

**ROLE OF SANITATION-HYGIENE PRACTICES AND SOCIAL NORMS ON OPEN
DEFECATION FREE STATUS IN HOUSEHOLDS OF SUNA-WEST SUB-COUNTY,
MIGORI COUNTY**

BY

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DECLARATION

This thesis is an original work and has not been presented to any other University for a degree or any other award.

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DEDICATION

Dedication to my girls Georgina, Beril, Sky and my husband George Odhiambo. Your smiles and laughter fill my life and make every effort worth the sweat.

ABSTRACT

The government of Kenya adopted Community-led total sanitation as a national strategy to elicit sanitation-related behaviour change and eliminate open defecation. Since then, several villages have achieved open defecation free status, increased access to sanitation and reduced sanitation-related morbidities. Suna West Sub-County particularly recorded increased access to sanitation and achieved partial ODF status since the adoption of CLTS within the county. However, research shows that close to 70% of villages in Kenya that received partial or full open defecation free status have reverted back to non-ODF status after a while. This study aimed at determining the role of sanitation hygiene practices and social norms on open defecation free status in households of Suna West Sub-County. Specifically, to determine ODF status in households, determine association between sanitation and hygiene practices and ODF status and to determine the association between social norms and ODF status. The study employed a cross-sectional study design targeting 384 household heads, administered questionnaire, used observation checklist and also conducted 6 key informant interviews for 2 public health professionals and 4 community leaders. Informed consent was sought from the participants and ethical considerations ascertained as reviewed by the University's ethics review committee. Results revealed 33.9% of households had sustained ODF status and 66.1% had partially reverted back to non-ODF status. The odds of being ODF for households that carried out sanitation-hygiene practices includes: treated water (OR=3.17; CI=1.20-8.40; $P=0.020$), used elevated racks (OR=2.17; CI=1.08-4.37; $P=0.030$), regularly cleaned their latrines (OR=4.88; CI=1.12-21.37; $P=0.035$), poured ash over the pit of the latrine (OR=4.25; CI=4.20-8.87; $P<0.001$) and used dug out pits for waste disposal (OR=4.51; CI=2.09-9.78; $P<0.001$). On social norms, the study found significant association between; laws/penalties (OR=0.31; CI=0.21-0.48; $P<0.001$), need to improve things in the family (OR=0.50; CI=0.28-0.92; $P=0.025$), rewards/incentives (OR=0.21; CI=0.13-0.33; $P<0.001$) whose odds of being ODF were less likely. The odds of being ODF was less likely for households with perception that; construction/maintenance materials were expensive (OR=0.52; CI=0.33-0.80; $P=0.003$), most people don't have a latrine (OR=0.40; CI=0.25-0.64; $P<0.001$) and it is okay to defecate in bushes/rivers/dams (OR=0.31; CI=0.19-0.51; $P<0.001$). There was partial reversion to non-ODF status in households one year after certification of Suna West Sub County mainly attributed to 3 major indicators; provision of hand washing facility, squat hole cover and privacy. Secondly, there was significant association between sanitation-hygiene practices and open defecation free status and that there were higher odds of sustained ODF status in households that carried out sanitation hygiene practices in Suna West Sub-County. Finally, even though there was association between social norms and ODF status, the odds of being ODF were significantly lower due to the weakly embedded social norms that failed to influence the perceptions on benefits and/or risks on sanitation-related awareness positively.

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LIST OF ACRONYMS AND ABBREVIATIONS

CLTS	Community-Led Total Sanitation
DFID	Department for International Development
PHO	Public Health Officer
EE	Environmental Enteropathy
FBO	Faith-based Organisation
GDP	Gross Domestic Product
HBM	Health Belief Model
IRSP	Integrated Regional Support Programme
MOH	Ministry of Health
MUERC	Maseno University Ethics Review Committee
NACOSTI	National Commission for Science, Technology and Innovation
OD	Open Defecation
ODF	Open Defecation Free
SDGs	Sustainable Development Goals
SoC	Stages of Change
SPT	Social Practice Theory
STH	Soil-Transmitted Helminth
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UNICEF	United Nations Children's Fund
USD	United States Dollars
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WSP	Water and Sanitation Program

OPERATIONAL DEFINITION OF TERMS

Certification: The action of official confirmation and recognition of open defecation free status by third party master certifiers after verification.

