Utilization of environmental health services of urban health extension program and associated factors in Debretabor town, North West Ethiopia: Cross sectional study

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Abstract: Back ground: Studies in a number of countries have shown that wherever indiscriminate waste disposal is high, infant and child mortality rates are high. Although utilization of environmental health services is an important indicator for measuring success of the health extension program; data on environmental health services of urban health extension program are scarce in the study area and elsewhere in Ethiopia. Objective: To assess utilization of environmental health services of urban health extension program and associated factors in Debretabor town, Amhara region, Ethiopia. Methods: A community based cross sectional study was conducted in Debretabor town from September 1-30, 2013. A total of 422 households were included in the study using systematic sampling technique. Data were collected using structured questionnaire and analyzed using SPSS version 16.0. Degree of association between independent and dependent variables was assessed with a 95% confidence level and p-value less than 0.05 was used to detect statistical significance. The findings of quantitative data were triangulated with the qualitative one. Result: In this study 69.8% and 65.5% of households practiced proper solid and liquid waste management mechanisms respectively. Income was found to be predictors for liquid waste management (AOR=1.82) Educational status of respondents was found to be predictors for liquid waste management (AOR=1.83). Conclusion: Solid and liquid waste management practices were lower than the minimum 75% expectation of the national health extension program package and, Educational status, house ownership, income and graduated as model family were main factors affecting environmental health services. Improving socio economic status of households, provision of continuous advice and technical support at household level on the utilization of environmental health service are recommended.

Keywords: Environment, Health, Urban Health Extension, Ethiopia

1. Background

Urban health services are type of services given for urban communities to prevent health problems including problems related to low sanitation coverage [1]. Human waste is a major pollutant of water sources. Unsafe water supply and poor sanitation contribute significant share of the world's hospital bed occupancy [2].

Creating and sustaining proper waste management practices is an essential part for improved human health, safe environment and sustainable development. In most of developing countries including Ethiopia waste management practices are poor. Sanitation Coverage in Ethiopia remain low, 60%, even considerable efforts is made by the government and partner organizations. In general, sanitation related health risks are common problems and

associated with low sanitation coverage [3].

Indiscriminate defecation and improper excreta disposal are principal determinants for both morbidity and mortality. It is estimated that more than five million people die each year from diseases related to inappropriate waste disposal [4]. The disease burden associated with poor sanitation is estimated to account for 4.0% of all deaths [5]. Moreover, 88% of diarrheal diseases are attributed to unsafe water supply, inadequate sanitation, and poor hygiene [6]. In the 48 countries designated as the least developed by the United Nations, 1 in 4 people practice open defecation and 1 in 10 use surface water for drinking and household use [7].

In the last few years in many areas of Ethiopia urban population growth is increasing. Although urban sanitation facility figures generally are exceeding rural, it is widely known that the poor, unplanned, densely populated areas are underserved. This density therefore poses a greater risk of contamination than thinly populated rural areas. Limited sanitation options and high demand are compounded by poverty and limited space, creating a major challenge unmet waste disposal needs of the urban poor who resort to high-risk disposal practices Urban areas are among the worst in both solid and liquid waste management. Much of these wastes are caused by lack of adequate excreta disposal facilities and inadequate solid waste collection [8, 9].

The government of Ethiopia adapted the rural HEP for the urban setting since 2009. Among the four packages of interventions, environmental health components are expected to affect urban population more. For urban setting the government choose to use clinical nurses as Urban health extension workers(UHEWs) with provision of additional three months pre-service training and to work at the household level on health prevention and promotion activities [10, 11, 12].

The HEP was designed and implemented in recognition of the fact that the major factor underlying the poor health status of the country's population is the lack of empowerment of households and communities to promote health and prevent disease. The government of Ethiopia recognized that the delivery of public health information and services in urban settings to be less than optimal and has been working to develop an Urban Health Extension Package building on the success of the rural HEP and HEWs are working at the kebele level to promote safe excreta disposal system in households (HH) [13, 14].

