

Knowledge Levels of Community-Based Health Workers on the Community-Led Total Sanitation Approach in Turkana County, Kenya

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Abstract

Community-Led Total Sanitation (CLTS) is a widely adopted approach to address health issues related to open defecation. While CLTS has shown success in arid and semi-arid regions, there is limited understanding of its implementation, particularly regarding the engagement and expertise of Community-Based Health Workers (CBHWs). This study aimed to assess the knowledge levels of CBHWs on the CLTS approach in Turkana County, Kenya. A community-based cross-sectional design was employed, involving 200 CBHWs and 430 households, selected through multistage sampling. Additionally, 21 key informants were purposively sampled. Quantitative data was managed and analysed using Excel and STATA version 17, employing both descriptive and inferential statistics. Qualitative data was analysed using NVivo, with thematic methods applied to identify key insights. The findings indicate that the majority of CBHWs in Turkana County possess a strong understanding of CLTS principles, with 75.51% of participants rating their knowledge as "Very Good" and 24.49% as "Excellent." Around 80% of CBHWs have undergone formal training in CLTS, primarily through workshops and seminars, reflecting the critical role of structured training in their effectiveness. This study underscores the robust knowledge of CLTS among CBHWs in Turkana County. However, it also reveals certain knowledge gaps and challenges in the implementation process, highlighting the need for ongoing training and empowerment of CBHWs to enhance CLTS outcomes.

Keywords: *Community-Based Health Workers, Community-Led Total Sanitation, Knowledge, Open Defecation, Open Defecation Free, Households.*

Introduction

Kamal Kar created the idea of Community-Led Total Sanitation (CLTS) for Bangladesh's rural areas around the year 2000 [1]. Around 2011, the CLTS strategy attained widespread acceptance [2]. When CLTS was first implemented in a nation, non-governmental organizations frequently took the lead [3]. Communities may receive recognition from their local governments by being granted "open defecation free" (ODF) status [4]. The initial CLTS plan purposely excluded toilet subsidies

because they could make the procedure more difficult [1]. At least 53 nations use CLTS in some capacity [2]. It is a participative strategy intended to inspire a shift in everyone's behavior in rural areas [5]. The CLTS technique was first created in 2009 in Bangladesh, and it has subsequently been used all around the world [1].

In 2011, the Open Defecation Free Rural Kenya was committed to making the whole country free of open defecation by the year 2020, and to do so, in May 2011, they started the Open Defecation Free (ODF) Rural Kenya

Campaign [6]. By the end of 2014, 15% of Kenyan villages had adopted CLTS, with 7% of those villages declaring themselves ODF; the highest concentration of ODF villages was in Busia, Kisumu, and Siaya Counties [7]. In these counties, the ODF status was 33%, 30%, and 29%, respectively [8]. Despite several purposeful attempts, Kenya failed to make progress toward the MDG target of halving the population without access to clean water and toilets by 2015 [9]. The lack of progress is attributed to various challenges, including insufficient infrastructure and community engagement [10].

A better approach to sanitation is crucial for maintaining human health [11]. Access implies that everyone will be able to easily access a facility for sanitation and hygiene whenever they need it, wherever they are, whether at home or in a public setting [12]. Numerous water-related illness outbreaks, such as the cholera outbreaks in Turkana in 2013 and 2018, as well as the high rates of typhoid and trachoma, have been linked to open defecation [13, 14]. After lack of water, poor sanitation is the second biggest problem affecting communities in Turkana County, Kenya [15]. The impact of open defecation on community health has been well-documented in various studies [16].

The Kenya Campaign was launched, and other sanitation campaigns have been running in Turkana since 2007, when Community-Led Total Sanitation (CLTS) programs were first executed [6]. Despite all these efforts, there hasn't been much progress since open defecation is still practiced by a large percentage of the population (72%) [17]. In addition, there aren't many latrines available, and as such, residents don't practice good personal hygiene [18]. Collectively, these issues have led Turkana County to have a high burden of water-related diseases, despite a rise in the number of community health units to 167 and the number of community-based health workers to 2,238 [19]. The inadequacy of

sanitation facilities and health education continues to be a significant challenge [20].

