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Source: Environmental Health Insights, 16(1)

Published By: SAGE Publishing

URL: <https://doi.org/10.1177/11786302221114819>

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Environmental Health Insights
Volume 16: 1–10
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DOI: 10.1177/11786302221114819



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ABSTRACT

BACKGROUND: In developing countries, open defecation is still a major health issue. While there has been a great deal of empirical research on latrine coverage. But little is known about household latrine utilization behavior. The objective of this study was to assess latrine utilization and associated factors among Community-Led Total Sanitation and Hygiene (CLTSH) implemented kebeles in Gurage Zone, Southern Ethiopia.

METHODS: A community-based cross-sectional study was conducted on 585 randomly selected households in Gurage Zone's rural Community-Led Total Sanitation and Hygiene (CLTSH) implemented kebeles. The data were entered into Epi-data version 3.1 and analyzed in SPSS version 20. A binary logistic regression analysis was used to identify factors associated with latrine utilization, and a *P*-value < .05 was used to declare significance.

RESULTS: In this study, 65.8% of households used latrines [95% CI: 61.8%-69.8%]. The odds of using a latrine were higher in households with less than 5 family members [AOR=2.53, 95% CI: 1.33-4.84], in households with no vegetation around their latrines [AOR=4.56, 95% CI: 2.27-9.18], households with clean latrines [AOR=2.19, 95% CI: 1.17-4.12], households with latrines located <6m from the dwellers [AOR=5.94, 95% CI: 3.13-1.27], households with latrines located 6 to 10m from the dwellers [AOR=3.94, 95% CI: 1.93-8.03], households head not attending formal education [AOR=0.24, 95% CI: 0.13-0.44], households without school children [AOR=0.15, 95% CI: 0.08-0.28], households owned latrine for less than 1 year's [AOR=0.24, 95% CI: 0.12-0.49], Households owned latrine for 1 to 3 year's [AOR=0.39, 95% CI: 0.25-0.64], and latrine that does not require maintenance 1.94 [AOR= 1.92, 95% CI: 1.04-3.61], were significantly associated with latrine utilization.

CONCLUSION: The findings of this study revealed that open field defecation is still practiced by households in CLTSH implemented kebeles. Therefore, to improve latrine utilization, community awareness must be raised through regular training on proper latrine construction, latrine usage, and sanitation and hygiene practices.

KEYWORDS: Community led total sanitation, hygiene, latrine utilization

RECEIVED: January 2, 2022. **ACCEPTED:** July 1, 2022.

TYPE: Original Research

FUNDING: The author(s) received no financial support for the research, authorship, and/or publication of this article.

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Introduction

According to 2017 World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) joint report, around the world, 13% of the population used latrines where excreta were disposed of in situ. In communities where access to improved sanitation facilities is limited, 892 million people practice open defecation (OD), the majority of whom live in rural areas of South Asia and Sub-Saharan Africa. This practice continues to be a major challenge, with approximately 2.3 billion people still lacking basic sanitation services or using unimproved facilities such as pit latrines without a slab, hanging latrines, or bucket latrines.¹

In the African Region, 584 million people lacked improved sanitation, and 231 million of them practiced OD.² Sub-Saharan Africa remained the most lagging in terms of accelerating access to improved latrine facilities. According to regional estimates, only 30% of Sub-Saharan Africans used improved latrine facilities.³ According to World Health Organization (WHO)⁴ and United Nations Children's Fund (UNICEF) Joint monitoring program (JMP) 2021 reports, 494 million people practice open defecation. Most of (92%) these people lived in rural areas and nearly half of them lived in sub-Saharan Africa. According to 2016 Ethiopian Demographic and Health Survey (EDHS), more than half of households, 53% (43%



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urban and 56% rural), use non-improved latrine facilities, with 32% (7% urban and 39% rural) still practicing OD.⁵

OD is a major environmental health problem facing many countries in sub-Saharan Africa. Study conducted in Ghana revealed that, 6 factors (education, household size, occupation, income, traditional norms, and beliefs and ownership of a toilet facility) were positively significant in determining OD.⁶ All sustainable development goal (SDG) regions saw a drop in the number of people practicing OD, except for sub-Saharan Africa, where high population growth led to an increase in OD from 204 to 220 million, and in Oceania, where the practice increased from 1 to 1.3 million.⁷

Community-Led Total Sanitation and Hygiene (CLTSH) is relatively a new approach pioneered by Dr. Kamal Kar through the Village Education Resource Center that focuses on empowering local people to analyze the extent and risk of OD-related environmental pollution and to construct and use toilets without the need for external subsidies. The methodology is now being used in the majority of Ethiopian regions, as well as in other parts of Asia and Africa.⁸ The elimination of OD is the primary goal of improving access to sanitation globally, and it is a proposed indicator for any country's achievement of the SDGs.⁹

