Assessing Hygienic Status, Sanitation Issues, and Associated Problems in Dambi Dollo Town, Oromia Regional State, Ethiopia

Tolera Kuma Eticha;¹[®] Melkamu Tamiru Adisu²

- Lecturer & Researcher at Ambo University, College of Natural and Computational Sciences–Biology Department, Ambo Town, Ambo, Oromia, Ethiopia
- 2. Lecturer & Researcher at Dambi Dollo University, College of Natural and Computational Sciences–Biology Department, Dambi Dollo, Oromia, Ethiopia

Correspondence:

Tolera Kuma Eticha Ambo University College of Natural and Computational Sciences Department of Biology AmboTown, Ambo, Oromia, Ethiopia E-mail: tolerakuma@gmail.com

Conflicts of interest/funding: This research was funded by Dambi Dollo University, Ethiopia. The authors verified that there is no competing interest in this manuscript.

Keywords: assessment; Dambi Dollo Town; hygiene; pollution; sanitation

Abbreviation: WHO: World Health Organization

Received: February 7, 2022 Revised: March 21, 2022 Accepted: April 1, 2022

doi:10.1017/S1049023X22000814

© The Author(s), 2022. Published by Cambridge University Press on behalf of the World Association for Disaster and Emergency Medicine.

Abstract

The pollutants discharged untreated into water bodies become a challenge in Ethiopia. This study aims to assess sanitation and hygiene status and the associated problems. A total of 500 households were selected using a systematic random sampling technique. Questionnaires, interviews, and site observation were employed. The absence of public and communal latrines had been seen as the constraint. The present study confirmed that waste disposal management has serious problems. In conclusion, these findings revealed that part of the households are living in communities with the town-owned poor sanitary facilities and that further studies are encouraged on waste disposal management.

Eticha TK, Adisu MT. Assessing hygienic status, sanitation issues, and associated problems in Dambi Dollo Town, Oromia Regional State, Ethiopia. *Prehosp Disaster Med.* 2022;37(4):455-461.

Introduction

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces.¹ Improved sanitation involves physically closer facilities, less waiting time, and safer disposal of excreta in the urban or town settings with extreme crowding, poor housing quality, and unsanitary environmental conditions that are growing health and social problem in sub-Saharan Africa, as well as elsewhere in low-income countries.² Poor sanitation is responsible for one of the heaviest existing disease burdens world-wide. Diseases associated with poor sanitation are diarrheal diseases, acute respiratory infections, undernutrition, and other tropical diseases such as helminths and schistosomiasis infections.¹ Sanitation is defined by the World Health Organization (WHO; Geneva, Switzerland) as the provision of facilities or services that separate people from urine and feces.³ Adequate sanitation is defined as the safe management of human excreta and includes both "hardware" (ie, sanitation technologies such as toilets and hygienic latrines) and "software" (ie, hygiene promotion, such as handwashing with soap).⁴

Pollution, defined as any artificial or human-induced change to the environment, originates from either a point source or a non-point source.⁵ The major point sources of pollution to freshwater originate from the collection and discharge of domestic wastewaters and industrial wastes, whereas the major non-point sources are agricultural activities that include pesticide spraying or fertilizer application.⁶ Access to adequate sanitation is fundamental to personal dignity and security, social and psychological well-being, public health, poverty reduction, gender equality, economic development, and environmental sustainability. Sanitation is a critical step towards reducing the impact of these diseases because it creates physical environments that enhance safety, dignity, and self-esteem; the joint monitoring program for water supply and sanitation reports that 62% of Africans do not have access to an improved sanitation facility.⁸ Inadequate sanitation can cause several diseases, which are transmitted from feces to humans via contaminated hands, soil, water, animals, and insects. Sanitation provides a barrier to fecal diseases by isolating human excreta and removing traces of fecal material from hands after contact.⁴ Communicable diseases are considered as major causes of morbidity and mortality, as well as disability in Ethiopia, and their high prevalence in the country is linked to the poorly developed socio-economic and environmental factors that have been inherent for centuries.⁹

