

Effects of Community Led Total Sanitation in Scaling up Sanitation Ladder and Disease Prevention in Developing Countries: A Review Focusing on Kenyan Situation

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ABSTRACT

Many people in many countries, especially in developing ones, face numerous challenges in accessing basic sanitation and hygiene. Reports indicate that around the world significant proportion of population do not have access to basic sanitation and hygiene. Although there have been valiant efforts, methodologies and approaches in scaling up sanitation, in recent years there has been escalation of CLTS implementation presumed to be effective in improving community sanitation. Thus the purpose of this review was to examine the effects of improving sanitation and hygiene through community led total sanitation (CLTS) adopted in many developing countries. Systematic reviews were conducted by searching existing literature resulting in retrieval and review of several published papers and reports. To achieve this, Preferred Reporting Items for Systematic Reviews and meta-analysis (PRISMA) method was followed in which 1108 were retrieved through Boolean internet search method. And after four stages of screening, 30 published papers were considered relevant as they met the criteria for reporting effectiveness of community led total sanitation as well as the relationship of sanitation and disease prevention. Most articles reviewed reported sanitation as a major problem in many developing countries and that CLTS is effective in up scaling sanitation and preventing sanitation related diseases. Moreover many people in developing countries who have adopted CLTS stopped open defecation and increased latrine usage. Although Kenya adopted CLTS over 10 years ago, it's still lagging behind in realizing its goal of achieving ODF status in the entire country. This review has shown that sanitation is a major problem in many developing countries and that community led total sanitation approach (CLTS) is effective compared to other methodologies and models. After CLTS adoption and attainment of ODF status in villages, upgrading unimproved latrines into improved latrines, that's moving step up in sanitation ladder, is crucial for safe human wastes disposal. However, sustainability is crucial for their continued usage and maintenance. Importantly, use of various conservancy technology options is vital in promoting their adoption in communities. Kenya as well as many countries needs to step up efforts in CLTS implementation so as to achieve goal of ODF status in entire country.

Keywords: developing countries, Kenya, sanitation ladder, hygiene promotion, communities, total sanitation, preventing disease

INTRODUCTION

Many people in many countries, especially the developing countries, face numerous challenges in accessing basic sanitation and hygiene (World Health Organization and UNICEF, 2021). Yet sanitation and hygiene are fundamental to health and socio-economic development and overall wellbeing. Reports indicate that around the world significant proportion of population do not have access to basic sanitation and hygiene.

Across the world an estimated 1.7 billion people lack basic sanitation which is about 21% of world population and about 2.3 billion (29% of world's population) do not have access to basic hygiene which include access to hand washing with soap and water (World Health Organization and UNICEF, 2021). Many of these people are in developing countries (World Health Organization and UNICEF, 2021). For instance, in Kenya according to 2019 population

and housing census only 51.2% of households have latrines (Kenya National Bureau of Statistics, 2019).

Basic sanitation in this context is defined as being accessible to safe human waste disposal as well as hygiene and clean environment.

In furtherance of sanitation agenda globally, the United Nations (UN) has made sanitation one of the sustainable development goals at no.6 which advocate for water and sanitation for all. The goal is to ensure basic sanitation and hygiene for all by 2030 (World Health Organization and UNICEF, 2021). Thus many countries including Kenya have incorporated this in their constitutional laws as a fundamental right of every citizen. For instance in Kenya constitution article 43(b) stipulates that everyone has a right to clean and health environment, adequate housing, and to reasonable standards of sanitation (New Constitution of Kenya, 2010).

The purpose of this review was to find out the status of the sanitation and hygiene problem and its association with diseases, as well as the status and effects of CLTS intervention in addressing the problem in communities in developing countries with a focus on Kenyan situation. Thus the main objective was to review published papers to find out how CLTS improves sanitation in communities, and the effects of improved sanitation on related diseases.

