

Assessment of Household Level Sanitation Practice of Mothers' and Associated Factors in Gedeo Zone, South Ethiopia

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Abstract Background: Provision of good and consistence sanitation practice plays an essential role in protecting human health to prevent communicable diseases. The aim of this study was to assess household level sanitation practice of mothers' and associated factors in Gedeo Zone, South Ethiopia. **Methods:** Community based cross-sectional study design was conducted in Gedeo Zone, South Ethiopia. 634 systematically selected mothers were included in the study. Data was collected using structured questionnaire and entered into SPSS version 20.0 for analysis. Descriptive statistics were computed and logistic regression model was used to identify factors associated with outcome variable. **Result:** In the study only about 12.5% mothers were good sanitation practice. Majority of the mothers' in the households, (68%) had shared toilet facility and almost all were simple traditional pit without a slab. From those mothers' in the households with toilet facility, hand washing practices after critical period was reported to be 44.2%. Current study revealed that ethnicity, presence of hand washing near the latrine, source and protection of source of water supply had shown significant association. **Conclusion:** sanitation practice by mothers at household level in the study area was low. So health workers must pay special attention to improve this problem.

Keywords: sanitation practice, mothers, household level

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1. Introduction

Provision of water supply, sanitation and hygiene plays an essential role in protecting human health for preventing disease. Good sanitation practices at community level help to prevent human-to-human transmission of infectious diseases [1]. Sanitation is among the most basic human needs and is a prerequisite to human health and development [2].

Worldwide, 1 in 3 people, or 2.4 billion, are still without sanitation facilities – including 946 million people who defecate in the open field. Access to improved drinking-water sources has been a major achievement for countries and the international community. With some 2.6 billion people gaining access since 1990, 91% of the global population now has improved drinking-water [3].

When human being does not have access to sanitation facilities, they suffer a lot in the overall socio-economic and environmental existence. Poor sanitation is also responsible for diseases such as trachoma, schistosomiasis, ascariasis, trichuriasis and hookworm infestation and contribute to an additional burden of disease [4]. Improper waste management also has health and environmental hazards. Studies showed that there is relationship of many infectious diseases to improper waste management [5].

Over 50 different infections are potentially transmitted from an infected person to a healthy one by various routes involving excreta. The use of sanitation facilities is known to interrupt the transmission of faeco oral related diseases [6]. The main problems, especially in developing countries, are the results of poor access of potable water, poor hygiene and sanitation practices [7]. Inadequate and unsafe water, poor sanitation and unsafe hygiene practices are the main causes of communicable diseases like diarrhea [8].

The combined effects of inadequate sanitation, unsafe water supply and poor personal hygiene are responsible for 88% of childhood deaths from diarrhea [5]. Of the 2.2 million people estimated to die each year from diarrhea as related diseases, the great majority were children, with a death rate of 5,000 children a day often being cited. The strong links between these figures and open defecation (OD), lack of access to, or use of, means for safe disposal of human excreta, lack of hygienic practices and contaminated water are not in dispute [9].

According to 2015 WHO/UNICEF JMP for water supply and sanitation report, the improved drinking water coverage and improved sanitation facilities reaches 91% and 68% respectively but about 2.4 billion people lack improved sanitation facilities and 663 million people lack improved drinking water sources. This report also show that nine out of ten rural residents still practice

open defecation in 2015 [3]. Report of Ethiopia Mini Demographic and Health Survey of 2014 also showed that about 45 % of households in Ethiopia have access to non-improved source of drinking water and 89% of households use non-improved toilet facilities [10] even if health risks associated with sanitation in Ethiopia are well recognized by the government and partners. In response to this, the government's commitment to the cause is embodied in the national HEP, in the formulation of a National Hygiene and Sanitation Strategy in 2006 and One WASH National Program in 2012 [11].

