The Effects of Community Health Strategy on Sanitation Indicators in Tharaka Nithi County, Kenya: A Comparative Analysis of two Study Sites

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ABSTRACT

Kenya has embraced Community Health Strategy as a means of enhancing community access to Healthcare services. This analytical cross-sectional study was designed to evaluate the effects of the Strategy on sanitation indicators within Tharaka Nithi County. The study revealed that 58.6% of households in the Community Health Strategy implementing sites owned improved sanitation facilities compared to 40.6% households in the non-implementing sites, $\chi^2 = 10.994$, df=1, $p<0.001$. Similarly, 43.9% of households in the Community Health Strategy implementing sites had hand washing facilities compared to 12.1% of the households in the non-implementing sites, $\chi^2 = 49.359$, df=1, $p<0.001$. The Community Health Strategy implementing sites also recorded a low diarrhoeal prevalence of 15.1% compared to 25% of households in the non-implementing sites $\chi^2 = 8.542$, df=1, $p=0.003$. The significant differences of sanitation indicators in favour of Community Health Strategy implementing sites demonstrate the effectiveness of Community Health Strategy in delivering sanitation services.

KEY WORDS

Community Health Strategy implementing site: A Community Health Strategy implementing site constituted a sub-location hosting a fully functional community Health unit for a period of more than three years prior the data collection.

Functional Community Health Unit: A Community Health Unit was classified as fully functional if it encompassed a body of trained Community Health Volunteers, trained Community Health Extension Workers, held quarterly dialogue days and had a community health information system.

Improved sanitation facility: This is a sanitation facility that hygienically separates human excreta from human contact. Improved sanitation facilities included water closet/pour flush, ventilated improved pit (VIP) latrines, pit latrines with a slab and composting toilets.

Non-Community Health Strategy implementing site: A non-Community Health Strategy implementing site referred to a sub-location where no attempts had been instigated to establish a community Health unit, selected within the same sub-county with the selected Community Health Strategy implementing site.

Sanitation: Sanitation generally involves the provision of facilities and associated hygiene promotion activities for safe collection, transport and disposal of human wastes, including and not limited to faeces and urine.

Sanitation Indicators: These are variables designed to measure the performance of sanitation related interventions. Access to sanitation was measured by reviewing the availability of standard pit latrines, toilets, and hand wash facilities, among other high impact indicators.

Sanitation Knowledge: This is the facts, information and skills acquired by the households regarding the provision of facilities and associated hygiene promotion activities for safe collection, transport and disposal of human wastes including and not limited to faeces and urine.
1.0 INTRODUCTION

1.1 Background to the Study
Globally, health care services are provided at different levels and by different types of providers. In most countries, the community is designated as the first level of care while the highest referral hospital becomes the highest level of care. The Community Health Strategy is an approach of healthcare service provision primarily organized at individual, family and community levels (Ministry of Health, 2014). The strategy is anchored on the principles of Primary Health Care. The importance of implementing Primary Health Care as an overriding health priority was underscored at a landmark International Conference held at Alma-Ata from September 6 to 12, 1978 (World Health Organization, 1978). During the Conference, more than 3000 delegates from 134 Governments and 67 International Organizations from all over the world adopted the Primary Health Care (PHC) as a priority approach for ensuring Universal Health Coverage by the year 2000. The concept of PHC is founded on a platform of empowering the individual households and the community to effectively take up their role as a pivotal pillar in health development. Principally, the PHC and particularly the community centred approach emerged from a backdrop of disappointment from the dominant medical models.

In Kenya, the Ministry of Health (MoH) has demonstrated resolute efforts towards the implementation of PHC as declared at Alma-Ata. The MoH has implemented several community focused programmes including the Home Based Care Programme (HBC) and Home and Community Based Care (HCBC) Programme. However, the major breakthrough in the implementation of the community component in PHC was the enactment of a policy document to guide the implementation of community health services. In 2006, Kenya developed and adopted Community Health Strategy (CHS), a new approach aimed at improving health indicators through actively engaging communities in managing their own health (Ministry of Health, 2006). Since then, the Government and other development partners in the Health sector have supported the initiative through establishing and operationalizing Community Health Units (Ministry of Health, 2014). According to the Kenya Master Health Facility List, the Ministry of Health together with development partners have established 2944 community Health units across Kenya hitherto (Ministry of Health, 2015).

