

The status of hygiene and sanitation practice among rural model families of the Health Extension Program (HEP) in Wolayta and Kembata Tembaro Zones of Southern Nations, Nationalities and Peoples' Region of Ethiopia

Kare Chawicha¹, Mengistu Asnake², Girma Kassie², Tariku Nigatu², Mehari Belachew², Habtamu Zerihun²

Abstract

Background: Since the Health Extension Program (HEP) started the training and graduation of model families, little is known about the status and maintenance of hygiene and sanitation practice to inform future directions and decisions.

Objective: to assess the status and maintenance of hygiene and sanitation practices among rural model families of the Health Extension Program.

Method: A cross-sectional comparative study was conducted from Dec.-June 2010/11 in Wolayta and Kembata Tembaro Zones of Southern Nations, Nationalities and Peoples Regional State of Ethiopia. Two types of comparisons were involved in the study; comparison of hygiene and sanitation practices of a randomly selected 690 model families and 686 non-model families, and comparison of similar practices among model families at the time of graduation, assessed in retrospective interview, versus at the time of survey. Quantitative data were collected from the two zones from Dec- Jan. 2010/11. Qualitative data were also collected in June 2011 to complement the findings of the quantitative data from a purposively selected group of women and men among model families in the study areas.

Descriptive and analytics statistics were used to analyse the quantitative data using STATA version 10 while the qualitative data were analysed using Open Code version 3.6.2.0

Results: The study showed that among model families, 82% of them had pit latrine, 23.1 % had solid and liquid waste disposal pits, 19.0% had shelves for storing utensils and 34.1 % had separate dwelling for people and cattle as compared to 55.6 %, 9.1%, 6% and 18.5 % of similar practices among non-model families respectively ($p < 0.001$). Latrine availability, storage of water in a narrow necked covered container, possession of shelves for storage of utensils and fuel saving stoves declined from 96.6% to 82.3%, 92.7% to 78.6%, 33.6% to 19.1% and from 6.1% to 3%, respectively among model families after graduation ($p < 0.01$). During FGDs and in-depth interviews, socio-economic and cultural reasons were mentioned as factors that hindered the maintenance of the practices

Conclusion: Generally, model families performed better in most of the hygiene and sanitation practices than non-model families. The study also indicated a decline in the maintenance of certain practices among some model families. [*Ethiop. J. Health Dev.* 2012;26(2):93-100]

Introduction

Maintaining proper hygiene and sanitation practices reduce a variety of disease conditions such as diarrhea, intestinal helminthes, guinea worm infections and diseases like; typhoid, typhus, trachoma, hepatitis, schistosomiasis and skin infections among others (1,2) . The late Dr LEE Jong-wook who was Director General of the World Health Organization (WHO) once said; "Water and Sanitation is one of the primary drivers of public health..... once we can secure access to clean water and adequate sanitation facilities for all people, irrespective of the difference in their living conditions, a huge battle against all kinds of diseases will be won." (3).

Reports show that every year, 1.8 million children die from diarrheal diseases (including cholera) of which 90% of them are children under the age of 5 and 88% of the diarrhea related deaths are attributable to unsafe water supply and inadequate sanitation and hygiene (4). In addition to diarrheal diseases, worldwide every year, 6 million people are also visually impaired by trachoma, 9,400 deaths are caused by intestinal helminthes

(Ascariasis, Trichuriasis, Hook worm), 160 million people are infected with schistosomiasis and 1.5 million suffer from clinical hepatitis (3). WHO estimates that improving sanitation and the simple act of washing hands at critical times (before eating, after using toilet and cleaning the bottoms of children) reduce diarrheal morbidity by more than 35 % (3,4). Similarly, the result of a systematic review indicated a 47 % reduction of diarrheal disease by a mere hand washing practice. The same study also showed that the risk of severe intestinal infections and shigellosis was associated with a reduction of 48% and 59 % respectively (5).

Globally, close to 2.6 billion people lack access to adequate sanitation. If the current trend continues, by 2015 there will be 2.7 billion people without access to basic sanitation. The regions with the lowest coverage are sub-Saharan Africa, Southern Asia and Oceania in ascending order (6).