The specific research questions being addressed by the review were:

- 1) What is the status of sanitation problem and associated diseases?
- 2) What is the association of sanitation problem and disease prevention in communities?
- 3) What effects does CLTS intervention have in scaling up sanitation and preventing related diseases?
- 4) What is the status of CLTS implementation in Kenya in line with its goal of making the entire country open defecation free (ODF)?

METHODS

Systematic reviews were conducted in order to obtain relevant information for sanitation problem and effectiveness of CLTS in up scaling sanitation and preventing diseases. Thus the guidelines of Preferred Reporting Items for Systematic Reviews and meta-analysis (PRISMA) (Moher *et al.*, 2009) were followed for systematic review in which 1108 were retrieved through Boolean search out of which after four stage screening 30 met the criteria for inclusion.

Internet Boolean search queries were conducted for published articles especially those relating to sanitation, CLTS and related diseases. The literature review was done between January and February 2022. All the articles that report evidence in the context of linkage of sanitation and diseases were included. Papers not published in English were excluded. After excluding, the following articles were selected 1) all abstracts relevant and within this review were included; 2) the abstracts of the articles reporting improving sanitation and reducing diseases were included and those not related to this were excluded; 3) the retrieved papers/articles were then fully reviewed.

As a result of review 1108 articles were accessed from internet Web search. The initial screenings yielded 48 articles without abstracts, and were removed leaving 1060 articles for further screening. In step two screening 676 articles were eliminated due to 1) they were not in English language; 2) were overview report articles; and 3) were not related to enhancing sanitation.

The remaining 384 articles abstracts were analysed in step 3 and found to be related to sanitation. Out of 384 articles, 147 were excluded in step 4 for not being specifically related to improvement of sanitation using CLTS approach and 207 articles were excluded for not being related to reducing diseases related to sanitation. Thirty (30) articles which remained were considered eligible for full review screening and the key summary of findings/results is indicated below.

FINDINGS/RESULTS AND DISCUSSION

Findings from review show that 7 papers reported sanitation as being a major problem affecting many people especially in developing countries, and is the sanitation is the main cause of preventable diseases and sanitation related problems, 8 reported evidence of linkage/association of sanitation and diseases, 9 reported evidence of improvement of sanitation through CLTS by moving villages from open defecation (OD) to open defecation free (ODF) i.e. 2nd rung of sanitation ladder and 6 reported evidence that CLTS approach has transitioned many OD Villages to ODF villages in Kenya. These papers, which are included in the reference section, their findings are discussed here below.

Status of Sanitation Problem and its Associated Diseases

Many people face numerous challenges and difficulties in accessing basic sanitation and hygiene (World Health Organization and UNICEF, 2021). As a consequence, poor sanitation due to not using toilets, behaviours not healthy, using unsafe water, and improper disposal of wastes are commonplace in some countries, especially in South Asia, Africa and Latin America. In addition to causing diseases, they devalue environment negatively affecting the health and lives of many vulnerable persons. Moreover many parts of Africa and South East Asia, the poor sanitary situation is widely distributed, numerous people are afflicted by diseases caused by unsafe drinking water, lack of sanitary facilities and poor hygiene practices (Kar *et al.*, 1998).

Some implementing agencies try to upscale sanitation utilize resources on motivating people to build latrines by providing subsidies. For instance in Bangladesh, before start of CLTS, it is reported that many agencies were involved in sanitation activities but there were no much achievements in sanitation. And as a result many people were defecating in the open (Kar *et al.*, 1998; WELL, 2001). This led to new way of addressing sanitation problem through CLTS innovated by Kamal Kar, in partnership with other organizations (Bajrachanja *et al.*, 1998). Results of the new approach demonstrated significant improvement in sanitation in many villages with evidence showing that households with latrines increasing by 65% (Bajrachanja *et al.*, 1998).