Ethiopia's health statistics indicate communicable disease accounts for about 60% to 80% of health problems that are preventable and considerable proportions of these diseases are directly related to unsafe water, poor hygiene, and inadequate sanitation.^{10,11} To mitigate such problems, CLTSH has remained the only instrument to ignite community-wide behavioral change and collective action to move the entire community toward improving sanitation activities in Ethiopia.^{12,13} It focuses on eradicating OD at a community level by generating sustained behavioral change,¹⁴ and enables communities to conduct their sanitation profile through observation, appraisal, and analysis of their OD practice and its effects, and the heart of this approach is a paradigm shift from providing sanitation facilities to achieving collective behavioral changes with growing evidence on reducing OD usage and creating open defecation free (ODF) environments.^{15,16}

Construction of latrine facility has been widely started in all parts of Ethiopia particularly by giving due attention to rural community since the start of health extension program.¹⁷ Sub-Saharan Africa made the least progress, having decreased the proportion of its population engaged in unsanitary practices by roughly 15%.¹⁸ Unless the speed of movement of change in the WASH sector is accelerated, the SDG 6.2 basic sanitation target may not be achieved by 2030.¹⁹ In low-income countries, diarrhea accounts for the largest share of WASH-related morbidity and mortality, causing 829 000 deaths per annum.¹⁹

Inadequate hygiene and sanitation facilities disproportionately affect vulnerable rural communities in social and economic terms. Poor hygiene and sanitation practices are also viewed as the primary risk to development, affecting the

nation's improvement in well-being, educational status, and gender equality, as well as societal and financial change on a global scale.^{20,21}

For low-income countries like Ethiopia, a cost-effective community-based participatory approach is essential to combat diseases caused by inadequate water, sanitation, and hygiene.²² Through the process, the community is sensitized to the consequences of poor sanitary practices, commits itself to find own solutions, and finally liberates from OD. This helps to increase a receptive environment for the adoption of improved practices in personal hygiene, safe handling of food, and water as well as safe confinement and disposal of excreta and waste.²²⁻²⁴

According to the study conducted in Ethiopia, Clean latrine facility, bad latrine facility, presence of children in the household, traditional latrine facility, and age of families were significantly associated with latrine utilization.¹⁷

The intervention of CLTSH in Ethiopia, include hygiene component, where basic hygiene behaviors, including hand-washing with soap and water at critical times, and safe water handling and treatment at the household level, are also addressed along with the drive to achieve ODF status in all villages of the country.²⁵

The Ethiopian government has placed 2 interventional programs, the introduction of a health extension program since 2003/4 and CLTSH program in 2006.^{26,27} The interventions were held with a vision of 100% improved household and institutional hygiene & sanitation and expected to facilitate in termination of OD through consistent latrine utilization.²⁵ However, the changes that have been recorded so far have not brought change in latrine utilization as required.²⁶

Southern Nations Nationalities and Peoples Region (SNNPR) government was also introducing CLTSH program in various Zonal offices including Sodo wereda which is located under Gurage Zone Administration. The drivers are Community Health Promoters (CHPs) who are volunteers from the community and Health Extension Workers (HEWs), due to the severe resource constraints; the program emphasizes low-cost technology and locally available materials. Whereby many of the latrines are open pits (no slabs or superstructure) using local materials like logs from acacia.²⁸

Inappropriate utilization of latrines and excreta disposal might be contributing to morbidity caused by these sanitation related conditions. In developing countries, there have been few data available concerning utilization of latrine among CLTSH implemented area and data is scarce in this particular study area. This implies that more research needs to be conducted in specific locations with different contexts to provide evidence to concerned bodies; in fact, latrine use and hygiene behavior of the community has been understudied so far, as far as the researcher's knowledge is concerned. Therefore, this study looks into latrine usage and associated factors in CLTSH-implemented rural *kebeles* in Soddoo wereda, Gurage zone, Southern Ethiopia.

Materials and Methods

Study area

A study was conducted in Soddo woreda, Gurage zone, which is located in the Southern Nations, Nationalities, and Peoples' Region (SNNPR) of Ethiopia, 105 km from Addis Ababa, the capital city of Ethiopia, and 197 km from Hawassa, the SNNPR capital city. Soddo woreda is bordered on the South by Meskane, and on the West, North and East by the Oromia Region. It was selected as it is one of CLTSH-implemented Woredas in Gurage zone. According to the last census in 2007, the total population of Soddo woreda was 134683.²⁹ In the woreda, there were 27478 households. In the woreda, there were 29232 rural households and 1778 urban households. The main economic activity of the woreda were agriculture. There are 8 health centers in the woreda, 1 primary hospital, and 54 health posts.

Study design and period

A community based cross-sectional study was conducted from May 01 to June 03/2020,

Population

Source population. The source population for this study was all households found in rural *kebeles* (The term kebele refers to the smallest administrative units) in Soddo woreda where the CLTSH program had been implemented.

Study population. The study population consisted of sampled households in Soddo woreda that used latrines as part of the CLTSH program implementation. Thirteen *kebeles* were chosen at random from a total of 39 *kebeles* where the program had been implemented to assess latrine utilization. We used systematic sampling techniques to select study participants by using a list of households that had implemented the CLTSH program as a sampling frame.

