

FACTORS INFLUENCING HOUSEHOLDS TO USE LATRINES AFTER THE OPEN DEFECATION FREE DECLARATION IN ERMERA DISTRICT, TIMOR-LESTE

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ABSTRACT: The objective of this study was to identify factors influence households to use and maintain latrines. This information is needed to scale up community led total sanitation programs in the Ermera District of Timor-Leste. The respondents were males and females 18-65 years of age in Haupu village. In order to access information from the subjects, the study was designed as a cross-sectional survey, based on a quantitative data design. The study was conducted in February 2013. Overall 417 respondents agreed to participate and data were collected using a structured questionnaire and were analyzed using chi-square tests of significance. The study found that 47.2% of households continued to use and maintain latrines and 52.8% had stopped by one year after the open defecation free declaration in Haupu Village. There were several factors that influenced households to continue use of or stop using latrines, namely socio-demography, knowledge, attitude and practice, socioeconomic status and environmental factors. It was found that there were significant associations between latrine use and gender (p -value=0.002), level of education (p -value<0.001), occupation (p -value =0.005), income (p -value <0.001), neighbors having a latrine (p -value<0.001), neighbor influence to build a latrine (p -value <0.001), knowledge (p -value =0.002), attitudes (p -value <0.001) and practices (p -value <0.001). There were 3 variables without significant associations namely: marital status (p -value 0.204), water source (p -value 0.959) and age (p -value 0.095). More than half of the households stopped use and maintenance of latrines by one year after the open defecation free declaration. There were significant associations between latrine use and socio-demography, knowledge, attitude and practice, socioeconomic status and environmental factors. Education and knowledge are essential elements to be improved, especially for those living in rural areas. Collaboration within relevant ministries, institutions and among partners are the key important roles to monitoring and supervise the sustainability of latrine use and maintenance in the future.

Keywords: Latrine use, Traditional belief, Timor-Leste

INTRODUCTION

Sanitation is one of the basic needs and an important element of human rights recognized worldwide. Lack of access and serious concerns about sanitation and hygiene can contaminate water sources, food and other things that eventually cause diarrhea [1]. The main objective of the decade was to substantially improve the standards and level of services in drinking water and sanitation by the

year 1990. However, only 62% of the present world's population has access to improved sanitation facilities [2]. More than 50 infectious diseases can be transmitted from an infected person to a healthy one by the route of human feces. Some 40% of the total world population still lacks improved sanitation and 80% of the people live in rural areas in developing countries [3]. In the WHO African Region, 40% of people did not have access to a wide range of improved sanitation facilities in 2000 [2]. According to World Resources International [WRI] inadequate access to water and

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sanitation contribute to 2.5 million childhood deaths each year from diarrhoea [4]. Community-Led total Sanitation (CLTS) represent a radical alternative to conventional top-down approaches to sanitation and offers hope of achieving the Millennium Development Goals [5]. Many of the people living in rural areas of Timor-Leste still have very low access to sanitation facilities; 65% of urban households and 34% of rural households use improved toilet facilities. However 88.2% of the communities have sustainable access to an improved water source in urban areas and 56% in rural areas [6, 7]. Basic sanitation shall be one of the Government's priorities in basic sanitation services, to improve the quality of life of Timorese people. Respiratory and diarrheal diseases remain the top two causes of infant and child mortality in Timor-Leste, both of which are strongly linked to inadequate sanitation and hygiene. Diarrhoea alone is responsible for more than 380 child deaths per year in Timor-Leste [8]. With this epidemiology, substantial numbers of the community suffer from both acute and chronic illnesses related to poor hygiene, inadequate sanitation and/or unsafe water supply, poor housing and workplace conditions among other outstanding public health issues in Timor-Leste [9]. The Government of the Republic Democratic Timor-Leste (RDTL) adopted CLTS-based approaches as a component in their national sanitation policy and the approaches are being implemented by the majority of sector stakeholders, covering almost 60% of the country. Many communities have been verified as open defecation free (ODF) with all households in the community using a latrine through these approaches. It is important however to understand the rate of regression back to open defecation after this status has been verified and how this status can be sustained beyond the achievement of 'ODF' status.

