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Research Article

Assessment of Knowledge and Practice of House Hold Water Treatment and Associated Factors in Rural Kebeles of Degadamot Woreda, North-West Ethiopia, 2020

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ABSTRACT

Background: Household water treatment and safe storage interventions are proven to improve water quality and reduce diarrheal disease incidence in developing countries. Almost 90% of the rural population of Ethiopia did not practice any alternative water treatment methods which would pose them to high public health risks. The aim of this study was therefore to identify factors of house hold water treatment practice and knowledge in rural kebeles of Degadamot woreda, North West Ethiopia, 2020.

Methods: A Community-based cross-sectional study design was conducted in Degadamot woreda, North West Ethiopia, 2020. A Multistage sampling technique was carried out to select 845 sample households. Data were entered into the Epi-Data version 4.1 and analyzed using SPSS Version 20. Binary Logistic regression analysis was conducted to identify factors of house hold water treatment practice and knowledge.

Results: In this study, 14% of participants were practicing household water treatment and 28.2% had knowledge on household water treatment practice. Educational status, income earning >600 ETB per month, number of under five children in the household, ways to fetch water and knowledge on HWT were factors significantly associated with household water treatment practice. And educational status, marital status, source of water for drinking, number of containers to store water two, three and above: and place of handling utensils were factors which had significant association with knowledge of house hold water treatment practice.

Conclusion: Factors that were significantly associated with household water treatment practice were educational status, income, number of under-five children, ways to fetch drinking water and good knowledge about household water treatment.

Keywords: Water treatment; Sanitation; Recontamination; Contaminated

INTRODUCTION

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]. Safe drinking water is water which does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages [2]. Safe water for all without discrimination is a human right, officially recognized by the United Nations (UN) in 2010. Safe water is critical to maintaining the good health of a population [3,4].

It is well known that access to safe water and sanitation are important in reducing disease transmission. 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 [5-7].

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Household Water Treatment (HWT) is treating drinking water at the household level to improve its microbiological purity before the water is used. It is seen as superior to treatment at other levels due to possible recontamination during the transport, storage, and consumption process. It has been shown to be one of the most effective and cost-effective means of preventing waterborne diseases.

Household Water Treatment (HWT), including boiling, chlorination, filtration, and solar disinfection, can improve the quality of drinking water at the point of use and reduce the risk of diarrhea among the millions of people that rely on unimproved drinking water sources, and among those that rely on improved water sources. It can reduce the risk of diarrheal disease by as much as 61% when effective HWT methods are used correctly and consistently by populations at risk of waterborne disease.

Approximately 1.8 billion people use fecally contaminated water sources globally, with the majority living in low and middle income countries. Household water treatment and safe storage are recommended as part of the World Health Organization (WHO) strategy to reduce diarrhea risk, yet only 10% of people living in Low and Middle-Income Countries (LMICs) report using an effective method to treat their household drinking water. Boiling is the most common method of household water treatment in low-and middle income countries; however, it is not always effectively practiced.

In Ukraine, more than half (54.1%) of the households have used Solar Disinfection (SODIS) during the summer and in Bolivia 56% of the households treated their water by boiling or with SODIS. None of the households chlorinated their drinking-water. Boiling is a common means of treating water with proven effectiveness against microbiological contamination in Lamingo, Plateau state, Nigeria but it is a costly method due to the need for energy resources. In Ethiopia the number of households treating their water prior to drinking with any treatment options was 8.0% in 2005, 10.2% in 2011, and 9.4% in 2016. Nowadays, simple, low-cost and acceptable household water treatment technologies are available. But in many communities, there is limited knowledge and poor practice for water treatment. Limited knowledge, misinformation, and lack of experience towards best practices of alternative water treatment technologies are among the leading challenges.

