Water, sanitation and hygiene practice and associated factors among HIV infected people in Arba Minch town, Southern Ethiopia

Desta Haftu, Gebrekiros Gebremichael, Desalegn Ajema, Genet Gedamu and Eskezyiaw Agedew

ABSTRACT

Human immunodeficiency virus (HIV) infected people have substantially greater need for water, sanitation and hygiene (WASH). Many opportunistic infections cause high morbidity and mortality in people living with HIV (PLHIV) than in immune competent populations. The objective of the study was to assess WASH practices and associated factors among PLHIV. A cross-sectional study design was conducted. Bivariate and multivariate logistic model was employed. According to this study, 97 (23.5%) of the households have unimproved water status, 221 (53.5%) of the households have unimproved sanitation status and 171 (41.4%) of the households have poor hygiene practice. Diarrhoea [adjusted odds ratio (AOR) = 16; 95% confidence interval (CI): (6, 44)] was associated with water status of the clients. Occupational status [AOR = 8.9; 95% CI: (2, 38)], wealth index [AOR = 0.23; 95% CI: (0.12, 0.4)], frequency of body washing [AOR = 0.23; 95% CI: (0.12, 0.4)] and hand washing device availability [AOR = 4.4; 95% CI: (2.5, 8)] were significantly associated with hygienic practice. It was concluded that the magnitude of the problem regarding WASH practices in HIV infected people in the study area was high. Health education and integrated additional support for the provision of WASH practices is needed.

Key words | Ethiopia, hygiene, people living with HIV, sanitation, water

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INTRODUCTION

The human immunodeficiency virus (HIV)-induced acquired immunodeficiency syndrome (AIDS) that damages a person's immune system, has been a major medical and public health problem globally. At the end of 2013, an estimated 35 million people were living with HIV. According to the WHO, since the start of the epidemic in 1981 around 78 million have become infected with HIV and an estimated 39 million people have died due to HIV/AIDS. In 2013, there were 1.5 million HIV-related deaths and 2.1 million new infections occurred (UNAIDS 2014).

Sub-Saharan Africa remains the region that is the most affected disproportionately by HIV/AIDS, with 24.7 million people living with HIV (PLHIV) and 1.5 million new infections, accounting for almost 70% of the global new HIV infections in 2013 even though new HIV infections have declined by 33% from 2005 to 2013 (UNAIDS 2014).

The HIV/AIDS epidemic has remained one of the important public health challenges in Ethiopia since it was first recognized in the mid-1980s. Ethiopia has been one of the countries severely affected by the HIV/AIDS epidemic. Recent data showed that the prevalence of HIV among pregnant women aged 15–49 has declined consistently from a peak of 5.8% in 2002 to 2.3% in 2012. Similarly, HIV prevalence among the same group has declined consistently in

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both urban and rural areas since 2003 (Ethiopian Health and Nutrition Research Institute (EHNRI) 2011). Estimated overall adult national HIV prevalence in 2013 was 1.3% with a rural and urban prevalence of 0.5% and 3.5%, respectively (Ethiopian Health and Nutrition Research Institute Federal Ministry of Health 2012).

Even though there has been significant progress in the water, sanitation and hygiene (WASH) sector since 1990, the MDG baseline year, today 748 million people do not have access to improved drinking water sources globally. Of these, almost a quarter rely on untreated surface water, and 2.5 billion people lack access to improved sanitation including one billion who practice open defecation (WHO/UNICEF 2014).

Good access to safe water and sanitation is indispensable for PLHIV and for the provision of home-based care to AIDS patients. Water is needed for bathing patients and washing soiled clothing and linen. Nearby latrines are necessary for weak patients. Finally, water is needed to keep the house environment and latrine clean in order to reduce the risk of opportunistic infections. Water and sanitation provision increases the sense of dignity of both patients and caregivers. In addition, safe drinking water is needed for taking medicines and to make food easier to eat for patients suffering from mouth ulcers or thrush. Despite these changing needs, however, access to WASH may, in fact, become more difficult for households caring for PLHIV due to declining physical health, worsening economic status and/or stigma (USAID 2007).