An evaluation of the performance of the full package of the Kenya’s Community Health Strategy carried out by the United Nations International Children’s Emergency Fund (UNICEF) pointed to improved indicators in areas where the Government had rolled out Community Health Strategy. The assessment indicated an increased proportion of households with latrines (87.7%) in the Community Health Strategy implementing sites compared to coverage of 84.4% in the non-Community Health Strategy implementing sites. The study further revealed that 78.6% of the respondents in Community Health Strategy implementing sites practiced proper handling of children stools as opposed to only 73.5% of their counterparts in the non-Community Health Strategy implementing sites (UNICEF, 2010). Despite these achievements, Tharaka Nithi County (TNC) has continued to post poor sanitation related health indicators. Indeed, an analysis of TNC disease patterns and trends indicate that sanitation related diseases and conditions bear a comparably higher burden of the causes of ill health. The Intestinal worms, Diarrhoea and Typhoid are rated amongst the top 15 causes of morbidity and mortality within the County (District Health Information System, 2016). This corroborates the Kenya Demographic Health Survey (KDHS) findings that denoted a high diarrhoea prevalence rate of 20.5% in children under age five years compared to a National average of 15% in the same age group (Kenya National Bureau of Statistics, 2014). The County has also suffered sporadic episodes of cholera outbreaks since 2006 with the latest cases being reported in April 2016 (District Health Information System, 2016). Poor sanitation practices are associated with low height for age scores in children. Certainly, 32.9% of children under age five years in TNC are stunted compared to 26% Nationally (KenayDemographic Health Survey, 2014).
An assessment conducted by the Kenya’s Ministry of Health to estimate the economic burden of poor sanitation indicated that TNC losses Ksh. 191 million each year as a result of diseases and conditions related to poor sanitation (World Bank Group, 2014). The estimates included losses due to access time, premature death, health care costs and productivity.

1.2 Objectives
The study was guided by the following objectives;

i. To assess the availability and use of sanitation facilities amongst households within Community Health Strategy implementing sites and non-Community Health Strategy implementing sites within Tharaka Nithi County.

ii. To assess the uptake of key sanitation practices amongst households within Community Health Strategy implementing sites and non-Community Health Strategy implementing sites within Tharaka Nithi County.

iii. To determine the levels of sanitation knowledge of households within Community Health Strategy implementing sites and non-Community Health Strategy implementing sites within Tharaka Nithi County.

iv. To establish the prevalence of diarrhoeal amongst households within Community Health Strategy implementing sites and non-Community Health Strategy implementing sites within Tharaka Nithi County.

2.0 METHODS

2.1 Study Site
The study was conducted in Tharaka Nithi County (TNC). TNC is one of the 47 counties in Kenya and covers an area of 2,662.1 Km²; including the shared Mt Kenya forest estimated to have 360Km². The area borders Embu County to the South and South West, Meru County to the North and North East, Kirinyanga and Nyeri Counties to the West and Kitui County to the East and South East (Ministry of Planning, 2013). The county is sub-divided into four administrative sub-counties including Tharaka North, Tharaka South, ChukaIgambang’ombe and Maara sub-counties. However, data was collected in Maara (Magutuni and Nkangani sub-locations) and ChukaIgambang’ombe (Kathatwa and Kanyakini sub-locations) sub-counties, based on purposive sampling.