Community-Led Total Sanitation: An innovative, participatory, non-subsidy approach that involves community mobilization to realise the bad effects of open defecation and igniting collective action towards its total elimination in the community.

Open Defecation: Situation where human faeces is exposed in the open; (bushes, forests, fields, bodies of water or other open spaces).

Open Defecation Free status: State of excreta free space; no exposed faeces, use of latrine that provide for privacy, squat-hole cover, privacy and excreta free hands.

Post-triggering: Activities of follow-up to monitor progress after triggering until village is declared open defecation free.

Pre-triggering: Assessment of villages suitable for CLTS, creating rapport and mobilization.

Sanitation and hygiene practices: The public health conditions and practices that maintain health and prevent spread of diseases; proper disposal of excreta, preventing human contact with faeces, provision of safe drinking water, provision of clean environment.

Social Norm: The informal understanding that govern behaviour of members of the community.

Sustainability: The maintenance of ODF status and sanitation and hygiene practices adopted during CLTS one year after certification.

Triggering: The process of facilitating participatory exercise using the different CLTS tools so that community can realize the negative effects of open defecation and make decision to stop it.

Verification: The action of declaring a village open defecation free by peer review team 1 month after self-claim of being open defecation free.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In Kenya, close to 20 million people engage in open defecation, exposing them and many other people to sanitation related diseases such as trachoma, schistosomiasis, soil-transmitted helminth and diarrhoeal infection(Njuguna, & Muruka, 2017). It is in light of such negative impacts of poor sanitation that the government of Kenya adopted Community-led Total Sanitation (CLTS) as a strategy to improve sanitation. Introduced by Plan International Kenya in 2007, it was approved by the then Ministry of Public Health and Sanitation (MOPHS)as the national strategy for ensuring rural sanitation and set a national target to reduce open defecation(Crocker, Saywell, & Bartram, 2017). The objective of CLTS was to achieve spontaneous and long-lasting behaviour change as opposed to just latrine construction. Its goal was to end open defecation in entire communities as every member of the community internalizes the effect of poor sanitation and takes an active role in ensuring sanitation behaviour change cite.

Sanitation and hygiene practices associated with sustained ODF status in other studies are latrine use by children over 3 years (UNICEF, 2015b).The factors that have been identified as demotivators to ODF status include; lack of own latrine and having to rely on a shared latrine located far away, degradation of the physical aspects of the latrine and cost of repair (Sigler, *et al.*, 2014). Additionally, lack of ease in usage due to the fact that the initial latrine built were often very basic and difficulty for young children and elderly and poor access to safe water associated with inconsistency in the use of hand-washing facilities at the household level have been identified as some of the issue affecting sustainability(UNICEF, 2014).

In the recent sanitation interventions and community-led total sanitation, key emphasis has been on establishing social norm around unacceptability of open defecation (Kar, & Chambers, 2011). The process of CLTS has been known to cause peer pressure by invoking emotions such as shame and disgust and change perceived social norms to establish open defecation as being socially unacceptable(Novotny', *et al.*, 2017). Social norms and how strong they are, has been found to greatly influence sustainable behaviour change in relation to sanitation practices. Where positive social norms were well rooted, the chances of achieving sustainable behaviour change were higher (Mukherjee, 2012). Although it has been reported that in Kenya over 70% of

villages that had partially or fully been certified reverted to non-ODF status (UNICEF, 2015b) hardly has any study has been done in Suna West Sub-County to look into the sustainability of open defecation free status after certification. This study geared to find out the sanitation status of Suna West Sub-County one year after certification and the association between sanitation hygiene practices and social norms and ODF status.