Regrettably, it is no surprise that much ill health is attributable to a lack of hygiene, sanitation and water. Globally, nearly one in five people (1.1 billion individuals) habitually defecates in the open. Conversely, 61% of the world's population (4.1 billion people) has some form of improved sanitation at home – a basic hygienic latrine or a flush toilet. Between these two extremes, many households rely on dirty, unsafe latrines or shared toilet facilities (UNICEF 2010).

Contaminated water, lack of sanitation, and poor hygiene practices in the homes of PLHIV increase the risk of diarrhoea, which can result in increased viral load, decreased CD4 counts, and reduced absorption of nutrients and antiretroviral drugs (Lule *et al.* 2005; Boschi-Pinto *et al.* 2008).

There are five areas in which water and sanitation issues have an impact on HIV infected people: opportunistic and other infection, home-based care, infant feeding, labour saving and food security (Kamminga & Wegelin-Schuringa 2003).

Poor WASH practices exert a particularly heavy toll on PLHIV because of their vulnerability to opportunistic infections. Many life-threatening opportunistic infections are caused by inadequate access to safe drinking WASH (WHO 2010). Diarrhoeal disease and enteric infections are largely caused by unsafe water, and a lack of sanitation and hygiene (Walker *et al.* 2011). Eighty-eight per cent of cases of diarrhoea worldwide are attributable to unsafe water, inadequate sanitation or insufficient hygiene (Pruss-Üstun *et al.* 2008). Diarrhoea affects 90% of PLHIV, the major cause of morbidity and mortality especially in sub-Saharan Africa, where the majority of PLHIV live, and where access to safe water and adequate sanitation is most limited (Thom & Forrest 2006).

The WHO guidance states that simple, accessible and affordable WASH interventions have been effective in reducing the risk of diarrhoeal diseases. Household water treatment, sanitation and personal hygiene interventions have been found to be cost-beneficial and (for patients on antiretroviral drugs) reduce the risk of contracting diarrhoeal diseases that reduce drug absorption (Bushen *et al.* 2004).

Safe WASH are not only a human right because good health will prolong lives and increase human dignity. The provision of safe water to HIV-positive and individuals with AIDs is paramount because they live with compromised immune systems and are therefore more susceptible to water-borne diseases (Ngwenya & Kgathi 2006).

Access to improved sanitation remains very low in a study done in four African countries. Cultural and traditional values and beliefs emerged as key factors influencing access to and utilization of improved sanitary facilities in Mozambique, Lesotho, Zambia and Swaziland (WaterAid 2014).

According to a recent Ethiopian demographic health survey, about two-thirds of households in Ethiopia (65%) obtain their drinking water from an improved source. Use of improved drinking water sources is more common among households in urban areas (97%) than among those

in rural areas (57%). Six per cent of households in Ethiopia use an improved and not shared toilet or latrine facility. Another 9% of households (35% in urban areas and 2% in rural areas) use facilities that would be considered improved if they were not shared by two or more households. Overall, 32% of households have no toilet facility at all (Central Statistical Agency 2016).

A study done in the city of Gondar, Ethiopia indicated that almost half and two-thirds of PLHIV had poor water and sanitation conditions, respectively. Among the reasons for this are discrimination, economic reasons, hygiene education and sickness, which affect WASH in this study (Yallew *et al.* 2012). Therefore, particular attention has to be given to the specific needs of HIV-positive people who have a substantially greater need for water and sanitation services: more water; safe water; access to water, sanitation and proper hygiene as a means to mitigate the epidemic. Until now, there has been little research examining the situation of WASH in PLHIV in Ethiopia. Therefore, this study helps in examining the current situation of WASH practice among PLHIV and provides the foundation for future effort to integrate water and sanitation and hygiene activities with HIV/AIDS.