Ethiopian government invest and initiated to increase access to improved sanitation facilities, high access rates to household latrines are often not matched by high usage rates and open defecation still remains the predominant norm by rural households [10,12]. However, assessment of household level sanitation practice among mothers' was not assessed especially in the study area in ways that help for improving sanitary condition and hygienic practice of mothers' in the community. Therefore of aim of this study was help to show sanitation practice among mothers' and associated factors.

2. Materials and Methods

Community based cross-sectional study was carried out from April 1-30, 2016 in Gedeo Zone which is situated about 369 Km from Addis Ababa, about 90km to the Southern segment from Hawassa (the regional capital) with a land mass of 1,347 square kilometers, with a total population of 1,105,813. The Zone have 6 rural districts/woreda (Bule, Dilla Zuria, Wonago, Yirga-Cheffe, Gedeb and Kochore) and 2 urban cities (Dilla, and Yirga-Cheffe city administration). In the Zone, there are 144 community health posts (operational unit for HEWs), and 40 health centers (4 local NGO's owned health centers), 1 teaching referral hospital (owned by Dilla University). According to the FMOH woreda-based data source population conversion factors, there were estimated 128,827 women in reproductive age group (15 -49 years) in Gedeo Zone.

The sample size was calculated using a single population proportion formula by considering design effect and non-response rate which gave a total size of 634 study mothers were included and distributed proportionally to population size in the kebeles. Data were collected using interviewer administered structured questionnaire and simple observation to confirm the availability or absence of latrine & its cleanliness. The questionnaire was administered in Amharic.

Before the beginning of the actual data collection the data collectors (six diploma nurses' and two public health officers) were trained for one day by the investigators and the instrument was pre-tested. Some amendment was made after the pre-test. Data was collected from the mothers through interview and observation by data collectors. Then the collected data were entered, coded, cleaned and analyzed by using SPSS version 20.0 statistical programs. Frequency tables and graphs were used to describe the study variables. Descriptive statistics were computed and logistic regression model was used to

identify factors associated with outcome variable at 5% level of significance and 95% confidence level.

Before data collection process, support letter was secured from Dilla University, College of Health Sciences and School of Medicine, Research, Dissemination and Community Services Directorate, and after describing the purpose of the study, verbal consent was also secured from the study participants.

According to this study sanitation practice of mother was assessed as follow. For each mothers' sanitation practice, a score of value was given for a correct answer and zero for not. Then score was calculated from 100% and those with a total of $\geq 90\%$ were classified as good sanitation practice whereas those scores $<90\%$ considered as having poor sanitation practice.

3. Results

3.1. Socio-demographic Characteristics of the Respondents

The study covered a total of (n=634) mothers' from households, yielding 100% of the response rate. Among the total study participants, 76.7% were protestant, 13.7% were orthodox, and 9.6% were others religious followers. Majority of the study participants, 74%, were belongs to Gedeo ethnic group. The mean age of the respondents was 36.34 years. Around 57.6% of respondents were illiterate and 36.3% had primary education. But 4.7% of study participants had educational background of secondary level and only 1.4 % of them had beyond secondary level educational background. The average household monthly income of the respondents was 565.66 Ethiopian Birr. Concerning occupational status of the respondent, 59.0% were housewife, but 27.3% of the respondents were farmers (Table 1).

Table 1. Socio-demographic characteristic of the study participants, Gedeo Zone, South Ethiopia, December 2016

Variables		Frequency (N=634)	Percentage
Religion	Orthodox	87	13.7
	Protestant	486	76.7
	Others	61	9.6
Ethnicity	Gedeo	472	74.4
	Oromo	119	18.8
	Amhara	40	6.3
	Others	3	5
Educational status	Illiterate	365	57.6
	Grade 1-4	113	17.8
	Grade 5-8	117	18.5
	Grade 9-12	30	4.7
	College & University	9	1.5
Occupational	Farmer	173	27.3
	House wife	374	59
	Daily Laborer	22	3.5
	Merchant	38	6
	Gov't Employee	27	4.3