According to the report on Access to Sanitation in Developing Countries,⁴ many diseases can largely be prevented with basic sanitation and hygiene. Lack of access to sanitation and poor hygiene together are responsible for diarrheal diseases in developing countries, and



sanitation and health experts also estimated that improved sanitation alone could reduce by one-third the global incidence of diarrheal disease¹⁰ and could also play a major role in reducing parasitic infections that impede child development.¹¹ Medical researchers have also extensively recognized the health impacts of poor sanitation.¹ Food handlers with poor personal hygiene working in food establishments could be potential sources of infections of many intestinal helminths, protozoa, and pathogenic bacteria.¹² Food handlers are anyone who works in food and drink establishments and who handle food or are in contact with any equipment or utensils that are likely to be in contact with food, such as cutlery, plates, bowls, or chopping boards.¹³

Diarrhea causes an estimated two million deaths per year, mostly among children under the age of five. Cholera - as of September there were 106,547 reported cases of cholera and a total of 3,155 reported deaths in 2004. Schistosomiases (Bilharzia) infect 100 million people, of which 20 million people suffer severe consequences. Improved water and sanitation may reduce this by 77%. Trachoma causes blindness in six-to-nine million people. Access to sanitation may reduce this by 25%. Intestinal worms infect approximately one-third of the population in developing countries; improved sanitation would control their transmission. Hookworms cause malnutrition. Using concrete slabs to cover pit latrines can prevent them from being transmitted to humans. According to Gebre Mariam, et al,¹⁴ increased magnitude of sanitation and hygiene problems in the urban surroundings of the country demand community-based studies that will facilitate a better understanding of the issues and influence at the national, regional state, town, and community levels. When urbanization increased, governments were unable to manage natural resources suitably with an additional demand on productive resources and additional wastes.¹⁵

The provision of safe disposal of wastes for the towns of developing countries became increasingly more complex and serious.¹⁶ Domestic wastes from the towns were emptied untreated into the rivers causing gross pollution. This was hazardous for human health (cholera) and deleterious odors rise from water bodies,¹⁷ and although provision of a fresh, clean water supply would substantially reduce water-borne illnesses,¹⁸ less attention was given to sanitary issues. A safe sanitation system designed and used to separate human excreta from human contact at all steps of the sanitation service until final disposal or end-use, and holist roach to address fecal risks from toilets for safe use or disposal, should be facilitated through sanitation safety planning. As a household moves away from open defecation towards the use of better sanitation services, and ultimately to safely managed systems, health benefits increase.¹⁹ In 2013, the United Nations also issued a call to action on sanitation that included the elimination of open defecation by 2025. The situation of the urban poor poses a growing challenge as they live increasingly in cities where sewerage is precarious or non-existent and space for toilets and removal of waste is at a premium. Limited data available on this topic suggest that a large proportion of wastewater in developing countries is discharged partially treated or untreated directly into rivers, lakes, or the ocean.¹⁹

In recent years, sanitation has raised the international policy agenda. Although most people do not know, safe hygiene practices and access to sanitation are crucial for combating the main health threats to us all. Safe water, sanitation, and hygiene are crucial for human health and well-being. Yet, millions of people globally lack adequate sanitation services and consequently suffer from or are exposed to a multitude of preventable illnesses. Lack of safe sanitation negatively impacts their quality of life and undermines fundamental human rights. Poor sanitation services also weaken health systems, threaten health security, and place a heavy strain on economies.¹⁹

It is obvious in the context of developing countries, such as Ethiopia, there is variation in terms of sanitation status (ie, as one goes from the capital city to the local town or town of the zone or district, the town municipality management of the solid and liquid waste has received step-wise declining attention). This means there is a problem in the timely collection, transportation, and disposal of wastes at the right place. Related diseases and risks are wide-ranging. They include infections transmitted by the fecal, or health impacts from exposures to chemicals and other contaminants in drinking water, as well as the impacts on well-being. Poor sanitary-related diseases and risks can be exacerbated by a number of factors including climate change, population growth, rapid urbanization, or in the case of antimicrobial resistance, antibiotic use. Consequently, the communities of Dambi Dollo Town have been exposed to unsafe environments and are vulnerable to communicable diseases. Dambi Dollo is one zonal town within the Oromia Regional State and lacks access to sanitation; diarrheal diseases, acute respiratory infection, measles, malaria, and malnutrition are the most common causes of death in emergencies. The majority of these driving factors are related to environmental conditions: inappropriate shelter and site planning, unclean water, poor sanitation, vector spreading, lack of personal protection such as insecticide-treated nets, personal hygiene, and health demotion that are known as risk factors because they can cause disease. It is important to understand the relationship between disease and environmental risk factors because interventions must target risk factors properly; an overview of environment-related diseases and environmental risk factors that contribute to disease is needed. It is worth noting that although malnutrition is not an environment-related disease, it is linked to diarrhea because malnutrition increases the severity of diarrhea, while diarrhea can cause malnutrition.