The aims of this study were to identify the association between household use and maintenance of latrines in Ermera District and to use the information to scale up the community led total sanitation program.

MATERIAL AND METHODS

Subjects and data collection

The study design was a cross-sectional survey of 430 households. The sample size was calculated by using Taro Yamane's formula (1973), with the assumption of a 95% confidence interval (two-sided). 97% was covered by the researcher at the time data collection in February 2012. A structured

questionnaire was used for data collection. Quantitative data was designed to access information from the subject. The study was done in Haupu village, Letefoho Sub district, Ermera District, Timor Leste. Data were collected by house to house survey both during the days and evenings in their residences. Five interviewers with education from senior high school attended training on data surveys and had already experienced many surveys such as the census survey, the Demographic and Health Survey and studies done by public health graduate students. One supervisor from District Health Services (Public Health Officer) had background in public health and had experienced many years in the public health area included environmental health assessment at the household level such as water and sanitation inspection at the household level and public places. They were recruited and trained before data collection. There were two days training with the main objective to make sure the research assistants were clear about the objectives of the study, the filling up the questionnaire, and how to maintain confidentiality. The orientation training was given by the principle researcher and included also the head of village. Field supervision and daily meetings during data collection were intended to ensure the quality of data collection. After completing all questionnaires, there was rechecking, coding and entering into a computer file by the researcher.

Statistical and data analyses

The researcher used a licensed Statistical Package for Social Sciences (SPSS 17.0.) and Excel for data entry and analysis. The researcher used Chi square tests to determine relationships between independent and dependent variables. The validity of the questionnaire was judged by three experts from the College of Public Health Sciences, Chulalongkorn University, and another from the Ministry of Health Timor-Leste. The pre-test questionnaire was administered to 30 people. Cronbach's alpha was used to test reliability on attitudes and KR-24 was used for items about knowledge. Perception with Cronbach's Alpha score was 0.84 and level of knowledge was 0.93.

Ethical considerations

This study was approved by the Human Research Ethics Committee, Cabinet of Health Research, Ministry of Health, Timor-Leste, with approval reference MS/CHRD/I/2013/144, and also the researcher ask permission from local authorities before starting the study.

Table 1 Latrine use among the respondents (n=417)

Characteristics	Number	Percentage
Respondent have and use latrine		
Yes	197	47.2
No	220	52.8
Type of latrine respondent uses (n=197)		
Pit without slab/earth	96	49.0
Pit latrine with slab	26	13.0
Flush latrine	75	38.0
If no latrine, where respondent goes for defecating (n=220)		
Share with neighbor	15	6.8
Bush	205	93.2
How long ago respondents started to use latrine (n=197)		
1-2 years	145	73.6
3-4 years	36	18.3
5-7 years	7	3.5
> 8 years	9	4.6
Distance of latrine from at home/outside (n=197)		
At home	4	2.0
Outside	193	98.0
Distance of latrine outside house (n=193).		
< 6 meters from house	55	28.5
6-19 meters from house	92	47.7
> 19 meters from house	46	23.8

RESULTS

Socio-demography of respondents

This description of the socio-demography of respondents covers age, gender, marital status, religion and level education (Table 1). The respondents for this study range in age from 18 to 65 years old. The majority age of respondents was 27.1% among 40-49 year olds. Regarding gender, 57.6% were male and 42.4% female. As to position of respondents in households, 62.4% had the position of head of household. The majority of respondents (72.7%) were married. The majority of respondent's religion (100%) was Catholic among the age group 18-65 years old. On educational background, 54% of respondents had no education or were illiterate, while the highest education of household members was 37.2% who had senior high school.