1.2 Statement of the Problem

Poor sanitation has been associated with negative health impacts such as premature deaths, loss of productivity, high cost of treating sanitation related diseases. In 2015, Migori County was one of the few counties to experience cholera outbreak and Suna West Sub-County in particular, recorded high cases of the outbreak. In 2016, Migori County reported that lots of resources was being lost yearly due to poor sanitation to the tune of 800 million and 38.5% of children had stunted growth linked to poor sanitation. Suna West Sub-County ranked poorly in terms of access to sanitation facilities before the onset of CLTS within the county.

Research has shown however, that many communities have not been able to sustain ODF status with over 70% of the certified villages in Kenya reverting to non-ODF status. Migori County in carrying out self-evaluation on the enabling environment for sanitation, ranked poorly in terms adequate resources for monitoring and evaluation of sanitation activities. This means that having been declared open defecation free, the county and Sub County by extension, does not have the capacity to evaluate the sanitation status post-certification. There are no follow-up mechanisms post-ODF and no clear monitoring tools for happenings beyond certification. No study had been done on the sanitation-hygiene practices within the sub county neither has any funds been directed towards the monitoring of the sanitation situation. Further, little is known about the social norms within the sub county and how they could influence the sustainability of ODF status. It is in the light on this resource and knowledge gap, that this study sought to find out the ODF status of Suna West Sub-County one year after certification and to determine the role of sanitation-hygiene practices and social norms on open defecation free status of the sub county.

1.3 Study Objectives

1.3.1 Main Objective

To determine the role of sanitation-hygiene practices and social norms on open defecation free status after implementation of CLTS in households of Suna West Sub-County, Migori County

1.3.2 Specific Objectives

- i. To determine ODF status of households in ODF certified villages in Suna West sub-county.
- ii. To determine association between sanitation hygiene practices and ODF status in households of Suna West sub county.
- iii. To determine the association between social norms and ODF status in households of Suna West sub county.

1.4 Research Questions

- i. What is the ODF status of households in ODF certified villages in Suna West sub-county?
- ii. What is the association between sanitation hygiene practices and ODF status in households of Suna West Sub County?
- iii. What is the association between social norms and ODF status in households of Suna West Sub County?

1.5 Justification of the Study

The results of this study on ODF status will inform the community of Suna West Sub-County on their sanitation status one year after third-party certification. The research will help the public health leadership look into the CLTS process so as to inform policy formation and the development of post-ODF monitoring tool. The results on association between sanitation hygiene practices and social norms will help the public health department put emphasis and direct funds towards post-ODF follow-up to ensure embedment of social norms that will ensure sustainability of ODF status.

1.6 Limitations and Delimitations of the Study

One limitation was latrine use measured by self-reporting. This could have been exaggerated above the actual use due to recall and social desirability bias. This was managed by focussing

recall to 48-hour prior. Social desirability bias on social norms around latrine use was managed by comparing the information from households with that given by key informants. Another bias may have arisen in the over estimation of reversion rate as a result of the assumption that ODF status was actually achieved during the initial verification which may not have been the case if the verification process was not thorough.

1.7 Null hypothesis

- i. There is no significant difference in ODF status between the time of certification and at re-verification of households in open defecation free villages.
- ii. Sanitation hygiene-hygiene practices are not significantly associated with ODF status in households of Suna West Sub-County.
- iii. Social norms are not significantly associated with ODF status in households of Suna West Sub-County.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Globally, between 1.6 million and 2.5 million lives are lost to faecal-oral diseases, most of these lives belonging to children aged below 5 years. It is estimated that 190 million people have schistosomiasis infection worldwide, an infection that can result in impaired growth, essential organ malfunction, colorectal and bladder cancers, chronic debilitation or haematuria (Mara, Lane, Scott, & Trouba, 2010). According to the WHO, roughly 842,000 lives are lost in low- and middle-income countries annually as a consequence of inadequate water, hygiene and sanitation (WHO, 2018). Poor sanitation is connected to infections such as diarrhoeal diseases,