2.2 Research Design
Analytical cross-sectional study design was used to concurrently examine the study variables amongst the Community Health Strategy implementing sites and the non-Community Health Strategy implementing sites. A Community Health Strategy implementing site constituted an administrative sub-location in which a functional community Health unit had existed for more than three years, while a non-Community Health Strategy implementing site constituted a sub-location where no efforts had been instituted whatsoever to establish a community Health unit. An appropriate non-Community Health Strategy implementing site was selected to reflect unique characteristics of the Community Health Strategy implementing site but, at a relatively far distance (outside 5km radius) to control for spill over effects. In addition, attempts were made to match the Community Health Strategy implementing sites and their respective comparison sites amongst the non-Community Health Strategy implementing areas. The selection of the comparison sites put into account the socio-demographic characteristics, cultural practices, economic dynamics, geographical factors, livelihood characteristics and population density of the respective Community Health Strategy implementing site.
2.3 Study Variables

**Coverage of sanitation facilities:** This was calculated as a proportion based on the total number of households with sanitation facilities (both improved and unimproved facilities) within a Community Health Strategy implementing site or non-Community Health Strategy implementing site divided by the total households within the same site.

**Diarrhoea Prevalence:** This was measured based on the World Health Organization (WHO) definition of diarrhoea, defined as the passage of three or more loose or liquid stools in a day (World Health Organization, 2015). The study recorded stool frequency based on a fourteen day recall period and then applied this definition to calculate diarrhoea prevalence in children aged five years and below.

**Coverage of handwashing facilities:** The handwashing facilities included any water facility installed inside or immediately after a sanitation facility and dedicated solely for purposes of washing hands after visiting the sanitation facility. The coverage was calculated as a proportion of all the households with handwashing facilities compared to the total households within the site.

**Solid waste disposal methods:** The approaches deployed by the respective households to manage any domestic garbage or refuse. The households were appraised on the basis of the method they used to dispose their domestic wastes, whether composting, burying, burning or indiscriminate dumping, among others.

**Open defeacation sites:** Open defecation was defined as defecation in fields, forests, bushes, bodies of water or any other open spaces.

**Knowledge:** This entailed the examination of any facts, information and skills acquired by the households about sanitation related matters and conditions. The households were asked a set of knowledge questions, each aligned to possible correct answers upon which the respondents were scored.

**Effect:** The effect of Community Health Strategy (CHS) on sanitation indicators was measured by comparing the state of the indicators in the CHS implementing sites and the non-CHS implementing sites.

2.4 Study population

The study included all the residents of Tharaka Nithi County based on their willingness to participate, age and period of stay in the County. In particular, the respondents were adults aged eighteen years and above, had to be residents of Tharaka Nithi County, able and willing to provide informed consent and able and willing to provide information based on the data collection tools.

2.5 Sample Size determination

The following formula was used to calculate the sample size:

\[
n = D \left[ (Z_{\alpha} + Z_{\beta})^2 \times \left( \frac{P_1 (1 - P_1) + P_2 (1 - P_2)}{P_2 - P_1} \right) \right], \quad \text{(Magnani Robert, 1999)}.
\]

Whereby;

- \( n \) = required minimum sample size per study site
- \( D \) = design effect, which provided a correction for the loss of sampling efficiency resulting from the use of clusters, this was set at 1.3, based on the estimates of design effect for similar characteristics in the 2010 Community Health Strategy evaluation report (UNICEF, 2010)
- \( P_1 \) = the estimated level of an indicator measured as a proportion for the non-Community Health Strategy implementing site (\( P_1 \) was estimated at 0.328 in consideration of the population with access to improved sanitation in Tharaka Nithi County (Ministry of Health, 2014))
- \( P_2 \) = the expected level of the indicator at the Community Health Strategy implementing sites, such that the quantity \( (P_2 - P_1) \) is the size of the magnitude of change desired for detection. The sample size was calculated...
with an intention to capture a difference of 10 percentage points in the critical indicators (e.g. latrine coverage) for each of the Community Health Strategy implementing sites areas. 

\[ Z_\alpha = \text{the } Z\text{-score corresponding to the degree of confidence with which it is desired to be able to conclude that an observed change of size } (P_2 - P_1) \text{ would not have occurred by chance} (\alpha \text{ is the level of statistical significance, set at } 1.645 \text{ at } 95\% \text{ significance level}), \text{and} \]

\[ Z_\beta = \text{the } z\text{-score corresponding to the degree of confidence required to detect a change of size } (P_2 - P_1) \text{ if one actually occurred} (\beta \text{ is the statistical power, estimated at } 0.840 \text{ at } 80\% \text{ statistical power}) \]

These parameters yielded a sample size of 373.5 respondents. This was rounded to 400 Households, and distributed in a ratio of 1:1 amongst the Community Health Strategy implementing sites and non-Community Health Strategy implementing sites. This translated into 100 households in each of the Community Health Strategy implementing sites (Magutuni and Kathatwa CHUs) and non-Community Health Strategy implementing site (Nkangani and Kanyakini sub-locations).