Despite attempts made nationally and locally, environmental sanitation, especially waste management, continues to be a major challenge in developing countries such as Ethiopia, in general, and poor attention has been given to waste management and sanitary issues in Dambi Dollo Town, in particular. The main objective of this research is to assess hygienic status, sanitation issues, and associated problems in Dambi Dollo Town. Thus, the main concern of this study is focusing on assessing sanitation and hygiene status and the associated problems in selected Kebeles of Dambi Dollo Town.

Materials and Methods

Study Site

The study was conducted in Dambi Dollo Town, the capital of Kellem Wollega Zone, Oromia Regional State, Ethiopia. Dambi Dollo Town was formerly known as Sayo and the total population of this town was 29,448, of whom 15,144 were men and 14,304 were women. The majority of the inhabitants were Protestants with 58.23%, while 30.14% were the followers of Ethiopian Orthodox Christians, 8.81% were Muslims, and 2.07% were Catholic Christians.²⁰ Dambi Dollo Town (Figure 1) has four Kebeles, namely: Biftu, Dollo, Lafto, and Yabalo. The town has a total population of 48,344, of which 24,336 are males and 24,008 are females (unpublished data obtained from the Health Office of Dambi Dollo Town, 2019).



Figure 1. Map of the Study Area.

Recently, the community of the study area consists of 10,636 households (unpublished data obtained from Dambi Dollo Town Administration Office; these data contained information only up to the beginning of September 2018). In this town, there is one health station, twenty-four clinics, five drug stores, and one pharmacy (unpublished data obtained from the Health Office of Dambi Dollo Town, 2019).

Study Design and Sampling Techniques

A community-based, descriptive survey design was conducted from April through August 2019. Semi-structured and structured questionnaires supplemented by both qualitative, as in Mnis,²¹ and quantitative, as outlined in Cresswell,²² were used in this study. The data for this study were collected basically from households of Dambi Dollo Town, as well as from the concerned offices and organizations/institutions found within Dambi Dollo Town. The qualitative approach was used to collect, analyze, and interpret data by observing what people do or say,²³ whereas the quantitative approach was applied to record data in numeric form. Among 10,636 households, only 500 households were surveyed among household dwellers of the town. A simple random sampling technique was used to select households from each Kebele to give each household an equal chance to be selected (ie, the numbering of the houses was done from the center to the edge of the town across all four Kebeles [Biftu, Dollo, Lafto, and Yabelo] of the town, and 125 houses took part in the survey process across the four Kebeles). This was done to be inclusive with the view of including households with different hygiene and sanitation.

Data Collecting Tools

https://doi.org/10.1017/S1049023X22000814 Published online by Cambridge University Press

In this study, interviews, focal group discussions, questionnaires, and site observation were employed as data collection tools.

Primary data were collected through the use of questionnaires and site observation. Data were collected from the representative households of Dambi Dollo Town using observation, interviews, and questionnaires. The focal group discussion and interview were also used to gather data from concerned offices and organizations/ institutions found within Dambi Dollo Town.

Data Analysis

SPSS Version 20 (IBM Corp.; Armonk, New York USA) was applied for data analysis. Both quantitative and qualitative data were used to analyze the data concurrently. The data from closed-ended items of the questionnaires were analyzed quantitatively. Then the data were expressed in graphs and the percentage was calculated, whereas the data from the open-ended items of the questionnaires and interviews were analyzed qualitatively by narrating the status of the study area and were expressed in words. Then based on the analysis and interpretation of data, precise conclusions and recommendations were given.

Ethical Consideration

Ethical permission to undertake the study was obtained from Dambi Dollo University Research and Technology Transfer Directorate (Dambi Dollo, Oromia, Ethiopia). An official letter for collaboration was sent to the Dambi Dollo Town Administration. Respondents were informed before conducting the interview or filling out the questionnaire voluntarily. For this case, a consent letter was attached to each questionnaire, and respondents were guaranteed that the confidentiality of their responses or private information was protected. The right of the respondent to withdraw from the interview or not to participate was respected. Identification of an informant was possible only through specific identification numbers or codes.

