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Assessment of Water Handling and Sanitation Practices Among Rural Communities of Farta Woreda, Northwest Ethiopia

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Abstract: Worldwide, 663 million people do not have access to improved drinking water supplies and 2.5 billion people lack access to improved sanitation including one billion who practice open defecation. Eighty-eight percent of deaths from diarrheal diseases are attributable to unsafe water, inadequate sanitation, and insufficient hygiene practices. So this study is aimed at assessing water handling and sanitation practice among rural communities of Farta woreda, North West Ethiopia. A community based cross-sectional study was conducted in Farta Woreda in March 2014. A total of 834 households were proportionally allocated to 10 kebeles of the Woreda and selected by systematic random sampling technique. Data was collected using a pretested structured questionnaire. Descriptive analysis was performed to obtain the frequency distribution of the variables. The majority of respondents used unprotected spring 313 (37.5%) followed by protected spring 206 (24.7%) for all domestic use. Most respondents 382 (92.5%) had covered their stored water and practiced pouring method to withdraw water from the stored container. Majority 738 (88.5%) of households had access to water within a time of 30 minutes or less. House hold water treatment was not common in the study area, only 23 (2.8%) households practiced. About four hundred seventy eight (57.3%) households had latrine facility, of which 263 (55%) was open pit latrine. Of those households having latrine only 102 (21.3%) households had hand washing facility. This study revealed that most of the respondents had poor water handling and sanitation practice. Thus, it underscores that there should be great attention.

Keywords: Water Handling, Sanitation, Ethiopia, Rural Community

1. Introduction

Access to safe water alone does not reduce diarrheal diseases significantly. Even if the source is safe, water become faecally contaminated during collection, transportation, storage and drawing in the home. Water and sanitation are among the most important determinants of public health and an adequate supply of clean water is one of the most basic human needs and one that must be met [1].

Sanitation practices have a major effect on community and household water issues. In most rural communities, the use of on-site sanitation is a common tradition, which is not hygienic for health. As a result of this, there is a growing concern that the wide spread use of on-site sanitation systems will cause sub-surface migration of contaminants, ultimately resulting in disease transmission and environmental degradation. Surface waters such as rivers and ponds undergo such degradation as they are subject to biological and chemical contamination [2].

About 2.4 billion people lack access to improved sanitation including one billion who practice open defecation. Moreover, nearly 1 in 4 people in developing countries were practicing open defecation [3]. Approximately eighty-eight per cent of cases of diarrhea worldwide are attributable to unsafe water, inadequate sanitation or insufficient hygiene. The proportion of population in rural areas with access to safe drinking water and sanitary latrines has a direct impact on the health of the masses [4].

Water sources and improper water handling practices constitute the socio risk factors of waterborne infectious

diseases. In addition to water sources, water collection, water storage in appropriate vessel and point-of-use treatment have been shown to greatly reduce diarrhoea generally and cholera specifically [5, 6].

Ethiopia has the lowest water supply and sanitation coverage. According to data from WHO and UNICEF estimated in 2008 only 38% of total population had access for improved water supply (98% for urban areas and 26% for rural areas), 12% had access for improved sanitation (29% in urban areas, 8% in rural areas) [7].

People living in rural communities are the population sector most affected by hydro-transmissible infectious pathogen agents. Therefore, controlling of water quality is one of the essential issues of drinking water management [8, 9]. There for the objective of this study was to assess water handling and sanitation practice among rural community.

2. Methods and Materials

2.1. Study Area

The study was conducted in Farta Woreda which is one of the 12 Woredas found in South Gonder zone, Amhara regional state of Ethiopia. The Woreda consists of 2 urban kebeles and 41 peasant associations (PAs). According to 2007 national housing and population census the projected estimated population of the Woreda for the year 2013/14 was 281,279. Agriculture is the main livelihood of the population, with potato, barley, teff, wheat, maiz, guya, bean, are the main crops cultivated in the Woreda. There are 10 health centers and 54 health posts providing health service for the Woreda population. According to 2013/14 report of Farta Woreda health office, the woreda had 88.4% & 85.2% health service and latrine utilization coverage respectively. The same year report of Farta Woreda water resource office showed that the Woreda had 1020 functional improved drinking water sources which includes 203 protected springs, 791 protected hand pumps dug well and 26 hand dug well. All these contribute 75.7% of improved water supply access in the Woreda.

2.2. Study Design

A community based cross- sectional study was conducted using interviewer-administered questionnaire in March 2014.