Eligible criteria

Inclusion criteria. In selected *kebeles* of the district, households that owned private latrines were included in the study. Household who had stayed in the area for at least 6 months before data collection date who utilize latrine under CLTSH program were also included in the study.

Exclusion criteria. Respondents who are unable to respond due to mental disorders or other health problems and refused to participate were excluded from the study.

Sample size determination. The sample size for this study was determined by using single population proportion formula using assumptions: margin of error 5%, 95% CI: the estimated latrine utilization, 60% from a study conducted in Chencha District, Southern Ethiopia,³⁰ and the non-response rate of

10%. By multiplying with design of 1.5 we obtain the final sample size of 609 households.

Sampling technique and procedure. The study participants were chosen using a multistage sampling technique. Soddo woreda was chosen on purpose. At the first stage, it was decided that one-third of the total *kebeles* would be sampled; 13 rural *kebeles* were chosen at random from a total of 39 *kebeles* (by lottery method). The number of households included from each *kebele* was proportionally allocated in the second stage. Each household was then chosen using a systematic sampling method. The total number of households in each *kebele* was taken from the administrative *kebele* chosen and used to calculate the sampling interval ($k=N/n$). Depending on number of households found in *kebeles* we calculated separate K value per each *kebele*. Following the first randomly selected household, households at every Kth interval were visited.

Variables

Dependent variable. Latrine utilization

Independent variables. Socio-demographic and economic factors: age, sex, marital status, educational level of the head of the household, household head's occupation, household's monthly income (which calculated from the annual income in monetary terms), Schoolchildren's presence, the presence of children under the age of 5, residential setting.

Behavioral factors: frequency of latrine use, observable feces in the compound and latrine, Frequency of latrine cleaning and cleanness of latrine, disposal means of children feces.

Environmental Characteristics: Place of defecation, Latrine since constructed (Year latrine in service), Superstructure, Presence of handwashing facilities near the latrine, Presence of vegetation around the latrine, Distance of latrine from the house.

Operational definitions. Functional Latrine: Is a facility which is found providing service to households during data collection even if it needs maintenance.³¹

Latrine Utilization: was defined as the use of the latrine by all the family members (above 5 years) in the households, that own private latrine.³²

Satisfactory latrine utilization: A household with a functional latrine and no feces visible in the compound, as well as at least 2 signs of latrine use.³²

Unsatisfactory latrine utilization: A household with latrine not fulfill the criteria of satisfactory latrine utilization.³²

Clean latrine: Pit not full, free from feces inside and around the structure, area properly swept and absence of bad smell at time of data collection.³¹

School children: Refers to the presence of children's attending formal education at elementary school and above in the family.

Data collection procedures. Data was collected using a questionnaire and an observational checklist adapted from previous literature.^{12,13,17} The questionnaires were administered face to face by a trained interviewer, and the observation checklist was used to assess signs of latrine usage such as a visible footpath leading to the latrine, observable splash water or urine on the latrine floor, the presence of fresh feces observed inside the latrine's squat hole, and the observation of at least 1 fly in the latrine.

Data quality control. To ensure data quality, the questionnaires and checklist were created in English, then translated into the local language, and finally back-translated into English by language experts to ensure consistency. Data collectors and supervisors received 2 days of training on data collection procedures. The questionnaire was pre-tested on 5% of the sample to ensure data quality (Cronbach's alpha is .81). Consistent and routine monitoring of data collectors was also carried out to maintain the quality of the data collection process, with thorough approval of the completeness and consistency of the data, followed by feedback during data collection. The data were checked and corrected anything unclear, missing, and ambiguous.

Data processing and analysis. The collected data were entered in to epi-data version 3.1 and analyzed using the statistical package for social sciences (SPSS) version 20. Descriptive statistics like frequency, proportions, and mean were used. To determine which variables were associated with the dependent variable, bivariable analysis was applied to each independent variable. Hosmer and Lemeshow goodness of test and Multicollinearity were checked respectively.^{17,32} Variables with $P < .25$ in the bivariable analysis were entered into the multivariable logistic regression model and a P -value less than .05 was declared to be significant.

Results

Socio demographic characteristics

This study included 585 study participants, with a response rate of 96%. The majority of study participants 438 (74.9%) were females, and 284 (48.5%) were between the ages of 36 and 44 years. About 352 (60.2%) of study participants were not attended formal education. In terms of religion, 402 (68.7%) were Orthodox, and the majority 414 (70.7%) were married. About 347 (59.3%) of respondents had 5 or more family members, and 383 (65.5%) of respondents' households had school children. The majority of participants 254 (43.4%) earned an average monthly income of 39 USD (Table 1).

Availability of sanitation facilities

The majority of households in the woreda, 537 (91.7%), used simple pit latrines, and 544 (86.2%) built their latrines with locally available materials. More than half of the latrines, or 58.6%, were more than 10 m away from dwellers. The majority

Table 1. Socio-demographic characteristics of study participants in the rural community of Soddo Woreda, Gurage Zone, Southern Ethiopia, 2020 (n=585).

