

Latrine use and Determinant Factors in Southwest Ethiopia

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Abstract

Background: Despite encouraging progress on sanitation, Ethiopia didn't meet the MDG sanitation target. According to Ethiopian DHS survey in 2014, 82.5% of the urban and 97.5% of the rural population had no access to improved sanitation, and that 8.7% of urban and 37.5% of the rural population practiced open defecation. This study aims to assess latrine use and associated factors at households in Southwest Ethiopia.

Method: This cross-sectional study employed a household survey and observation of latrine facilities in Ilu Aba Bor Zone in Southwest Ethiopia. The survey questionnaire and observation checklist were adapted from the Afan Oromo version of the Demographic and Health Survey (DHS) and other scientific literature. A total of 823 households were randomly selected through systematic sampling in selected kebeles. Logistic regression was used to explore factors associated with latrine use.

Results: Out of 823 households interviewed, 88.2% had latrines. Among these, about one third (32.8%) of the respondents did not use them at all, only 36% reported their consistent use, and 31.3% used them occasionally. Factors associated with household latrine use were presence of a child attending formal education in household (Adjusted OR=2.30, 95% CI: 1.15-4.59), heard information about latrine (Adjusted OR=3.34, 95% CI: 1.59-7.02), presence of a hand washing facility Adjusted OR=4.08, 95% CI: 1.62-10.27), yearly household income (Adjusted OR=9.90, 95% CI: 2.66-36.82) and age of latrine (Adjusted OR=2.85, 95% CI: 1.54-5.26).

Conclusion: In this study, despite evidence of high latrine coverage in the study area compared to other recent surveys and studies in similar areas, most latrines needed repair and maintenance, and were not used properly by the households. Therefore, continued hygiene, health and sanitation education, and encouragement to households to construct and consistently use latrines is crucial.

Keywords: Latrineuse; Sanitation; Southwest Ethiopia

Background

Despite encouraging progress on sanitation, most of Sub-Saharan Africa did not meet the MDG sanitation target. In 2015 it is estimated that 2.4 billion people globally still use unimproved sanitation facilities. Of these, an estimated 1 in 8 (946 million) people still practice open defecation worldwide [1]. Ethiopia achieved the largest decrease in the proportion of the population practicing open defecation, from 44.3 million Ethiopians in 1990 to 28.3 million in 2015, or an average reduction of over 4 percentage points per year over 25 years [1].

In developing countries, 47 % of the population has living in unhygienic environment, while in developed countries the proportion is only 1% [2]. The sanitation coverage of rural and urban was 39% and 71% respectively in developing countries [2]. Nowadays, globally 80% users of unhygienic sanitation facilities and 85.7% who practice open defecation were live in rural areas [3]. The Ethiopian DHS survey in 2014 estimated that 82.5% of the urban and 97.5% of the rural population had no access to improved sanitation, and that 8.7% of urban and 37.5% of the rural population practiced open defecation [4]. Poor sanitation has great impact on public health because it facilitates transmission of infectious pathogens in the human excreta [2]. Globally about 1.5 million children die due to diarrheal diseases each year, 88% of these deaths occurring due inadequate sanitation, improper hygiene, and unsafe drinking water [2].

Ethiopia is one of Sub-Saharan countries in which still significant numbers of people are still living in unimproved hygiene and need rapid improvement of sanitation which call for detail research [5]. To improve sanitation and hygiene throughout the country, federal ministry of health setted the goal that every households should have access to latrine and large-scale interventions were implemented to increase sanitation coverage [6]. However, the strategy gives emphasis to the coverage without focusing on its use. To address the rapidly increasing demand for sanitation, identifying current level of use and its predictors is the most important issue. Therefore, one major objective of this study was to assess latrine use and associated factors in southwest Ethiopia, where the Health Extension Program has been implemented.

Materials and Methods

Study setting and design

This cross sectional survey was conducted in Ilu Aba Bor Zone, located approximately 600 km from Addis Ababa in the Southwest Oromia Region of Ethiopia. It has a total population of 1,503,733, with people residing in 22 rural districts and 2 town districts. It is bounded by East Wollega and West Wollega zone in the north, West Wollega zone and Kellem Wollega zone in the West, Jimma zone in the east and Gambella region in the south. The study zone has 2 hospitals, 56 health centers, and 481 health posts (Ilu Aba Bor annual zonal office report, unpublished).