MATERIALS AND METHODS

Study area, design and period of time

The study was conducted in Arba Minch town, which is the capital city of Gamo Gofa Zone, located approximately 450 km to the south of Addis Ababa. In Arba Minch town, there are two associations working for HIV infected people. The study was conducted from February 1–29, 2016 at Arba Minch town in Southern Ethiopia. A community-based cross-sectional quantitative study design was employed.

Study population, sample size determination and sampling technique

A total of 423 samples was calculated by Epi Info software version 3.5.3. with the assumptions of $Z = 1.96$ at 95% confidence interval (CI), d = margin of error assumed to be (0.05), P = proportion of WASH practice (0.67) (Yallew *et al.* 2012). To minimize errors arising from the likelihood of non-compliance, 10% of the sample size contingency was added. Sixty-nine (69) participants from Addis Tesfa and 354 participants from Tesfagoh association were selected by simple random sampling using a random table.

Data collection procedures

A structured questionnaire and observational checklist was developed to collect information on the households' socio-economic, environmental conditions and behavioural aspects. The questionnaires and checklists were first prepared in English and then translated to the local language and again back to English to ensure consistency.

The client was interviewed by the trained data collectors on the outcome and independent variables. Moreover, an observational checklist was completed by direct observation to collect complementary information on the characteristics of the home and surrounding environment. During data collection, if the participant was not available at the time of the first visit, the data collectors made another visit to that household the next day. If the same condition occurred at the second visit, the household was considered as a non-response.

Ten bachelor degree holder health professionals who have long experience in data collection were recruited as data collectors. Considering the above points, an extensive 4-day training was given to the data collectors and supervisors prior to the start of the data collection process. The training was given by the principal investigator(s).

A training manual was also prepared to facilitate the training process. The training was mainly focused on interviewing techniques, and emphasis was also given for questions that need careful attention and observation. Classroom lectures, mock interviews and field practice were included in the training. Two public health professional supervisors with a master's degree were involved in the survey. The supervisors were trained together with the data collectors, alhough familiarization was given to the supervisors separately on how to supervise the data collectors and how to check the completed questionnaires, for instance, checking for inconsistencies in responses. The supervisors were responsible for supervising the data

collectors, checking the completed questionnaires and correcting any mistakes or problems encountered. The overall data collection process was coordinated by the principal investigators.

Data quality assurance

To ensure reliable information, the questionnaire, check lists and interview guides were developed after reviewing the relevant literature on the subject to include all the possible variables that addressed the objective of the study. All the tools were first prepared in English and then translated to Amharic and back translated to English to maintain the consistency of the contents of the instrument.

A pretest was done in 5% of the total sample size outside the study area. Vague terms, phrases and questions identified during the pretest were modified and changed. Missing responses like 'No response' and 'Others' were added, and skipping patterns were also corrected.

The completed data collection tools were checked every day during data collection for completeness, clarity and consistency by the supervisors/principal investigators. Any mistake detected was corrected the next day. Five per cent of the households were re-interviewed by the supervisors/principal investigators to check for the consistency of data collection and correction was done on the spot.

Data management and analysis

Data were entered and cleaned using Epi Info version 3.5.3 and exported to SPSS (Statistical Package for Social Sciences) version 21.0 software for analysis. Missing values and outliers were managed.

Descriptive measurements (frequencies, proportions and measures of central tendency) were done to assess the WASH practice. Logistical regression analysis was performed to determine the independent effect of the independent variables with dependent variables by calculating the strength of the association between WASH practice and associated factors using odds ratio (OR) and 95% CI. Crude odds ratio (COR) was estimated by bivariate analysis, those variables which were significant in the bivariate analysis were used for multivariate analysis and adjusted odds ratio (AOR) was then estimated by multivariate logistic regression analysis with respective 95% CIs. P value less than 0.05 (5%) was considered as statistically significant. The socioeconomic status of clients was constructed using household asset data via a principal component analysis (PCA).

