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Original Research Article

Estimating access to drinking water supply in Farta district rural community, Amhara Region, North Central Ethiopia, 2017: a community based cross-sectional study

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ABSTRACT

Background: Water is an essential for lives and development. Ethiopia is endowed with enormous water resources potential but access to water is limited. An uneven spatial distribution of water sources and drinking water demand is big challenge. Therefore objectives of this study were to estimate access for water supply among household of Farta district, Ethiopia.
Methods: A community based cross-sectional study design was employed in 758 households of Farta district. Interview and observational check lists were used to collect data. Systematic sampling technique was used to select households. Data was analyzed using SPSS version 20 software.
Results: The community has access to improved water supply which was estimated to be 57.1%. The rest 42.9% of the households used unimproved water sources from other unprotected sources like unprotected dug well and river. Nearly the third quartile (74.5%) of the households had access to water within a distance of 1.5 km or less from dwelling. Majority (86%) of households had no access to water within a time of 30 minutes or less. Nearly 92.3% of the households used less than 20 liters per capita per day.
Conclusions: There was a significant gap in accessing water supply for the community within 1.5 km in the district. Nearly half of households used protected well water sources. The per capita water consumption of the households were extremely low. Hence local administrator should expand protected well in all members. The community participation should be encouraged to prepare and maintain the water sources.

Keywords: Access, Water, Ethiopia

INTRODUCTION

Access to water supply is vital for the dignity and health of all people. According to the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) estimates that 1.1 billion people live without improved water sources.[1,2] Waterborne diseases such as diarrhea, typhoid and cholera are leading causes of death and illness in the developing world.[3]

Safe and adequate water supplies have the potential to prevent at least 9.1% of the global disease burden and 6.3% of all deaths.[4] Globally, access to improved drinking-water sources is 73% in rural areas. In sub-Saharan Africa 41% of people in rural areas are served.[5] Sub-Saharan Africa represents about 11% of the world population, but 37% of people not using an improved source of drinking water live in Sub-Saharan Africa.[6] Water is important for sustainable development, yet it is unevenly distributed; one-fifth of the world's population

lives in regions where water is scarce and one-quarter suffer from severe water shortage.[7.] To resolve these problems, WHO, UNICEF and other organizations have exerted tremendous effort, Consequently, access to improved water was 89% in 2010 globally, accounting for more 90% of Latin America and Asia, as well as 61% of the population of sub-Saharan Africa.[7,8]

The heath of the population is affected by the coverage of water supply.[9,10] The disease burden from inaccessible water is estimated to be 4% of all deaths and 5.7% of the total disease burden occurs worldwide.[11] Morbidity like diarrhea and trachoma are associated with poor water supply.[12,13] Best ways of combating enteric diseases associated with poor sanitation in many developing countries of the world from cost-effectiveness points of view are access to safe and adequate drinking water.[14,16] In developing countries, access to safe water supply in the rural areas was 56% in 2010.[17] Shortage of improved water supply might be due to population increase, improved living conditions, and lifestyle changes in rural areas.[18]

Ethiopia like many other countries has low levels of water supply coverage. The provision of safe water supply for the population has far reaching effects on health and quality of life, as well as on the development. Shortage of clean water supply in the country has been a serious problem and studies show that more than 60% of health related deaths are caused by water-borne diseases. In the rural areas long queues around safe drinking water points are common. The national coverage for access to safe rural water supply within 1.5 km is quoted to be 41%.[19,20]

A study done in Dukem, Ethiopia showed that only 1.5% households (HHs) use unimproved water sources river).[21] A study done in Dejen district showed that 29%, 23% of the HHs used spring, tube well respectively. The majority (87.4%) of the HHs used water in the distance that takes 30 minutes and less. About (49.2%) the HHs treat the water, and which 81% of them add bleach, only 7.7% boil and about 11.3% the respondents filter the water. Nearly all (99.1%) of the HHs cover the water during transportation. With regard to per capita per day water consumption of water, 79.4% use ≤20 liters and the rest 20.6% use >20 liters.[22]

A study done Wolaita town, Ethiopia, revealed that the overall water supply coverage was inadequate in all HHs of the town; the physical access of improved water source was 67.9%. According to this study, among improved water source users, 72% of the community used tap water. Above 28.5 % of the respondents had used chemical disinfection for homemade water treatment.[23] A clear understanding of access to safe water is critical to design effective water use strategies. In investigating these issues, researchers have focused on water demand in urban areas.