Almost 90% of the rural population of Ethiopia did not practice any alternative water treatment methods which would pose them to high public health risks unless prompt intervention like alternative HWT methods with safe water storage is undertaken. Ensuring safe drinking water remains a big challenge where waterborne diseases cause a great harm to public health. Moreover, there are little studies pertaining to knowledge and practices of household water treatment and associated factors in Ethiopia. Therefore, this study aims to assess knowledge and practice of household water treatment in rural kebeles of Dega Damot Woreda, North West Ethiopia.

MATERIALS AND METHODS

Study area and period

This study was conducted in Dega Damot Woreda, which is found in the West Gojjam Zone. It is about 410 km to the North West of Addis Ababa, a capital city of Ethiopia and 275 KM from Bahir Dar City; a capital city of Amhara Regional State. The weather condition of the district is 41% Dega, 37% Woynadega and 22% Kola. Its population size is estimated to be 184, 369 (91,263 males and 93, 106 females) living in about 42,877 households in 2019. More than 99 % are orthodox followers. It has 2 urban and 32 rural Kebeles, 7 Health Center, 1 primary Hospital, 2 private clinics and 1 private drug store. There are 779 functional and 20 nonfunctional hand dug wells, 68 functional and 4 nonfunctional protected springs and 2 functional 1 nonfunctional borehole. The rural population who use protected water source is 138,740 (82.4%). The study was conducted from March 20/2020 –April 20/2020.

Operational definition

Respondents able to identify methods of HWT, recognize the importance of treating drinking water and identify diseases that can result from drinking unclean water. Variables in the questionnaire were given a total score range from 0 to n where n is the number of knowledge questions. Using frequency distribution, a score of <50% from the total knowledge questions were considered as poor knowledge whereas a score of ≥ 50% of the total knowledge questions were labeled as good knowledge. Households who used at least one alternative method of HWT with in the last 24 hrs were considered as good practices which will be scored as 1, while poor practices were considered as households who were not used any alternative method of HWT and scored as 0.

Sample size determination and procedure

Single population proportion formula was used to determine sample size with assumptions of 5% margin of error (d) 95% CI (Z=1.96), design effect of 2 and 10% non-response rate and taking prevalence of practice 44.8% from the study done in Burie, Northwest Ethiopia. Thus, the final sample size was 845.

A multistage sampling technique was used. Twenty percent of kebeles in Degadamot woreda were selected by simple random sampling method. The samples were distributed proportionally by their number of households for each selected kebeles. Study participants were selected by systematic random sampling from HHs in the selected Kebeles. The sampling interval (k) was determined by study population (5218 HHS in the selected Kebeles) divided by sample size (845)=6). Then, the data were collected in every 6 HH intervals. Lottery method was used to select the first study subject. Respondents were mothers of the households. In case, if more than one mothers in the household, one of them was selected by lottery method (Figure 1).

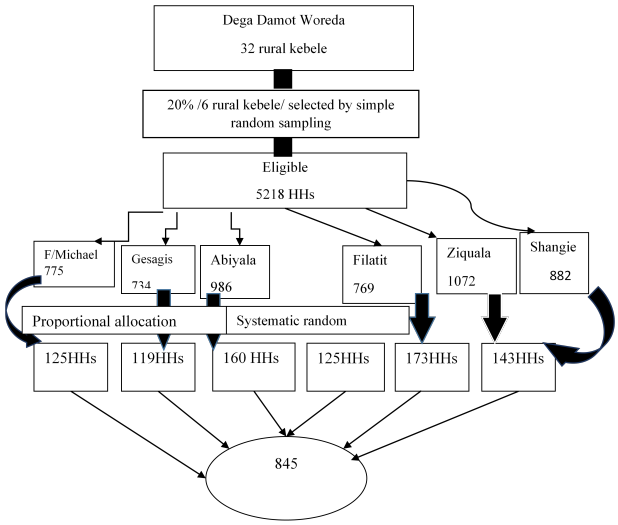

Figure 1: Sampling procedure to assess knowledge and practice of HWT.