VARIABLES	FREQUENCY (%)
Gender	
Male	147 (25.1)
Female	438 (74.9)
Educational status	
Not attended formal education	352 (60.2)
Attended formal education	233 (39.8)
Age	
18-26 years	37 (6.3)
27-35 years	142 (24.3)
36-44 years	284 (48.5)
≥45 years	122 (20.9)
Religion	
Orthodox	402 (68.7)
Catholic	10 (1.7)
Protestant	132 (22.6)
Muslim	41 (7.0)
Marital status	
Single	57 (9.7)
Married	414 (70.8)
Divorced	64 (10.9)
Separated	18 (3.1)
Widowed	32 (5.5)
Family size	
<5	238 (40.7)
≥5	347 (59.3)
Presence of school children	383 (65.5)
Occupation	
Farmer	418 (71.5)
Merchant	78 (13.3)
Housewife	8 (1.4)
Private	61 (10.4)
Labor daily	20 (3.4)
Income (United States Dollar)	
≤39 USD	254 (43.4)
40-59 USD	187 (32.0)
41-79 USD	89 (15.2)
80-99 USD	28 (4.8)
≥100 USD	27 (4.6)

of the available latrines, 458 (78.3%), were not surrounded by vegetation. Only 107 (18.7%) of latrines had a door, and 60 (10.3%) of household latrines had a squat hole cover. The majority of the observed latrines, 52.5%, had been in use for more than 3 years, and only 80 (13.7%) of the latrines had nearby hand washing facilities. However, only 15 (18.8%) of hand washing stations were found to have adequate supply of water and soap (Table 2).

Behavioral factors

All study participants were given information about the CLTSH program. The majority of study participants, 339 (57.9%), were informed about the CLTSH program by local health personnel. In this study, 428 (73.2%) of households were familiar with all CLTSH triggering steps. From these, 382 (89.3%) remembered the pre-triggering phase of the CLTSH steps, and 545 (93.2%) explained that community volunteers were appointed to mobilize and maintain household and environmental sanitation. In terms of techniques used to ignite the community, 236 (46.6%) of households reported that community facilitators were using the transit walk technique to achieve an ODF environment (Table 3).

Latrine utilization

The overall latrine utilization rate in the study woreda was 65.8% (95% CI: 61.8-69.8). The majority of households, 89 (44.5%) prefer to defecate around bushes and 71 (35.5%) prefer to defecate in open fields. Respondents' main reasons for children not using latrines were: large squat hole 120 (37.5%). In terms of latrine cleaning frequency, 212 (36.2%) of households clean their latrines only infrequently, and more than half, 323 (55.2%) of latrines observed were dirty. The vast majority of respondents, 376 (64.3%), wash their hands before eating. Flies were observed in 382 (65.3%) of the households' latrines (Table 4).

Factors affecting latrine utilization

In multivariable logistic regression analysis, educational status, the number of members of the household, presence of school-aged children in the home, the year the latrine was built, the distance from the house, the need for maintenance, the presence of vegetation around the latrine, and the cleanliness of the latrine were all factors significantly associated with proper latrine utilization. However, the presence of a wall for privacy, and the presence of squat hole cover were not significantly associated with latrine utilization.

According to the findings, household heads who were not attended formal education were 76% [AOR=0.24, 95% CI: 0.13-0.44] less likely to use their latrine than mothers who could read and write and above. Households with fewer than 5 family members were 2.53 [AOR=2.53, 95% CI: 1.33-4.84] times more likely to use the latrine than those with 5 or more family members. Households without school children were

Table 2. Distribution of respondents by environmental characteristics in the rural community of Soddo Woreda, Gurage Zone, Southern Ethiopia, 2020 (n=585).

VARIABLES	FREQUENCY (%)
Type of latrine	
Trench	27 (4.6)
Simple pit latrine	537 (91.7)
VIP latrine	21 (3.6)
Latrine construction	
Locally available	504 (86.2)
Locally unavailable materials	11 (1.9)
Mixed materials	70 (12.0)
Latrine with door	107 (18.7)
Latrine with roof	434 (74.2)
Latrine with slab	465 (79.5)
Latrine with wall for privacy	474 (81.0)
Distance of latrine from the house	
<6m	114 (19.5)
6-10m	128 (21.9)
>10m	343 (58.6)
Latrine need maintenance	354 (60.5)
Part of latrine needs maintenance (n=354)	
Super structure	128 (36.2)
Slab	38 (10.7)
Roof	20 (5.6)
Mixed	168 (47.5)
Presence of vegetation around latrine	127 (21.7)
Presence of squat hole cover	60 (10.3)
Hand washing facility near to latrine	80 (13.7)
Detergent for hand washing (n=80)	
Only water	65 (81.2)
Water and soap	15 (18.8)
Time taken to fetch water for round trip	
<30 min	332 (56.8)
30-60 min	122 (20.9)
≥60 min	131 (22.4)
Duration of latrines since constructed	
<1 year	70 (12)
1-3 year	208 (35.5)
>3 year	307 (52.5)

Table 3. Distribution of respondents behavioral characteristics in the rural community of Soddo Woreda, Gurage Zone, Southern Ethiopia, 2020.