Respondent characteristics

The highest percentage of respondent occupations was 34.1% for farm/livestock. On continuity of employment, well over half (67.9%) was occasional; 59.2% had incomes less than 100 US dollars per month. On household size 49.2% were in the range of 6 to 10 persons per household. With regarding to the latrine use of respondents, 47.2% of households still continued use of latrines and 52.8% of them had stopped. There was 49% use of pits without slab/earth. Regarding respondents who had no latrine, the majority

(93.2%) defecated in the bush. The majority of respondents (73.6%) had been using latrines for 1-2 years. Most of the respondents (98.0%) had their latrine outside of the home, while 47.7% of the respondents had a distance from home to latrine between 6 and 19 meters. About 49.9% of the respondent did not have children and 31.4% of them had never used a latrine and 98.5% of the children under five years old disposed of feces outside the house. Regarding the preferred time to use the latrine, most (97.5%) had no preference. Most of the respondent's neighbors (95.4%) were in family relationships including brother, sister, uncle, aunt, father, mother, grandmother and grandfather. Of respondent neighbors 56.0% had no latrine, and 44.0% of them had latrines. Most of the respondents (98.0%) defecated in the bush. 36.8% of the respondents had been influenced by neighbors to defecate in the bush. 54.9% of the respondents used water from spring water. Regarding water sources 29.5% of the respondents had a distance from home to water sources of 10 meters or less.

In terms of respondent's knowledge about latrine use and diseases associated, there were highest scores on the statement (1) using latrine to defecate is one way to break the chain of diarrhea disease transmission. On this 93.5% of the respondents answered true. Almost all the respondents had knowledge about latrine use and maintenance. The highest score for statement

(2) open defecation does not effect contamination of water sources, food and ground, was 75.8% who answered false. Many of the respondents had a low level of knowledge about the effects of open defecation. Statement (3) that the condition of latrine facility need not be checked on a regular basis because it is not possible to fix immediately, shows the highest score of 36.5% for false. Few respondents understood to check and maintain latrines. The highest score in statement (4) diarrhea diseases caused by human excreta, was 92.1% who answered true. While the highest score in statement (5) defecating any place can transmit diseases to humans such as diarrhea, worm infection, Hepatitis A etc, was 88.2% for true. Most of the respondents (92.3%) could answer true the statement (6) hand washing with soap after defecation, before preparing food and eating to prevent diarrhea diseases. To the statement (7) human feces transmit diseases by fluids, fields, flies and fingers: most of the respondents (91.8%) answered true. Statement (8) Improving clean water and sanitation facility can reduce incidence of diarrhea diseases, most respondents (87.8%) answered true. From the statement (9) diarrhea is a main cause of malnutrition of children, most respondents (87.8%) answered true and on statement (10) children are remarkably more vulnerable to diarrhea diseases than adults, the highest percentage was 86.3% of the respondents answering true.

According to traditional believes and attitudes, statement (1) Defecation in the bush is a continuation of ancestor's way of life, therefore must be continued by young generation: 47% of the respondents strongly disagreed. Statement (2) human excreta smell bad, is disgusting, and attract many flies inside the latrine facility, so defecation in the bush more comfortable: There was 35.5% disagreement with the statement. The highest percentage in statement (3) I don't use the latrine because of shame at being seen approaching a latrine, was 28.5% of the respondents with strong disagreement with the statement. While the highest percentage in statement (4) I think it is necessary to use the latrine to defecate was 59% of the respondents strongly agreeing with the statement. Statement (5) I think it is necessary for parents to teach the children and other household members to use and maintain latrines: the highest percentage was 57.3% of the respondents strongly agreeing with the statement. Statement (6) I think it is necessary to wash my hands with soap after defecation and before preparing food and eating, there were 54.7% of the respondents strong

agreeing with the statement. Statement (7) I think water is important to use to maintain latrines, 54.2% of the respondents strong agree with the statement. Statement (8) I think children's feces is not harmful and defecation in open spaces by children is common, 33.3% of the respondents agreed and with the statement. Statement (9) I think cleaning the latrine and repair or reconstruction of latrines is the responsibility of everyone in the household, 48% of the respondents strongly agreed. Statement (10) I believe that channels of health information from radio and TV, NGOs, health staff and volunteers can influence me to use and maintain the latrines, 47% of the respondents strong agreed.