No.	Parameters	Response	Number	Percent (%)
1	Sex of Respondent Households	Male	160	32.0
		Female	340	68.0
2	Age of Respondent Household in Years	≤20	0	0.0
		21-30	191	38.2
		≥31	309	61.8
3	Marital Status	Single	37	7.4
		Married	443	88.6
		Divorced	14	2.8
		Widowed	6	1.2
4	Educational Status of the Household	Cannot Read/Write	24	4.8
		≤5 Years	49	9.8
		6-12	269	53.8
		Higher Education	158	31.6
5	Occupation	Government Employees	124	24.8
		Non-Government Employees	113	22.6
		Unemployed	63	12.6
		Business-Related Workers	109	21.8
		Daily Laborer/Workers	91	18.2
6	Family Size/Number of Family Members in the Household	≤4	138	27.6
		5-8	235	47.0
		≥9	127	25.4

 Table 1. Socio-Demographic Distribution of Households in Dambi Dollo Town

 Note Source - Researchers' Survey, 2019.

Results

458

Socio-Demographic Distribution of Respondent Households in Dambi Dollo Town

More than one-half (53.8%) of the respondent households had educational levels in the ranges of grades six to twelve. Sixty-eight point eight (61.8%) percent of the household were \geq 31 in the age range. Daily laborer/workers and unemployed individuals accounted for 18.2% and 12.6%, respectively. Nearly one-half (47.0%) of the respondents in the household had a family size ranging from five to eight (Table 1).

Factors Deteriorating Hygiene and Sanitation of Dambi Dollo Town

Dollo (68.0%) was the leading Kebele, followed by Biftu (55.2%), in having a higher number of households whose homes lacked waste dumping sites among all Kebeles. This could be a factor in the poor hygiene of the area (Table 2). This study observed that Dambi Dollo Town had not been providing public and communal latrines to town dwellers, although it is a basic element for sanitation services. This might be one of the factors that contributed to the poor sanitary condition of the town. The visual (Figure 2) finding of the present study also showed that there were water scarcity, environmental pollution, and less participation of the community as a whole as sanitary-related issues. The discussion made with the Health Office expert of Dambi Dollo Town revealed that there was less participation of NGOs in tackling such serious problems of the communities. The observations made by the researchers, together with information obtained from Health Office experts of Dambi Dollo Town, depicted that there was the poor sanitary condition in the town.

Eticha © 2022 Prehospital and Disaster Medicine

Hygiene and Sanitary Condition of Dambi Dollo Town

The respondent households of Dambi Dollo Town told that the town had poor sanitary conditions. Their response revealed the existence of poor hygiene and sanitation in the town. In the views of these respondents, this poor sanitary status resulted from the absence of waste dumping, which led to waste disposal on the road and open defecation/urine. This could be due to the lack of proper waste disposal sites. In addition, less awareness of the town administration and less motivation of the town dwellers might be seen as attributing factors that led to poor quality of town sanitation. This study analyzed latrine materials, maintenance, cleanliness, and handwashing facilities, alongside sanitation practices, which revealed the importance of careful consideration of the target. In the present study, fifty-one (10.2%) of the respondent households witnessed that the children suffered diarrhea in recent times (Table 3). This might be caused by non-access to safe disposal of wastes, poor hand washing facilities at the latrine, and little knowledge of handwashing using soap latrine. This study also observed that there was less awareness of the households on attempting to make water from untreated sources safe for drinking and other domestic use.

This study found that dwellers of Dambi Dollo Town widely accessed water from a pipe-based (52.8%) and traditional handdug well fitted with a hand pump (19.4%; Table 4). The visual finding of the study also demonstrated that there was water scarcity, water pollution, and less participation in this community on sanitary issues of water sources.

Name of Kebele	Number of Families Possess Waste Dumping Hole at their Home Yard (%)	Number of Families Lack Waste Dumping Hole at their Home Yard (%)
Biftu	56 (44.8)	69 (55.2)
Dollo	40 (32.0)	85 (68.0)
Lafto	79 (63.2)	46 (36.8)
Sabalo	67 (53.6)	58(46.4)
Eticha © 2022 Prehospital and Disaster Medic		

Table 2. Households of Dambi Dollo Town and Status of Waste Dumping

Note Source - Researchers' Survey, 2019.



Figure 2. Status of Waste Management Facilities at the Home Yard in Dambi Dollo Town.