2.3. Source Population

All households found in 41 rural kebeles of Farta Woreda

2.4. Study Population

Selected households found in 10 rural kebeles of Farta Woreda

2.5. Inclusion and Exclusion Criteria

Respondents lived at least for 6 month in the study area were included and respondents who were critically ill and other mental problems that prevents to get the required information were excluded from the study

2.6. Study Variables

Household water handling and Sanitation practice, age, education, occupation and marital status of the respondent, family size, type, ownership and availability of latrine, hand washing facility of latrine, water source, distance from house to water source, daily water consumption, ways of refuse disposal, types of floor and roof construction material and number of rooms, Latrine utilization, hand washing practice were variables included in the study.

2.7. Sample Size Determination

The total sample size included in the study was calculated by using Epi Info window version 3.5.3 statistical software manufactured by Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia (USA). A single population proportion formula used by considering 95% confidence level, Proportion of households covered their storage container from previous study was 52% (0.52), margin of error 5%, design effect of 2 and 10% non response rate give the total sample of 834 HHs.

2.8. Sampling Procedures

Multi-stage sampling technique was used. Ten rural kebeles were selected randomly by lottery method from 41 rural kebeles of the Woreda and included in the study. After allocating the sample in to each kebele proportionally 834 households were selected by using systematic random sampling technique (every other household).

2.9. Data Collection Tools and Procedures

Data was collected using pretested structured questionnaire and observational check list. The questionnaire had three parts that was designed to cover socio-economic and demographic status, home and environmental health conditions and behavioral aspects of respondents. The questions were developed after reviewing of relevant literature and in addition to literature questions regarding to environmental factors were adapted from WHO core questions for drinking water and sanitation facilities. Respondents for the administered questionnaire were females that had lived in the household for the preceding six months. Ten data collectors, who completed 12th grades and two diploma environmental health professionals as supervisors were recruited for the whole data collection process. The interviewers physically observed the condition of house hold water handling practices and utilization of sanitation facilities. The supervisors were fully responsible to lead and handle the whole session of data collection process along with the principal investigator.

2.10. Data Quality Management and Analysis

Two days training of data collectors and supervisors on sampling procedures, techniques of interviews and data

collection process was performed. In addition the data collectors and supervisors were participated in pre-testing of the questionnaire for its understandability by 5% of sample size in another kebele with the same level in every aspects of basic infrastructure and socio-demographic characteristics in the study area which were not included in the study and the result of the pretest was used to correct some unclear ideas and statements. During data collection the supervisors and principal investigator had closely followed the day-to-day data collection process and ensure completeness and consistency of questionnaire administered each day. After data collection the collected information was rechecked for its completeness and consistency by the supervisors and principal investigators before transferring in to computer software. Non over lapping numerical code was given for each question and the coded data was entered and cleaned into Epi Info soft ware Version 3.5.3 by doing simple frequency and cross tabulation and transformed to SPSS version 20. Descriptive statistic including proportion, mean and standard deviations were performed to describe the sample population in relation to relevant variables.

2.11. Operational Definitions

Improved water sources: includes Piped water into dwelling, Piped water to yard/plot, Tube well or borehole, Public standpipes, protected dug wells, protected springs and Rainwater. “Improved” source is one that is likely to provide "safe" water [10].

Improved sanitation facilities: includes flush toilet, piped sewer system, septic tank, ventilated improved pit latrine (VIP), pit latrine with slab, composting toilet [10].

Proper hand washing facility: household having functional hand washing facility with water in the container and moisture under the container.

High contamination risk in household water handling practices: is the sanitary risk score of 8-10 from the total 12 questions which is used to measure household water handling practice [11]

Medium contamination risk in household water handling practices: is the sanitary risk score of 5-7 from the total 12 questions which is used to measure household water handling practice [11]

Low contamination risk in household water handling practices: is the sanitary risk score of 2-4 from the total 12 questions which is used to measure household water handling practice [11]

Proper latrine utilization: households with functional latrines and at least no observable faeces in the compound, observable fresh faeces through the squat hole and the foot-path to the latrine were uncovered with grasses.

Good hand washing practice: hand washing practices at least three times out of five critical times of hand washing practice.

Proper refuse disposals a way of disposal which included, burning, burying in a pit or storing in a container and disposing in designed site.

3. Results and Discussion

3.1. Socio-demographic and Economic Characteristics of the Respondents

The majority 793 (95.1%) of the respondents were females, Married 781 (93.6%), Illiterate 547 (65.6), Orthodox in religion (99.8%) and Amhara (100%) in ethnicity. The mean (±SD) ages of the respondents were 31 (±7) years. Seven hundred twenty six (87.1%) respondents were farmers. The mean household family size of the study population was 5 (±2) persons. Five hundred eight (60.1%) households had five or more persons in their families (Table 1).