In terms of practices using and maintaining latrines, Statement (1) Respondent uses latrines to defecate: The highest percentage was 47.7% who never used a latrine. Statement (2) Respondents go to the bush for defecation, 49.6% of respondents said they never went to the bush. Statement (3) Head of household advises household members to use and maintain latrines: 51.3% of heads of households never advised household members to use and maintain latrines. Statement (4) respondent covers the pit after defecation to prevent flies and bad smell, 60.2% never cover a pit latrine after defecating. Statement (5) how often do you clean the latrine? 51.6% of respondents said they never cleaned the latrine. Statement (6) respondents use clean water to wash their hands with soap after defecation, before preparing food and eating, 60.2% said they always washed hands with soap after defecation and before preparing food. Statement (7) respondent's responsibility to repair and reconstruct latrine facilities, 52.8% of respondents said they had no responsibility to repair and reconstruct the latrine facility. Statement (8) respondent attended environmental health training and a study tour due to a water, sanitation and hygiene program, 52.8% of respondents had not attended environmental health training. Statement (9) respondent had been trained as a health volunteer, 53.2% of respondents had not attended health volunteer training. Statement (10) the respondents had access to environmental health information regarding water sanitation and hygiene through the radio, TV/TVTL, NGO, health staff or volunteers, 56.4% of respondents had access to environmental health information.

Association between socio-demography of the household and latrine use

There was no significant association among the respondent's age and latrine use and maintenance (*p-value* 0.095) as shown in Table 2.

Table 2 Association between socio-demography and household latrine use (n=417)

Variables	Use latrine n(%)	Not use latrine n(%)	χ^2	<i>p-value</i>
Age (n=417)				
< 35	69(54.0)	59(46.0)	4.703	0.095
36-50	75(47.5)	83(52.5)		
>50	53(40.5)	78(59.5)		
Mean= 43.3 ±SD=13				
Gender (n=417)				
Male	98(40.8)	142(59.2)	9.318	0.002**
Female	99(55.9)	78(44.1)		
Marital status (n=417)				
Single	39(41.5)	55(58.5)	1.611	0.204
Married	158(48.9)	165(51.1)		
Level of education respondent (n=417)				
No education	82(36.4)	143(63.6)	28.202	0.000**
Low education (Elementary, secondary and high school)	66(53.7)	57(46.3)		
High education (Diploma and bachelor degree)	49(71.0)	20(29.0)		
Highest education household members (n=417)				
No education	21(38.2)	34(61.8)	21.317	0.000**
Low education (Elementary, secondary and high school)	59(36.0)	105(64.0)		
High education (Diploma and bachelor degree)	117(59.1)	81(40.9)		

** $p < 0.001$

The highest level of latrine use was 54% at the range of ages <35 years old compared to 47.5% at the range of 36-50 years old, and the lowest level of using and maintaining latrines was 40.5% at the range of age >50 years old. There was a significant association between gender and latrine use and maintenance (p -value 0.002). Latrine use was 55.9% for females and 40.8% for males. Females were more likely to use and maintain latrines compared to males. In terms of marital status, there was no association between marital status and latrine use and maintenance (p -value 0.204) the range of percentages was 48.9% for the married and 41.5% for the single. There was a statistically significant association between level of education and latrine use and maintenance (p -value <0.001). The highest level of latrine use and maintenance was 71.0% in the high education group, 53.7% in the low education group and 36.4% in the no education group. However there was a significant association between the highest education of family members and latrine use and maintenance (p -value <0.001). It was concluded that respondents who had high education were more likely to use latrines than those who had low education. The high percentage was 59.1% at the level of high education, 38.2% at the level of no education, and 36.0% at the low education level. There was a significant association between occupation and latrine use and maintenance (p -value 0.005) as show in Table 3. The high level of latrine use and maintenance was 81.2% in the group of employed