Distribution of Children Who Suffered from Sanitation-Related Diseases in Dambi Dollo Town

The present study found that children were more susceptible to water-borne diseases such as amoeboid dysentery. The burden of disease distributions within the town was eight (15.69%), twelve (23.53%), seventeen (33.33%), and fourteen (27.45%) for Yabalo, Lafto, Dollo, and Biftu Kebeles, respectively (Figure 3). The majority of the family members who recently suffered were children (Figure 4; 42.5%) while adults were relatively fewer (30.0%).

Discussion

Socio-Demographic Distribution of Respondent Households

The present study found that 53.8% of the households have educational levels ranging from grades six to twelve. Distributions of the occupational status are government employees, non-government employees, unemployed, business-related workers, and daily laborer/workers; from these occupations, daily laborer/workers and unemployed individuals accounted for 18.2% and 12.6%, respectively. Approximately 47.0% of the respondent households have a family size ranging from five to eight. The leading Kebeles concerning having a number of families who lacked a waste dumping site in their home yard are Dollo (85; 68.0%) and Biftu (69; 55.2%) Kebeles, respectively.

No	Measured	Response of Respondent Households (1: Yes; 2: No)		
	Parameters	1 (%)	2 (%)	
1	Household is with Regularly Cleaned Latrine	267 (53.4)	233 (46.6)	
2	Household Having a Poorly Cleaned Latrine	214 (42.8)	286 (57.2)	
3	Access to Safe Disposal of Human Waste	358 (71.6)	142 (28.4)	
4	Maintains Good Personal/ Environmental Hygiene	294 (58.8)	206 (41.2)	
5	Access to Improved Health Environment	283 (56.6)	217 (43.4)	
6	There is Open Defecation (OD) in Public Places	187 (37.4)	313 (62.6)	
7	Knowledge of Hand Washing Using Soap Latrine	147 (29.4)	353 (70.6)	
8	A household that Boils Water from the Well to Use	92 (18.4)	408 (81.6)	
9	Children Have Suffered from Diarrhea in Recent Time	51 (10.2)	449 (89.8)	
10	Household with Hand Washing Facilities at the Latrine	162 (32.4)	338 (67.6)	
11	Household Attempted to Make Water Safe for Drinking	216 (43.2)	284 (56.8)	

Eticha © 2022 Prehospital and Disaster Medicine

 Table 3. The Hygienic and Sanitary Condition of Dambi Dollo

 Town

Factors Deteriorating Hygiene and Sanitation of Dambi Dollo Town The discussion made with the Health Office expert of Dambi Dollo Town indicated that waste disposal (both solid and liquid) management has serious problems in the town due to the absence of landfills for dumping purposes. This could be the cause of poor waste management and the inability to access adequate water supply for usage. In line with this study, Admasie and Debebe²⁴ in their report concluded that the possible explanation for the lower improved water supply status could be the problem of a supply system as a result of the incomparability between the infrastructure and the rate of urbanization as the town is rapidly growing. At the present, 25 (5.0%) of the interviewed household in the community consumed water from the unprotected source without treatment.

Hygiene and Sanitary Condition of Dambi Dollo Town

This study observed that there was a poor sanitary status in Dambi Dollo Town. This resulted from the absence of a waste dump water sourcing site which led to waste disposal on the road and open

l	Source of Water in	Frequency		
NO.	Use	Total Responses	Percent (%)	
1	Pipe Extension- Based Water Distribution	264	52.8	
2	Traditional Hand- Dug Well Fitted with a Hand Pump	97	19.4	
3	Unprotected Source Without Treatment	25	5	
4	Mixed (Treated/ Protected and Unprotected)	114	22.8	

Eticha © 2022 Prehospital and Disaster Medicine

Table 4. Respondent Household Distribution by Water Sources Used for Drinking and Other Purposes (n = 500)





Figure 3. Number and Percentage of Children Stomachache in Dambi Dollo Town.



Figure 4. Categories of the Family Members Who Suffered from Disease.

Prehospital and Disaster Medicine

defecation/urine. In addition, these studies observed that less awareness of the town and less motivation of the town dwellers as a whole, including the town administration, as attributing factors that led to poor hygiene quality in the town. In the current study, the poor latrine maintenance and cleanliness, as well as the handwashing facilities alongside sanitation practices, were also seen as the driving factor for the poor sanitary situation in the town. Kamara, et al²⁵ reported similar findings that related incidence of diarrheal diseases with open defecation, inappropriate infant fecal disposal, temporary latrines, absence of handwashing facilities after latrine use, poor knowledge of handwashing, and clean and safe drinking water.