Although the government of Ethiopia is trying to solve urban health problems through UHEP, there are issues in waste management practices that affect urban population, only 14 % urban population has access to an improved toilet facility [12] and sanitation coverage remains low (60%). The government is trying to address environmental health services as part of multi years (20 years) rolling Health Sector Development Program (HSDP). The Health Extension Program (HEP), which is extensively under implementation since 2009, is one of the major pillars of the health service delivery system in Ethiopia [3, 15, 16,17]. Despite this commitment, however, problems related to

waste management in the towns are still public health concerns.

Because of growing concerns of environmental health related risks from the towns of the country, it is essential to perform community based studies that will support better understanding of the problems. Based on these contexts, the present study was conducted with regard to utilization and associated factors of environmental health services implemented by urban health extension packages.

2. Participants and Methods

2.1. Study Design, Period and Area

Community based cross-sectional study using quantitative and qualitative methods was conducted. The study was conducted in Debre tabor town, south Gondar zone, North West Ethiopia from September 1-30/2013 and is located 665 Kms away from Addis Ababa, capital of Ethiopia.

2.2. Study Population

Selected households found in Debretabor town during the study period. Individual household heads (preferable female) that lives in the town for at least 6 months and above, during the study period was included.

For the qualitative study- Thirteen key informants (8 UHEWs, three health center heads, one UHEWs supervisor and 1 woreda health office head) were involved in the in-depth interview.

2.3. Variables

Utilization of Environmental Health services of UHEP was dependent variable. Marital status, Educational status, Religion, Family size, Monthly family income, knowledge and attitude of respondents to UHEP, graduated as a model family, Exposure for sanitation campaign, were independent variables.

2.4. Sample Size Determination and Sampling Procedures

Sample size was calculated using single population proportion formula. By taking the proportion of safe solid waste disposal coverage of households, 53.3%, from other studies in other part of the country, 95% confidence interval and setting alpha at 5% a total of 422 sample size was calculated. To support the quantitative study, in-depth interview with 13 participants: 1 health extension supervisor, 8 UHEW (2 from each kebele), 3 health center heads was conducted. The sample size was allocated proportional to the size of households in each kebele (the smallest administrative unit in Ethiopia). The number of households was taken from each kebele administrative office. The sampling interval of households in each kebeles was determined by dividing the total number of households to the allocated sample size. The initial interviewed households were selected by lottery method from the sampling interval nearest to each kebele administrative offices, using a number

between one and sampling interval. After selecting the first household, the subsequent households were selected using systematic sampling technique. For the qualitative study purposive sampling was used.

2.5. Data Collection

For the quantitative method data were collected using a structured questionnaire adopted from reviewing literatures. Eight data collectors and one supervisor were recruited and face to face interview was the technique of data collection; if the selected respondent was not found at home during the first visit, one additional visit was undertaken by data collectors. The quantitative data were collected by a semi-structured interview guide and the interview was audio taped. Data collection tools were initially prepared in English and were translated in to Amharic (local language) and again re-translated back to English to check for any inconsistencies in the meaning of words and concepts.

2.6. Scoring

A set of questions about utilization of environmental health service of UHEP was used to obtain the mean scores. The mean score was used to classify the knowledge level of the respondents in to three groups (high, moderate and low). Respondents who scored ≥75% of the correct answers were classified as high, 60-74% of correct answers were classified as moderate and who scored less than 60% of correct answers were classified as low level.

Likert's scale was applied to measure the attitude. All individual answers to attitudinal questions was computed to obtain total scores and calculated for means. The mean scores were used to divide the participants into three groups; positive, neutral and negative. Respondents scored 65 -100 was considered as having positive, 51 - 64 as neutral and <=50 as negative attitudes.

2.7. Data Quality Assurance

To assure quality, data collectors and their supervisor were trained for two days in role play form and pretesting of the instrument was conducted before the actual data collection. The supervisor and principal investigator closely supervised the performance of the data collectors on a daily basis and the collected record sheets were thoroughly scrutinized every day at the end of data collection session. The data were thoroughly cleaned just before coded and carefully entered in to EPIinfo to minimize the error.