Operational definition

Unimproved (poor) water status

Water from a dam, pool or stagnant water source from a river, stream or rainwater tank, unprotected well, unprotected spring, water from a spring or borehole, cart with tank, tanker truck, surface water, bottled water, piped water collected more than 200 m outside dwelling or yard or from a water vendor (WHO/UNICEF 2006).

Improved (good) water status

Piped water into the residence, water from household connection, public tap, tube well, protected dug well, protected spring, collected rainwater, piped water collected from up to 200 m (WHO/UNICEF 2006).

Unimproved (poor) sanitation status

Household with no latrine or toilet facility or a bucket system; open latrine, outside yard/compound, shared private facility of any type, outside yard/compound, shared public facility of any type, open defecation (WHO/UNICEF 2006).

Improved (good) sanitation status

Household with pour-flush latrine piped to sewer system, ventilated improved pit latrine (VIPL), pit latrine with slab, composting toilet, in dwelling, yard/compound (WHO/UNICEF 2006).

Poor hygiene practice

Individuals who have no hand washing, and bathing facilities and detergents in the house, wash their hands with water but have no soap and other detergents.

Good hygiene practices

Individuals have hand washing and bathing facilities with the availability of soap and other detergents in the house (WHO/UNICEF 2006).

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board of Arba Minch University. Permission was obtained from the organizations and Arba Minch city administration office. The questions from the questionnaire were proved not to affect the morale and personality of study subjects. Informed written consent was obtained from each study subject after explanation of why they were taking part in the research and any involvement was done after his or her complete consent. Agreement was taken, and if there were risks and benefits the client was part of it. Confidentiality was ensured from all data collectors and principal investigator's side via using code numbers rather than names and keeping questionnaires locked. Data collectors interviewed people separately to retain the privacy of clients. Computers and related research equipment/facilities that could reveal identifying information were only accessible to the authorized research team. Data collectors provided health education and advice to clients about WASH during data collection.

RESULTS

Sociodemographic characteristics

Four hundred and thirteen study participants were interviewed and included in the analysis, providing a 97.6% response rate, out of which 292 (70.7%) were females. The mean age of respondents was 37.14 ± 7.74 years. Of the total 413 participants, 116 (28.1%) were in the age group of 36–40 years (Table 1).

In terms of marital status, 235 (56.9%) were married. Most of the people included in this sample were daily labourers (145 (35.1%)) followed by housewives (86 (20.8%)). About 170 (41.2%) of the respondents had a formal elementary education and 125 (30.3%) were illiterate.

Table 1 | Frequency of distribution among PLHIV by sociodemographic characteristics, Arba Minch town, Southern Ethiopia, February 2016

Sociodemographic characteristics	Frequency	Per cent
Sex		
Male	121	29.3
Female	292	70.7
Marital status		
Married	235	56.9
Single	35	8.5
Widowed	74	17.9
Divorced	62	15
Separated	7	1.7
Age category		
20–25	22	5.3
26–30	89	21.5
31–35	87	21.1
36–40	116	28.1
41–45	56	13.6
45 +	43	10.4
Occupation		
Housewife	86	20.8
Merchant	79	19.1
Student	17	4.1
Maid	12	2.9
Government employee	53	12.8
Daily labourer	145	35.1
Other	21	5.1
Wealth index		
Lowest (poorest)	84	20.3
Second (poor)	81	19.6
Third (middle)	117	28.3
Fourth (high)	79	19.1
Fifth (highest)	52	12.6
Educational status		
No schooling	125	30.3
Elementary	170	41.2
High school	95	23
Diploma and above	23	5.6

A household level wealth index was constructed using information on asset ownership (TV, radio and private home). These variables were not individually included in multivariable regression models. PCA was used to develop

weights for asset variables. Three principal components (PCs) were retained, each individually contributing 36.23%, 49.74% and 60.5% of the explained variance (cumulatively 61.05%), with eigenvalues above 1. Then, each PC was weighted according to its contribution to the proportion of the explained variance in the dataset (i.e., the normalized sum of squared loadings), with scorings summed for the four PCs into one resultant socioeconomic score. This score was categorized into quintiles, and revealed that the poorest/lowest, second, third/middle, fourth/high and richest/highest quintile accounted for 20.3%, 19.6%, 28.3%, 19.1% and 12.6%, respectively (Table 1).