The initiative also altered behaviour of communities, by stopping open defecation, improving disposal of wastes as well as drinking safe water. As a result of tackling sanitation problems through this initiative, many people adopted use of latrines in many rural communities leading to reduction of diseases (Venkataramanan *et al.*, 2018).

Association of Sanitation and Disease Prevention

Improved sanitation and disease prevention are closely associated. For instance, poor personal hygiene leads to increased diarrhea cases (Huttley, Morris, & Pissani, 2001). Furthermore, other studies have demonstrated linkage hygiene practices and health. For example, a study conducted in Congo, showed reduction of 11% of diarrheal diseases in communities where hygiene practices were improved (Ashworth *et al.*, 2002).

Contamination of hands with fecal matter, due to lack of safe sanitation, has been linked with transmission of disease pathogens. A research in Honduras demonstrated fecal contamination of the fingertips of women tested during household chores (Trevett, 2003). Related findings have also showed pathogenic enterotoxigenic *Escherichia coli* (ETEC) in mothers and children's hands in Thailand (Echeverria *et al.*, 2004). Similarly other empirical findings have indicated decrease of 64% in diarrheal diseases in places where sanitation improved including hand washing (Esrey *et al.*, 1991). This support need for promoting hand washing practices at all times.

Yet more studies have shown that CLTS adoption can lower stunting in children and enhance healthy growth. For example a randomized controlled trial in rural Mali conducted

around 2011 to 2013 demonstrated that CLTS enhanced child growth thus reducing stunting, particularly in children aged two years and below (Bajrachanja *et al.*, 1998; Venkataramanan *et al.*, 2018).

Association of Safe Water, Hygiene and Disease Prevention

Safe water is vital for drinking and hand washing since inadequacy may contribute to transmission of water borne diseases that may cause suffering or death. There is no doubt that children are more vulnerable to diseases linked to contaminated water and poor sanitation (Curtis & Cairncross, 2003; Bajrachanja *et al.*, 1998). A cross country study of child health in urban areas of Brazil, Egypt, Ghana, and Thailand demonstrated that drinking water sources, improvement of sanitation and hygiene including housing conditions are correlated with prevention of childhood diarrhea (Curtis & Cairncross, 2003). A related study in Congo showed that children from households using water from protected sources had less episodes of diarrhea (Pruss-Ustun *et al.*, 2008).

Moreover, hand washing is important a long side providing proper sanitation in preventing diseases. Studies have shown evidence of hygiene practices, particularly hand washing with water and soap in nearly 50% reduction in incidences of diarrheal (Curtis & Cairncross, 2003; Esrey *et al.*, 1991). Practices proper hygiene enhances general health through reduction in diseases such as pneumonia, influenza, scabies, skin and eye infections. Thus it implies that communities that have poor hygiene practices are more likely to contract water and sanitation related diseases. It should be known that these diseases have adverse impact on health and nutrition of young children (Curtis & Cairncross, 2003).

Furthermore, some studies demonstrated reduction of sanitation and hygiene diseases when sanitation initiatives are implemented concurrently (Pruss-Ustun *et al.*, 2008; Roberts, Fewtrell, & Kaufmann, 2001) and safe water (Shahid *et al.*, 1996). Thus there is need to refocus efforts on preventing them through improved sanitation and hygiene.

Effects of Community Led Total Sanitation

Over the years there has been considerable efforts coupled with varying methodologies and approaches aimed at improving or uplifting sanitation especially in developing countries with low sanitation and hygiene coverage. Notably many of these countries are in Africa and Asia. Such methods included education and enforcement of rules and regulations from earliest times of civilization, promotion of ventilated improved latrines in from 1980s, Participatory hygiene and sanitation transformation (PHAST) in 1990s as well as water, sanitation and hygiene (WASH) approaches.

Besides the above methodologies, the most recent sanitation methodology or approach for promoting hygiene and sanitation is the CLTS initiated by Dr Kamal Kar and collaborators in 2000 in India (Kar *et al.*, 1998). Thereafter it extended to other countries. Since then many countries have adopted CLTS technology or methodology including Kenya which adopted it around 2011 (Ministry of Health, Kenya (MoH), 2017).