In Kenya diarrhoea claims the lives of roughly 3,100 children annually and trachoma, schistosomiasis are health problems linked to poor sanitation. Of the lives lost in the country due to diarrhoea, 90% are directly linked to poor sanitation, water and hygiene (Mutambo, 2016). By improving one or more of these components (safe water, good hygiene and adequate sanitation), rates of morbidity and the severity of different diseases can be reduced and the quality of life of many people, more so children, in developing countries significantly improved (Capps, Njiru, & DeVries, 2017). Previous studies have shown CLTS to have outcomes such as increased access to sanitation facilities; decline in open defecation rates or total elimination of open defecation; improved hygiene behaviours (including hand-washing at critical times). These practices have resulted in reduced stunting and underweight among children, reduced risk of diarrhoea-related illness and mortality; and less environmental enteropathy among children (Alzua, *et al.*, 2015). Where sanitation is poor, people are exposed to disease, lack of privacy and indignity. The negative impact include; premature death, high cost of treating sanitation-related diseases, economic activity lost due to sanitation-related sickness and value of time lost due to people having to access a latrine (Alzua, *et al.*, 2015).

2.2 The Community-Led Total Sanitation Process

Community-led total sanitation triggers the aspiration for change in a community, and propels the community to action and applying appropriate local solutions to improve sanitation and hygiene (Cavill, Chambers, & Vernon, 2015). In other words, CLTS is a community-driven approach that focuses on spontaneous and long-lasting behaviour change and that aims to end

open defecation in an entire community. The CLTS process involves three main steps; pre-triggering, triggering and post triggering (Cavill, Chambers, & Vernon, 2015;Vernon, & Bongartz, 2016). The pre-triggering stage which is one of the most crucial is where the implementors assess the villages that are suitable for CLTS intervention (Kar, & Chambers, 2011). In this stage, the facilitator creates a rapport with the community and the baseline data collection on the hygiene and sanitation situation of the community as well as the community's leadership structure is done. The community members are mobilised and invited for the triggering process at a set date (Cavill, Chambers, & Vernon, 2015).

Triggering stage involves transect walk through areas people openly defecate in and mapping them. Further, it involves calculating the amount of faeces generated by the households and community at large when they defecate in the open and calculating the expenses incurred due to sanitation-related health issue (Kar, & Chambers, 2011). During the transect walk, community members are able to see the areas of open defecation aimed at creating a sense of shame and disgust among community members as they are able to see the reality of mass open defecation and how it affects the entire community negatively(Kar, & Chambers, 2011).

The goal of facilitators during triggering is to help members of the community see for themselves the consequences of open defecation and to create an environment that is unpleasant. Once this goal has been achieved, it is upon the community members to decide how they will deal with the problem and the action they will take (Venkataramanan, V. *et al.*, 2017). Next is the post-triggering stage. This involves conducting routine follow-up visits aimed at verifying and certifying open defecation free status (Sarah, 2016).

The final stage in the CLTS process is the certification stage. In Kenya, the Ministry of Health, (2013) has developed a procedure to be followed in ODF certification and the first step towards ODF certification is ODF self-claim. This step involves the community doing a self-assessment facilitated by a Community Health Assistants and upon realising that it has met all the ODF requirements, makes a self-claim(Sarah, 2016; Ministry of Health, 2014). A month following the self-claim, verification is done by the sub county Public Health Officer's team. This comprises of at least three persons including a sub-county public health officer, community leader, trained natural leader, and representatives of a non-governmental organisation (NGO) working in the

area(Sarah, 2016). Finally, is the actual certification by a trained county-level certification team comprising members drawn from organisations or institutions such as Faith-based Organisations, Community-based Organisations or NGOs. Previously, certification was done by Kenya Water for Health Organisation (KWAHO) but since devolution, power has been devolved to the 47 counties. Counties now carry out certification locally by the ‘Third-party master certifiers’ and KWAHO has remained to carry out trainings and quality assurance (Ministry of Health, 2013). The quality control is done by randomly sampling 10% of the certified villages by the county teams and qualifying that they meet the ODF requirements (Ministry of Health, 2013). After a community has been certified to be ODF, it is recognised at the local, regional and national levels through the award of certificates, public celebrations, billboards and through the media.