Due to different contextual concerns and challenges, CLTS adoption has been slow in many parts of Kenya [3]. ODF achievement in diverse communities is hampered by many contextual difficulties, and Turkana County is no exception [7]. To date, no specific research has been carried out to examine the obstacles that community-based health professionals face in Turkana County [18]. Even though numerous studies on CLTS have been conducted in both Kenya and other nations, most studies conducted in Kenya have not made a conclusive statement regarding the adoption and implementation of the CLTS approach as a strategy used to address the issue of open defecation [3]. There is a shortage of data on the examination of community-based health workers' (CBHWs) knowledge, function, motivation, and obstacles related to the implementation and adoption of the CLTS strategy to achieve ODF status [20].

It is upon this background that the current study was set to determine the impact of CBHWs on CLTS implementation on latrine ownership and the practice of open defecation among household members in Community-Led Total Sanitation in Turkana County in Kenya. The current survey aimed at evaluating the effectiveness of CBHWs in the implementation of CLTS in Turkana County, Kenya.

Methods

Study Area

The study was conducted in Turkana County, the most populous county in North-Western Kenya, which is bordered by Uganda, Ethiopia, South Sudan, Lake Turkana, Marsabit County, and the Ilemi Triangle. The county, with a population of 926,976 according to the 2019 census [21], is located south and east of West Pokot, Baringo, and Samburu Counties.

The County comprises seven sub-counties: Loima, Kibish, Turkana Central, Turkana West, Turkana East, Turkana South, and North

Turkana. Turkana, Kenya's poorest county, faces challenges such as dry and semi-arid environments, distance from the capital, limited access to services, and poverty [22]. Turkana County ranks 47th out of 47 in infant vaccination, literacy, sanitation, and health care indicators [17]. The arid region experiences high temperatures and heavy rainfall, impacting its economy based on nomadic pastoralism [23]. Disease outbreaks and unusual migratory patterns persist [24]. Livestock numbers are slowing down, making it difficult for locals to make a living off herding alone [25].

Study Design and Participants

A community-based cross-sectional survey was conducted with Community-Based Health Workers, households, key informants, and focus group discussion (FGD) participants to collect information on the effectiveness of Community-Based Health Workers in the implementation of the CLTS approach.

Data Collection

A total of 12 research assistants participated in data collection. They were trained for two days on data collection procedures and other aspects related to the study. A structured questionnaire was used to collect data from households and CBHWs, while an interview guide and schedule were used to collect data from key informants and FGD participants.

Data Management and Analysis

Excel and STATA version 17 were both used for data management, analysis, and presentation of quantitative results, while

NVivo was used for qualitative data. Descriptive and inferential statistics such as mean, standard deviation, frequencies and their percentages, chi-square test, and multivariate logistics were used for the analysis of quantitative data and thematic analysis for qualitative data. Regression analysis was used to test for association. In all tests, $p < 0.05$ was considered statistically significant.

Ethical Consideration

The study obtained ethical approval from Mount Kenya University Ethics and Research Committee (ERC) (MKU/ISERC/2659) and National Council for Science, Technology and Innovation (NACOSTI) (679798) Kenya. Written consent was also sought from all study participants.

Results and Findings

Characteristics of the Respondents

The recruitment rates for both households (97.4%; 419 of 430) and community-based health workers (98.0%; 196 of 200) for the study were high, and good enough for quantitative analysis and inferences. For households' characteristics (Table 1), most of the study participants were aged over 40 years (52.51%), with a relatively balanced gender distribution. Similarly, majority of the participants were married (68.74%), unemployed (61.58%) and identified as Christian (90.21%). Educationally, the sample was diverse, with significant proportions having completed secondary school (22.43%) or post-secondary education (27.45%).