RESULTS

Totally 845 mothers were participated in this study, with 100% response rate. The mean (+SD) age of the respondents was 40.46 (+12.16) years and more than half (64.9%) of them were illiterate. The mean (+SD) family size of respondents was 4.88 (+1.2). Almost all the respondents were Christian and farmer and majorities (87.2%) were married. More than half of the households had earned greater than 600 per month (Figure 2).

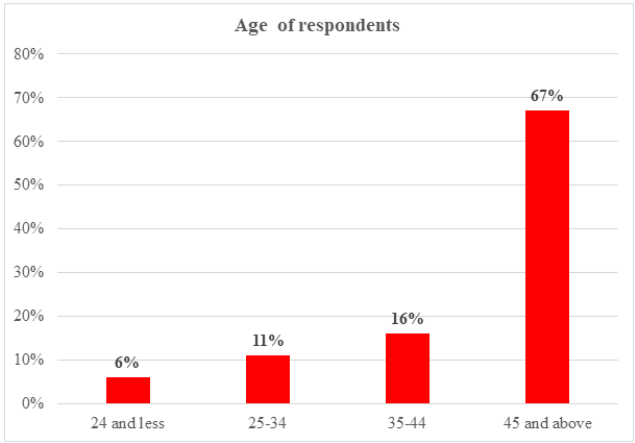

Figure 2: Age of respondents in Degadamot woreda selective kebeles, North West Ethiopia, 2020 (n=845).

DISCUSSION

Water is the most important determinants of public health and an adequate supply of clean water for drinking is one of the most basic human needs and one that must be met. It is obvious that access to safe water is important in reducing disease transmission. Even if the source is safe, water becomes faecally contaminated during collection, transportation, storage and drawing in the home so, access to safe water alone does not reduce diseases significantly. Above all, it is determinant to have knowledge on household water treatment and should practice effectively by highly recommended methods.

However, the finding of this study showed that the magnitude of practice on HWT was (14.1%) with CI (11.8-16.3). The prevalence of practice on HWT in this self-reported study (14.1%) was much lower than studies conducted in India (53%), Zambia (50%), Nigeria (54%) and Kenya (69%) respectively. The difference might be due to difference in clean water coverage as well as choice of water treatment methods that could be implemented by household level may be vary in the countrywide based on their knowledge on quality of water and its accessibility. In addition to this water treatment practice is not applied in Ethiopian community mainly in rural areas.

Also, this study was less than a study conducted in North West Ethiopia (23.1%). The difference is likely to be due to difference in setting where the previous study was conducted on the community that got information from different sources and hence they had better awareness on the issue than the current study site. On the other hand, the current finding was somewhat greater than a study conducted in a rural block of Haryana, India (10%). The difference might be due to difference in time period when the previous was done seven years back from right now. There is also a difference in sample size in which the previous was used near to half of this study's sample size.

While looking at the magnitude of knowledge on HWT, it was found to be 28.2% CI (25.3-31.5). This finding was in line with a study conducted in Nigeria (26.1%). On the other hand, this was much lower than studies done in India (69%). The difference is likely to be the first study was conducted in a country which is developed than the current's study area where better accessibility of information about HWT could have been provided. This was also lower than a study undertaken in North West Ethiopia (49.3%). This difference might be due to difference in living status of communities like culture that could influence them to use drinking water taken directly from the source waters. However, it is higher than a study done in Patan (16.7%). This is probably due to the use of small sample size which is almost one fourth of the current study's sample size.

In this study, there were factors which had significant association with practice on HWT. The first one was educational status of households. Households who can read and write were better to practice HWT than their counter parts. The finding was supported by two researches done in Bure Zuria and Dabat district, Ethiopia. This is due to the fact that literates are better to get information regarding HWT practice and can easily understand methods than their counterpart.

The second factor significantly associated with practice on HWT was greater than 600 ETB monthly income of household which was 2.71 times more to practice it than their counter part. This was supported by a research conducted in North West Ethiopia who explained as the more the households earn income, the more they can afford to avail materials needed for treatment.