Establishing trustful relation with respondents, training the note taker, and interviewing in private rooms were the activities undertaken for the qualitative study.

2.8. Data Management and Analysis

The data were coded, checked for completeness and consistency. The data were entered into EPI Info version 3.1 and exported to SPSS version 16.0 statistical software for its analysis. Cronbach's alpha was used to test internal reliability of attitude items and a factor loading of 0.3 or greater was the criterion used to retain items. Both bivariate and multivariate analyses were done. All variables with a p-value <0.25 in the bivariate analysis were further fit to multivariate logistic regressions for better prediction of determinants. The Hosmer-Lemeshow goodness-of- fit statistic was used to assess whether the necessary assumptions for the application of multiple logistic regression were fulfilled. Crude and adjusted odds ratio with 95% confidence intervals were computed. P- Value less than 0.05 was taken as statistically significant.

2.9. Ethical Consideration

The study was ethically approved by research ethical committee review board of Jimma University. Before commencing data collection legal permission with letter of support was obtained from Debre Tabor town health office. All the study participants were informed about the purpose of the study and their right to refuse. Informed consent was obtained from every respondent. Strict confidentiality was also maintained through coding of questionnaire anonymously.

3. Results

3.1. Socio Demographic Characteristics

A total of 422 households sampled in the town and 414 of them have participated in this study, giving a response rate of 98.1%. Of total study subjects 337 (81.4%) were females. The mean age of the respondent was 35.99 with ±9.23 year standard deviation. Majority of respondents 281 (67.9%) were married, and 158 (38.2%) were housewives respectively. The mean family size of the households was 3.62. Regarding the ethnicity 401 (96.9%) of the respondent were Amhara and majority of the respondents 373 (90.1%) were Orthodox by religion. More than three forth of households 314 (75.8 %) were privately owned. About Three hundred twenty six (78.7%) of the respondents attended formal education and only less than half, 179 (43.2 %) households were graduated as a model family.

3.2. Knowledge of the Respondents Related to Environmental Health Services of Urban Health Extension Program

Among 414 HHs, 390 (94.2%) of the respondents knew the presence of UHEWs in their kebele but of those who knew the presence of urban health extension workers (UHEW) only 173(44.4%) correctly described the professional status of the UHEWs as nurse. A little higher than two third, 278(67.1%) of the respondents had high level of knowledge pertaining to environmental services given by urban health extension workers (table 1).

3.3. Attitude of the Respondents towards Environmental Health Services of Urban Health Extension Program

Nine in ten of the respondents 373(90.3%) had positive

attitude towards HEWs being female and almost similar proportion, 380(91.8%) were in favor of the home to home service delivery approach of the health extension workers. Also 362 (87.4%) of the respondents had positive attitude towards environmental health services of the urban health extension service, approach, and service providers.

3.4. Solid Waste Management Practice

Regarding solid waste management practice 125(30.2%) of the households had poor solid waste management practice. The finding was also reinforced by the saying of one UHEW participated in the in-depth interview stating

that; *".though the numbers of community members who use pit in their compound as means of solid waste disposal become increased, still significant numbers of the population dispose solid waste on open field."*