2.6 Sampling Techniques
A purposive sampling was used to select two Community Health Strategy (CHS) implementing sites and two appropriate non-Community Health Strategy implementing sites within Tharaka Nithi County. The selected Community Health Strategy implementing sites included Magutuni Community Health Unit (CHU) in Maarasub-county and Kathatwa Community Health Unit in Chukalambang’ombe sub-county, while the non-Community Health Strategy implementing sites included Nkangani sub-location and Kanyakini sub-location in Maara and Chukalambang’ombe sub-counties respectively. The selection of the CHS implementing sites and the non-CHS implementing sites was based on the dynamics of Tharaka Nithi County and in particular the differences in socio-demographic characteristics, cultural practices, economic standing and geographical factors. Also, the selection took into consideration the households’ livelihood characteristics and population density.

Simple random sampling was used to identify the households’ level respondents from both the selected Community Health Strategy implementing sites and the non-Community Health Strategy implementing sites. In this case, household registers (MOH 513) were used to compute the study population for the Community Health Strategy implementing sites, while the projected housing and population census report of 2015 and sub-chiefs population registers (where appropriate) guided the study population in the non-Community Health Strategy implementing sites. The key informants, including the participants of the focused group discussions were purposively selected taking into account their knowledge and exposure on community health services.

2.7 Data Collection Techniques
Data collection from primary respondents was organized in units embodying one community health implementing site or a sub-location in the case of a non-Community Health Strategy implementing site. In this case, the study first established the total number of households within every unit. All the households within every unit were listed separately and assigned a numerical value based on the order of appearance in the list. A random number generator application (software) installed in the smart phones of the research assistants was then used to randomly identify the participating households. In every selected household, an appropriate respondent was examined based on the established eligibility criteria. In cases where consent was denied, the study team thanked the concerned household and proceeded to the next selected household.

2.8 Data Analysis
The study generated both quantitative and qualitative data. Quantitative data gathered from the household level respondents’ was analysed using computer software (IBM SPSS, version 20) and MS Excel (version 2010). The sample characteristics were described using frequencies and percentages, while a chi-square test was used to infer the sample characteristics at the population level. A \( p \) value of less or equal to 0.05 (i.e. \( p \leq 0.05 \)) was considered to be statistically significant. The qualitative information, mostly gathered from the key informants
and focused group discussions were analysed manually using thematic network analysis technique. The interpretations of the data were shaped based on the source and the themes emerging from the coded transcripts.

2.9 Ethical Considerations
Ethical clearance was obtained from Kenyatta University Ethics Review Committee (KUERC-KU/R/COMM./51/648) and informed consent from study participants prior to data collection. Research permit was granted by the National Commission for Science, Technology and Innovation (NACOSTI/P/16/51833/10197). Participation in the study was purely voluntary and confidentially of collected information was ensured at all stages of the process.

3.0 RESULTS

3.1 Socio-demographic Characteristics of the Study Respondents
The study engaged 394 primary respondents, 196 respondents from the Community Health Strategy implementing sites and 198 from the non-Community Health Strategy implementing sites. This represented a response rate of 98.5%, measured against the desired sample size of 400 respondents. Among the respondents, 42.1% were household heads, 56.6% were females and 65% married. The majority (93.9%) were Christians and had attained at least primary education (42.1%).