VARIABLES	FREQUENCY (%)
Source of information about CLTSH	
Local health Staff	339 (57.9)
Award during formal training	61 (10.4)
Local NGO	124 (21.2)
Political leaders	50 (8.5)
Neighbors and peers	11 (1.9)
Accept the need of CLTSH program	498 (85.1)
Reason not to accept the need of CLTSH program (n=87)	
I don't see its usefulness	21 (24.1)
I didn't recognize it	66 (75.9)
Familiar with CLTSH steps	428 (73.2)
Remember the pre-triggering phase (n=428)	382 (89.3)
Remember the triggering phase (n=428)	347 (81.1)
Remember the post- triggering phase (n=428)	111 (25.9)
Remember the scaling up and going beyond CLTS phase (n=428)	34 (7.9)
Practice of social mobilization	506 (86.5)
Techniques used to ignite the community (n=506)	
Transect walk	236 (46.6)
Feces/sanitation mapping	184 (36.4)
Feces/shit calculation	45 (8.9)
Feces mobility cart	41 (8.1)
Presence of community motivators volunteers	545 (93.2)

85% [AOR=0.15, 95% CI: 0.08-0.28] less likely to use the latrine than school children.

According to this study, households with a latrine in service for less than a year are 76% [AOR=0.24, 95% CI: 0.12-0.49] less likely to use it than those with a latrine in service for more than 3 years, and those with a latrine in service for 1 to 3 years are 61% [AOR=0.39, 95% CI: 0.25-0.64] less likely to use it than those with a latrine in service.

Households with latrines less than 6 m and between 6 and 10m away from the house were 5.94 [AOR=5.94, 95% CI: 3.13-11.27] and 3.94 [AOR=3.94, 95% CI: 1.93-8.03] times more likely to use them, respectively, than those with latrines more than 10m away. When comparing households with a latrine that does not require maintenance to households with a latrine that does require maintenance, the odds of using the latrine were 1.94 [AOR=1.94, 95% CI: 1.04 -3.61] times

Table 4. Distribution of respondents latrine utilization characteristics in the rural community of Soddo Woreda, Gurage Zone, Southern Ethiopia, 2020 (n=585).

VARIABLES	FREQUENCY (%)
Latrine utilization	385 (65.8)
Frequency of latrine use (n=385)	
Daily	238 (61.8)
Mostly	132 (34.3)
Rarely	15 (3.9)
Where do residents who don't use latrines defecate? (n=200)	
Open field	71 (35.5)
Rivers	15 (7.5)
Around bushes	89 (44.5)
Backyards	25 (12.5)
Reason for not using latrine by ≤5 children (n=320)	
Floor not safe stand on	100 (31.3)
Large squat hole	120 (37.5)
Latrine not clean	39 (12.2)
Unreasonable bad smell	10 (3.1)
Being child	51 (15.9)
Place of disposing feces of ≤5 children (n=320)	
In the compound	83 (25.9)
Outside the compound	62 (19.4)
In the bush/tree	23 (7.2)
Disposing by burying	19 (5.9)
In the pit latrine	133 (41.6)
When do you wash your hands (Multiple response allowed)?	
After defecation	338 (57.8)
After cleaning child's bottom	227 (38.8)
Before feeding children	169 (28.9)
Before preparing food	314 (53.7)
Before eating food	376 (64.3)
Poor cleanliness of latrine	323 (55.2)
Frequency of cleaning latrine	
Daily	71 (12.1)
When dirty	172 (29.4)
Rarely	212 (36.2)
Never cleaned	130 (22.2)
Presence of fly inside latrine	382 (65.3)

higher. The odds of using the latrine were 4.56 [AOR=4.56, 95% CI: 2.27-9.18] times higher in households with no vegetation around their latrine than in households with vegetation around their latrine. Households with clean latrines were 2.19 [AOR=2.19, 95% CI: 1.17-4.12] times more likely to use their latrines than those with dirty latrines (Table 5).

Discussion

Lack of water, sanitation, and hygiene facilities, as well as poor practices, are major development challenges, affecting the nation's improvement in well-being, educational status, and gender equality, as well as societal and financial change. According to the findings of this study, the overall latrine utilization rate was 65.8%, (95% CI: 61.8-69.8). The findings of this study were higher than those of previous studies conducted in Hulet Ejju Enessie Woreda, East Gojjam Zone (61%),³³ and the study conducted in Laelay Maichew district, North Ethiopia (46.8%).³⁴ However, lower than the study conducted in Wondo Genet District, Southern Ethiopia (83.1%).³⁵ The differences could be explained by differences in the study areas' CLTSH program implementation.

Households with heads who could not attend formal education were 76% less likely to use the latrine than households with heads who could attend formal education. The findings were consistent with those of a study conducted in the Dembiya District.³⁶ This could be due to illiterate people's resistance to change and preference for old practices such as open defecation. As a result, head illiteracy may have a negative impact on latrine utilization in the home.