In Ethiopia, diarrhea is one of the leading causes of under 5 mortality. Intestinal helminthes are also one of the

¹South Nationse Nationalities and Peoples Regional Health Berou (SNNPR) Regional Health Berou, Hawassa, Ethiopia;

²Pathfinder International Ethiopia Box 12655, Mobile: 0911795443, Office: +251114407642, Addis Ababa, Ethiopia.

leading causes of outpatient visits (7, 8). According to the 2011 Ethiopian Demographic and Health Survey (EDHS), 13 % of mothers reported that their children had at least one episode of diarrhea in the two weeks prior to the survey period (9).

The midterm review of the third round of the Health Sector Development Plan (HSDP III) in 2008 indicated that many areas have made significant strides in increasing sanitation coverage in Ethiopia. A review of published materials in 2005 indicated that low level of education, income, occupation, and place of residence affect the provision of basic sanitation and the occurrence of diarrheal diseases in Ethiopia (10).

Another study conducted in SNNP region of Ethiopia revealed that a mere hygiene and sanitation promotion in the community leads to improvements in hygiene and sanitation coverage. The same study indicated that the number of household latrine coverage, in few years, grew from 16% to 94 % in Mirab Abaya and 10% to 69 % in Alaba (11). A hygiene and sanitation success story in SNNPR also reported a rise in latrine coverage from 75% to 90% (12). In addition to these achievements, in SNNPR, Open-field Defecation Free (ODF) villages are also being promoted to improve the utilization of latrines in the region (13).

Improvements in sanitation have also been shown to consistently result in better health, as measured by fewer diarrheas, reductions in parasitic infections, increased child growth, and lower morbidity and mortality (14). Cognizant of this fact, the national strategy for hygiene and sanitation improvement focuses on universal access (100% hygienic and sanitized households) in primarily rural or peri-urban environments in Ethiopia (14).

Besides the national hygiene and sanitation strategy, since 2003, the Ministry of Health in Ethiopia has been implementing its flagship health service delivery system known as the Health Extension Program (HEP). The program aims to improve the health status of families by creating access to packages of basic promotive, preventive and selected high impact curative health services at household levels. It also focuses in the training of Health Extension Workers (HEWs) in four major program areas. The areas include; disease prevention and control, hygiene and environmental sanitation, family health, and health education and communication. Of these packages, seven of them are related to hygiene and sanitation (15).

The HEP is implemented within the community to deliver basic health services based on the *diffusion model*, which states that community behavior is changed gradually and step by step. It involves the training of early adopters first (model families), then moving to the

next group that is ready to change. Those resistant to change would gradually be conditioned to change because of changes in their environment (16). The HEP also assumes that health behaviors and practices can be enhanced in communities by creating model families that others will admire and emulate (17).

One major component of the HEWs' role is identifying, supporting and training of selected families for 96 hours to be "models" to the community. When it has been determined that the families have successfully implemented 75% of the program package (recently changed to 100%), they are then certified as "model families." Upon graduation, the families are given certificates as official acknowledgement of their accomplishments and they continue working with HEWs as role models within the community (15).

As the model family initiative is a new strategy designed to change the health behaviours of the communities in a wide range of varying and complex cultural and socioeconomic contexts, assessing behavioural changes and its sustainability after model family graduation is important. The purpose of this study is therefore to assess the status and maintenance of hygiene and sanitation practices among rural model families in Wolayta and Kembata Tembaro Zones of Southern Nations, Nationalities and Peoples Region (SNNPR) of Ethiopia.

Methods

Study Area, Study Design and Study Population

The study was conducted in Wolayta and Kembata Tembaro Zones of Southern Nations Nationalities and Peoples Region (SNNPR) of Ethiopia from Dec-June, 2010/11 by employing a comparative cross sectional study design. The study involved both quantitative and qualitative methods sequentially. First, the quantitative data were collected from Dec-Jan, 2011 and involved two comparisons; static group comparison of hygiene and sanitation practices between model and non-model families and a retrospective assessment of similar practices among model families at the time of graduation versus at the time of the survey. Data on the practices at the time of graduation were obtained by interviewing model families about what they had or had not by the time they graduated as model families while the practices at the time of the survey were assessed through interviewing model families and observing their practices at the time of the survey.