Sample size and Sampling technique

The sample size for the survey was calculated by using the formula for a single population proportion, including a 95 % CI, 5% margin of error, and estimate of 58.4% of households using latrines, based on a previous study in Ethiopia [7]. With a 10% adjustment for non-response rate and a design effect of 2, the resulting calculation for a total sample size was 823 households. The study employed a multi-stage sampling technique, taking into consideration that socio-demographic factors affecting latrine use might differ based on the household's distance from the town. The 24 districts were first stratified into three groups (urban, semi-urban, and rural districts), and then seven districts (Bedelle town, Bedelle rural district, Gachi district, Dabo hana district, Bure district, Algie district and Darimu district) were randomly selected by lottery method by proportional allocation to size (1 from the first, 2 from the second and 4 from the third stratum). Then, a proportional sample size was allocated according to the number of kebeles in each district. Accordingly 60, 140, 120, 84, 86, 107 and 226 households were selected from Bedelle town, Bedelle rural, Gachi, Dabo hana, Bure, Algie and Darimu districts respectively. Households were randomly selected from a list provided by the district administration. Intervals (K^{th}) for selecting households were determined by dividing the number of households with the sample size allocated for each districts. After determining the K^{th} interval, the first household was selected randomly. The next households were identified systematically onwards by adding cumulatively K^{th} intervals to the first selected household.

Data collection method and analysis

Data were collected by diploma health professionals after training using a pretested, structured questionnaire prepared in English and then translated into the local language of Afan Oromo. Data collectors administered the questionnaire through household visits. Information was primarily collected from the head of households (father or mother), or if this was not possible, from another adult household member selected randomly by lottery method. Information related to socio-demographic characteristics was collected by questionnaire while latrine availability, latrine condition and its use was collected by checklist through observation. Data was entered into Epidata version 3.1, and Stata version 11.0 was used for analysis. Descriptive statistics provided means and percentages related to socio-demographic characteristics, latrine use, and condition. Univariate logistic regression was used to analyze the association of each variable with latrine use. Multi-logistic regression model was developed to further assess the impact of variables on the latrine use.

Operational definitions

Pit latrine: Is the simplest form of dry latrine and consists of a pit dug in the ground and a cover slab or floor above the hole.

Functional latrine: Is defined as a latrine which has super structure, some type of closure over the pit/slab and currently in use.

Consistent latrine use: Was assumed when all family members used the latrines as reported by the respondents, and no faeces were observed to be present in the vicinity.

Availability of hand washing facility: This is usually a plastic container hung from a tree which can be tilted or tipped to release a small amount of water for washing hands.

Availability of water: This is presence of water in the plastic container hung from a tree which can be tilted or tipped to release a small amount of water for washing hands during the observation.

Ethical consideration

Ethical clearance was obtained from the Mettu University Faculty of Public Health and Medical Sciences Institutional Research Ethics

Review Committee, as well as from the zonal and district-level health offices. Before each interview, researchers sought consent from each respondent.

Results

Socio-demographic characteristics

In total, 823 households were interviewed with a response rate of 100%. The respondents were either the head of the household or adult household member. The mean \pm standard error (S.E) age of the respondents was 36.1 \pm 12.2 years with an average household family size of 5.2. The majority of the respondents were married (727, 88.3% and 518 (62.9%) had a family size of five or more. About 202 (25.7%) fathers and 389 (47.7%) mothers were literate (at least can read and write). Among the households, 337 (40.9%) had children attending at primary or junior high school. The majority of the respondents (710, 86.3%) were engaged in farming, and 713 (86.6%) households had an income of less than 5,000 Ethiopian Birr per year (Table 1).

Variables	Frequency	Percent
Sex		
Male	745	90.5
Female	78	9.5
Age (years)		
15-29	280	34.0
30-44	335	40.7
\geq 45	208	25.3
Marital Status		
Single	53	6.4
Married	727	88.3
Divorced	10	1.2
Widowed	29	3.5
Separated	4	0.5
Husband educational level		
Illiterate	202	25.7
Literate	584	74.3
Wife educational level		
Illiterate	389	47.7
Literate	426	52.3
Occupation		
Farmer	710	86.3
Governmental Employee	31	3.8
Merchant	54	6.6
Daily laborer	22	2.7
Other	6	0.7
Monthly income of HH (birr)		
< 5,000	713	86.6
\geq 5,000	110	13.4
Family Size		
< 5	305	37.1
\geq 5	518	62.9
Presence of radio in the HH		
No	467	56.7
Yes	356	43.3
Presence of television in the HH		
No	774	94
Yes	49	6
Presence of mobile in the HH		
No	400	48.6
Yes	423	51.4

Table 1: Socio-demographic characteristics of respondents, Ilu Aba Bor Zone, Southwest Ethiopia, 2015

Latrine coverage and use

Of the households, 726 (88.2%) had latrines and the majority were pit latrines 661(91%). More than half of the latrines (441, 60.7%) were constructed 2 or more years prior to the time of the study. At the time of data collection, 220 (62.0%) latrines were functional.