The CLTS intervention as a three-step model of improving sanitation is shown in Figure 1 below.

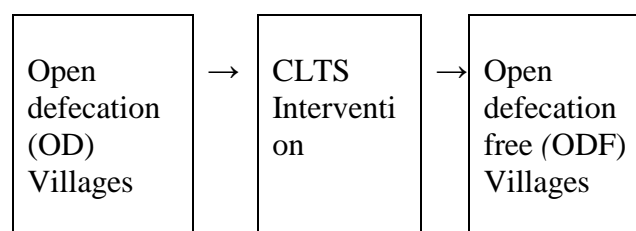


Figure 1. CLTS intervention as a three-step model of improving sanitation

The CLTS approach aims at changing behaviour of people in villages through a process known as triggering that quickly results in stopping people from open defecation practices. Thus it focuses on changing behaviour of the entire community. The triggering process focuses on methods of stimulating community into action to end defecating in the open, and use simple latrines constructed by them. Hence CLTS increases self-respect and pride in a community (Venkataramanan *et al.*, 2018). This is achieved as a result of instilled disgust, fear and shame about one's own shameful open defecation behaviours (Venkataramanan *et al.*, 2018).

The results of CLTS implementation across different countries demonstrated increased construction of latrines leading to enhancement practices of sanitation and hygiene. Consequently there was considerable improvement in a number of communities upgrading sanitation facilities up the sanitation ladder (Venkataramanan *et al.*, 2018). Hence adoption of CLTS approach supported by sanitation mobilization and marketing aids in accelerating moving up in sanitation ladder starting from open defecation through unimproved latrine to improved latrines as shown here below. Thus the apt slogan depicting this progress is: from non-toilet (open defecation), to better a toilet (unimproved/shared latrine), to better toilet (improved latrines) as depicted in Figure 2 below.

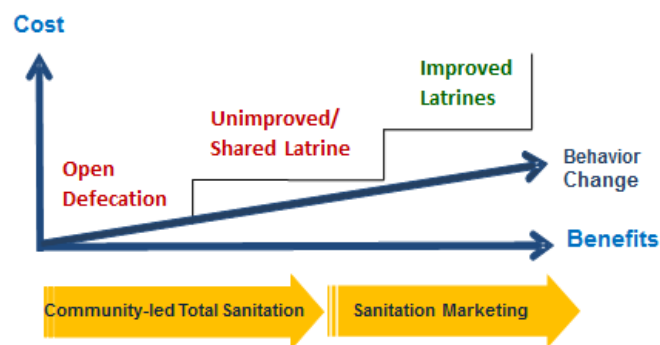


Figure 2. Two-step Sanitation ladder from Open Defecation Level

In this ladder, the bottom indicates open defecation, first rung indicates traditional latrines/ shared latrines while the next rung indicate improved latrines.

Thus notably, CLTS intervention has moved many people from open defecation to the first rung of the sanitation ladder- that is one step up the ladder rungs.

Moreover, after moving one step up the ladder, some people have moved further up the ladder to improved latrine status through sanitation marketing. The sanitation ladder approach is useful strategy for enhancing sanitation as it enables visualization of sanitation problem and progress in adoption of sanitation technologies.

Effectiveness of CLTS has been supported by evaluations done in some countries which showed improvement in community sanitation, personal hygiene, and safe water usage, as well as environmental cleanliness. In addition members of community were empowered. Another study showed that majority of communities use latrines and some had hand washing facilities with water and soap outside the latrines and had well maintained refuse pits (Magala & Roberts, 2009). Additionally, a controlled study in Ghana demonstrated that mothers with under five year children and without latrines had an odds ratio of 17.5 on diarrheal morbidity compared to those with latrines. That means the former were more at risk to diarrheal disease. A related study in Zimbabwe also showed that diarrheal morbidity among school children was significantly lower in communities that used latrines than in communities that had not.