Thirdly households who hadn't under five children were practicing HWT less likely than who had one. This is likely to be due to that mothers in the household living with children are more practice HWT for the sake of preventing their kids from

water born disease since in this study the knowledge of households as untreated water causes childhood diarrheal disease is found to be high (52.4%).

Households who were fetching their drinking water through pouring from the container were less likely to practice HWT, which was the fourth variable significantly associated. This might be due to the fact that participants thought as pouring is safe method of water handling practice.

The last and fifth factor associated significantly with HWT practice is good knowledge towards HWT practice. This was supported by the researches done in Patan and North West Ethiopia. This is likely to be the more households know regarding HWT, the more they can implement it.

Another dependent variable in this study was knowledge on HWT. The first factor which was significantly associated with this variable is educational status. Households who can read and write were more prone to know about HWT. This was supported by a research done in Patan, Biye Kaduna state, Nigeria and Dabat North West Ethiopia. This is obvious that to develop one's own knowledge by different means, being able to read and write is highly important.

The second factor significantly associated with knowledge on HWT was marital status. Households who were single had good knowledge on HWT than those who were widowed. This was in line with Patan. This is likely to be singletons are less in work load because of having no kids or old individuals to implement the practice. Additionally, singles were more educated compared to divorced (88% *vs.* 12%).

Thirdly, protected type source of water was factors associated with knowledge on HWT. Households who had protected/improved source water for drinking were more knowledgeable than their counter part. This was supported by a research done in north west Ethiopia. This indicates that the more households know about HWT, the more they take measurements to escape using unprotected drinking water. Likewise, knowing every effect of unprotected water on health, created awareness on them to use protected type of water source.

Another and the forth variable which was significantly associated with knowledge on HWT number of containers to store water. Households who had two containers to store water for drinking was more likely to know about HWT than households who had only one container. Similarly, households who had three containers to store drinking water were more likely to know HWT than those who had only one container and even they know it stronger than households who had two containers. This might be the knowledge of households on HWT and its advantage can have obliged them to have more than one containers to store drinking water. Frankly, the increment of drinking water containers in the household measure household's knowledge on using these containers separately for different purposes. One may be for dipping type of water fetching from containers by fixing it inside, and the others for other purpose.

Lastly, place of handling drinking utensils was factors which had significant association with knowledge on HWT. Households who have handled their utensils on the shelf or anywhere over the floor, were more likely to know WHT than those households who were handled their utensils on the floor. This indicates that handling their utensils in on the shelf or anywhere over the floor or kipping it safe may prevent households from different water born disease. And they are doing this because of they had awareness on how to handle their utensils. This is the fact that all water drinking materials should be preserved from any of unclean objects and should be kept in safe place on the shelf or anywhere other than floor.

The prevalence of diseases in society can serve as an indicator. How well society will do appears to depend on it. By all indications, the US has failed to contain a deadly virus such as Covid-19. As of December 21, 2020, according to the John Hopkins University and Medicine, Coronavirus Resource Center reports that the US has over 17 million infection cases and over 318,000 deaths due to Covid-19. It ranks 13th among nations with the highest, with 97 per 100,000. Except for Peru, all other nations listed with higher rates are either Western or Eastern European. The one similarity with all of these nations is that they are all fully integrated into the world capitalist system.

CONCLUSION

HWT was quite less practiced in Degadamot woreda and their knowledge on it was too. Educational status, income earning >600 ETB, number of under five children in the household, ways to fetch water and knowledge on HWT were factors significantly associated with HWT practice. On the other hand, variables which had significant association with knowledge on HWT were educational status, marital status, source of water for drinking, number of containers to store water and place of handling utensils.

Nongovernmental organizations who are participating in drinking water are better to do marvelous activities to promote community's awareness and their practice. Supporting materials needed for HWT practice early soon the community walked up to do so is also better to be implemented.

This study used cross-sectional nature of the study design and does not confirm definitive cause and effect relationship between the variables. The result about HWT practice was based on self-reports of participants. Participants may answer either due to courtesy or social desirability that leads to a bias that may result in over or under estimates.

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