One hundred fifty nine (38.4%) HHs segregate solid waste before disposal, 361(87.2%) of HHs had temporary storage container at HH level. One hundred fifty five (37.4%) of HHs had exposure to sanitation activities in the last one year. Concerning to site of disposal, 153 (37.0%) of the respondents dispose their solid waste by burning within the premises, 97 (23.4%) within private pit, and 86 (20.8%) used open field (figure 1).
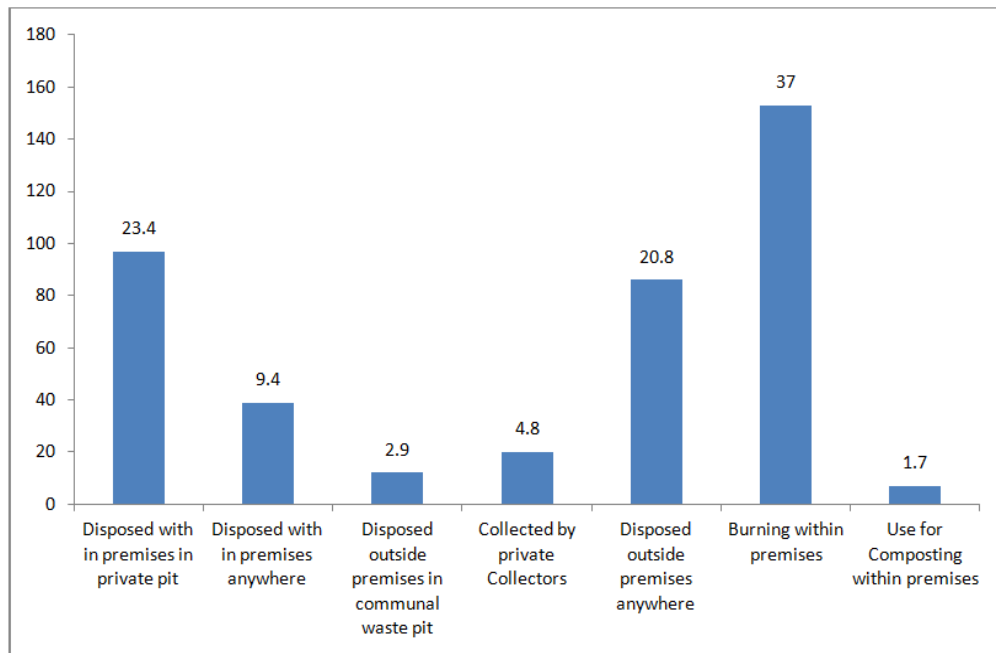

Figure 1. Solid waste disposal methods/sites used by the respondents in Debretabor town, Amhara Region, North West of Ethiopia, September 2013

3.5. Liquid Waste Management Practice

The finding of this study indicated that 270 (65.2%) of HHs practiced proper liquid waste disposal methods. The majority, 268 (64.7%) households have their own seepage pits and 236 (88.1 %) of HHs utilized seepage pits properly. The major types of liquid waste disposal methods used were 74 (17.9%) discharge their liquid waste in to street surface and 70 (16.9%) of the HHs discharge their liquid waste in to premises yard, (Table 2).

3.6. Predictors of Utilization of Environmental Health Services of Urban Health Extension Program

3.6.1. Factors Associated with Solid Waste Management Practice

To identify the important variables which are independently associated with solid waste management practice bivariate analysis was computed and house ownership, graduated as model family, and marital status were among the variables selected for multivariable analysis variables as the bivariate analysis that turned out to be associated with solid waste management at the level of p-

value ≤ 0.25. The multivariate analysis result showed that House ownership and being graduated as model family had shown significant association with solid waste management practice with p-value <0.05. Respondents which have their own house were 1.77 times more likely to have proper solid waste management practice than those who had rental house (AOR=1.77, CI: 1.08, 2.90). Community members who had graduated as model family were 2.36 times more likely to have proper solid waste management practice than their counterparts (AOR= 2.36, 95% CI=1.49,3.74) (Table 3).

3.6.2. Factors Associated with Liquid Waste Management Practice

Bivariate analysis was carried out to assess the associated factors for liquid waste management practice at the HH level and the bivariate analysis revealed that respondent's marital status, income, ownership of house, family size, previous exposure to sanitation activities, graduated as model family and educational status of the respondents were associated with liquid waste management practice.

Adjustment of variables using multivariable analysis was

carried out to predict variables that were associated with proper liquid waste management. Accordingly, Income, marital status, educational status, graduated as model family had shown significant association, but owner ship of the house, exposure to sanitation activities and family size were not significantly associated   proper liquid waste disposal practice when entered in to multivariable analysis at significance level of p-value < 0.05.