Table 1. *Socio demographic characteristics of the respondents in Farta Woreda, Northwest Ethiopia, March , 2014 (n=834).*

Characteristics	Frequency	Percent
Sex		
Female	793	95.1
Male	41	4.9
Age of respondents		
15-24	141	16.9
25-34	428	51.3
>34	265	31.8
Marital status of respondent		
Married	781	93.6
Divorced	28	3.4
Others[a]	25	2.9
Educational level of respondent		
Illiterate	547	65.6
Can read and write	144	17.3
Primary school	105	12.6
Secondary school and above	38	4.6
Occupation of respondent		
Farmer	726	87.1
Government employee	6	0.7
Merchant	14	1.7
Daily laborer	88	10.6
Religion		
Orthodox	832	99.8
Muslim	2	0.2
Family size		
≤4	326	39.1
≥5	508	60.9

a = single and widowed

3.2. Water Source and Household Water Handling Practice

The major source of water supply for the study household were Unprotected spring 313 (37.5%) followed by protected spring 206 (24.7%) and contributes 449 (53.8%) improved water supply access of study households. This is consistent with a study conducted in rural Dire Dawa communities, Ethiopia [12]. The majority of households 738 (88.5%) required less than 30 minutes to fetch drinking water and the mean per capita daily water consumption of the households was 10.2 (±4.4) liters. Of the total 834 households, 121 (14.5%), 146 (17.5%) and 567 (68%) households were at high, medium and low contamination risk in household water handling practices respectively.

3.3. Water Handling Practice Related to Water Collection

Adult women 639 (76.6%) followed by 160 (19.2%) female child (under 15 years) were responsible for the collection of water for domestic use. The study revealed that the most 789 (94.6%) commonly preferred type of water collection container was Jerrican. This finding is in agreement with similar study done in Dire Dawa rural communities and Kolladiba Town [13, 12]. From the total respondents, the majority 579 (64.4%) and 743 (89.1%) were clean their container and wash their hands before collection of water respectively. In addition, majority 793 (95.1%) of the respondents were cover the collection container during transportation.

Table 2. *Water source and water collection practice among households in rural kebeles of Farta Woreda, Northwest Ethiopia, March , 2014.*

Characteristics	Frequency	Percent
Source of drinking water		
Public tap/stand pipe	68	8.2
Protected hand dug well	172	20.6
protected spring	206	24.7
Unprotected dug well	58	7.0
Unprotected spring	313	37.5
surface water (river, lake, dam)	17	2.0
Time taken to obtain drinking water (round trip)		
<30min	738	88.5
>=30min	96	11.5
Person who collect drinking water		
Adult woman	639	76.6
Adult man	16	1.9
Female child (under 15 years)	160	19.2
Male child (under 15 years)	19	2.3
Water collection container		
Clay Pot	29	3.5
Plastic bucket	7	0.8
Iron bucket	9	1.1
Jerrycan	789	94.6
Hand washing before water collection		
Yes	579	69.4
No	255	30.6
Collection container rinsing or washing		
Yes	743	89.1
No	91	10.9
Covering of water collection container		
Yes	793	95.1
No	41	4.9

3.4. Water Handling Practice Related to Household Water Storage

Four hundred ninety five (59.4%) of the households used Jerrican followed by clay pot 180 (21.6%) to store water at household and About 338 (40.5%) of the respondents used separate containers to store water for drinking purposes. This is used in many African countries storing water using Jerrican [14]. Similarly majority 753 (90.3%) of the households covered the storage containers during data collection time but the sanitation near to the storage containers was poor and only 148 (17.7%) drinking water storage containers kept as WHO recommendation (40 cm above the floor) [11]. Pouring method for drawing water from storage containers was used commonly by 609 (73%) of the respondents and separate cane for taking drinking water from the storage container used by 331 (39.7%) respondents. After use, drinking utensils were mostly kept on table by 399 (47.8%) followed by floor 290 (34.8%) respondents. This finding is in line with a study done in Bahirdar city and Adama town [15, 16].

Eight hundred twenty one (98.4%) respondents wash water storage container before storing water, of which 528 (63.3%) washed every day followed by 251 (30.1%) every other day and the majority 554 (66.4%) of households stored water for one day. Treating water was not common in the study area, only 23 (2.8%) households practiced water treatment method of which around 12 households used leach/chlorine to treat drinking water (Table 3). This is finding is similar with a study done in Sidama zone, southern Ethiopia [17].