Households without school children were 85% less likely to use latrines than households with school children. The findings of this study were consistent with those of a study conducted in the Gulomekada District of Tigray Region.³⁷ This could be due to a lack of adequate information about latrine usage in households without school children.

Households with 5 or more members were 2.53 times more likely to use the restroom. This could be due to the fact that the proportion of shits dropped in constructed latrines had no effect. According to this study, the duration of a latrine since it was built (latrine in service) was 76%, and latrines aged 1 to 3 years were 61% less likely to be used than those with a 3 year history of use. A similar study in Gulomekada District, Tigray Region, supports this finding.³⁷ The newer latrine might not be constructed after the household's knowledge about latrine utilization was improved and may not immediately understand the benefit of using latrine.

Households that locate their latrine within 6 m and between 6 and 10 m of their residence were found to be 5.94 and 3.94 times more likely to use their latrine, respectively, than those that locate their latrine more than 10 m from their residence. This finding is similar to that of a study conducted in the

Laelay Maichew district of North Ethiopia.³⁴ It is primarily due to the fact that latrines located a long distance from the house were inconvenient for disabled and elderly household members to use.

Households whose latrines were not in need of maintenance at the time of data collection were 1.94 times more likely to use their latrines than those whose latrines were in need of maintenance. This finding is consistent with the findings of a study conducted in Awabel District, Northwest Ethiopia.³⁸ This might be due to the fact that households who had latrines out of maintenance need may feel more secure and got privacy during latrine utilization.

Households with no vegetation around their latrine were 4.56 times more likely to use it than households with vegetation around the latrine. This could be because households whose latrine was free of vegetation were encouraged to use their latrine due to privacy concerns.

Households with clean latrines were 2.19 times more likely to use latrines than counters. This study was similar to the one conducted in Laelay Maichew Woreda, Northern Ethiopia.³⁹ The possible reason for this is that users prefer to have a clean and better using environment that is appealing and attractive to use rather than unclean latrines.

Conclusion

Based on the findings of this study, we concluded that open field defecation is still practiced by rural residents in CLTSH-implemented *kebeles*. Latrine utilization were significantly associated with mothers' educational status, family size, latrine maintenance, the presence of school children, the age of the latrine, the distance of the latrine from the house, the presence of vegetation around the latrines, and the cleanliness of the latrines. Therefore, there is a need to raise community awareness by providing regular training on proper latrine construction, latrine usage, and sanitation and hygiene practices. Health workers, community leaders and local authorities should give special emphasis to improve utilization of latrine and it needs to put due attention on the aforementioned factors to promote hygiene and sanitation behavior of the community.

HEW's and the Local Government should initiate and sustain measures such as training of community engineers and natural leaders on sanitation and hygiene, and sensitization of communities to improve hygiene and sanitation behavior to end Open Defecation (OD) by promoting consistent latrine utilization. Furthermore, strengthen and increase measures that improve the implementation of the CLTSH approach such as follow up of triggered villages until declare of Open Defecation Free (ODF) status. Moreover, follow up of organized interventions performance and provide comprehensive and supportive feedback to performers on time.⁴⁰

Table 5. Multivariable logistic regression analysis of factors affecting latrine utilization in the rural community of Soddo Woreda, Gurage Zone, Southern Ethiopia, 2020 (n=585).

VARIABLES	LATRINE UTILIZATION		COR (95% CI)	AOR (95% CI)	P-VALUE
	YES (%)	NO (%)			
Educational status					
Not attended formal education	190 (53.97)	162 (46.03)	0.23 (0.15-0.34)	0.24 (0.13-0.44)	.001**
Attended formal education	195 (83.69)	38 (16.31)	1.00	1.00	
Family size					
<5	185 (77.7)	53 (22.3)	2.57 (1.77-3.72)	2.53 (1.33-4.84)	.005*
≥5	200 (57.6)	147 (42.3)	1.00	1.00	
Presence of school children					
Yes	272 (71.0)	111 (30.0)	1.00	1.00	.001**
No	113 (56.0)	89 (44.0)	0.52 (0.36-0.74)	0.15(0.08-0.28)	
Presence of wall for privacy					
Yes	322 (69.93)	152 (30.07)	1.61 (1.06-2.46)	1.26 (0.72-2.21)	.414 ^{ns}
No	63 (56.75)	48 (43.25)	1.00	1.00	
Year since latrine constructed					
<1 year	28 (40.0)	42 (60.0)	0.17 (0.10-0.30)	0.24 (0.12-0.49)	.001**
1-3 years	113 (54.3)	95 (45.7)	0.31 (0.21-0.45)	0.39 (0.25-0.64)	.001**
>3 years	244 (79.5)	63 (20.5)	1.00	1.00	
Distance of latrine to house					
<6m	96 (84.2)	18 (15.8)	4.66 (2.70-8.05)	5.94 (3.13-11.27)	.001**
6-10 m	106 (82.8)	22 (17.2)	4.21 (2.54-6.99)	3.94 (1.93-8.03)	.001**
>10 m	183 (53.3)	160 (44.7)	1.00	1.00	
Latrine needs maintenance					
Yes	196(55.4)	158 (44.6)	1.00	1.00	.037*
No	189(81.8)	42 (18.2)	3.63 (2.44-5.38)	1.94 (1.04-3.61)	
Presence of vegetation					
Yes	71 (55.9)	56 (44.1)	1.00	1.00	.001**
No	314 (68.6)	144 (31.4)	1.72 (1.15-2.57)	4.56 (2.27-9.18)	
Presence of squat hole cover					
Yes	334 (63.6)	191 (36.4)	3.24 (1.56-6.73)	1.33 (0.43-4.08)	.62 ^{ns}
No	51 (85.0)	9 (15.0)	1.00	1.00	
Cleanness of latrine					
Yes	214 (81.7)	48 (18.3)	3.96 (2.71-5.81)	2.19 (1.17-4.12)	.015*
No	171 (52.9)	152 (47.1)	1.00	1.00	