Table 1. Demographic Characteristic for Household

Characteristics	n	%
Age Category		
21-30	47	11.22
31-40	152	36.28
> 40 Years	220	52.51
Gender		
Female	208	49.64
Male	211	50.36

Marital Status		
Married	288	68.74
Separated	61	14.56
Unmarried	11	2.63
Widowed	59	14.08
Religion		
Christian	378	90.21
Muslim	41	9.79
Education		
No Formal Education	113	26.97
Primary	97	23.15
Secondary School	94	22.43
Post-Secondary School	115	27.45
Occupation		
Employed	95	22.67
Own a Business	66	15.75
Unemployed	258	61.58

Demographic Characteristics for Community based Health Worker

The demographic analysis of community-based health workers reveals several notable patterns (Table 2). Most health workers fall within the age range of 31-40 (71.94%), with a relatively balanced gender distribution. The majority were married (83.67%) and identified as Christians (98.47%). Educationally, there was a diverse range of attainment levels, with a

significant portion having completed post-high school education (45.92%). In terms of occupation, a substantial portion were employed (41.84%) or self-employed (33.67%), with roles primarily in agriculture (10.2%) or pastoralism (14.29%). Moreover, majority were Community Health Volunteers (57.65%), with varying durations of service, with a notable proportion having worked for 2-4 years (46.43%).

Table 2. Demographic Characteristics for Community based Health Workers

Characteristics	n	%
Age Category		
21-30	17	8.67
31-40	141	71.94
>40	38	19.39
Gender		
Female	97	49.49
Male	99	50.51
Marital Status		
Married	164	83.67
Separated	19	9.69
Unmarried	3	1.53
Widowed	10	5.1
Religion		

Christian	193	98.47
Muslim	3	1.53
Education Level		
No Formal Education	49	25
Primary	42	21.43
High School	15	7.65
Post High School	90	45.92
Occupation		
Agriculture	20	10.2
Employed	82	41.84
Pastoralism	28	14.29
Self Employed	66	33.67
Position in Health Unit		
Community Health Extension	83	42.35
Community Health Volunteer	113	57.65
Duration Worked		
2-4 Years	91	46.43
5-7 Years	32	16.33
8-10 Years	13	6.63
Below 2 Years	60	30.61

CBHWs Knowledge on CLTS Approach

Most of CBHWs in Turkana County have a good understanding of CLTS, with 75.51% rating their knowledge level as "Very Good" and 24.49% as "Excellent" (Table 3). Furthermore, the majority had received training on CLTS (86.22%). The primary methods through which CBHWs in the county ensured they have knowledge on CLTS include attending training workshops (55.10%), consulting their supervisors (31.63%), and reading about CLTS (13.27%). To stay updated on CLTS, CBHWs primarily attend training

workshops (49.49%), consult their supervisors (38.27%), and read about CLTS (12.24%). Additionally, when addressing knowledge gaps, CBHWs commonly attend training workshops (54.08%), consult their supervisors (30.61%), and read about CLTS (15.31%). The results highlight high knowledge on CLTS among the Community health workers in Turkana County and a strong commitment to further acquire it primarily through training, consultation with supervisors, and self-study, which are essential for effective implementation of sanitation initiatives.