2.3 Status of Households in ODF certified Villages

The quality of the CLTS process has an impact on the sustainability of CLTS practices (Odagiri, *et al.*, 2017). According to the findings of recent studies conducted in South East Asia, South Asia and Africa, when the process is poorly implemented, significant reversion to open defecation and low sustainability is significantly likely to occur (UNICEF, *et al.*, 2013). On the other hand, when the process is well implemented, low reversion rate and sustainability are more likely to be recorded. A study in Ghana and Ethiopia one year following the implementation of CLTS revealed that when the process was facilitated by health extension worker, Ethiopia recorded an 8% increase in open defecation. The study, however, recorded sustained declines in open defecation of between 8% and 24% following the implementation of teacher-facilitated CLTS, NGO-facilitated CLTS with training, and NGO-facilitated CLTS without training in the two countries (Crocker, Saywell, & Bartram, 2017).

The study concluded that when local actors are subjected to capacity building and training, the sustainability of ODF status is highly likely. Further, that CLTS may not be suitable in all settings and that rather than being a stand-alone strategy for improving sanitation, be accompanied with efforts to address barriers faced by households in constructing latrines that are of higher quality(Crocker, Saywell, & Bartram, 2017). The results from a study on the sustainability of ODF status in Kenya conducted by UNICEF revealed that the sustainability of ODF achievements remained a major concern with over 70% of villages that had received partial or full ODF status reverting to non-ODF status (UNICEF, 2015). One of the factors that hamper

sustainable change with respect to ODF outcomes is lack of access to a latrine (Singh, & Balfour, 2014). Community members who rely on a shared latrine that is located too far from where they live or whose latrine had become dysfunctional or collapsed were more predisposed to revert back to open defecation.

Among the factors that demotivate community members from using a latrine after becoming ODF relates to physical aspects of the latrine (such as lack of privacy and fear of the latrine collapsing) and the need to share a latrine with other people (Singh, & Balfour, 2014). Further, for young children, elderly persons, persons with disabilities and persons with chronic illness, difficulty in using a latrine is a common factor that drives them back to OD. Environmental factors such as the cost of repairing toilets, unfavourable soil conditions, and the filling of pits by groundwater are factors that demotivate people from maintaining latrines, which consequently result in reversion to open defecation (UNICEF, 2015b). In Kenya, poorer households spend disproportionately more than their wealthy counterparts on repairs relative to the initial cost of latrine construction given the poor quality of the initial latrine. The lack of public latrines is a major cause for reversion to open defecation and according to the study, a significant number of households (18.4%) engaged in open defecation post ODF when they were away in spite of having a latrine at home (UNICEF, 2015b)

Lack of access to safe, functioning household latrine (not shared) and defecation practices by children were the main reasons behind the reversion from ODF status (UNICEF, 2015). In a study done in Kenya, some of the reasons behind slippage from ODF status included collapse of latrines as a result of; conflict; displacement; and lack of capacity to repair, maintain or upgrade toilets (UNICEF, 2014). The study also revealed that reversion can also occur when behaviour change is not sufficiently embedded. This study explored the ODF status of Suna West sub county one year after certification i.e., the sustainability of ODF status, what they could be doing differently, the challenges and best practices on the issue of sanitation that could be replicated in order to record better results. At certification there are key indicators that are looked at and which form the basis for declaring a village ODF or not. These are classified as either non-negotiable (must be fulfilled) or negotiable as illustrated in the Table 2.1 below (Sarah, 2016). Statistics on ODF status and sustainability can be inaccurate if the initial verification was not done to standard, if it was conducted unprofessionally, or if the verifying or certifying

organisation was incentivised to declare the village ODF(Vernon, & Bongartz, 2016). Critical on the sustainability of ODF status relates to the question as to whether a community can be certified as ODF all the time with certainty. While Plan International used latrine presence - latrine status and usage - as a measure of sustainability (Tyndale-Boscoe, *et al.*, 2013) this particular study looked into the 5 non-negotiable indicators used during the initial verification process as listed in Table 2.1 to state the ODF status of the sampled villages. All the non-negotiable indicators had to be in every sampled household within the village for it to be declared ODF.