Qualitative data were also collected from model families in June 2011 to complement the findings of the quantitative study. The qualitative study focused only on model families in order to gain in-depth understanding of the factors that hindered or facilitated the implementation of the practices and their maintenance over time.

Sample Size and Sampling Technique

The sample size for the study was calculated using the standard formula for two population proportions (taking $p=50\%$ with 8 percentage point difference between model and non-model families). After considering for non-response, the final sample size yielded 1400 households (700 models & 700 non-models). The Zones that implemented the Health Extension Program (HEP) in accordance with the standards set by the Ministry of Health and those that implemented the HEP since 2007 were selected purposively in consultation with the health officials at different levels in SNNPR for the quantitative and qualitative studies. Four Woredas, two from each Zone, were also selected purposively using the same criteria. From each woreda, five Kebeles were selected using Probability Proportional to Size. From the twenty kebeles selected in such a way, list of households was prepared based on their model family status (model vs. non-model) and their year of graduation. Then, from each kebele, 35 model and 35 non-model families were chosen by systematic random sampling technique from the list to ensure the selection of 700 model and 700 non-model families as per the calculated sample size. The model families were also selected proportional to the size of the graduation year. Respondents from each household were any knowledgeable adult family member. Twelve trained health professionals collected data from the selected model and non-model households using interviewer administered structured and pretested questionnaire. Checklists were also used for observation.

For the qualitative study, three different groups of FGD participants were selected based on the following criteria: Women who graduated before July 2009, women who graduated between July-Dec. 2009 and all men in model families regardless of their year of graduation. The list of model families, including their year of graduation, which was prepared for the quantitative study, was used to select FGD participants. The 10 FGD participants were selected purposively from the list for each group. A total of 12 separate FGDs (10 participants per focus group) were conducted in three groups (4 FDG per group) of model families using a discussion guide. The number of FGDs was equally divided between the selected woredas. A total of 21 In-depth interviews were also conducted with various actors including the HEWs using in-depth interview guides.

Operational Definitions

Storage of water in a narrow necked water container, possession of shelves for storing utensils and possession of fuel saving stoves and separate dwelling for people and cattle in this study are defined as households having any container which has a narrow opening that is used to store drinking water, households with shelves used to store utensils and other household cooking equipments, stoves that save fuel while cooking and animals kept in a separate roof other than where people live respectively.

Data Management and Analysis

The data from the completed questionnaires were entered and analysed using STATA 10. Data were also cleaned by running frequencies before analysis. The qualitative data was also analysed using open code software package version 3.6.2.0. Descriptive and analytics statistics were used to analyse the quantitative data and the results are displayed using tables and graphs. The qualitative data were transcribed and summarized under different thematic areas and are presented textually.

Ethical Considerations

The study obtained ethical clearance from the SNNPR Health Bureau Ethical Clearance Review Board. Permissions were also obtained from local officials at the data collection sites. The objectives of the study were explained to study participants and oral consents were obtained prior to data collection. Only those who were willing to participate were included in the study. There were no unique identifiers of respondents in the questionnaire and all the data collected were handled confidentially.

Results

Socio-demographic Characteristics

A total of 1376 (690 model and 686 non-model) families were included in the study with a response rate of 98.3%. Of the total number of model families that participated in the study, the majority (58.7%) of them graduated in 2009 and 2010 and only 0.7% didn't know their year of graduation (Table 1).

Table 1: **Model families by years of graduation, SNNPR Ethiopia, Dec.2010-June 2011**

Year of graduation	Number N (%)
2007	90 (13)
2008	190 (27.5)
2009	208 (30.1)
2010	197 (28.6)
Unknown	5 (0.7)

The sex composition of family members in both model and non-model households was more or less similar. Majority of the respondents in both families were between 20-49 years of age groups and were married and illiterate. The average family size of model and non-model families were 5.5 and 5.1 children per woman, respectively. There was no significant difference in the proportion of women of reproductive age group and under five children between model and non-model families. Overall, females had lower levels of education as compared to their husbands. The husbands of women in non-model families were also less educated than the husbands of women in model families (Table 2).