Table 3. CBHWs Knowledge on CLTS approaches

Characteristics	n	%
CBHWS Knowledge level on CLTS		
Very good	148	75.51
Excellent	48	24.49
Received Training		
No	27	13.78
Yes	169	86.22
How CBHWs Ensure They Have Knowledge on CLTS		

Attending Training Workshops	108	55.10
Consult My Supervisor	62	31.63
Reading About CLTS	26	13.27
How they stay updated on CLTS		
Attending Training Wo	97	49.49
Consult My Supervisor	75	38.27
Reading About CLTS	24	12.24
How CBHWs Address Knowledge Gap		
Attending Training Workshops	106	54.08
Consult My Supervisor	60	30.61
Reading About CLTS	30	15.31

Sources of CBHWs Information on CLTS

Figure 1 below shows sources of information about Community-Led Total Sanitation (CLTS) for Community-Based Health Workers (CBHWs) in Turkana County. The results show that training workshops and seminars (39.29%) is the main source of information for the

CBHWs while observation what others (7.14%). These percentages indicate that CBHWs predominantly rely on formal channels such as training workshops/seminars for acquiring knowledge on CLTS, suggesting that structured training sessions play a significant role in enhancing their understanding of CLTS principles and practices.

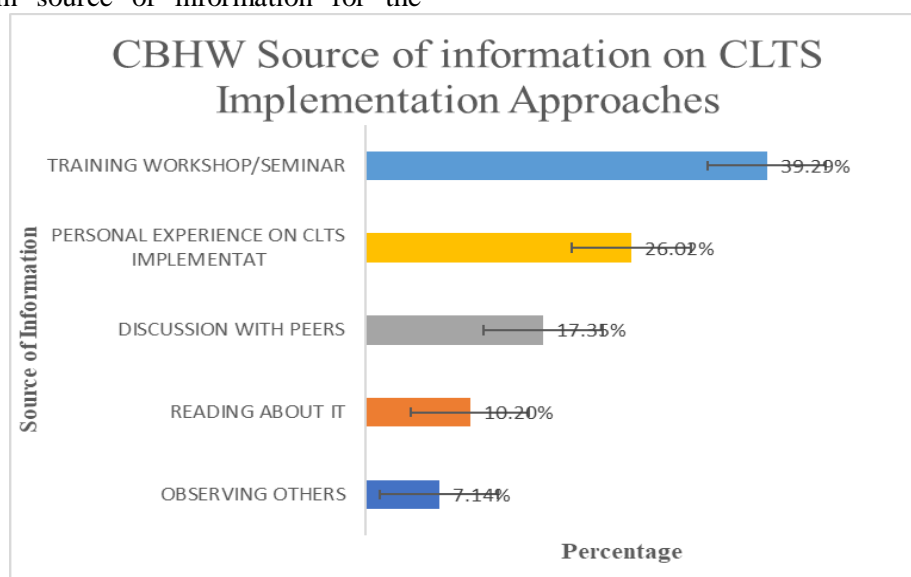


Figure 1. CBHWs Sources of Information on CLTS

Multivariate Logistic Regression of CBHWs Knowledge Associated Factors

Table 4 shows the analysis of CBHWs knowledge-associated factors using multivariate logistic regression, highlighting the influence of Community-Based Health Workers' (CBHWs) knowledge and training on latrine ownership and the practice of open

defecation. The data demonstrates that CBHWs' knowledge level on Community-Led Total Sanitation (CLTS) significantly impacts latrine ownership. Specifically, those with higher CBHWs' knowledge on CLTS are 3.495 times more likely to own a latrine (AOR: 3.495, 95% CI: 7.7-19.98, $p = 0.039$). Conversely, the likelihood of using open defecation decreases,

with an adjusted odds ratio of 0.37 (AOR = 0.37, 95% CI: 6.49-18.97, p = 0.022). This suggests that greater CBHWs' knowledge correlates with a higher probability of latrine ownership and a reduced tendency towards open defecation.

Training received by CBHWs also plays a crucial role. Those who have received training are significantly more likely to own a latrine, with an (AOR = 8.872, 95% CI: 11.6-20.0, p = 0.021). This training also reduces the likelihood of using open defecation (AOR = 2.01, 95% CI: 7.27-17.31, p = 0.028), indicating that proper training enhances both latrine ownership and the reduction of open defecation practices.