In the present study, observation and interviews made with Dambi Dollo Town dwellers and focus group discussion being made with the Dambi Dollo Town Health Office revealed that the absence of public and communal latrines to town dwellers was the constraint that deteriorates the sanitary services of the town, together with lack of legal landfill in the town. So, the existence of poor sanitary conditions is seen as the root cause of public health emergencies in the area. In line with this study, the WHO¹⁹ reported that inequalities in access to sanitation are compounded when sewage removed from wealthier households is discharged into storm drains, waterways, or landfills, polluting poor residential areas. In agreement with this finding, Kamara et al²⁵ reported that diarrheal diseases related to inadequate water supply and sanitation are one of the leading causes of death among children in the developing world.

Limitation of the Study

Every study has a set of limitations, or "potential weaknesses or problems with the study identified by the researcher."²⁶ The sample in the study was focused only on Dambi Dollo Town dwellers as a population, not on other residents from the poor sanitary condition. As a whole, sanitation is a problem for other communities as well for Dambi Dollo Town dwellers, but the focus of this research is on only Dambi Dollo household use. Likewise, this study has the following limitations:

- 1. The rural community households of the Kellem Wolega Zone were not included in this study, although they are more or less similar in terms of the sanitary condition; and
- 2. Due to the time limitation, the study did not sample the entirety of households in the study area.

Conclusion

Sanitation is a vigorous health problem that adversely impacts the lives of many people around the world; uniquely, it is well-pronounced in developing countries including Ethiopia. This study examined the hygienic status, sanitation issues, and associated problems of the community living in Dambi Dollo Town. The finding of this study revealed that part of the households were challenged with poor sanitation facilities, including latrine and waste disposal pits, improved hygienic conditions, and the absence of public latrines and landfills. Despite the few interventions that had been made by the community and town administration to improve sanitation and hygiene, there are still unsatisfactory sanitary and hygienic conditions. The sanitary condition of Dambi Dollo Town was substandard for lives that need serious attention to undertake. The finding of this study stated that awareness of people considered in this study was seen as low, and this led the town to progressively lose its hygiene quality. The finding of this research confirmed that there is an interconnection between poor

hygienic status and families (chiefly children) openness to sanitaryrelated amoeboid dysentery in the case of the people under study was seen. Personal observation in this study established that the sustainability of water supply and sanitation facilities is still under question and requires special consideration, although a few interventions are in use. The assessment of the hygienic status, sanitation, and the related factors were seen as the best prudence effort prevailed for the reality of sanitation on the ground. Therefore, this study provided relevant information on the sanitary condition of the area under this study. Hence, the finding of this study could inform and initiate managers and other decision makers to give serious attention at all levels to the promotion and continuity of the communities' health assurance through taking participatory and integrated measures into action.

Recommendations

Taking the finding of this study into account, the following measures were put forward to be intervened for assurances of sanitary service of the town dwellers and to prevent further deterioration of hygiene quality:

1. The present study didn't assess all sanitary-related parameters within wide ranges and across all seasons; the study was done in a limited area within less than a

References

- Minh HV, Nguyen-Viet H. Economic aspects of sanitation in developing countries. Environ Health Insights. 2011;5:63–70.
- Nordberg GF, Bernard A, Diamond GL, et al. Risk assessment of effects of cadmium on human health (IUPAC Technical Report). *Pure and Applied Chemistry*. 2018;90(4):755–808.
- Seetharam K. Challenges and opportunities for sanitation in developing countries. J Sci Policy Governance. 2015;7(1):1–12.
- Access to Sanitation in Developing Countries (ASDC, 2002). ASDC Report, Number 190.
- Hun T. EPA provides a status update at a packed technical session. Water Environment and Technology. 1998;10(12):36–37.
- Chapman D (ed). Water Quality Assessments A Guide to Use of Biota, Sediments, and Water in Environmental Monitoring. Second Edition. Oxfordshire, United Kingdom: Taylor and Francis Group: 1996.
- Socio-Economic Rights Institute of South Africa (SERI). Basic Sanitation in South Africa: A Guide to Legislation, Policy, and Practice, South Africa, 2011. Johannesburg, South Africa: SERI; 2011.
- World Health Organization. Poor sanitation threatens public health 6 in 10 Africans remain without access to a proper toilet. Joint News Release WHO/UNICEF. Geneva, Switzerland: WHO; March 20, 2008.
- Kumie A, Ali A. An overview of environmental health status in Ethiopia with particular emphasis on its organization, drinking water, and sanitation: a literature survey. *Ethiop J Health Dev.* 2005;19(2):89–103.
- Beyene A, Hailu T, Faris K, Kloos H. Current state and trends of access to sanitation in Ethiopia and the need to revise indicators to monitor progress in the post-2015 era. *BMC Public Health.* 2015;15:451.
- United Nations. General Assembly of the United Nations Resolutions 64th Session, 2010. Resolution No. A/RES/64/292 28 July 2010. http://www.un.org/en/ga/64/. Accessed January 2022.
- World Health Organization. Health Surveillance and Management Procedures of Food-Handling Personnel. Geneva, Switzerland: WHO; 1999: 7–36.
- Tessema AG, Gelaye KA, Chercos DH. Factors affecting food handling practices among food handlers of Dangila Town food and drink establishments, North West Ethiopia. *BMC Public Health*. 2014;14:571.