Comparison of Model and Non-Model Families

Average family size, mean age of respondents and proportions of married respondents were found to be significantly higher in model families than non-model families ($p<0.01$). The proportion of illiterate respondents in model families was high (68%) but

significantly lower than non-model families (72.3%) ($p<0.05$). Similarly, the proportion of respondents' husbands who were at least 7 graders was significantly

higher in model families than non-model families ($p<0.05$) (Table 2).

Table 2: Selected background characteristics of respondents by type of family, SNNPR, December 2010.

	Model Family n=690	Non-model family n=686	P-value
Families with women 15-49 years (%)	23.2	22.6	0.793
Families with under five children	10.9	12.9	0.269
Sex composition of family members			
Male (%)	49.5	47.4	
Female (%)	50.5	52.6	0.417
Age of respondent			
15-24 (%)	8.8	12.4	0.001
25-34 (%)	30.0	28.2	
35-44 (%)	27.9	12.2	
45-54 (%)	32.3	16.1	
55+	18.4	15.0	
Missing age	14.9	32.2	
Median Age	38	38	
Education			
Cannot read/write (%)	68.0	72.3	
Not currently married (%)	2.2	1.6	0.042
1-6 grade (%)	23.8	20.5	
7+ (%)	6.0	5.6	
Marital status			
Currently married (%)	85.8	70.7	
Read/write only (%)	14.2	30.2	0.001
Number of children ever born			
0 (%)	4.3	4.9	
1-2 (%)	13.7	17.5	
3-5 (%)	32.7	32.1	
6-9 (%)	41.8	38.6	
10+ (%)	7.5	6.9	
Mean CEB (SD)	5.4 (0.1)	5.1 (0.1)	
Family Size: Mean (SD)	6.75 (0.025)	5.8 (0.05)	0.001
Husband's education			
Cannot read/write (%)	32.6	37.6	
Read/write only (%)	1.1	1.3	
1-6 grade (%)	34.2	22.7	
7+ (%)	17.9	8.1	
NA (%)	14.2	30.2	0.042

NA-Not Applicable, Missing cases are excluded,

A comparison of specific hygiene and sanitation practices that included the presence of pit latrines, separate dwellings for people and animals (among households with animals) and solid and liquid waste disposal systems was made between model and non-model families. We also compared safe water storage practices using narrow necked water containers, availability of separate hand

washing facilities with cleaning agents such as soap and possession of fuel saving stoves and shelves for hygienic storage of utensils. The result of the study showed that except ownership of fuel saving stoves, all the other practices were significantly higher in model families than non-model families ($p<0.001$) (Table 3).

Table 3: Observed Hygiene and sanitation Practices by model and non-model families at the time of interview, SNNPR, December 2010

Sanitation Practices;	Model family (%) n=690	Non-Model family (%) n=686	P-value
A pit latrine	82	55.6	0.001
A separate dwelling for people and animals (among households with livestock)	34.1	18.5	0.001
Latrines with a separate hand washing facility/with water	27.2	2.3	0.001
Soap, detergent, or other cleansing agent for hand washing	10.9	1.0	0.001
Fuel saving stove/improved Stove	2.9	1.7	
A shelf to store utensils	19.0	6	0.001
A narrow-necked water container	78.6	65.1	0.001
Solid waste disposal place	23.1	9.1	0.001
Liquid waste disposal place	3.7	0.2	0.001

Maintenance of Hygiene and Sanitation Practices and challenges

Even though, model families performed better than non-model families, there was also decline in hygiene and sanitation practices among some model families while some other model families acquired certain practices after graduating without having them (Table 4).