Table 2. Sanitation practice of the study population, Gedeo Zone, South Ethiopia, December 2016

Variables		Frequency	Percentage
Latrine availability	Available (shared facility)	431	68
	Available (not shared facility)	114	18
	No toilet facility at all	89	14
Type of latrine	Pit latrine with slab	419	76.9
	Pit latrine without a slab	126	23.1
Distance from home	Within 6 meters	403	73.9
	More than 6 meters	142	26.1
If no latrine defecation place	Bush/backyard/field	89	100
If No Latrine, What could be the main reason why your family cannot construct a latrine?	A lot of space to defecate	82	92.1
	Expensive	2	2.2
	Defecation is not an issue	1	1.1
	Not a priority	3	3.4
	Others	1	1.1
Where is baby's/infant's feces usually being thrown?	Toilet	411	64.8
	Bury	1	0.2
	Throw it on the ground/field	170	26.8
	Garbage pit	1	0.2
	Other	51	8
Waste disposal	Garbage pit/bury	19	3
	Burn	97	15.3
	Fill low ground	75	11.8
	Composting	442	69.7
	Others	1	0.2
Waste separation	Yes	251	39.6
	No	383	60.4
Responsible body for waste disposal	Mother	517	81.5
	Children	117	18.5
Importance of waste management	It is important	573	90.4
	Do not know whether it is important	61	9.6
Improper disposal of waste	Cause a disease	574	90.5
	Do not know if it cause a disease	60	9.5
Educating family about waste management	Yes	282	44.5
	No	352	55.5
Reason for waste disposal	Cleanliness	372	58.7
	Fear of illness	203	32
	Smell/odour	59	9.3
Type of waste produced	Food remnants	473	74.6
	Bottle/ cans	89	14
	Clothing materials	72	11.4
Sanitation practice of mothers	Good practices	79	12.5
	Poor practices	555	87.5

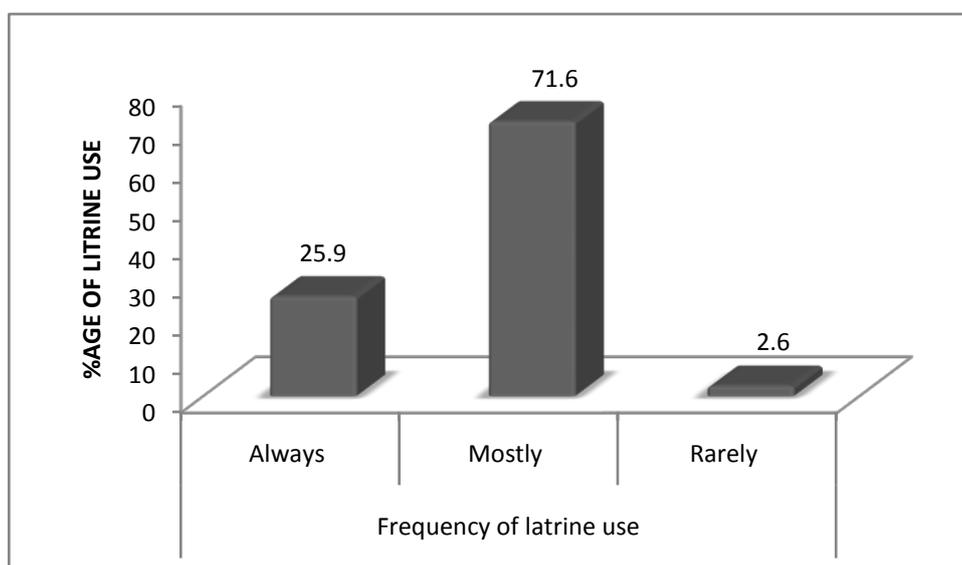


Figure 1. Latrine utilization of the study participants, Gedeo Zone, South Ethiopia, December 2016

3.2. Sanitation Practice

From a total of 634 mothers assessed for toilet facility ownership, 68.0% reported that they have shared latrine by two or more households; while 14.0% were without toilet facility. All types of available toilets were pit latrines with slab and without a slab (open pit), 76.9% and 23.1% respectively. The mothers who don't have toilet facility reported that they use bush/backyard/ field for defecation. Table 3 shows that 64.8% mothers disposed their children's faeces in the pit and 26.8% of them throw it on the ground/field. In the study only about 12.5% mothers were good sanitation practice (Table 2).