Table 3. *Household water storage practice among households in rural kebeles of Farta Woreda, Northwest Ethiopia, March , 2014.*

Characteristics	Frequency	Percent
Water storage container		
Clay Pot	180	21.6
Plastic bucket	152	18.2
Iron bucket	7	.8
Jerrycan	495	59.4
Separated drinking water storage container		
Yes	338	40.5
No	496	59.5
Drinking water kept above floor level (40cm)		
Yes	148	17.7
No	686	82.3
Drinking water storage containers have a narrow mouth		
Yes	610	73.1
No	224	26.9
Drinking water storage containers have a cover		
Yes	753	90.3
No	81	9.7
Water drawing technique from storage container	609	73.0
Pouring	225	27.0
Dipping		
Separate cane for taking drinking water from the storage container		
Yes	331	39.7
No	503	60.3
Placement of drinking utensils		
Table or shelves	399	47.8
Inside the container	26	3.1
Storage cover	119	14.3
Floor	290	34.8
Wash water storage container before storing water		
Yes	821	98.4
No	13	1.6
Frequency of washing		
Every day	528	63.3
Every other day	251	30.1
Every week	51	6.1
Every month	4	0.4
Duration of water stored in the container		
less than one day	88	10.6
one day	554	66.4
greater than day	192	23.0
Treat water to make it safer to drink		
Yes	23	2.8
No	811	97.2

Characteristics	Frequency	Percent
Treatment methods		
Boiling	6	0.7
Add leach/chlorine	12	1.4
Strain it through a cloth	2	0.2
Let it stand and settle	3	0.4

3.5. Housing Condition and Sanitation Practice

From the total households, 828 (99.3%), 629 (75.4%) and 816 (97.8%) had dwelling with mud floor, corrugated roof, Timber and mud wall respectively. Three hundred sixty (43.2%) dwelling houses had three and more living rooms and 403 (48.3%) households shared their living rooms with animals.

About four hundred seventy eight (57.3%) households had latrine facility, of which 263 (55%) was open pit followed by 204 (42.7%) pit latrine without slab and 445 (93.1%) had privately owned. The extent of the latrine utilization habit of households in the study area was improper, only 134 (28.1%) of the households used latrine properly. Of the households having latrine 259 (72.9%) used latrine for disposal of child feces.

In addition of those households having latrine, only 102 (21.3%) of households had hand washing facility, of which water and soap were available only in 41 and 10 households respectively. Regarding to hand washing practice habit at five critical times, 347 (41.6%) were claimed to poor hand washing practice. From those practicing hand washing, above half of 492 (59%) the respondent used only water to wash their hands. Open field 323 (38.7) followed by private pit 144 (17.3) were the common methods for the disposal of solid waste in the study area.

Table 4. *Housing condition and Sanitation practice among households in rural kebeles of Farta Woreda, March , 2014.*

Characteristics	Frequency	Percent
Types of floor material		
Mud	828	99.3
Others[b]	6	0.7
Types of Roof material		
Thatched	205	24.6
Corrugated iron sheet	629	75.4
Types of Wall material		
Timber and mud	816	97.8
Others[c]	18	2.1
Number of living rooms for humans		
1	177	21.2
2	297	35.6
>=3	360	43.2
Separate kitchen		
Yes	594	71.2
No	240	28.8
Animal live with human		
Yes	403	48.3
No	431	51.7
Latrine facility available		
Yes	478	57.3
No	356	42.7
Type of latrine(n=478)		
Pit latrine with slab	11	2.3
Pit latrine without slab	204	42.7
open pit	263	55
Ownership of latrine (n=478)		
Private	445	93.1
Shared	33	6.9
Latrine utilization (n=478)		
Proper	134	28.1
Improper	344	71.9
Disposal system of feces of children (n=355)		
Proper	259	72.9
Improper	96	27.1
Hand washing facility (n=478)		
Yes	102	21.3
No	376	78.7
Soap near to hand washing facility (n=102)		
Yes	10	9.8
No	92	90.2
Water inside the hand washing facility (n=102)		
Yes	41	40.2
No	61	59.8
Hand washing practice		
Good	347	41.6
Poor	487	58.4
Hand washing materials		
Only water	492	59.0
Soap & water	307	36.8
Ash & water	35	4.2
Method of Refuse disposal		
Private Pit	144	17.3
Communal Pit	12	1.4
Composting	131	15.7
Burring	53	6.4
Burning	171	20.5
Open Field	323	38.7

b = Cement, Wood: c = Timber and bamboo, Stone

4. Conclusion

The present study revealed that the water handling practice of the community was very poor, which showed that supply of safe water alone cannot guarantee that the water in the household for drinking purpose is safe as well. Sanitation practice in rural household is still very far from the recommended level. So efforts will be required to increase awareness regarding the components of household water handling and sanitation practice.

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