year. Thus, year-round sampling frequency and analysis of many parameters which encompass both town and rural areas should be undertaken for consistency of data at wide ranges of places and time at zonal/regional/ national levels.

- Further study should be conducted on waste disposal management issues since waste management is the best way of promoting ecological robustness by minimizing pollutant disposal at the wrong site.
- 3. The present study observed that Dambi Dollo Town had been exposed to pollution due to less awareness of people on environmental maintenance, sanitation issues, and the related problems; so, the town needs action measures such as community alertness on hygienic maintenances and promoting town dwellers' engagement in efforts against environmental pollution, working on adequate water provision services, constructing landfill, and communal latrine in the town, which should be properly done.

Acknowledgments

The authors' gratitude goes to the Dambi Dollo University Research Offices and Dambi Dollo Town communities, as this research is well worth accompanied by participation.

- Gebre Mariam AG, Girsha WD. Assessment of long-lasting insecticidal net utilization and its associated factors among households in Adama District, Oromia Region, Ethiopia. *Science Journal of Public Health.* 2016;4(6):476–481.
- Novotny V. Water Quality. Diffuse Pollution and Management. Second Edition. Hoboken, New Jersey USA: John Wiley and Sons, Inc; 2003.
- Mwangi FN. Land use practices and their impact on the water quality of the Upper Kuils River (Western Cape Province, South Africa). MSc Thesis. Cape Town, South Africa: Western Cape University; 2014.
- Brown J, Cairneross S, Ensink JHJ. Water, sanitation, hygiene, and enteric infections in children. *Arch Dis Child.* 2013; 98:629–634.
- Sanitation and Hygiene in Developing Countries: Identifying and Responding to Barriers. A Case Study from the Democratic Republic of Congo. Teddington, United Kingdom: Tearfund; 2007.
- World Health Organization (WHO). Water, Sanitation, Hygiene, and Health: A Primer for Health Professionals. Geneva, Switzerland: WHO; 2019.
- Population and Housing Census of Ethiopia. Results for Oromia Region, 2007. https://www.ethiopianreview.com/pdf/001/Cen2007firstdraft(1).pdf. Accessed January 2022.
- Mnis R. An Assessment of the Water and Sanitation Problems in New Forest, Bush Buck Ridge Local Municipality, South Africa. MSc Thesis. Bloemfontein, South Africa: University of the Free State; 2011.
- Cresswell J. Qualitative Inquiry and Research Design Choosing among Five Traditions. Thousand Oaks, California USA: Sage Publications; 2009.
- Telmo AA. Water supply and sanitation study of the village of Gouansolo in Mali, West Africa. http://www.cee.mtu.edu/peacecorps/studentfiles/telmo.pdf. Accessed January 2022.
- Admasie A, Debebe A. Estimating access to drinking water supply, sanitation, and hygiene facilities in Wolaita Sodo Town, Southern Ethiopia, in reference to national coverage. *J Environ Public Health*. 2016;2016:8141658.
- 25. Kamara JK, Galukande M, Florence Maeda F, Luboga S, Renzaho AMN. Understanding the challenges of improving sanitation and hygiene outcomes in a community-based intervention: a cross-sectional study in Rural Tanzania. *Int J Environ Res. Public Health.* 2017;14(6):602.
- Creswell J. Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. 2nd ed. Upper Saddle River, New Jersey USA: Pearson; 2005.