Table 1.1: Non-negotiable and negotiable indicators

Non-negotiable indicators	Negotiable indicators
No exposed faecal matter, either in the bushes around household, along pathways or latrine floor.	1. Safe handling and storage of drinking water
Access to a latrine (individual or shared) that is in use as evidenced by clear foot path to it.	2. Food hygiene, evidenced by the covering of foods
Latrine must provide for privacy	3. Use of elevated racks for drying utensils
Latrine must have squat hole cover	4. Dug out pit for grey water disposal
Hand washing facility with soap near the latrine	5. Dug out pit for solid waste management

2.4 Association between sanitation hygiene practices and ODF status in households

In Indonesia, total sanitation was a reflection that all households are sustainably carrying out all the key sanitation and hygiene behaviours. No open defecation, water treatment and proper waste disposal (liquid and solid) were key to these sanitation and hygiene practices (Mukherjee, 2016). While some projects have concentrated on facilitating latrine construction with view that attention to hygiene could cause a digression from the focus of attaining ODF status, some projects have encompassed hand washing with soap, refuse disposal, waste water disposal among others (Mills, & Oliver, 2016). In the study conducted in East Java, it was noted that many households that continued to use the basic latrines were at risk of turning back to open defecation. This was because the initial latrines had low hygiene standards, were smelly and failure to improve them led to their collapse but were rarely re-built (Mukherjee, 2016). In east Timor, households that reverted back to open defecation showed no improvement in their facilities beyond the traditional latrine(Abdi, n.d). Among the things that are important in sustaining proper sanitation and scaling up sanitation facilities in poor households, is a well-

designed plan for offering subsidy that is geared towards the most vulnerable and marginalised members of the community (Robinson, & Gnilo, 2016a). Although within CLTS the issue of subsidy has remained controversial for a long time, there is evidence-based suggestion that for the poorest and most marginalised, sustained access to improved sanitation and climbing the sanitation ladder may not be possible in the absence of some form of external assistance (Cavill, Chambers, & Vernon, 2015; Robinson, & Gnilo, 2016a). When individuals do not handle their wastes properly, it affects entire communities as poorly dumped waste act as breeding ground for rodents and other vectors that have potential of spreading disease (Yoda, *et al.*, 2014; Noufal, M. *et al.*, 2020). However, even though food remains form the major source of waste at household level and that households do not practice waste segregation, a good number are aware of the importance of solid waste management and dispose of their waste appropriately as revealed in a study done in Syria (Noufal, M. *et al.*, 2020). Behaviour change communication is an essential element in WASH and personal motivation and concerns are great facilitators of change (Cavill, Chambers, & Vernon, 2015).

In explaining latrine cleanliness, findings have it that latrines were cleaned if respondents were positive about their will and ability to clean latrine and didn't think of it as too much effort. To another extent, if they often had conversations around latrine cleanliness and were disgusted about having to use unhygienic latrines. There is need therefore, to introduce hygiene promotion into CLTS promotion and that the ultimate goal for CLTS may not just be ODF communities but hygienic and healthy individuals, families and communities (Noufal, M. *et al.*, 2020). This is because one of the main barriers to sanitation coverage is lack of awareness about the benefits of a safe latrine (Abdi, n.d). In a study done in Dembiye to see household's sanitation and hygiene status following WASH promotion, results revealed an increase in households that use latrine, properly disposed of their solid waste and practiced food and utensil safety after the health education in schools, community and church-based forums. There was also a reduction in open defecation (Gizaw, & Addisu, 2020). Programmes ought to focus on behaviour change as an objective and should be held accountable for the same. Their objective should always go beyond figures, such as number of latrines built or number of households having latrines (Mukherjee, 2016).