The health extension workers had promoted the construction and supervised the work to make proper dry pit latrines, but for different reasons some households did not construct the latrines as instructed. Wood slab with a plastic sheet super structure was the most common material used for the construction of the latrine. Furthermore, per the observational checklist, 296 (40.8%) of the latrines needed repair and maintenance of slabs, walls, roofs or dug.

Out of the interviewed 726 households with latrines, about one third of the respondents (32.8%) did not use them at all, only 261 (36%) reported their consistent use, and 227 (31.3%) used them occasionally. Consistent use was assumed when all family members used the latrines as reported by the respondents, and no feces were observed to be present in the vicinity. Of the available latrines, 34 (4.7%) were located at a distance of less than 6 meters from the home. Of the households with latrines, only 82 (11.3%) had hand-washing facilities, among them only 25 (30.5%) had water and 7(8.5%) had detergents available during data collection (Table 2).

Variables	Frequency	Percent
Has latrine		
No	97	11.8
Yes	726	88.2
Use of latrine		
No	238	32.8
Yes	488	67.2
Type of latrine		
Pit latrine	661	91
Others	65	9
Availability of latrine construction materials		
Available	672	81.6
Not available	151	18.4
Functionality of latrine		
Yes	718	98.9
No	8	1.1
Distance of latrine from home		
< 6 meters	34	4.7
6-10 meters	188	25.9
> 10 meters	504	69.4
Age of latrine (in years)		
<2yrs	285	39.3
>2yrs	441	60.7
Latrine condition		
Need maintenance	296	40.8
Not need maintenance	430	59.2
Availability of hand washing facility		
No	644	88.7
Yes	82	11.3
Availability of water for hand washing		
No	57	69.5
Yes	25	30.5
Availability of detergent for hand washing		
No	75	91.5
Yes	7	8.5
Diarrheal disease in household in last month		
No	692	15.9
Yes	131	84.1

Table 2: Latrine availability, use, conditions, Ilu Aba Bor Zone, Southwest Ethiopia, 2015

Factors associated with latrine use

Bivariate analysis was carried out to examine the associated factors for latrine use at the household level. Many variables were explored to test association of Adjustment of variables using logistic regression was carried out to predict variables that were associated with latrine use during the crude analysis. Factors associated with the use of latrine by households were presence of a child attending formal education in the household (Adjusted OR=2.30, 95% CI: 1.15-4.59), heard information about latrines (Adjusted OR=3.34, 95% CI: 1.59-7.02), presence of a hand washing facility Adjusted OR=4.08, 95% CI: 1.62-10.27), yearly household income (Adjusted OR=9.90, 95% CI: 2.66-36.82) and age of latrine (Adjusted OR=2.85, 95% CI: 1.54-5.26) (Table 3).

Discussion

Out of the 726 households interviewed that had latrines, 32.7% of the respondents did not use them at all; only 36% reported using them

Variables	Latrine use		Crude OR (95% CI)	Adjusted OR (95% CI)
	No	Yes		
Head of HH				
Yes	237	420	1.00	1.00
No	1	68	38.37 (5.29-278.12)	7.40 (0.84-65.07)
Children in HHS attend formal education				
Yes	148	240	1.00	1.00
No	90	248	1.70 (1.24-2.33)	2.30 (1.15-4.59) *
Television in HH				
Yes	7	38	1.00	1.00
No	231	450	0.36 (0.16-0.82)	0.33 (0.07-1.52)
Heard about latrine				
No	89	89	1.00	1.00
Yes	149	399	2.68 (1.89-3.80)	3.34 (1.59-7.02) *
Latrine condition				
No need of maintenance	179	251	1.00	1.00
Needs maintenance	59	237	2.86(2.03-4.04)	3.20(1.68-6.11) *
Availability of hand washing facility				
No	229	415	1.00	1.00
Yes	9	73	4.48 (2.20-9.11)	4.08(1.62-10.27) *
Family size				
≥ 5	104	158	1.00	1.00
< 5	134	330	1.62 (1.18- 2.23)	1.29 (0.65-2.57)
Husband education				
Illiterate	38	138	1.00	1.00
Literate	190	329	0.48 (0.32-0.71)	0.52 (0.25-1.06)
Income				
<5000 Et. birr per yr	219	406	1.00	1.00
≥ 5000 Et birr per yr	19	82	2.33 (1.38-3.94)	9.90(2.66-36.82) *
Type of latrine				
Pit latrine	205	456	1.00	1.00
Others	33	32	2.29 (1.37-3.83)	1.86 (0.53-6.49)
Latrine year of construction				
<2 yrs	39	146	1.00	1.00
≥ 2 yrs	99	342	3.29 (2.38-4.54)	2.85 (1.54-5.26) *
Frequency of supervision				
One times	114	167	1.00	1.00
Two and more	5	32	4.37 (1.65-11.55)	3.58 (0.98-13.08)