Different reasons were mentioned for the loss of practices among some model families. Lack of latrine durability, which led to frequent re-digging, and resource constraints were the common reasons mentioned for the decline in latrine construction and utilization after graduation. A female FGD participant from the first graduate group of the model family program explained this as;

‘‘The soil in this area is quite slack that slides and fills the pit latrine quickly. This requires digging pits frequently which is tiring. Lack of money also prevents us from constructing solid and permanent latrines.’’. Some participants also mentioned lack of resources such as labour as a reason for not having latrines.

Indepth interview participants indicated that, the main challenge mentioned for the inability to maintain proper solid and liquid waste disposal was the fact that the waste

disposal pits are usually prepared for temporary purposes and they often fill quickly and are out of service in few months. In particular, some model families that graduated 2-3 years before the survey reported that there was fatigue in preparing new waste disposal sites and they had, therefore, stopped having the pits. On the other hand, preparing permanent and long lasting solid and liquid waste disposal sites was reported to be a challenge as it requires resources and skills that were not easily available.

Graduation without acquiring the necessary knowledge and using inappropriate mud for construction of shelves were also mentioned as possible reasons by the indepth interview study participants for the inability to prepare shelves for hygienic storage of utensils.

The commonest reasons given by model families for not using a separate dwelling for people and cattle were; fear of cattle rustlers, emotional attachment with cattle and financial shortages. One male FGD participants voiced concerns about cattle rustlers as:

‘‘I can afford to construct separate house for my cattle and my family, but I am scared of cattle rustlers. For this reason I didn’t do it.’’

Table 4: Level of Hygiene and Sanitation Practices at the time of graduation vs. at the time of the survey among model families. SNNPR, Dec. 2010

Hygiene and sanitation related practices	Model Families who reported having the practices at the time of graduation	Model Families that had the practice at the time of survey	Model Families with the Practices both at the time of graduation and survey	Model Families that dropped the practices after Graduation	Model Families that developed the Practices after graduation	p- value of the difference between n ₂ and n ₃
n ₁	n ₂	n ₃	n ₄	n ₅ =n ₂ -n ₄	n ₆ =n ₃ -n ₄	p-value
	$\% = \frac{n_2 \times 100}{n_1}$	$\% = \frac{n_3 \times 100}{n_1}$	$\% = \frac{n_4 \times 100}{n_1}$	$\% = \frac{n_5 \times 100}{n_2}$	$\% = \frac{n_6 \times 100}{n_3 - n_2}$	(n ₂ -n ₃)
Availability of pit latrine (n=690)	667 (96.6)	568 (82.3)	550(82.4)	117(17.6)	18 (78.3)	0.001
Separate dwelling for people and animals (n=684)	258 (37.7)	233 (34.0)	214(82.9)	44(17.1)	19(4.5)	0.002
Fuel saving stove(n=690)	42 (6.1)	21(3.0)	8(19.0)	34 (81.0)	13(2.0)	0.002
A shelf to store utensils (n=648)	218(33.6)	124 (19.1)	98(44.9)	120(50.0)	26(6.0)	0.001
A narrow necked water container with cover\safe water storage (n=687)	637(92.7)	540(78.6)	504(79.1)	133(20.9)	36(72.0)	0.001

The study also showed that receiving graduation certificates by model families at the time of graduation seems to be related to higher uptake and sustainability of the practices. Of all the model families studied, 40 % of them graduated without certificates. Lack of budget by the woreda health office was commonly mentioned as a reason for not issuing certificates up on graduation. A

little over a third (35%) of the HEWs also reported having received in-service trainings on the model family program. Model families residing in Kebles where the HEW received in-service trainings seemed to perform better than model families from Kebles where the HEW did not receive in-service trainings (Figure 1 & 2).