3.2 Access to Sanitation Facilities
Access to sanitation facilities was established through probing the respondents to know where they defecate. Those who defecated in any form of a sanitation facility were considered to have access to sanitation facilities whereas those who defecated in the bush or open ground were considered as lacking access to sanitation facilities. There was no significant difference between the two sites, 96.9% of households in the Community Health Strategy implementing sites and 95.5% of households in the non-Community Health Strategy implementing sites reported to have used a sanitation facility at the last time they defecated ($\chi^2 = 0.593$, df=1, $p=0.441$). Table 1 illustrates the findings.

3.3 Availability of any Method of Sanitation Facility
The study assessed the availability of sanitation facilities by seeking to know whether the household owned any form of a latrine or toilet. The results as presented in table 2 indicated that 87.8% and 83.2% households in the Community Health Strategy implementing sites and non-Community Health Strategy implementing sites respectively owned some form of a sanitation facility ($\chi^2 = 1.609$, df=1, $p=0.205$).

3.4 Availability of Improved Sanitation Facilities
A significant majority of 58.6% of households in the Community Health Strategy implementing sites had improved sanitation facilities compared to 40.6% of households in the non-Community Health Strategy implementing sites ($\chi^2 = 10.994$, df=1, $p=0.001$). The findings are illustrated in table 3.

3.5 The Type of Ownership of the Sanitation Facilities
The respondents were asked to state whether the sanitation facility they used was private, shared or public. The results pointed to a statistically significant difference between the households that had access to private (one household), shared (more than one household) and public sanitation facilities. More households (67.5% of households) in the Community Health Strategy implementing sites used a private sanitation facility compared to 48% of households in the non-Community Health Strategy implementing sites ($\chi^2 = 15.334$, df=1, $p<0.001$) as presented in table 4.
3.6 Availability of Handwashing Facilities
There was a significant difference in the availability of handwashing facilities between Community Health Strategy implementing and non-implementing sites ($\chi^2 = 49.359$, df=1, $p<0.001$). Whereas 43.9% of households in the implementing sites had handwashing facilities, only 12.1% reported in the non-implementing sites. Table 5 illustrates these findings.

3.7 Uptake of selected Hygiene Practices
The uptake of selected hygiene practices was examined in the context of how household members washed their hands and where they disposed their domestic wastes. In both sites, a significant majority of the households used soap when washing hands. However, more households (78.1%) reported using soap for washing hands in the CHS implementing sites compared to non-CHS implementing sites (61.6%); a chi square test showed that this difference was significant ($\chi^2 = 12.656$, df=1, $p<0.001$). Similarly, the key informant interviews pointed to increased uptake of sanitation and hygiene practices in areas covered by community health units. For instance, a project officer working for a local NGO observed, “Sanitation and hygiene services are fairly covered by the Community Health Volunteers. Consequently, we have witnessed increased uptake of certain practices like handwashing with soap, proper solid waste management and improved cleanliness in the households. In this regard, I wish to appeal to the Government to ensure that the Community Health Volunteers are fully supported to sustain these efforts and more importantly, be able to provide the complete set of the essential community health package. The findings are illustrated in table 6.

The respondents were also asked to explain how they disposed the domestic wastes generated from their households. The results indicated that majority (40.6%) of the households disposed their domestic wastes through composting, followed by open burning (26.4%), burying (22%) and crude dumping (11%). However, there was a statistically significant difference between the CHS sites and non-CHS implementing sites on the recommended environmentally friendly methods (composting and burying) of domestic waste disposal. Whereas 73% of households in the implementing sites either composted or buried their domestic wastes, only 52.5% of the households did the same in non-implementing sites ($\chi^2 = 17.584$, df=1, $p<0.001$) as shown in Figure 1.

3.8 Methods Used to Dispose Children Faeces
The study assessed the methods used to dispose children faeces in households that reported to have children less than five years. The respondents were probed to explain how they disposed children faeces with particular emphasis on the last bout of defeacation. The results showed that a statistically insignificant majority of 86.3% households in the Community Health Strategy implementing sites disposed the children faeces safely compared to 76.8% of households in the non-Community Health Strategy implementing sites ($\chi^2 = 1.959$, df=1, $p=0.162$). Table 7 illustrates these findings.