Table 3: Final logistic regression model for household's latrine use in Ilu Aba Bor zone, South West Ethiopia, 2015

*p<0.05 – Significantly associated

consistently, and 31.3% reported using them occasionally. Consistent use was assumed when all family members used the latrines as reported by the respondents, and no faeces were observed to be present in the vicinity. The consistent use of latrines in this study was lower than that of Tigray in northern Ethiopia [8], and rural Msongora in Tanzania [9]. The variations might be due to different demographic characteristics, their perceptions and economic status of the three groups.

This study found that only 11.8% of the households lacked pit latrines, a low proportion compared to the 45% of households in rural areas lacking latrine facilities per the 2011 Ethiopia DHS and 32.3% in a study in rural North Shewa zone in Amahara region [10, 11]. Despite high latrine coverage in this study, consistent latrine use was very low. The health extension workers promote the awareness among the rural communities of the benefits from constructing latrines, but have been less active in teaching proper use and maintenance.

At the time of data collection, nearly all latrines (98.9%) were functional (able to be used); this is higher than that reported in a study conducted in rural Zinder in Niger [12] and (86.7%) reported from study done in Hulet Ejju Enessie district of Ethiopia [13]. Among the available pit latrines, 40.8% required maintenance; a lower proportion compared to the 47.2% found in the Hulet Ejju Enessie study [13]. In order to avoid inconvenience and the related health risks literatures recommend building a latrine with a minimum of 6 meters far away from the home [14,15], 4.7% of the available latrines were located at distance less than 6 meters from the home.

In this study only 11.3% latrine facilities had hand washing facilities. This is higher with the findings from Kersa Woreda, Eastern Ethiopia, which indicated that about 5.1% of households had a habit of hand washing after defecation [16]. In this study, the likelihood of latrine use was 4-fold higher among households that had a latrine with a hand washing facility compared to those with no hand washing facility.

Households with very high yearly income were 9.90 times more likely to use latrines than their counterparts with low incomes. This finding is in line with the results of a study conducted in Tigray, northern Ethiopia, [8]. This might be due to higher income rural households being more likely to accept health extension programme packages and adopt the promoted behaviors.

Latrine use was also affected by the age of the latrine, with households 2.85 times more likely to use latrines constructed two or more years ago compared to recently constructed latrines. It may be that households having a latrine for a longer period of time were more accustomed to using them. Latrine use was significantly associated with latrines needing maintenance. This may be due to more frequently used latrines needing maintenance after a certain period of use compared to unused ones. Respondents who had heard information about latrines were more likely to use them compared to their counterparts. This may be related to the difference in the knowledge and awareness levels of the two groups regarding human waste management and human health.

Finally, this study shares the limitations of cross-sectional studies and hence it might suffer from temporal relationship establishment with some variables and might not provide much stronger evidence of causality. However, this study identified some important factors which affect latrine use by households and the level of latrine use in the study setting.

Conclusions

Though latrine coverage was high in this study compared to other recent studies and surveys in similar rural areas, most of the latrines were dry pit

latrines constructed from locally available material, needing repair and maintenance and were not used properly by the households. Therefore, economic or material support that enables households to construct and maintain latrine, health and sanitation education, and encouragement to households to consistently use latrines is crucial.

Competing Interests

The authors declare that they have no competing interests.

Author's Contributions

DO design the survey, trained the research team, oversaw the fieldwork and participated in editing the manuscript. TSB participated in the design of the survey, trained the research team and oversaw the fieldwork and critical revision of the manuscript. All authors read and approved the final version of the manuscript.

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