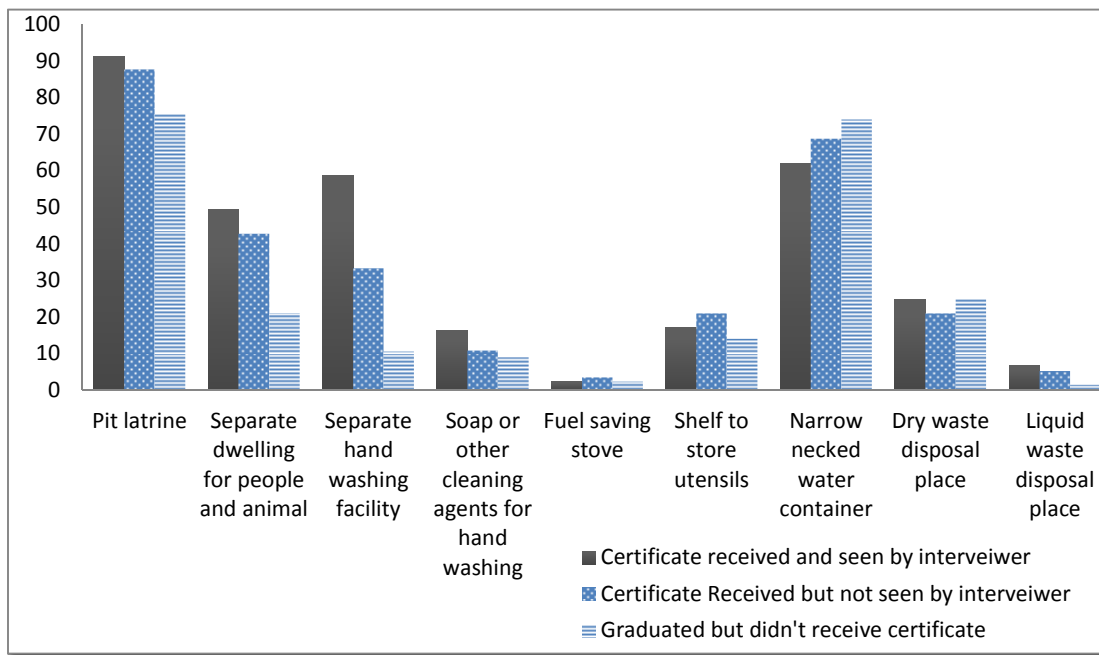


Figure 1: Performance of model families in selected hygiene and sanitation Practices by Certification Status (n=690) at the time of survey. SNNPR, Dec. 2010

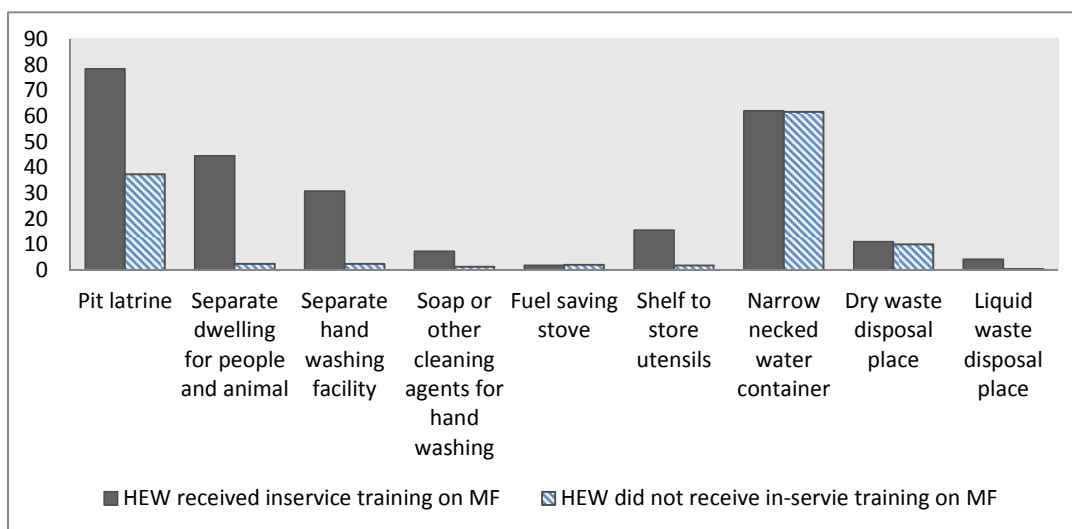


Figure 2: Performance of model families at the time of survey (n=690) according to whether the HEWs received in-service training or not, SNNP, Jan. 2011