Further, the ability of CBHWs to ensure they have knowledge on CLTS is associated with increased latrine ownership (AOR = 2.072, 95% CI: 9.59-11.77, p = 0.014) and decreased use of open defecation (AOR = 0.13, 95% CI: 4.67-18.15, p = 0.017). This suggests that when CBHWs are well-informed about CLTS, they are more effective in promoting latrine usage and reducing open defecation.

Staying updated on CLTS also has a significant impact, with an (AOR = 1.541, 95%

CI: 14.28-11.51, p = 0.033) for latrine ownership and an (AOR = 0.52, 95% CI: 4.33-18.62, p = 0.034) for open defecation. This indicates that continual updates on CLTS knowledge are associated with better outcomes in both latrine ownership and reduced open defecation.

Lastly, CBHWs addressing knowledge gaps also contributes positively, as evidenced by an (AOR = 4.725, 95% CI: 14.84-15.52, p = 0.027) for latrine ownership and an (AOR = 1.188, 95% CI: 13.08-24.91, p = 0.031) for decreasing open defecation. This shows that filling knowledge gaps is instrumental in improving latrine ownership and reducing the practice of open defecation.

Overall, these findings highlight the critical role of CBHWs' knowledge, training, and ongoing education in enhancing latrine ownership and reducing open defecation practices. The results underscore the importance of investing in CBHWs' capacity-building to improve sanitation outcomes at the household level.

Table 4. Multivariate Logistic Regression of CBHWs Knowledge Related Factors

Characteristics	Own A Latrine			Used Open Defecation		
	AOR	95% CI	p	AOR	95% CI	p
CBHWS Knowledge level on CLTS						
No	REF			REF		
Yes	3.495	7.7-19.98	0.039	0.37	6.49-18.97	0.022
Received Training						
No	REF			REF		
Yes	8.872	11.6-20.0	0.021	2.01	7.27-17.31	0.028
CBHWs Ensure They Have Knowledge on CLTS						
No	REF			REF		
Yes	2.072	9.59-11.77	0.014	0.13	4.67-18.15	0.017
Stay updated on CLTS						
No	REF			REF		

Yes	1.541	14.28-11.51	0.033	0.52	4.33-18.62	0.034
CBHWs Address Knowledge Gap						
No	REF			REF		
Yes	4.725	14.84-15.52	0.027	1.188	13.08-24.91	0.031

COR, crudes odd ratio; *AOR, adjusted odds ratio –were calculated using multiple regression model by adjusting independent variables; *P-values were calculated using multivariate logistic regression model.

Discussion

The demographic profile of the households reveals a predominantly mature population, with over half (52.51%) of the respondents being over 40 years old. This age distribution suggests that a significant portion of the population possesses considerable life experience, potentially influencing their views on health and sanitation practices. The nearly equal representation of genders provides a balanced perspective from both male and female participants.

A majority of respondents are married (68.74%) and identify as Christian (90.21%). These factors may play a role in shaping communal health practices and the acceptance of interventions such as Community-Led Total Sanitation (CLTS). The high unemployment rate (61.58%) highlights economic challenges that could hinder the ability to invest in sanitation facilities like latrines. Education levels among respondents are varied, with notable percentages having secondary (22.43%) and post-secondary education (27.45%), which could positively influence health awareness and practices.

The demographic data of Community-Based Health Workers (CBHWs) indicate a predominantly middle-aged group, with 71.94% aged between 31 and 40 years. This age range is typically associated with both the maturity and physical capacity necessary for the demanding tasks of CLTS activities. The nearly equal gender distribution suggests active participation of both men and women in community health work, which is essential for addressing the diverse needs of the community.

A high proportion of CBHWs are married (83.67%) and Christian (98.47%), reflecting the household characteristics and potentially aiding cultural alignment between the workers and the communities they serve.

Educationally, a significant portion of CBHWs (45.92%) have education beyond high school, likely enhancing their ability to comprehend and effectively convey health information. Their diverse employment status, with many being employed (41.84%) or self-employed (33.67%), indicates that they are well-integrated into the local economy, potentially bolstering their credibility and influence within the community.