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio; Significant at * $P < .05$, ** $P < .01$, ns, not significant; 1.00, Reference

Acknowledgements

Authors would like to thank the Hawassa University, department of environmental health for approval of ethical clearance. The authors are also very grateful for data collectors and study participants. Finally, our special thanks go to Genet Elias for her genuine support.

Author Contribution

ETW contributed to conceiving and designing the study. AE, TA, and ZA analyzed and interpreted the data. AE and ZA wrote the manuscript. All the authors read and approve the final manuscript.



Availability of Data

Data will be made available by request.

Ethical Consideration

Both verbal and written consent were considered and supportive letters from Hawassa University and different stakeholders has been secured and also Approval from IRB of the university was secured (approval no./ID: IRB/096/12, Date 20 April 2020) before the implementation of the research.

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REFERENCES

- WHO, UNICEF. *Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines*. World Health Organization (WHO) and the United Nations Children's Fund (UNICEF); 2017. Report no. CC BY-NC-SA 3.0 IGO.
- AMCOW (2010), WHO/UNICEF Joint Monitoring Programmed for Water Supply and Sanitation. *All Data From a Snapshot of Drinking Water and Sanitation in Africa – 2010 Update*. AMCOW; 2010.
- UN. The Millennium Development Goals Report. 2013. Accessed November 26, 2021. <https://www.un.org/millenniumgoals/pdf/report-2013/mdg-report-2013-english.pdf>
- WHO. Progress on household drinking water, sanitation and hygiene 2000–2020: Five years into the SDGs. 2021.
- Central Statistical Agency (CSA) and ICF. *Ethiopia Demographic and Health Survey, 2016*. CSA and ICF; 2017.
- Osumanu IK, Kosoe EA, Ategeeng F. Determinants of open defecation in the Wa Municipality of Ghana: empirical findings highlighting sociocultural and economic dynamics among households. *J Environ Public Health*. 2019;2019:3075840.
- Millner PD. Bioaerosols associated with animal production operations. *Bioresour Technol*. 2009;100:5379-5385.
- FDRE. Community-led total sanitation and hygiene (CLTSH) facilitators training guide in January 2011. 2011.
- Clasen TF, Bostoen K, Schmidt WP, et al. Interventions to improve disposal of human excreta for preventing diarrhoea. *Cochrane Database Syst Rev*. 2010;6:CD007180.
- MoH. *National Drinking Water Quality Monitoring and Surveillance Strategy*. Federal Democratic Republic of Ethiopia, Ministry of Health; 2011: 10.
- Bekele T, Leta S. Water supply and health: drinking water and sanitation coverage in Ethiopia 1990 - 2015 review. *Int J Environ Agric Biotechnol*. 2016;1:11-24.
- Araya M; UNICEF Ethiopia. Leadership matters: the case of community led total sanitation and hygiene, unite for children of Ethiopia. 2016. Accessed May 28, 2020. <https://unicefethiopia.wordpress.com/2016/04/13/leadership-matters-the-case-of-cltsh>
- Gebremariam B, Hagos G, Abay M. Assessment of community led total sanitation and hygiene approach on improvement of latrine utilization in Laelay Maichew District, North Ethiopia. a comparative cross-sectional study. *PLoS One*. 2018;13:e0203458.
- Kar K, Chambers R. *Handbook on Community-Led Total Sanitation*. Plan UK; 2008.
- Chambers R. Going to scale with community-led total sanitation: reflections on experience, issues and ways forward. Institute of Development Studies practice paper. 2009: 10.
- González AH. Pathways to sustainability in community-led total sanitation. Experiences from Madhya Pradesh and Himachal Pradesh. 2013. Accessed December 26, 2021. <https://riunet.upv.es>
- Chanie T, Gedefaw M, Ketema K. Latrine utilization and associated factors in rural community of Aneded District, North West Ethiopia, 2014. *J Community Med Health Educ*. 2016;06:478.
- Tiaji SB. Global Access to Clean Drinking Water and Sanitation: U.S. and International Programs. Congressional Research Service; 2012. Report no. R42717.
- WHO. *Water, Sanitation, Hygiene and Health: A Primer for Health Professionals*. World Health Organization (WHO/CED/PHE/WSH/19.149), Licence: CC BY-NC-SA 3.0 IGO; 2019.