Figure 1 shows latrine utilization patterns of mothers. From those households who had latrine, 25.9% of the respondents utilize always, 71.6% utilized mostly and 2.6% used rarely.

3.3. Water and Hygiene Related Variables

Table 3 reveals that 35.2% mothers with toilet had no any kind of hand washing facilities. Almost all, 97.6 % of the respondents from interviewed mothers' wash their hands after defecation. Almost all of them use water and soap/ash to wash their hands after defecation. Concerning time of hand washing practice, 44.2% of mothers reported that they wash their hands at all critical time whereas 55.8% wash their hands in mixed practice.

The mothers also asked about water supply. Main source of water supply for drinking purposes was from spring (54.3%) and pipe/bono (45.7%). About 78.9% of study participant drinking water was from protected source and about 21.1% was not. Around 77.8 % of study participants wash water container before collecting water, while 22.2% did not wash the container.

Table 3. Water and hygiene related variables in the study population, Gedeo Zone, South Ethiopia, December 2016

Variables		Frequency	Percent
Presence of hand washing near the latrine	Yes	353	64.8
	No	192	35.2
If no presence of hand wash why?	Don't use	164	86.0
	don't know it's important	28	14.0
Hand washing after defecation	Yes	619	97.6
	No	15	2.4
Detergent used during hand washing	Only water	54	8.7
	Water and Soap/ash	565	91.3
Know importance of hand washing	Yes	623	98.3
	No	11	1.7
Main source of water supply	Spring	344	54.3
	Pipe/bono	290	45.7
Protection of source	Yes	500	78.9
	No	134	21.1
Washing the container before collecting the water	Yes	493	77.8
	No	141	22.2
If your water source is other than bono source do you treat it?	Yes	457	72.0
	No	177	28.0
Water treatment	Using water guard	457	100.0
Water storage	Jerrycan	634	100.0
Way of water drowing	Pouring	634	100.0