What does it take to bring about sustainable sanitation behaviour change? Research has shown that in spite of efforts to promote behaviour change such as improving hand washing at critical times through knowledge and attitude-oriented interventions, achievements have been found not to be sustainable (Wasonga, Okowa, & Kioli, 2016). Further, the research found that provision of water supply and sanitation on its own is not adequate and must go together with behaviour change. In a study carried out in Chad, one third of the study population used chlorine-based products for water treatment although intermittently, only during dry spell or disease outbreaks and also knowledge around water treatment was low (Lilje, Kessely, & Mosler, 2015).

In Kenya, some of the reasons listed as to why people cleaned their latrines were comfortability, urgency in the need to use of latrine, to prevent foul smell and women cleaned for fear of contracting disease or their children contracting disease. Quality and structure of the latrine motivated or discouraged use e.g., latrines without privacy, with wooden slab, which were dirty or were full discouraged use (Simiyu, *et al.*, 2020). Further, that evidence from previous studies have showed how critical using communication and behaviour change theory was in dealing with issues of cleanliness of shared sanitation facilities (Mahbub, 2011).

Kenya through Kenya Environmental Sanitation and Sanitation Policy, set itself on the path to eradicate open defecation by 2020, achieve sustained ODF status and ensure universal access to improved sanitation by 2030 through scaling up latrine coverage and ensuring sustainable use of the same (Ministry Of Health, 2016). Also, key indicators in the sanitation policy include, safe water handling, sustained hand washing, food hygiene and clean home environment as among the contributors to disease burden is unsafe drinking water. Therefore, household water safety and treatment were thus integrated in sanitation and hygiene as the benefits of the former can only be fully realised under conducive sanitary conditions. It is thus crucial for appropriate water treatment technologies to be promoted at household level for the objective to be achieved (Ministry Of Health, 2016). Some of the water treatment technologies include boiling, solar treatment, chlorine-based treatment at household and communal-based, filtration among others (Ministry Of Health, 2016). Everyone has a right to a clean and healthy environment in Kenya (NEMA, 2014). The use of latrines and garbage pits have been found to allow for safe disposal of waste and thus reduce the transmission of diseases (Wasonga, Okowa, & Kioli, 2016). The Kenya Environmental Sanitation and Hygiene Policy states that a key element in

waste water management is ensuring that households have gutters and soakage pits for waste water disposal to reduce the incidences of having puddles(NEMA, 2014). The county government of Migori is keen on ensuring proper waste management at household, community and public set up and has placed down clear guidelines in the Environmental Health and Sanitation Bills (Migori County Bills, 2019). In Migori County, the provision of safe water has been deemed key and included in the integrated development plan to ascertain its usage in a safe and sustainable manner (Migori County Government, 2018). Although, community led total sanitation has been successfully carried out in Suna West Sub-County, little is known on the sanitation and hygiene practices within the sub county. Hardly has any study has been done on the same within the sub county or county at large. This study is geared to finding out the sanitation and hygiene practices in Suna West Sub-County and their role in determining ODF status.

2.5 Association between Social Norms and ODF Status

There has been a lot of findings over the years on research about social norms. Why do people do what they do, what guides how they think and act (Mackie, *et al.*, 2015). In trying to understand social norms there are several aspects that need to be understood. Custom– these are what people do simply because it meets their needs, empirical expectation – beliefs about what we expect others to do, normative expectation – belief about what others think we should do(Bicchieri,Christina, &Penn, 2015). Conditionality of preference which are binary. When one chooses to do something whether others are doing or think they should do it or not is called unconditional preference, on the other hand, conditional preference is when one chooses to do something because others are engaging in the same or think they should engage in it. Reference network – refers to the people whose actions and beliefs matter to one in their decision making. Moral norm refers to the things people do because it is the right thing to do while descriptive norm refers to what people do because majority within their reference network is doing it. Factual beliefs are beliefs around how things are (cause and effect), this often heavily influence personal normative beliefs which basically refers to beliefs about what people should do. This can be based on their interest, prudential or based on reasons beyond prudence like religion or morality (non-prudential). Lastly is social norm – this meets both empirical and normative expectations, that is, people do because majority within their reference network is doing it and