Status of water supply

The majority of clients, 403 (97.6%), reported their drinking water source is tap water. According to this study, the location of their drinking water source (165 (40%)) is within their compound.

A good number of clients stored their drinking water in containers: 386 (93.5%) used jerrican containers, followed by plastic containers 22 (5%). Data collectors observed whether the household water container was covered or not. The results showed that most households (382 (92.5%)) had covered their stored water. Most of the clients practised the pouring method to withdraw water from the stored container, while 129 (31.2%) practised dipping and 123 (29.8%) used both dipping and pouring methods.

Nearly half (45.2%) of the households treated their drinking water within 24 hours, mostly through adding WaterGuard (98.5%). In general, water status for the clients showed that 316 (76.5%) of households had improved and 97 (23.5%) of the clients had unimproved water status. In the majority of households (328 (79.7%)), an adult woman usually collected drinking water from water sources.

Status of sanitation

More than half (170 (57.8%)) of the clients had a latrine facility, with the predominant type being traditional pit latrine (334 (80.9%)), followed by VIPL (30 (7.3%)) and bush/field (49 (11.9%)). A majority of 95.8% of the latrines did not have hand washing facilities. The main reason for not having any form of sanitation facility was economic. The other reasons were lack of a location, did not consider it important, and had no interest in constructing one. In general, sanitation status for the clients showed that 192 (46.5%) of households had improved and 221 (53.5%) of the households had unimproved sanitation status.

Status of hygiene practice

Around 282 (44.1%) of the clients had a hand washing location, and of those, 12 (4.1%) households had hand washing devices such as a tap, basin, bucket, sink. Nearly two-thirds (173 (65.9%)) of clients had washed their hands with water and soap during the past 24 hours and 140 (33.9%) washed their hands with water only. In general, 171 (41.1%) of clients had poor hygiene practices. Almost half of the clients (140 (45.%)) had attended hygiene education in the past year (Table 2).

Table 2 | Frequency of distribution among PLHIV by hygiene practice, Arbaminch town, Southern Ethiopia, February 2016

Variables	Frequency	Percentage
Hygiene status		
Good	242	58.6
Poor	171	41.4
Separate place for bathing		
Yes	242	58.6
No	171	41.4
What do you use for hand washing mainly		
Water and soup	272	65.9
Water and ash	1	0.2
Water only	140	33.9
How frequently adults wash their body ($n = 400$)		
Daily	258	62.5
At least once per week	139	33.7
Have you ever heard about WASH?		
Yes	186	45
No	227	55
Place for hand washing		
Yes	231	55.9
No	282	44.1
Diarrhoea for the past 24 hours		
Yes	36	8.7
No	377	91.3

Factors associated with WASH practice

Among the potential associated factors analysed using bivariate and multivariate logistic regression, the most common behavioural and sociodemographic factors that have previously been described to have an effect on water status were not associated with water supply in this study except diarrhoea. Clients who had diarrhoea for the past 24 hours are ten times more likely to have unimproved water status as compared to those who did not have diarrhoea for the past 24 hours (AOR = 10; 95% CI: 1.4, 78) (Table 3). We used diarrhoea within the past 24 hours to minimize recall bias.

As shown in Table 4, none of the variables was significantly associated in the bivariate and multivariate logistic regression analysis with the sanitation status of clients.