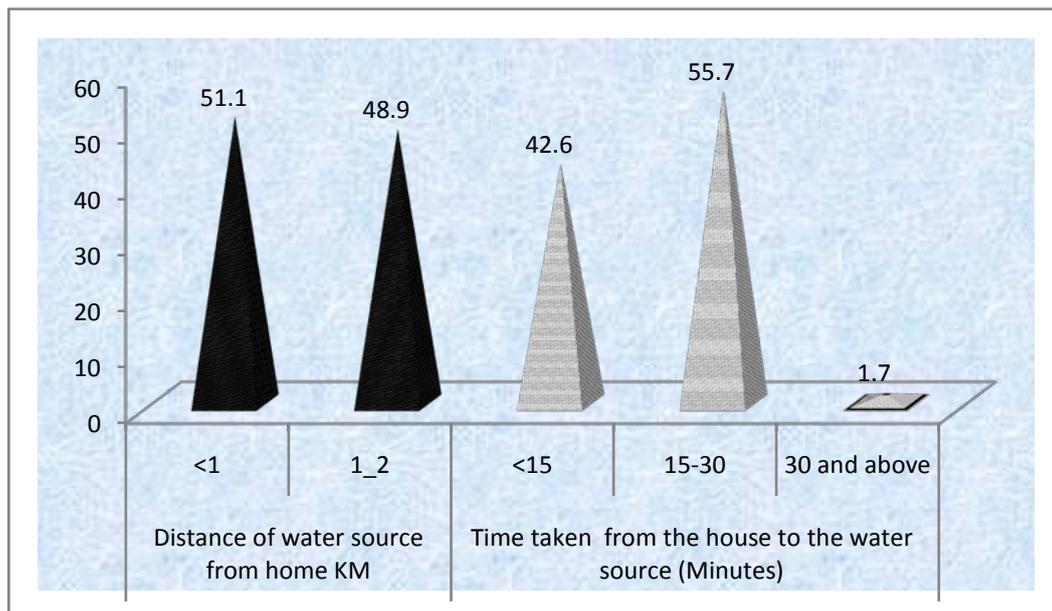


Figure 2. Distance and time taken to fetch water by study participants, Gedeo Zone, South Ethiopia, December 2016

Table 4. Association of socio-economic and other characteristics of respondents with sanitation practice Gedeo Zone, South Ethiopia, December 2016

Variables		Sanitation practice of mothers		COR (95% CI)	AOR (95% CI)
		Good	Poor		
		No (%)	No (%)		
Religion	Orthodox	9(1.40)	78(12.30)	1	1
	Protestant	53(8.40)	433(68.30)	0.94(0.45-1.99)	1.02(0.40-2.59)
	Others	17(2.70)	44(6.90)	0.30(0.12-0.73)	0.43(0.15-1.23)
Ethnicity	Gedeo	62(9.80)	410(64.70)	1	1
	Oromo	13(2.10)	106(16.70)	1.23(0.65-2.32)	2.24(1.04-4.82)*
	Amhara	3(0.50)	37(5.80)	1.87(0.56-6.23)	1.51(0.37-6.15)
	Others	1(0.20)	2(0.30)	0.30(0.03-3.39)	0.43(0.03-5.33)
Educational status of respondent	Illiterate	42(6.60)	323(50.90)	1	1
	grade 1-4	21(3.30)	92(14.50)	0.57(0.32-1.01)	0.88(0.48-1.65)
	grade 5-8	12(1.90)	105(16.60)	1.14(0.56-2.24)	1.22(0.58-2.58)
	grade 9-12	3(0.50)	27(4.30)	1.17(0.34-4.03)	2.09(0.57-7.64)
	college or university	1(0.20)	8(1.30)	1.04(0.13-8.53)	2.27(0.26-19.72)
Is the toilet provided with hand washing facility	Yes	60(11.0)	293(53.8)	0.54(0.31-0.93)	0.43(0.22-0.83)*
	No	19(3.5)	173(31.7)	1	
By what you wash your hands after defecation?	Only water	10(1.6)	44(7.1)	0.61(0.29-1.27)	0.50(0.19-1.28)
	Water and Soap/ash	69(11.1)	496(80.1)	1	
What is the main source of water for the household?	Spring	39(6.2)	305(48.1)	1.25(0.78-2.01)	3.09(1.48-6.47)*
	Tap/bono	40(6.3)	250(39.4)	1	
Is the source protected?	Yes	55(8.7)	445(70.2)	1.76(1.05-2.98)	3.15(1.52-6.54)*
	No	24(3.8)	110(17.4)	1	
Do you wash the container before collecting the water?	Yes	71(11.2)	422(66.6)	0.36(0.17-0.76)	1.35(0.49-3.64)
	No	8(1.3)	133(21.0)	1	

Significant at $P < 0.05^*$.

Figure 2 shows about the distance and time taken to fetch water. Accordingly about 51% mothers collected water by going less than 1 km and 55.7% mothers reported that about 15-30 minutes takes to address water collecting place.

3.4. Factors Associated with Sanitation Practice

In the bivariate analysis any possible confounders were not controlled and assessing the independent effects of the covariates was difficult. So, to avoid an excessive number of variables and unstable estimates in the subsequent model, only variables with a p-value 0.3 in bivariate analysis were kept in the subsequent analyses in the logistic regression model to see their relative effects on sanitation practice.