Another study conducted to evaluate the effectiveness of CLTS showed that CLTS had been successful in various areas and was an effective way of achieving ODF communities

compared to other conventional approaches to sanitation, such as hardware-based approaches (Kar & Chambers, 2021). This study was conducted in Madhya Pradesh, India, where both CLTS and a conventional hardware-based approach were implemented in two separate communities. The results demonstrated that CLTS led to greater behavioural changes, such as the use of latrines, than the hardware-based approach. The researchers concluded that CLTS was more effective because it focused on addressing the underlying behavioural causes of poor sanitation.

Another study by Khush *et al.* (2018) conducted in Nepal, concluded that CLTS was more cost-effective than other sanitation methodologies. The study analysed the cost and effectiveness of three different sanitation interventions i.e. CLTS, the subsidy-based approach, and the hardware-based approach. The study found that CLTS was the most cost-effective approach as it required fewer resources and produced better sanitation outcomes. The study noted that the participatory approach of CLTS led to more sustained sanitation improvements, which in turn led to long-term savings.

The participatory nature of CLTS is a significant reason for its success. Rather than relying on external actors to provide sanitation solutions, the approach empowers communities to take ownership of the problem and find their solutions. This approach has been shown to lead to sustained behavioural changes that are more likely to result in long-term ODF communities. A study by Devine *et al.* (2018) in Mozambique found that communities which had undergone CLTS were more likely to achieve and maintain ODF status than those that had undergone conventional hardware-based approaches.

Moreover a study conducted in Niger by Graveleau *et al.* (2021) similarly found that CLTS approach was more cost-effective compared to other sanitation approaches. The study reported that the cost per household for the CLTS approach was lower compared to other approaches, and that the program was able to reach more households with the same amount of resources. Regarding sustainability, another study conducted found that the CLTS approach led to sustainable sanitation improvements in rural communities (Bongartz, Vermon, & Fox, 2021). The study reported that the program had a long-term impact on improving sanitation practices, with communities continuing to invest in and maintain their sanitation facilities even after the program had ended.

The foregoing empirical findings suggest that the CLTS approach is a better methodology for up scaling sanitation coverage in rural communities compared to other methodologies. This evident that CLTS is effective in improving sanitation coverage, increasing community participation, bringing about behaviour change, being cost-effective, and leading to sustainable sanitation improvements. These findings support the adoption and implementation of CLTS by governments and other organizations working to improve sanitation in rural communities.

It is important noting that one of the unique advantages of CLTS is that it is community-driven. It involves community members identifying their sanitation problems and finding solutions. This additional advantageous approach has been found to be effective in increasing community participation and ownership of sanitation initiatives, ultimately resulting in better and sustainable outcomes (Kar & Chambers, 2008). In addition, a study by Jenkins and Scott (2007) found that CLTS was more effective in reducing open defecation than other sanitation promotion programs in Bangladesh, India, and Vietnam.

Another unique advantage of CLTS is that it emphasizes the use of social sanctions, which has been found to be an effective way of achieving behaviour change in communities. A study by Hope and Mitsuhashi (2014) found that social sanctions were more effective than monetary incentives in promoting behaviour change and ending open defecation in rural communities.

Furthermore, CLTS focuses on triggering emotional responses in communities, such as disgust, fear and shame, to change behaviour. This approach has been found to be effective in mobilizing communities to construct latrines and adopt better sanitation practices (Chambers, 2010). A study by Mosler (2012) found that emotional appeals were more effective in promoting latrine use and improving hygiene behaviours in rural communities in Ethiopia.

More importantly, empirical study findings indicate that CLTS is a better methodology for up scaling sanitation coverage in rural communities compared to other methodologies. Therefore, it's worthwhile for governments and development partners to consider wide scale implementation of CLTS in their sanitation promotion initiatives so as to achieve sustainable improvements in sanitation coverage in rural communities. This is more so considering that there is evidence indicating this approach is cost-effective and therefore good value for money.