Respondents that had income of 1201 or more Eth. Birr per month, currently married, those who attended any level of education, and hose holds graduated as model family were almost twice more likely to practice proper liquid waste management than their counter parts: AOR= 1.82 , 95% CI=1.13, 2.93; AOR= 1.92, 95% CI=1.18, 3.11, AOR= 1.83, 95% CI=1.04, 3.22,AOR= 2.18 , 95% CI=1.36, 3.51 respectively(Table 4).

Table 1. *Environmental health services related Knowledge of the respondents on urban health extension workers in Debre-tabor town, September 2013*

Variables	Frequency	Response (%)
Know the presence of UHEWs in the kebele		
Yes	390	94.2
No	24	5.8
Total	414	100
Know the professional status of HEWs		
Yes	173	44.4
No	217	55.6
Total	390	100
Mentioned component environmental health services of UHEP packages		
Yes	45	10.9
No	369	89.1
Total	414	100
Do you know activities of UHEWs		
Yes	177	42.8
No	237	57.2
Total	414	100
UHEP related Knowledge level		
Low	41	9.9
Moderate	95	22.9
High	278	67.1
Total	414	100

Table 2. *Types of liquid waste disposal method by household, Debretabor town, September 2013*

		Frequency	Percent
Where do you usually dispose your waste water	Seepage pit	268	64.7
	Drain in closed sewer system	2	0.5
	Discharge in to premises yard	70	16.9
	Discharge in to street surface	74	17.9
Do the HH utilized seepage pit properly	Yes	236	88.1
	No	32	11.9
Liquid waste management			
Proper liquid waste management		270	65.2)
Improper liquid waste management		144	34.8

Table 3. *Association of socio-demographic and other characteristics of respondents with solid waste management in Debretabor town, Amhara, North West Ethiopia, Sep 2013*

Variables	Solid waste management		COR (95% CI)	AOR (95% CI)
	Proper (%)	Improper (%)		
Owner ship of the house				
Privete owned	229(72.9),	85(27.1)	1.80(1.12, 2.88)	1.77(1.08,2.90)*
Rented	60(60),	40(40)	1	1
Marital status				
Mairred	203(72.2),	78(27.8)	1	
©Other	86(64.7),	47(35.3)	0.70(0.45,1.1)	
Graduated as model family				
Yes	142(79.3,),	37(20.7)	2.30(1.47,3.60)	2.36(1.49,3.74)**
No	147(62.6),	88(36.4)	1	1

*P-value < 0.05, **P-value < 0.001 © other- single, widowed, divorced

Table 4. *Association of socio-demographic and other characteristics of respondents with liquid waste management in Debretabor town, Amhara Region, North West Ethiopia, Sep 2013*

Variables	liquid waste management		COR (95% CI)	AOR (95% CI)
	Proper (%)	Improper (%)		
Owner ship of the house				
Private	218(69.4)	96(30.6)	2.10,(1.32, 3.32)	
Rent from Private	52(52.0)	48(48.0)	1	
Income (ETB)				
<=1200	114(54.5)	95(45.5)	1	
>1200	156(76.1)	49(23.9)	2.65 (1.74, 4.04)	1.82 ,(1.13, 2.93)*
Marital status				
Married	204(72.6)	77(27.4)	2.69(1.75,4.13)	1.92(1.18, 3.11)
©Other	66(49.6)	67(50.4)	1	
Educational status				
Never attended school	46(52.3)	42(47.7)	1	
Attended some school	224(68.7)	102(31.3)	2.01 (1.24, 3.24)	1.83,(1.04, 3.22)*
Exposure to sanitation activities				
Yes	113(72.9)	42(27.1)	1.75(1.13,2.70)	
No	157(60.6)	102(39.4)	1	
Family size				
<= 4	205,(61.6)	128,(38.4)	1	
>= 5	65,(80.2)	16,(19.2)	2.54(1.41,4.58)	
Graduated as model family				
Yes	134(74.9%)	45(25.1%)	2.17 ,(1.42, 3.32)	2.18 ,(1.36, 3.51)**
No	136(57.9%)	99(42.1%)	1	1

*P-value < 0.05 ** P-value< 0.01

4. Discussions

The result showed that 94.2% of the respondents knew the presence of HEWs in their kebele. But as it is stated by the National Urban Health Extension Package Implementation guide line, let alone not to know the presence of UHEWs, it was expected that within three years all of the households should became graduated as model family [15]. Two third, 67.1%, of the HHs had high level of knowledge and majority 87.4% of the respondents had positive attitude towards environmental health services of HEP. In the same way all the in-depth interviewees agreed that the community's attitude towards the HEP was improving.