As shown in Table 5, among the potential associated factors analysed using bivariate and multivariate logistic

Table 3 | Association between factors and water supply status among PLHIV in Arba Minch town, February 2016

	General water supply status			
Variables	**Unimproved no. (%)**	**Improved no. (%)**	**COR (95% CI)**	**AOR (95% CI)**
Age category				
20–25	4 (18.2)	18 (81.8)	1	1
26–30	28 (31.5)	61 (68.5)	0.48 (0.15, 1.56)	0.5 (0.14, 1.6)
31–35	14 (16.1)	73 (83.9)	1.16 (0.34, 3.95)	0.9 (0.25, 3.4)
36–40	25 (21.6)	91 (78.4)	0.8 (0.25, 2.6)	0.7 (0.2, 2.6)
1–45	17 (30.4)	39 (69.6)	0.5 (0.15, 1.73)	0.5 (0.15, 2)
45 +	9 (20.9)	34 (79.1)	0.84 (0.23, 3.1)	0.9 (0.2, 3)
Educational status				
No schooling	31 (24.8)	94 (75.2)	1	1
Elementary	31 (18.2)	139 (81.8)	1.5 (0.8, 2.6)	1.5 (0.8, 2.7)
High school	29 (30.5)	66 (69.5)	0.75 (0.4, 1.4)	0.8 (0.4, 1.6)
Diploma and above	6 (26.1)	17 (73.9)	0.9 (0.3, 2.6)	1.3 (0.4, 4.7)
Occupational status				
Housewife	18 (20.5)	70 (79.5)	2.3 (0.8, 6.5)	
Merchant	15 (19.7)	61 (80.3)	2.4 (0.8, 7)	1.9 (0.6, 6)
Student	3 (16.7)	15 (83.3)	2.9 (0.6, 13)	2 (0.4, 11)
Maid	7 (38.9)	11 (61.1)	0.9 (0.24, 3.5)	0.9 (0.2, 4)
Government employee	17 (31.5)	37 (68.5)	1.3 (0.4, 3.8)	0.8 (0.2, 2,9)
Daily labourer	30 (21.4)	110 (78.6)	2 (0.8, 6)	1.7 (0.5, 5)
Other	7 (36.8)	12 (63.2)	1	1
Wealth index				
Lowest (poorest)	18 (21.4)	66 (78.6)	0.77 (0.3,1.86)	0.8 (0.3, 2)
Second (poor)	29 (35.8)	52 (64.2)	0.38 (0.16, 0.88)	0.4 (0.2, 1)
Third (middle)	21 (17.9)	96 (82.1)	0.96 (0.4, 2,26)	0.9 (0.3, 2)
Fourth (high)	20 (25.3)	59 (74.7)	0.6 (0.26, 1.5)	0.6 (0.2, 17)
Fifth (highest)	9 (17.3)	43 (82.7)	1	1
Diarrhoea for the past 24 hours				
Yes	1 (2.8)	35 (97.2)	11.96 (1.6, 88.5)	10 (1.4, 78)*
No	96 (25.5)	281 (74.5)	1	1

*Significant at $P < 0.05$.

Table 4 | Association between factors and sanitation status among PLHIV in Arba Minch town, February 2016