The findings reveal that most CBHWs possess a strong understanding of the CLTS approach, with 75.51% rating their knowledge as "Very Good" and 24.49% as "Excellent." This solid knowledge base is crucial for the successful implementation of CLTS initiatives, as it directly affects their ability to educate and influence the community. The fact that 86.22% of CBHWs have received CLTS training underscores the importance of formal education in enhancing their skills and knowledge. Training workshops (55.10%) and consultations with supervisors (31.63%) are the main sources of this knowledge, highlighting the significance of structured learning and mentorship in capacity building. Ongoing knowledge updates, primarily through additional training (49.49%) and consultations (38.27%), indicate the dynamic nature of the CBHWs' roles and the necessity of continuous education to effectively address new challenges and promote sanitation practices.

Training workshops and seminars are identified as the primary sources of information on CLTS for CBHWs (39.29%), underscoring the critical role of formal, structured training environments in equipping CBHWs with the necessary skills and knowledge for effective CLTS implementation. The relatively low reliance on observation (7.14%) suggests that while hands-on experience is valuable, it is less commonly used as a primary learning method compared to formal training sessions.

The logistic regression analysis demonstrates a significant link between CBHWs' knowledge of CLTS and improved sanitation outcomes, such as increased latrine ownership and decreased open defecation. Higher levels of knowledge are significantly associated with latrine ownership (AOR: 3.495, $p = 0.039$) and a reduction in open defecation (AOR: 0.37, $p = 0.022$), highlighting the crucial role of knowledgeable CBHWs in promoting community sanitation. Training further strengthens these outcomes, with trained CBHWs being more likely to own latrines (AOR: 8.872, $p = 0.021$) and less likely to engage in open defecation (AOR: 2.01, $p = 0.028$). This finding emphasizes the importance of formal training programs in empowering CBHWs for effective CLTS implementation.

Continuously updating knowledge and addressing knowledge gaps also positively impact sanitation outcomes. CBHWs who actively seek to update their knowledge or address gaps are more likely to promote latrine ownership and reduce open defecation, reinforcing the need for ongoing education and training to sustain the effectiveness of CLTS interventions.

Overall, these findings highlight the critical role of CBHWs' knowledge, education, and ongoing training in promoting sanitation practices in Turkana County. The strong correlation between CBHWs' knowledge and improved sanitation outcomes underscores the importance of investing in their training and continuous education for the success of CLTS

initiatives. Additionally, the demographic characteristics of both households and CBHWs suggest that socio-economic factors and community dynamics must be considered when designing and implementing health interventions.

Conclusion

The study highlights the critical role of Community-Based Health Workers (CBHWs) in the successful implementation of Community-Led Total Sanitation (CLTS) initiatives in Turkana County. The demographic profile of CBHWs, characterized by a middle-aged, educated, and economically active group, positions them as influential agents in promoting community health behaviors. The high recruitment rates and strong knowledge of CLTS among CBHWs, bolstered by structured training programs, validate the study's findings that well-informed and well-supported CBHWs are essential for achieving improved sanitation outcomes.

However, the study also identifies challenges, including knowledge gaps and coordination issues, that could hinder the effectiveness of CLTS initiatives. These challenges underscore the need for ongoing support and capacity-building for CBHWs. Addressing these issues through continuous education, training, and better coordination mechanisms is crucial for enhancing the overall effectiveness of CLTS programs. By doing so, the community can achieve sustained improvements in sanitation practices, ultimately leading to better health outcomes in Turkana County.

In conclusion, while the study reaffirms the importance of CBHWs in driving CLTS success, it also calls for a sustained investment in their development to ensure the long-term impact and sustainability of sanitation initiatives in the region.

Conflict of Interest

We hereby declare that there are no conflicts of interest regarding the thesis.

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