About 70% of the households were found to have good solid waste management practices. This finding is higher than the one reported from Jimma zone, Ethiopia, where 31.6% of households practice proper solid waste disposal methods [18].The discrepancy might be due to the fact that the study conducted in Jimma zone included the rural areas, while the current study was conducted in urban community.

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. According to this study finding 87.2% of the HHs had temporary storage at household level. This finding is much higher than the finding of a study conducted in Kersa woreda, South Ethiopia 6.9% [19]. This inconsistency might be due to the time gap (2008 versus 2013) and/or study population difference (rural vs urban community) in Kersa study and the current study respectively.

This study demonstrated that the proportion of households who had proper liquid waste disposal system

was found to be 65.2 %. This finding is higher than that of the research conducted in Kersa woreda where 6.3% and that of the study in Dukem town where 24.8% of the respondents had proper liquid waste disposal system [19, 20]. The possible reason might be as result of continuous advice and technical support of UHEWs and use of health development army approach and model women network that that is currently fascinated in the country.

The effect of other factors on utilization of environmental health services of UHEP was also assessed.

House ownership was significantly associated with proper solid waste management practice. Respondents who had their own house were twice more likely to have proper solid waste management practice than those who rent the house. This finding is in line with the findings of a study done in Damboya Woreda, Dukem town and Kersa [19, 20, 21].

In this study, educational status of the respondents was found to have statistically significant association with proper liquid waste management practice. Those respondents who attended any level of education were about 2 times more likely to be in a household with proper liquid waste management practice than those who did not attended their education.

Findings from this study showed that income of the respondents was found to have statistically significant association with proper liquid waste management practice. Those respondents who had income of above 1200.00 Eth. Birr per month were about two times more likely to practice proper liquid waste management than respondents with or less than 1200.00 Eth. Birr per month. This report is consistent with the study done in Bahrdar Zuriya [22].

In this study, being graduated as a model family on UHEP showed significant association with proper solid waste management practice. Being graduated as a model

family were 2.36 times more likely to have proper solid waste management practice than those who were not graduated as model family. It was also found to be factor for proper liquid waste management practice. Households who were graduated as a model family on UHEP were 2 times more likely to practice proper liquid waste management when compared with their counterparts. This might be an appropriate way of promoting feasible and easy interventions that have major impact on the health of the community.

5. Strength and Weakness

5.1. Strength

To enhance the quality of the data we used community based data collection that can represent the community.The study also employed both qualitative and quantitative data collection methods that help to capture and assess the reasons underpinning Utilization of environmental health services of urban health extension program and associated factors in depth.

5.2. Weakness

Like most other health studies, data from cross-sectional studies, by its nature has a defect to detect cause and affect relationship; there could be social desirability and recall bias by respondents to address all relevant variables.

6. Conclusions

Solid waste management was not adequate as over one-quarter of households disposed their solid waste in open field and nearly four- in- ten households practically used improper liquid waste disposal methods. While House ownership and being graduated as model family were important predictors for proper solid waste management, income, household's level of education, being graduated as model families on UHEP were predictors for proper liquid waste management.

Authors' Contribution

YT: Conceptualized the research problem, designed the study, prepared the proposal, conducted field work, and analyzed the data, manuscript writting.

MW: Revised the proposal, participated in data analysis and the report revision

HA: Revised the proposal, participated in data analysis and the report revision

AA: Participated in preparing the manuscript for publication

Acknowledgements

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