Demand in rural HHs of developing countries, where traditional and cultural influence on water consumption is expected has not been sufficiently studied; therefore the objective of this study was to estimate access to drinking water supply in Farta district, North Central Ethiopia.

METHODS

Study site

Community based cross sectional study was conducted in Farta district from January 1 to 30/2017. Farta district is located 105 km far from Bahir Dar (the capital city of the Amhara region) and 666 km far away from Addis Ababa the capital of Ethiopia. The healthcare services of the district are delivered through 10 health centers 54 health posts. All HHs who reside for six months in Farta district were the source population. Whereas all HHs who reside for six months in Farta district selected kebeles were the study populations.

Sample size determination

Sample size was calculated using STATCALC program of EPI INFO statistical software version 7 by taking 18.91% proportion of childhood diarrhea among HHs living in model and 22.22% none model HHs from prior studies, 95% confidence interval ($Z\alpha/2$), 80 % power, design effect 2.[24] Accordingly, the total sample size was 772 HHs.

Data collection procedure and tools

The data was collected using semi structured questionnaires and observational checklist. Ten kebeles were taken randomly and these HHs were selected across each of the ten kebeles based on the number of HHs' proportion to each kebele. HHs was selected using systematic random sampling techniques.

Operational definition

An unimproved water source is water from a dam or pool or stagnant water from a river, stream, or rainwater tank. Improved water sources are water piped into the residence, from a human-powered drill or from a water tower.[25]

Data quality assurance

To assure the quality of the data, English version questionnaire was translated to Amharic (local language) and back translated to English. Data collectors and supervisors were trained and a regular supervision and follow-up were made by principal investigators. Pretest was done in non-selected kebeles. The collected data was checked for completeness and consistence each day.

Variables

Variables were classified as two main ones, namely, demographic variables such as age, sex, education status, occupation status, ethnicity, religion, and family size, and water supply.

Data processing and analysis

For quantitative data, Epi Info version 3.5.4 and SPSS version 20 were used. Then a descriptive frequency was used for checking of outliers. Data was cleaned and further analysis was done.

Ethical consideration

Ethical permission to undertake the study was obtained from Debre Tabor university research and ethics review committee. Official letter was given to Farta district health office. Written informed consent was obtained from each respondent. We explain to study participants that participation is voluntary and confidential and private information was protected. The right of the respondent to withdraw from the interview or not to participate was respected.

RESULTS

Demographic characteristics of respondents

From a total of 772 HHs, 758 were participated in the study making 98 % response rate. The mean age of the respondents was 31.6±6.7 standard deviations years. Nearly all respondents 736 (97.1) were married and majority of them 692 (91%) were housewives. All respondents were Orthodox Christian in religion and Amhara in their ethnicity. With regard to the educational status 420 (55.4%) were not attend any formal education. The mean family size of the respondent was 5.1±1.5 standard deviation. About 474 (62.5%) of HHs had a family size of less than five. Nearly half 378 (49.92%) of HHs had average monthly income 1001 to 2000 Ethiopian birr. Socio-demographic characteristics of HHs are shown in (Table 1).

Water supply condition

The main drinking water sources in the study area were estimated to be 433 (57.1%) and 325 (42.9%) from improved and unimproved water source respectively. More than half 433 (57.1%) of the HHs in this study depends upon protected dug well water supply, the rest 325 (42.9%) of the HHs used from other unprotected sources like unprotected spring, unprotected dug well and surface water or river.

With respect to distance of water source from dwelling, nearly the third quartile 565 (74.5%) of the HHs had access to water within a distance of up to 1500 m or less. The rest 25.5 % of the HHs had access water more than 1500 m. Also, an overwhelming majority (86%) of HHs had no access to water within a time of 30 minutes or less. In the majority of HHs (61.2%) an adult woman usually collected drinking water from different water sources. Regarding consumption of water, majority of the HHs (92.3%) had used less than 20 l per capita per day and 45.6% HHs had used less than 10 l per capita per day. the rest 46.7 % of HHs had used in between 10 to 19 liters per capita per day.

Table 1: The socio-demographic characteristics of respondents in Farta district, North Central Ethiopia, 2017.

Variables	Frequency	Percentage (%)
Age of the respondents (years)		
<30	200	26.3
30-39	326	43
40-49	90	11.9
50+	27	3.6
Educational status		
Not attended any formal education	597	77.6
Attended formal education	170	22.4
Occupation of the respondent		
Housewife	692	91.3
Farmer	66	8.7
Household size		
<5	474	62.5
≥5	284	37.5
Family average monthly income		
≤1000	150	19.8
1001-2000	378	49.9
>2000	230	30.3

Table 2: Access to water source and consumption of water by households in Farta district, Ethiopia.