3.9 Households’ Knowledge on the Critical Times of Washing Hands
The study participants were assessed on the critical times of washing hands, steps of washing hands, types of sanitation related diseases and basic facts on sanitation related diseases’ prevention. Knowledge on the critical times of washing hands was generally poor in both communities but slightly better in Community Health Strategy implementing sites at 23% compared to the non-CHS implementing sites at 15.2% ($\chi^2 =3.896$, df=1, $p=0.048$) as indicated in figure 2. The results also revealed that a majority 60.9% of the households (48.5% in the CHS implementing sites and 73.2% in the non-CHS implementing sites) could not follow the recommended steps of washing hands ($\chi^2 = 25.368$, df=1, $p<0.0001$). Similarly, the results indicated that a majority of 56.9% of households (57.7% in the Community Health Strategy implementing sites and 56.1% in the non-Community Health Strategy implementing sites) knew more than three types of sanitation related diseases ($\chi^2 = 0.102$, df=1, $p=0.750$).
When asked about the harmfulness of the adults’ faeces as compared to those of children, a significant majority of 90.8% of households in the Community Health Strategy implementing sites correctly stated that children faeces were equally harmful as those of adults compared to 79.8% of households in the non-CHS implementing sites ($\chi^2 = 9.525$, df=1, $p=0.002$). Table 8 illustrates these findings.

3.10 Estimated Diarrhoea Prevalence and knowledge on prevention

The study sought for information about diarrhoea in children less than five years for the period within two weeks prior to the household interviews. Apparently, diarrhoea was reported in 15.1% of children within the Community Health Strategy implementing sites and 25% of children in the non-Community Health Strategy implementing sites($\chi^2 = 8.542$, df=2, $p=0.003$). The findings are presented in figure 3.

3.11 Knowledge on Diarrhoea Prevention

A statistically significant majority of 97.4% of households in the Community Health Strategy implementing sites correctly named at least one method of diarrhoea prevention compared to 92.9% of households in the non-implementing sites($\chi^2 = 4.384$, df=1, $p=0.036$). The findings are illustrated in table 9.

4.0 DISCUSSION

As part of its 2030 Agenda, the United Nations (UN) set as Goal 6 of the 17 Sustainable Development Goals (SDGs) the ambition to “Ensure access to water and sanitation for all”, including the target to “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.” The importance of influencing behaviour inorder to achieve these goals is widely recognized. This study has investigated the effects of the Community Health Strategy on the availability and use of sanitation facilities, uptake of key sanitation and hygiene practices, sanitation knowledge and changes on diarrhoea prevalence.

The study showed that a significant majority of households in the Community Health Strategy (CHS) implementing sites had improved sanitation facilities compared to the non-Community Health Strategy implementing sites. The findings, especially for the non-CHS implementing sites are in concurrence with the Water and Sanitation Programme assessment report that estimated that about 32.8% of Tharaka Nithi population had access to improved sanitation in 2014 (World Bank Group, 2014). The significant difference on improved sanitation facilities in favour of Community Health Strategy implementing sites can be attributed to the efforts of Community Health Volunteers (CHVs). During house to house visits, CHVs educate communities on the importance of sanitation facilities with a key focus to promoting the construction and use of improved sanitation facilities. A Nationwide assessment of the Community Health Strategy similarly indicated a significant increase of the households with improved sanitation facilities in areas where Community Health Strategy had been rolled out compared to where there were no community health units (UNICEF, 2010).

The coverage of handwashing facilities was found to be significantly high in areas where Community Health Strategy had been rolled out. Indeed, 43.9% of households in the Community Health Strategy implementing sites had handwashing facilities compared to 12.1% of households in the non-Community Health Strategy implementing sites. In their study, Freeman et al (2014) estimated that 19% of the world’s population practice hand washing with soap which closely compares with our findings, particularly at the non-Community Health Strategy implementing sites.