and the low level was 45.9% in the group of unemployed. Respondents who were employed were more likely to use latrines compared to who those were unemployed. There was a statistically strong significant association between household income and latrine use and maintenance (p -value < 0.001). The high level of latrine use and maintenance was 75.9% at the range of high income, 42.1% for low income and 30.4% for median income. Respondents who had high income were more likely to use latrines than those who had low income. There was a strongly significant association between family size and latrine use and maintenance (p -value < 0.001). The highest level of latrine use and maintenance was 80.0% in the range of 11-15 people per household. It was 51.2% in the range of 6-10 people per household and 37.4% in the range of 1-5 people per household. Respondents who had a large family size were more likely to use latrines compared to those with low family size. There was a statistically strong significant association between neighbors having latrines and latrine use, and maintenance (p -value < 0.001). The highest level of latrine use was 75.7% in the group with neighbors who had latrines and only 22.7% with neighbors who had no latrine. Neighbors having latrines had influenced latrine use and maintainance compared to those who did not have latrines. There was a statistically strong significant association between neighbor influence and latrine use (p -value < 0.001). The high level of latrine use and maintenance was 90.5% for the

Table 3 Association between socioeconomic status and household latrine use and maintenance (n=417)

Variables	Use latrine n(%)	Not use latrine n(%)	χ^2	p-value
Occupation of respondent				
Employed	13(81.2)	3(18.8)	7.721	0.005*
Unemployed	184(45.9)	217(54.1)		
Household income				
Low income <USD100/month	104(42.1)	143(57.9)	22.224	0.000**
Median income USD101-200/month	49(30.4)	112(69.6)		
High income >USD200/month	44(75.9)	14(24.1)		
Family size				
1-5 person/household	68(37.4)	114(62.6)	21.345	0.000**
6-10 person/household	105(51.2)	100(48.8)		
11-15 person/household	24(80.0)	6(20.0)		

* $p < 0.005$; ** $p < 0.001$

Table 4 Association between traditional belief and attitude, knowledge about latrine use and maintenance and diseases associated and practice with latrine use and maintenance (n=417)

Variables	Use latrine n(%)	Not use latrine n(%)	χ^2	p-value
Traditional belief and attitude latrine use and maintenance				
Low attitude (<36)	55(37.4)	92(62.6)	25.292	0.000**
Moderate attitude (36-46)	75(43.4)	98(56.6)		
High attitude (>46)	67(69.1)	30(30.9)		
Knowledge about latrine use and maintenance, and diseases associated				
Low knowledge <14	16(26.2)	45(73.8)	12.663	0.002**
Moderate knowledge 14-19	173(50.9)	167(49.1)		
High knowledge >19	8(50.0)	8(50.0)		
Practice latrine use and maintenance				
Low practice <=14	26(24.5)	80(75.5)	46.197	0.000**
Moderate practice 15-18	127(49.6)	129(50.4)		
High practice > 18	44(80.0)	11(20.0)		

group of neighbors influenced to build and use latrines and the low level was 20.1% in the group without this neighbor influence. The respondent was influenced by the neighbor to build and use a latrine, and also to stop defecating in the bush compared to those didn't have neighbors. There was no association between water source distance and latrine use and maintenance (p -value 0.959). The high level of latrine use was 47.8% at the range of water source distance less than 70 meters compared to a level of 46.5% for those with water between 70-370 meters, and 46.2% for those with water of a distance of >370 meters.

Association between knowledge, attitude, practice and latrine use

There was statistically strong significant association between attitudes and latrine use (p -value <0.001). The high percentage of latrine use was 69.1% among those with high attitudes, 43.4% among those with moderate attitudes and 37.4% among those with low attitudes. The respondents who had high attitudes were more likely to use and maintain latrines compared to

those with low attitudes. There was a significance association between knowledge about latrine use and maintenance and disease associated with latrine use (p -value 0.002). Latrine use was 50.9% at the range of moderate knowledge, 50.0% at high knowledge and 26.2% at the range of low knowledge. The respondents with high knowledge were more likely to use and maintain latrines compared to those who had low knowledge. There was also a statistically strong significant association between practice and latrine use (p -value <0.001). On the subject of practice of latrine use, latrine use was 80.0% at the range of high practice, 49.6% at moderate practice and 24.5% at the range of low practice. The respondents who had high practice were more likely to use and maintain latrines compared to those with low practice, Table 4.