	Sanitation status			
Variables	**Unimproved no. (%)**	**Improved no. (%)**	**COR (95% CI)**	**AOR (95% CI)**
Age category				
20–25	10 (45.5)	12 (54.5)	1.8 (0.7, 5)	2.3 (0.66, 7.7)
26–30	36 (40.4)	53 (59.6)	2.3 (1, 5)	2.4 (1.05, 5.6)
31–35	47 (54)	40 (46)	1.3 (0.6, 2.7)	1.2 (0.5, 2.8)
36–40	67 (57.8)	49 (42.2)	1.3 (0.6, 2.7)	0.9 (0.7, 7)
41–45	35 (62.5)	21 (37.5)	0.9 (0.4, 2)	2 (0.4, 2.3)
45 +	26 (60.5)	17 (39.5)	1	1
Educational status				
No schooling	70 (56)	55 (44)	1.2 (0.5, 3)	1.04 (0.3, 3)
Elementary	95 (55.9)	75 (44.1)	1.2 (0.5, 3)	0.9 (0.3, 2.8)
High school	42 (44.2	53 (55.8)	2 (0.8, 5)	1.4 (0.5, 4)
Diploma and above	14 (60.9)	9 (39.1)	1	1
Occupational status				
Housewife	41 (46.6)	47 (53.4)	1.03 (0.4, 2.8)	1.4 (0.5,4)
Merchant	46 (60.5)	30 (39.5)	0.6 (0.2, 1.6)	0.9 (0.3, 2.7)
Student	7 (38.9)	11 (61.1)	1.4 (0.4, 5)	1.5 (0.3,6)
Maid	6 (33.3)	12 (66.7)	1.8 (0.5,7)	2.6 (0.6,12)
Government employee	35 (64.8)	19 (35.2)	0.5 (0.2, 1.4)	0.6 (0.2, 1.8)
Daily labourer	77 (55)	63 (45)	0.7 (0.3, 2)	0.9 (0.3, 2.7)
Other	9 (47.4)	10 (52.6)	1	1
Diarrhoea for the past 24 hours				
Yes	25 (69.4)	11 (30.6)	0.5 (0.23, 1)	0.5 (0.2, 1.13)
No	196 (52)	181 (48)	1	1

Note: Other at occupational status (jobless, farmer and private).

regression between sociodemographic and predictor variables to the water status of PLHIV, occupational status, income quintile, availability of hand washing device, diarrhoea in the past 24 hours and frequency of washing their body were significantly associated with water status. However, the results revealed that educational level, sex and age category had no significant association.

Accordingly, the government employees were nine times more likely to have poor hygiene practices as compared to their counterparts [AOR = 8.9; 95% CI (2, 38)]. Clients who did not have hand washing devices are 4.4 times more likely to have poor hygiene practices compared to those who have hand washing devices in the house [AOR = 4.4; 95% CI: (2.5, 8)].

Clients who washed their body daily were more than 77% less likely to have poor hygiene practice as compared to clients who washed their body at least once per week [AOR = 0.23; 95% CI: (0.12, 0.4)]. Clients who had diarrhoea for the past 24 hours are three times more likely to have poor hygiene practice as compared to those who did not have diarrhoea for the past 24 hours [AOR = 3; 95% CI: (1.12, 12.9)].

DISCUSSION

WASH are among the recommendations which were formulated covering 13 areas of intervention seen as low

Table 5 | Association between factors and hygiene practice among PLHIV in Arba Minch town, February 2016