There also existed highly significant differences on waste management practices, with more households within CHS implementing sites practicing proper household waste management than in the non-CHS implementing sites. Overall, 73% of households in the CHS implementing sites either composted or buried their domestic wastes compared to 52.5% of the households in the non-CHS implementing sites. The results revealed in the non-CHS implementing sites are comparable to the estimates by The Open University (2010) that showed that a
slightly less than half of the population rely on indiscriminate dumping of domestic wastes or burning in the open space (The Open University, 2016).

The success of Community Health Strategy was also exhibited on the households’ management of children faeces. Majority of households (86.3%) in the CHS implementing sites disposed the children faeces safely as compared to 76.8% in the non-Community Health Strategy implementing sites. Similar results were reported by the Nationwide Community Health Strategy evaluation report (UNICEF, 2010) that found out that 78.6% of respondents in CHS intervention sites practiced proper handling of children faeces as opposed to 73.5% of households in the non-intervention sites. The results are also consistent with the findings by the Kenya National Demographic and Health Survey (2014). The survey (KNDHS) indicated that 83% of children less than five years have their faeces disposed in sanitation facilities (KNBS, 2014). Other studies across the globe have also highlighted some levels of unsafe disposal of children faeces, even among households with improved sanitation facilities (UNICEF, 2015).

Overall, the households in the CHS implementing sites demonstrated higher knowledge on matters related to sanitation and hygiene. For instance, 23% of households in the CHS implementing sites knew all the four critical times of washing hands compared to 15.2% of households in the non-CHS implementing sites. Significant differences were also noted in the mastery of steps of washing hands. More than half (51.5%) of the households in the CHS implementing sites correctly demonstrated more than four steps of washing hands compared to 26.8% of households in the non-CHS implementing sites. Undoubtedly, the differences on the levels of knowledge in the basic concepts of sanitation and hygiene promotion came as a result of actively and effectively involving and enabling households to increase their control over their environment and health through established CHS structures. The CHS workforce deploys multifaceted approaches in eradicating water, sanitation and hygiene related diseases, primarily encompassing awareness creation, technical support and social mobilization.

The CHS has also established mechanisms of building the technical capacity of Community Health Volunteers who in turn empower their communities through house to house health education. Accordingly, the households within CHS implementing sites also demonstrated higher knowledge on the characteristics of human faeces. The study established that 90.8% of households in the CHS implementing sites correctly stated that children faeces and adults faeces were equally harmful compared to 79.8% of households in the non-CHS implementing sites. Were (1984) also found improved levels of household knowledge on health related matters in Kakamega district after rolling out the pioneer community based primary health care project, that by large was implemented using Community Health Strategy principles (Were, 1984).

The households within CHS implementing sites reported to have experienced relatively low diarrhoea prevalence (15.1%) compared to the households within non-CHS implementing sites (25%). The lower diarrhoea prevalence recorded in CHS implementing sites is undoubtedly a reflection of the purposed outcome of Community Health Strategy. The empirical association is further reinforced by the fact that CHS implementing sites also recorded high coverage of sanitation facilities, high coverage of handwashing facilities and good uptake of some hygiene promotion activities like proper disposal of solid and liquid wastes.

5.0 CONCLUSIONS
Generally, the study has documented statistically significant improvement in most of the assessed sanitation related indicators in areas where the Community Health Strategy has been rolled out.
6.0 RECOMMENDATIONS

Tharaka Nithi County department of Health should endeavour to provide all the community based sanitation activities through the existing framework of Community Health Strategy. The policy makers, both at Tharaka Nithi County Government and the National Government should ensure that all the community based approaches aimed at improving health indicators are designed in conformity with the structures established under the Community Health Strategy. Further, the County Government should focus on establishing more community health units and position them as channels for creating household demand for increased uptake of desirable sanitation and hygiene practices. Similarly, the County Government together with development partners should put in place mechanisms to harness the full potential of the households empowered with sanitation knowledge, preferably through continuous engagements and providing a platform for leveraging other community based developmental services on Community Health Strategy.