Accordingly, ethnicity, presence of hand washing near latrine, source and protection of source of water supply had shown significant association, but religion, educational status, hand washing after defecation by water/soap/ash and washing container before water collection were not significantly associated with sanitation practice when entered in to multivariable analysis. The degree of sanitation practice of mothers collecting water from protected source was about 3.15 times more applicable when compared with those mothers collecting water from unprotected sources [OR: 3.15, 95%CI: (1.52-6.54)]. Mothers whose main source of water for the household from spring had higher odds of sanitation practice [OR: 3.09; 95% CI:(1.48-6.47)]. Good sanitation practice is 3 times higher by those mothers collecting water from

spring when compared to those collected from bono/ tap (Table 4).

4. Discussion

The findings of this study revealed that about 87.5 mother practice poor sanitation which exposes them to different kinds of bacteria that, when ingested in large quantities, leads to decreased absorption of micronutrients necessary for the production of hemoglobin in the blood and causes anemia [22] contributes to 20% of all maternal deaths [23]. The study also showed that self-reported utilization of shared traditional pit-latrines by two or more households was about 68%, and 18% of mothers had private latrine, but 14% of the households don't have latrine facility at all. A distinction between the use of shared toilet facilities and privately owned toilet facilities also aided in the determination of 'improved and unimproved' toilet facilities as defined by the WHO/UNICEF [14].

Sharing of toilet facilities by two or more households in this study is much lower compared to the study conducted in Ghana communities revealed that, sharing of sanitation facilities was predominant in Nkwawie, 80% and nearly consistent compared to Abuakwa, 61.7% which is least practiced, Private use of sanitation facilities was predominant in Abuakwa, 38.3% and less practiced in Nkwawie, 20% [13].

But it is much lower than the findings reported from Kersa district, Jimma Zone which is 91.5% of households of the Community-Led Total Sanitation and Hygiene (CLTSH) implemented and 87.90% of households of the non-implemented kebeles had pit latrines [15].

This result is also lower than the findings of Research-Inspired Policy and Practice Learning in Ethiopia and the Nile region (RIPPLE) in Mirab Abaya Woreda, the SNNPR, which shows that the latrine coverage was 94% [16]. But greater when compared with the findings of the Ethiopia Demographic and Health Survey (EDHS) 2011, which indicated that about 55% households of the rural areas had latrine facilities [17]. It was also better when comparing with the study conducted in district of Bahir Dar Zuria (58.4% [18]). And consistent with the findings reported in Kewott woreda, Amhara Region which is 67.7% [19].

The findings of this study also show that households in the selected kebeles who don't have latrines, which are about 14%, were practice open field defecation during the survey. The possible explanation for the difference might be due to the fact that community-led initiative improves the community to undertake their own appraisal and analysis of open field defecation situation and resolve to stop it, and CLTSH also targets the whole community and spreads naturally. Low utilization of toilet facility in the study area can be also explained that health extension workers promote the benefits of constructing latrines among the rural communities, but they were less active and not consistent in teaching proper utilization.

Among 68% of households having shared toilet facilities, 23.1% were simple unsanitary traditional pits without slab, and this finding is higher when compared with the study conducted in Hulet Ejju Enessie district, East Gojjam Zone, Amhara Regional state which is 13.6% [12]. The possible explanation for the discrepancy might be due to emphasis given by female health extension workers to the community to construct traditional pit latrines with slab.

Despite recommendations to build latrine within a minimum of 6 meters distance from the resident in order to avoid the associated health risk and inconvenience, 73.9% of the available latrines were located within 6 meters distance from the home which is as per the recommendation but the findings reported from similar study conducted in Bahir Dar Zuria reveals that 32.1% of available latrine were located within less than 6 meters distance from the home [18]. The possible reason for the difference might be due to inadequate information provided to the households by health extension workers about the recommended distance to construct toilet facility from the resident.