DISCUSSION

Females had higher use and maintenance of latrines than males, consistent with Timorese culture about defecating in the bush, shame because of dignity, women are more strongly

moved by emotions of shame and disgust than men and disgust sensitivity tends to decline with age. Women in a community where defecation during the day time is shameful [3]. It is very important for women and girls, when they are menstruating, or the risk of sexual violence [5]. The study was consistent with a Water Aids evaluation CLTS program in Nigeria 2007, significant amongst women was privacy and dignity over use of latrines [10]. The studies found that use and maintenance of latrines was greater at high levels of education. Latrine presence and use was associated with educational level of the head of household. Education of household head determines the availability of Pit latrines in the homes [11]. The household heads who had ever been to school were more likely to have latrines in their homes compared to those who had never been to school [11]. Household heads who had any education, including non-formal, were more likely to be using a latrine than those who had never attended school [12].

The study found higher use and maintenance of latrines in the group of employed. A good job would provide better conditions of latrine facilities compared with those people working in the fields. High education and skill would obtain better jobs, while low education and skill would obtain low quality jobs. There was a higher proportion of use and maintenance of latrines with high income. High income would be high earners with high use and maintenance of latrines. High income, high school degree and had skill were also associated with good knowledge.

There was a significant association between use and maintenance of latrines and household income. The availability of latrines was two fold higher in households that had high income [13]. The cost of building a latrine is high in relation to household income in many rural communities [14].

A high proportion of latrine use and maintenance in the group of large households with 11-15 people per household. From the study it is concluded that large household members were more likely to use and maintain latrines compared to smaller households. This study is similar to a study conducted in Ethiopia which revealed that those in larger households were more likely to be using a latrine than those in smaller households [12].

According to guidelines for sanitation and hygiene in developing countries the minimum requirements for the quality and amount of latrine was 1 latrine for 20 members (20/pit latrine) [15]. The study found that highest number of use and

maintenance of latrines was among neighbors who had latrines (75.7%). Living together in one small group in the village, has become the habit and character of peoples in rural areas. Because these always depend on and need each other, then influence each other to build, use and maintain latrines. The majority of neighbors in one place might influence each other to use or not use and maintain latrines. Minorities are influenced by majority groups. The higher proportion of use and maintenance of latrines in the group of neighbors influence to build and use latrines and stop defecating in the bush was 90.5%. The study done by Anteneh and Kumie in Amara Region shows that the extent of latrine utilization was about five times more satisfactory in the house that constructed a latrine by learning from peer groups than by being imposed by other people [3]. A study in Nigeria, found that overall, around half of the households were using a shared latrine [16]. There was greater group use and maintenance of latrines in high and moderate knowledge levels with 50.9%. High knowledge might produce better desire and willingness to have better attitudes and practices. Greater knowledge affects a person's behavior, because before people adopt new behaviors they must have knowledge, interest, and evaluate whether or not they ought to try and finally adopt new behavior and knowledge is a very important domain for the formation of one's actions [17]. The highest practice of latrine use and maintenance was the group with low practice with 97.1%. This study was consistent with a CLTS case study in Nigeria 2007 which revealed that it was very successful in promoting significant decline in the practice of open defecation in communities, with many of the assessed community achieving open defecation free status [18]. There were 3 variables not significant, namely: marital status (*p-value* 0.204), water source (*p-value* 0.959) and age (*p-value* 0.095).

CONCLUSION

The study found that 47.2% of households still continued to use and maintain latrines and 52.8% had stopped after one year of the open defecation free declaration in Haupu Village. There were significant associations between latrine use and socio-demography, knowledge, attitudes and practices, socioeconomic status and environmental factors. However education and knowledge are essential elements for improving social behavior and attitudes, especially for those living in rural areas. Cross-sector collaboration within relevant ministries and with institutional partners have a key

role in monitoring and supervising programs to improving knowledge and awareness for the sustainability of latrine use and maintenance in the future.

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