	Hygiene practice			
Variables	**Poor no. (%)**	**Good no. (%)**	**COR (95%CI)**	**AOR (95% CI)**
Sex				
Male	42 (34.7)	79 (65.3)	1.5 (1,2.3)	1.4 (0.7, 3)
Female	129 (44.2)	163 (55.8)	1	1
Age category				
20–25	16 (72.7)	6 (27.3)	0.4 (0.14, 1.3)	1.4 (0.3, 6)
26–30	33 (37.1)	56 (62.9)	2 (0.9, 4)	1.6 (0.4, 7.5)
31–35	31 (35.6)	56 (64.4)	2 (1,4. 3)	0.9 (0.2, 4)
36–40	42 (36.2)	74 (63.8)	2 (1, 4)	0.8 (0.2, 4)
41–45	26 (46.4)	30 (53.6)	1.3 (0.6, 3)	1.2 (0.3, 5.6)
45 +	23 (53.5)	20 (46.5)	1	1
Educational status				
No schooling	60 (48)	65 (52)	0.6 (0.23, 1.5)	1.4 (0.8, 2.7)
Elementary	59 (34.7)	111 (65.3)	1 (0.4, 2.5)	1.03 (0.5, 2.3)
High school	44 (46.3)	51 (53.7)	0.6 (0.24, 1.6)	0.4 (0.07, 2)
Diploma and above	8 (34.8)	15 (65.2)	1	1
Occupational status				
Housewife	50 (56.8)	38 (43.2)	1.6 (0.6, 4.7)	2.3 (0.6, 8.8)
Merchant	31 (40.8)	45 (59.2)	3 (1.2, 9)	1.9 (0.5, 7)
Student	13 (72.2)	5 (27.8)	0.8 (0.2, 3.4)	0.3 (0.03, 3.2)
Maid	12 (66.7)	6 (33.3)	1.1 (0.3, 4)	1.3 (0.2, 8)
Government employee	13 (24.1)	41 (75.9)	7 (2, 21)	8.9 (2, 38)*
Daily labourer	39 (27.9)	101 (72.1)	5.6 (2, 15)	4.4 (1.3, 15)
Other	13 (68.4)	6 (31.6)	1	1
Income quintile				
Lowest (poorest)	55 (65.5)	29 (34.5)	0.01 (0.001, 0.08)	0.02 (0.002, 0.2)
Second (poor)	46 (56.8)	35 (43.2)	0.02 (0.002, 0.1)	0.013 (0.001, 0.12)
Third (middle)	44 (37.6)	73 (62.4)	0.03 (0.004, 0.24)	0.02 (0.002, 0.2)
Fourth (high)	25 (31.6)	54 (68.4)	0.04 (0.006, 0.3)	0.03 (0.003, 0.3)
Fifth (highest)	1 (1.9)	51 (98.1)	1	1
Hand washing device availability				
Yes	56 (24.2)	175 (75.8)	5 (3.5, 8)	4.4 (2.5, 8)*
No	112 (62.9)	66 (37.1)	1	1
How frequently adult wash their body ($n = 400$)				
Daily	130 (50.4)	128 (49.6)	0.3 (0.2, 0.4)	0.23 (0.12, 0.4)*
At least once per week	29 (20.9)	110 (79.1)	1	1

*Significant at $P < 0.05$.

cost and of particular importance for PLHIV in resource-limited settings by the World Health Organization (WHO 2008).

In this study, general water supply status for the clients showed that 316 (76.5%) of households have improved and 97 (23.5%) of the clients had unimproved water

status. This is better than a study conducted in Gondar. This might be due to the socioeconomic and geographical formation difference.

Clients who had diarrhoea for the past 24 hours were ten times more likely to be in the unimproved water status as compared to those who did not have diarrhoea for the past 24 hours [AOR = 10; 95% CI: (1.4, 78)]. This is consistent with a study carried out at Gondar, Ethiopia (Yallew *et al.* 2012).

Regarding sanitation, more than half (53.5% (221)) of the client households have unimproved sanitation status. This is supported by a study done in four other African countries – Mozambique, Lesotho, Zambia and Swaziland (WaterAid 2014).

About 171 (41.1%) of the clients had poor hygiene practice, which is similar to another study done in Ethiopia (Yallew *et al.* 2012). According to this study, the government employees were nine times more likely to have poor hygiene practice as compared to their counterparts [AOR = 8.9; 95% CI (2, 38)]. This might be due to educated people having more exposure for awareness about hygiene and care for their health. Clients who did not have a hand washing device are 4.4 times more likely to have poor hygiene practice compared to those who had a hand washing device in the house [AOR = 4.4; 95% CI: (2.5, 8)]. This may be due to the presence of hand washing facility being an enabling factor to practice. Clients who washed their body daily were more than 77% less likely to have poor hygiene practice as compared to clients who washed their body at least once per week [AOR = 0.23; 95% CI: (0.12, 0.4)]. The reason might be that as frequency increases the hygienic status is improved.

CONCLUSIONS

In conclusion, almost a quarter, half and two-thirds of PLHIV were found to have unimproved water status, poor hygiene practice and unimproved sanitation status, respectively. The presence of diarrhoea was associated with unimproved water status of the households. Wealth index, occupational status, availability of hand washing facility, and frequency of washing their body were among the factors that affected hygiene practice of the clients in this study. The study draws attention towards the greater and special needs of PLHIV regarding WASH as compared to the general population as well as other preventive and control methods.

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