Although the Community Health Strategy implementing sites recorded low diarrhoea prevalence than the non-implementing sites, it was evident that the prevalence was generally high and unacceptable. Accordingly, the County Government should strengthen the capacity of Community Health Strategy workforce to fully intervene in the prevention and control of diarrhoea infections at the household level. For instance, the County can avail adequately equipped community health kits to all the Community Health Volunteers.

### 6.0 TABLE AND FIGURES

**Table 1: Comparison of Access to Sanitation Facilities**

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who used a toilet the last time they wanted to defecate</td>
<td>96.9%</td>
<td>95.5%</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Those that defeacated in the open the last time they wanted to defeacate</td>
<td>3.1%</td>
<td>4.5%</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: Comparison of availability of any form of a Sanitation Facility**

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that owned any form of a sanitation facility</td>
<td>87.8%</td>
<td>83.2%</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Households that did not own any form of a sanitation facility</td>
<td>12.2%</td>
<td>16.8%</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Comparison of the availability of Improved Sanitation Facilities

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that owned improved sanitation facilities</td>
<td>58.6%</td>
<td>40.6%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Households that did not own improved sanitation facilities</td>
<td>41.4%</td>
<td>59.4%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4: Comparison of the ownership of Sanitation Facilities

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that owned a Privately used sanitation facility</td>
<td>67.5%</td>
<td>48%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Households that owned/used a shared sanitation facilities</td>
<td>32.5%</td>
<td>52%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5: Comparison of the Coverage of Handwashing Facilities

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of households with hand washing facilities</td>
<td>43.9%</td>
<td>12.1%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Proportion of households without hand washing facilities</td>
<td>56.1%</td>
<td>87.9%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Comparison of the use of Soap in Hand Washing

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of households that used soap for washing hands</td>
<td>78.1%</td>
<td>61.6%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Proportion of households that did not use soap for washing hands</td>
<td>21.9%</td>
<td>38.4%</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7: Methods used to Dispose Children Faeces

<table>
<thead>
<tr>
<th>Response</th>
<th>Community Health Strategy implementing sites</th>
<th>Non-Community Health Strategy implementing Sites</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dropped into toilet, buried or washed and discharged as grey water</td>
<td>86.3%</td>
<td>76.8%</td>
<td>82.2%</td>
</tr>
<tr>
<td>Disposed in the open ground, as solid waste/garbage, washed away and water discharged outside or did nothing/left it there</td>
<td>13.7%</td>
<td>23.2%</td>
<td>17.8%</td>
</tr>
</tbody>
</table>

### Table 8: Comparison of the Households’ perceptions on Human Faeces

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of households that correctly stated that children faeces are equally harmful as those of adults</td>
<td>90.8%</td>
<td>79.8%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Proportion of households that thought children faeces are less harmful than those of adults</td>
<td>9.2%</td>
<td>20.2%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 9: Comparison of the Households’ Knowledge on Diarrhoea Prevention

<table>
<thead>
<tr>
<th>Category</th>
<th>CHS Implementing Sites</th>
<th>Non-CHS Implementing Sites</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of households that knew at least one method of diarrhoea prevention</td>
<td>97.4%</td>
<td>92.9%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Proportion of households that didn’t know any method of diarrhoea prevention</td>
<td>2.6%</td>
<td>7.1%</td>
<td>&lt; 0.05</td>
</tr>
</tbody>
</table>
Figure 1: Methods used by Households to Dispose Solid Waste

Methods used to dispose Household Solid Wastes

- Composting: 61.0% (Non-CHS) vs. 20.2% (CHS)
- Burning: 32.3% (Non-CHS) vs. 34.3% (CHS)
- Crude dumping: 13.2% (Non-CHS) vs. 9.0% (CHS)

Figure 2: Households’ Knowledge on the Critical Times of Washing Hands

Knowledge on the Four Critical times of Washing Hands

- Knew all the four Critical times: 77.0% (CHS) vs. 23.0% (Non-CHS)
- Didn't Know all the four Critical times: 84.8% (CHS) vs. 15.2% (Non-CHS)
Figure 3: Reported Diarrhoea Cases within two Weeks Prior to the Study

7.0 REFERENCES


