተጠበቀ ነዉ? (ስደታ)	1. አዎ 2. አይደለም		
804	የዉሃ ማጠራቀሚያዉ ስቃ ንጋህና የተጠበቀ ነዉ?(ስደታ)	1.አዎ 2. አይደለም		
805	የዉሃ ማጠራቀሚያዉ ስቃ ክዳን ስሰዉ?(ስደታ)	1.አዎ 2. የሰዉም		
806	ዉሃዉ የተገኘዉ ንጋህናዉ ካስተጠበቀ ከሆነ በቤት ዉስጥ ዉሃዉን እንዴት በማከም/በማጣራት ደጠቀሙበታል?	1. ያለምንም ህክምና 2. ዉሃዉ ስስከሰከን በማቆየት 3. ስፍሰት በማቀዝቀዝ 99. ሲሳ/ ደጠቀስ _____		
የስጅ ንጋህና ስጠባበቅ				
901	ስጅዎትን መቼ መቼ ይታጠባሉ?	1.መጠቀሚያ ቤት ከተጠቀሙ በኋላ 2.ሰዳሚ ካጠቀሙ በኋላ 3.ምግብ ከማዘጋጀት በፊት 4.ህፃናትን ከመመገብ/ከማጥባት በፊት 99. ሲሳ ካስ ደገስል _____		
902	መጠቀሚያ ቤት ከተጠቀሙ በኋላ፤ ሰዳሚ ካጠቀሙ በኋላ፤ ምግብ ከማዘጋጀትም በፊትና ሰዳሚ ካጠቀሙ በፊት ስጅዎትን በምን ይታጠባሉ?	1. በዉሃ ብቻ 2. በሳሙና 3. በአመድ 99.በሲሳ ካስ ደገስል _____		
903	የስጅ የስጅ ጥፍር ሁኔታ ምን ደመሰሳል?(ስደታ)	1. የተቆረጠ 2. ንጋህ ሆኖ ያስተቆረጠ 3. ንጋህና የሲሰዉና ያስተቆረጠ		
904	ስጅዎ በራሱ መመገብ ከሚጠራበት ጊዜ ጀምሮ የሰዳሚ ስጅ ከመመገቡ በፊት በምን ያጥቡታል?	1. በዉሃ ብቻ 2. በሳሙና/በአመድ 3. ስደታጠብም		
የስክላሊ ንጋህና ስጠባበቅ				
1001	የቤት እንስሳት በሰዉ መኖሪያ ቤት ዉስጥ ይኖራሉን?	1.አዎ 2.አይኖሩም		መሰሉ ስዎ ከሆነ ወደ ጥያቄ 1003 ደሰፍ
1002	የጥያቄ 1001 መሰሉ ስደኖራም ከሆነ ከመኖሪያ ቤት ያሰዉ ርቀት በሚትር ምን ያህል ነዉ? (ስደታ)	1.<10 2.10 ና ከዚያ በላይ		
1003	የእንስሳት መኖሪያ ከዉሃ ጉድጓድ ያሰዉ ርቀት በሚትር ምን ያህል ነዉ? (ስደታ)	1.<100 2.100 ና ከዚያ በላይ		የዉሃ ጉድጓድ ከሲስ ይታሰፍ
1004	የቤት ዉስጥ ቅሻሻን እንዴት ታስወግዳላችሁ?	1. የትም ቦታ መጣል 2. መቅበር 3. ማቃጠል 99. ሲሳ ካስ ደገስል _____		
1005	በጎረቤት ግቢ ዉስጥ የሚታደ ሠገራ/ሲሳ ቅሻሻ ስሰን? (ስደታ)	1. አዎ 2. የሰም		