Discussion

Many communicable diseases in Ethiopia can be easily prevented by improving hygiene and sanitation practices and through simple interventions like hand washing with soap (18). In this study, the hygiene and sanitation practices of model families were compared with non-model families to see the contribution of the HEP in improving the practices among model families. The result of the study showed that except the presence of narrow necked water container for safe storage of water and availability of fuel saving stove, all the other practices assessed were better performed by model families than non-model families. The result is in accordance with the goal of the HEP that aims to improve such practices among model families following their training on HEP packages. Studies in Bangladesh also reported improvements in hygiene and sanitation practices after sanitation interventions in a particular community as compared to areas where the intervention did not take place (19, 20).

This study also showed that there was a decline in maintaining the recommended hygiene and sanitation practices following model families' graduation. This is similar to the findings of a case study conducted in Bangladesh that reported a decline in hygiene and sanitation practices over time following a community based intervention (11). This decline in maintaining the desired hygiene and sanitation practices may have a negative repercussion in the sustainability of the practices and in meeting the hygiene and sanitation related Millennium Development Goals.

Lack of resources (financial and non-financial) emerged as important factors for sustaining the hygiene and sanitation practices of model families. This is the case especially for those that focused on construction of items, particularly separate dwellings for cattle and people, fuel saving stoves, shelves for utensils and latrines. Most study participants noted that these activities required resources from the families and said that this makes things more difficult to implement and sustain. In addition, inappropriate soil type, absence of adequate space and technical skills and increased community fatigue were also mentioned as constraining factors particularly for the construction and use of human waste disposal systems like latrines and solid and liquid waste disposal pits. Various studies conducted in the areas of hygiene and sanitation also indicate that availability of resources is important for trial, adoption and sustainability of hygiene and sanitation practices within communities (21).

Socio-cultural factors also affected the making of separate dwellings for people and cattle. Fear of cattle rustlers, emotional attachment with cattle and the belief that cattle should reside with people were mentioned in the study. It is not unique to this study when social and cultural norms of a particular society affect health seeking behaviour.

The result of this study has also shown that providing graduation certificate to model families and in-service trainings to HEWs positively affected the practice of model families. This indicates the fact that recognition of model families' performance, undertaking gap filling activities and provision of refresher trainings to HEWs are important for improving and sustaining hygiene and sanitation practices in the community.

The major limitation of this study lies in its inability to randomly allocate study subjects in to model and non-model family groups to attribute the difference observed in the hygiene and sanitation practice of the two groups of families to the implementation of the HEP. There could also be diffusion of desired and undesired behaviours from model to non-model families or the vice versa. In addition, since information obtained on the hygiene and sanitation practices of model families at the time of graduation is a reported practice measured at the time of survey, the result could be compromised by recall and social desirability biases. Therefore, the study team recommends the conduct of prospective cohort studies to see the relationship between the HEP inputs, the resulting changes of hygiene and sanitation practices and associated reductions in hygiene and sanitation related morbidities among model families.

Conclusion and Recommendations

To conclude, this study showed that model family program when viewed in its totality is undoubtedly a success story despite some challenges and gaps. Several shortcomings that work against program implementation and sustainability of key components were identified. The shortcomings can be grouped as economic, legal, socio-cultural and programmatic factors. There is no immediate magic bullet to address these problems. However, the program may need to seek ways to support the poorest of the model families with the necessary basic inputs.

Even though lack of resources were mentioned as shortcomings to maintaining some of the practices, strengthening behavioural change interventions seems to be the most important measure to mitigate the problem of resources from its root. In addition, fostering the sharing of best practices within and between communities enhances the utilization of locally available resources and reduces the impact of resources on the maintenance of the practices. Involving Voluntary Community Health Workers (VCHWs) in the training and follow up of model families also creates local ownership of the program. Besides, strengthening inter-sectoral collaboration such as with the justice system, giving graduation certificates and refresher trainings to model families and providing in-service training to HEWs are crucial in the improvement and maintenance of the desired practices. Keeping records of hygiene and sanitation practices attained at the time of graduation for each model family will also help to make future follow ups and more meaningful comparisons.

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