Variable	Frequency	Percentage (%)
Water source		
Protected well	433	57.1
Unprotected source	325	42.9
Distance of water source from the dwelling		
<1.5 km	565	74.5
>1.5 km	193	25.5
Material used to contain water		
Jerry can	498	65.7
Plastic container	143	18.8
Traditional pot	117	15.4
Means of drawing water from the container		
Pouring	492	64.9
Dipping	266	35.1
Have separate water drawing utensil		
Yes	563	74.3
No	195	25.7
Coverage of water storage		
Yes	741	97.8
No	17	2.2
Most of the time who collect water		
Female less than 18 year	294	38.8
Adult women	464	61.2
Per capita water consumption		
<10	346	45.6
10-19	354	46.7
≥20	58	7.7
Do you treat water		
Yes	123	16.2
No	635	83.8
How do you treat water		
Wuha agar/chlorine	112	14.8
Boiling	3	0.4
Filtering by cloth	4	0.5
Other method	4	0.5

Most of the participants (498) (65.7%) stored their drinking water using a container made up of plastic materials (jerry can) and barrel users were 143 (18.8%), the rest 117 (15.4%) of the HHs use traditional pot to store water. Data collectors observed whether the household water container was covered or not. The result showed that most HHs (97.8%) had covered their stored water and about 498 (65.7%) of HHs had used plastic jerry can container and 117 (15.4%) of the HHs use traditional pot container. Even though most of the households heard about HHs water treatment methods, only 123 (16.2%) of the participants ever used either of the HHs water treatment methods. The most dominant type of water treatment methods used was disinfection (using chemicals like chlorine, wuha agar, which was estimated to be 112 (14.8%) (Table 2).

DISCUSSION

This study investigated access for safe water supply among households in Farta district in Ethiopia. The study found that almost more than half (57.1%) of the households had access to improved water supply and quite a large proportion of households (42.9) had unimproved water supply sources like unprotected well. The overall water supply coverage of the district was reasonably inadequate.

In this study, females carried 100% (61% adult women and 39% girls) of the water from water sources. This finding indicates that the task of water collection is considered a task for women and girls. In many communities, household water is managed exclusively by women. Women and girls are generally the ones who

obtain water for the home, transport it, store it and then use it for various household purposes. Therefor ensuring access to water supply systems can greatly reduce the time women spend collecting water, allowing more time to care for young children and more time for income generating activities.

The physical access of water to the HHs was 74.5% which is higher with study done in Wolaita town (67.9%).[23] This might be the difference of measurement of coverage of water supply that means in the current study we use 1.5km since it is rural community but in Wolaita town access is measured with in 1km radius. The current study was lower than the EDHS 2011 report, 94.5%.[26] The possible explanation of the lower improved water supply status could be a different in study setting i.e. in the current study we include rural population only. Despite the fact that most of the hardship associated with water hauling affects females in the studied households, but the accessibility to an improved source of drinking water within reasonable time and distance to fetch drinking water in a households could reduce the burden of hardship and the time spent for collecting water by women.

In this study above 16.2% of the respondents had used chemical disinfection for homemade water treatment. This is lower than the study done in Wolaita town 28.5% of the respondents had used chemical disinfection.[23] The study showed that there was a higher water treatment practice in the HH level as compared to EDHS 2005 Report, at which only 8% of the HHs treat water at HH prior to drinking.[27] The result of this study revealed that only 7.7% of the HH use ≥20 litre per capita per day water consumption. Despite the progress seen in Ethiopia, nearly 92% of the HHs didn't have adequate water supply. This may expose the HH members to water scarce related diseases like trachoma and scabies; However, making large quantities of safe water readily accessible to all HHs is often not easily realizable.

CONCLUSION

This study found that the water coverage was low. There was a significant gap in accessing water supply for the community within 1.5 km in the district. More than half of the HHs used protected well water as a primary source. Majority of the HHs use jerry can for storing of water. Though most HHs cover water storage, the per capita water consumption is extremely low. Only small proportion of the HHs participates in treating water at point of use. Hence local authorities should expand protected well in all members of the district. It was not possible for the government to address the demand of water supply; therefore community participation should be encouraged to prepare and maintain water sources. New ways of financing for water should also be explored. The health extension worker should encourage the community to use water treatment options at the point of use.

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