- Caruso BA, Clasen TF, Hadley C, et al. Understanding and defining sanitation insecurity: women's gendered experiences of urination, defecation and menstruation in rural Odisha, India. *BMJ Glob Health*. 2017;2:e000414.
- Baker KK, Story WT, Walser-Kuntz E, Zimmerman MB. Impact of social capital, harassment of women and girls, and water and sanitation access on premature birth and low infant birth weight in India. *PLoS One*. 2018;13:e0205345.
- Department for International Development. Policy paper, 2010 to 2015 government policy: water and sanitation in developing countries GOV.UK, Published March 22, 2013, Updated May 8, 2015. Accessed December 15, 2021. <https://www.gov.uk/government/publications/2010-to-2015-government-policy-water-and-sanitation-in-developing-countries>
- Kar K, Pasteur K. Subsidy or self-respect? Community led total sanitation. *An update on recent developments*. Working Paper 257. IDS; 2005.
- Marielle SNEL, Jacimovic R. Pan African programme countries and their national CLTS policies: empowering self-help sanitation of rural and peri-urban communities and schools in Africa. 2012.
- Bongartz P, Musyoki SM, Milligan A, et al. Tales of shit: community-led total sanitation in Africa- an overview. *Participatory Learning and Action*. 2010;61:27.
- FDRE, MOH. Health sector development programme IV. Addis Ababa, Ethiopia; 2010.
- WHO, UNICEF. Progress on drinking water and sanitation: 2014 update. 2014. Accessed November 24, 2021. <https://reliefweb.int/report/world/progress-drinking-water-and-sanitation-2014-update-1>
- FDRE, MoH. Implementation guideline for CLTSH programming. 2012.
- Mehta L, Bongartz P. *Community-led total sanitation (CLTS) across the seas: experiences from Africa with a special emphasis on Ethiopia*. RiPPL Working Paper 12. RiPPL; 2009.
- Population Census Commission, AAE. *Summary and Statistical Report of the 2007 Population and Housing Census. Population Size by Age and Sex [2008]*. Federal Democratic Republic of Ethiopia, Population Census Commission; 2007.
- Chare Koyra H, Mensa Sorato M, Shiferaw Unasho Y, Zema Kanche Z. Latrine utilization and associated factors in rural community of Chencha District, southern Ethiopia: a community based cross-sectional study. *Am J Public Health Res*. 2017;5:98-104.
- Temesgen A, Molla Adane M, Birara A, Shibabaw T. Having a latrine facility is not a guarantee for eliminating open defecation owing to socio-demographic and environmental factors: the case of Machakel district in Ethiopia. *PLoS One*. 2021;16:e0257813-e0257813.
- Budhathoki SS, Shrestha G, Bhattachan M, Singh SB, Jha N, Pokharel PK. Latrine coverage and its utilisation in a rural village of Eastern Nepal: a community-based cross-sectional study. *BMC Res Notes*. 2017;10:209.
- Anteneh A, Kumie A. Assessment of the impact of latrine utilization on diarrhoeal diseases in the rural community of Hulet Ejju Enessie Woreda, East Gojjam Zone, Amhara Region. *Ethiop J Health Dev*. 2010;24:110-118.
- Gebremariam B, Tsehaye K. Effect of community led total sanitation and hygiene (CLTSH) implementation program on latrine utilization among adult villagers of North Ethiopia: a cross-sectional study. *BMC Res Notes*. 2019;12:478.
- Tesfaye A, Abel FD, Zemichael G. Latrine utilization and associated factors among kebeles declared open defecation free in Wondo Genet district, South Ethiopia, 2015. *ISABB J Health Environ Sci*. 2018;5:43-51.

37. Yimam YT, Gelaye KA, Chercos DH. Latrine utilization and associated factors among people living in rural areas of Denbia district, Northwest Ethiopia, 2013, a cross-sectional study. *Pan Afr Med J.* 2014;18:334.
38. Debesay N. Latrine utilization and associated factors in the rural communities of Gulomekada District, Tigray Region, North Ethiopia, 2013: a community based cross-sectional study. *J Community Med Health Educ.* 2015;05:338. doi:10.4172/21610711.1000338
39. Gedefaw M, Amsalu Y, Tarekegn M, Awoke W. Opportunities, and challenges of latrine utilization among rural communities of Awabel District, Northwest Ethiopia, 2014. *Open J Epidemiol.* 2015;5:98-106.
40. Gebremedhin G, Tetemke D, Gebremedhin M, et al. Factors associated with latrine utilization among model and non-model families in Laelai Maichew woreda, Aksum, Tigray, Ethiopia, comparative community based study. *BMC Res Notes.* 2018;11:586.