Community Led Total Sanitation in Kenya

Kenya initiated the open defecation free (ODF) rural Kenya campaign by adopting CLTS in 2010 as the key strategy to achieving ODF status (UNICEF, 2009; Ministry of Health, Kenya, 2022). Although initially adoption of CLTS was low in Kenya, over the years it gained momentum. Since then this innovation has become a movement considerable potential for addressing sanitation and hygiene problems especially in rural settings. Thus regions where CLTS has been implemented have shown improvements in sanitation and hygiene.

Kenya has an estimated total of 81, 186 villages in which by 2021, 42,875 villages (53.0%) had been triggered, 30,993 villages (38.0%) had claimed ODF status, 27,709 villages (34.0%) had been verified and 25,356 villages (31.0%) certified. However majority of the villages (50,193) accounting for 62.0% remained unclaimed. These villages were facilitated in triggering by community workers whereas others did it through their self-initiative attributed to influence of local leaders and community members from nearby ODF villages (Ministry of Health, Kenya, 2022; Plan Kenya, 2019).

It is worth noting that despite CLTS implementation, many households in Kenya (about 51.2%) have no latrines (Kenya National Bureau of Statistics, 2019). This means that many people practice open defecation. Inadequate access to sanitary facilities could, among other factors, be due to cultural beliefs relating to latrine use in some communities. For instance, some communities in Kenya do not like sharing latrines with some household members. This is despite the fact that there is evidence from a number of studies showing that sanitation and hygiene levels were higher in areas where CLTS has been implemented than where it has not (Pickering *et al.*, 2015; Huttly, Morris, & Pisani, 1997). This elucidates the fact that enhancing CLTS implementation could lower or eliminate open defecation and in turn reduce the burden of diarrheal diseases.

Nonetheless, in spite of effectiveness of CLTS, there is concern regarding long-term sustainability of usage of latrines after villages have been certified open defecation free. There is also concern about people who revert to open-defecation after their villages have been certified ODF. This means there is need continued support to communities not only to upgrade their facilities but also to sustain ODF status of villages. Equally important is the continual monitoring of the impacts of effectiveness of CLTS in eliminating open defecation, and preventing sanitation diseases.

CONCLUSIONS

This review has revealed that sanitation is a major problem and there is evidence, though limited, that CLTS is effective in up scaling sanitation up the sanitation ladder rungs as well as in preventing related diseases. Moreover, empirical findings suggest that the CLTS approach is effective and a better methodology for up scaling sanitation coverage in rural communities compared to other methodologies. CLTS is also cost-effective in improving sanitation

coverage. However, the review found that despite Kenya adopting CLTS over 10 years ago, it has not achieved its target of making the entire country ODF. These findings strongly support scaling up efforts in implementation of CLTS to enhance sanitation coverage and prevent diseases.

RECOMMENDATIONS

This paper recommends that governments and partners should step up efforts in implementing CLTS to enhance sanitation coverage in order to make their countries ODF and ensure that everyone has access to safe sanitation. Communities should be sensitized not only to stop open defecation but also move up the sanitation ladder and use improved latrines for safe management of human wastes as well as hand washing with soap and water.

Moreover owing to paucity of empirical studies on effectiveness of CLTS, it is recommended that more studies should be done, particularly experimental studies, in order to compare its effects in improving sanitation and preventing diseases in different settings. This will enable use of appropriate cost effective sanitation methodologies and approaches, and hence go along in enhancing sanitation and hygiene. Thus ultimately contribute to accelerating disease prevention as well as promotion of health and wellbeing.

ACKNOWLEDGMENT

I wish to express my gratitude to all authors whose work I have cited in this review article.

FUNDING

The author received no funding.

CONFLICT OF INTEREST

The author has no conflict of interest to declare.

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