Among the reasons given by 92.1% mothers' for not using latrine facilities were considering open field defecation is comfortable but this finding is much higher when compared to the report of similar study conducted in Denbia district, Northwest Ethiopia, which is 18.9% [20]. The possible explanation for the discrepancy might be lower rate of household latrine utilization in the study community.

However, the utilization of latrines by children less than five years is not recommended. The methods of handling babies or infants faeces by mothers' are varied among respondents, 64.8% of mothers' disposing infants faeces into the latrine, 26.8% were thrown on the field or ground, while only 0.2% were burying. This behavior is entirely unacceptable practice of handling faeces of children. The use of latrine for safe disposal of children faeces in this study was much higher when compared with similar study

conducted in East Gojjam Zone which revealed that, 38.9% households disposed their children's faeces improperly by disposing out of houses somewhere either in the backyard or in the nearby bush [12]. The possible explanation for the difference might be due to increased awareness about health risk of throwing children faeces on the field or ground,

The basic functional units of solid waste management start with onsite storage and handling of wastes. Proper waste handling at household level has positive implication on waste management. Many researchers have underlined the relationship between public health and improper solid waste management. This study indicated that households dispose solid wastes in open dump to fill low ground, open pit or by open burning. This leads to a polluted environment. Utilizing solid waste for different purpose rather than to dump it for no use has many advantages. The present study indicated that 69.7%, of the households utilize solid waste as manure. This, however, was done without following proper composting operations. It would have been more effective if they were supported by appropriate composting techniques. This finding is higher when compared to the finding of 2003 welfare monitoring survey conducted in Ethiopia. The finding showed 45.6% of the household waste in the rural areas and 5.5% in the urban areas were utilized as manure in garden and fields [21]. The onsite separation and use of solid waste for different benefits should be encouraged; but with the precaution of its proper treatment and handling.

The study also revealed that in most of the households, 81.5% solid waste management was the responsibility of mothers. It was reported that children manage solid waste only in 18.5% of the households. The finding of this study is lower when compared with the findings reported from Kersa district, Eastern Ethiopia which is 98.4% [5].

Hand-washing with soap is a cost-effective intervention not only against diarrheal diseases but also for the prevention of acute respiratory infections [6]. About 64.8% of mothers had hand washing facilities near the latrine. However, vast majority of mother (97.6%) in the household with latrines reported washing their hands after defecation. Among these, 91.3% reported to use soap and water while 8.7% use water only to wash their hands. This finding is much more higher compared with the findings reported from Kersa district that is from those households having latrine the habit of hand-washing after defecation was reported to be only about 5.1% [5]. The possible reason for the discrepancy might be as result of continuous advice and technical support of health extension workers and use of health development army approach and model women networking that is currently fascinated in the country. And also due to the fact that there has been high community mobilization on hygiene and sanitation which increases hand washing facility coverage of the study area, this discrepancy might be again due to the difference in effort made to mobilize the community to use hand washing facilities.

5. Conclusions

Among the total number of households (n=634), this study revealed that only 18% of the households owned

private latrines, whilst 68% indicated that they possess shared traditional pit latrine by two or more households, but they don't utilize properly. The most dominant facility used by 92.1% of the households which had 'shared immediate accesses' to latrines was open field for defecation. More than 69% of the households don't have temporary storage for solid waste, and they utilized as manure without proper composting operations.

Therefore, this study recommends Health-workers and local authorities must give health education and sensitization for the community to improve this sanitation practice problem by participatory approaches.

Authors' Contributions

NES the main investigator and performed the study design, data entry, statistical analysis of results, data interpretation and writing the manuscript. GNY has participated in performed the study design and write discussion and helped to edit the manuscript. Both authors read and approved the final manuscript.

Competing Interests

The authors have declared that they have no competing interests.

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