the reference network think they should do it (Bicchieri, Christina, & Penn, 2015; Mackie, *et al.*, 2015). People who engage in harmful collective patterns as well as those who try to change or eliminate them have their own reasons. An example is open defecation, many who practice open defecation are people who have done it for generations, have easy access to rivers and dams and the communities consider defecation in water bodies normal (Bicchieri, & Noah, 2017; Mukherjee, 2012). It is important to understand why people engage in open defecation, a misunderstanding of the same often lead to failed intervention thereby prolonging the negative public health impact of the harmful behaviour (Odagiri, *et al.*, 2017).

Open defecation has been known to be an independent action, that is, people engage in open defecation because they believe it meets their needs and that it is not harmful to them and others, it is a custom rather than a social norm (Bicchieri, & Noah, 2017). Further, those who defecate in water bodies think it makes them feel good, does not give bad smell and does not pollute the environment in the case of those who go a distance into the forest (Mukherjee, 2012; Bicchieri, & Noah, 2017). However, to eliminate open defecation in a particular group, there is need to create a social norm promoting latrine use and maintenance. People will need to think that their reference network think they should use and maintain latrines and them believing in that will motivate them to engage in open defecation-free behaviour (Odagiri, *et al.*, 2017). In Madagascar, there was a social norm for open defecation, meaning people believed in it as a correct practice and fully endorsed it. Through implementation of CLTS, there was a new social norm created for safe excreta disposal (Gaya, *et al.*, 2015). While latrine use in one area may be an independent action purely due to personal preference, it can also be an interdependent action that is, due to fear of social sanctions, shaming or punishment (Bicchieri, & Noah, 2017).

Social norms and how strong they are greatly influence sustainable behaviour change in relation to sanitation, hygiene and ODF practices (Mukherjee, 2012). Where social norms are well rooted, the chances of achieving sustainable behaviour change are higher. The establishment of informal and formal sanctions agreed by members of the community and enforced by leaders is key in creating and maintaining social norms. The presence of sanctions can be a sign that social norms exist within a community (Bicchieri, & Noah, 2017). Reports from a study shows that the villages that obtained ODF quickly were found to have sustained ODF status 4-28 months later as they had their monitoring mechanisms and in place sanctions for those who went against the

ODF set rules (Mukherjee, 2012). Behavioural and social norms, cultural and community dynamics, preferences and motivations for open defecation, and meeting the different needs of community members relate to the social and behavioural sustainability dimension (Myers, 2016; Cavill, Chambers, & Vernon, 2015). Campaigns to bring about sanitation behaviour change has previously done health promotion at household level through education and information communication. Although the focus has been creating awareness and communicating health risks, it is emerging that there are more important factors that drive people into the need for improving their sanitation safety. These include prestige, their willingness to adopt a modern lifestyle, wealth, need for privacy, comfort, social expectation and power relations, locally specific taboos and cultural factors. Awareness creation in isolation don't always work and incentives can corrupt intrinsic motivation (Cavill, Chambers, & Vernon, 2015; Bicchieri, & Noah, 2017; WaterAid, 2011). Fear of diseases or shame of being found defecating on the open are less effective in persuading open defecators and any changes that happen because of these have been found to not be sustainable (Mukherjee, 2012). The more effective mechanisms according to the research include, emphasis on convenience and safety provided by the use of latrines. Further, privacy, less embarrassment when having visitors, dignity, comfort and securities are more of the reasons households improve their sanitation (Mukherjee, 2012).

In a study done in Ethiopia, when an entire community changes its sanitation practice the positive outcome is then realised (Novotny', *et al.*, 2017). This has formed the basis for much focus on social and emotional factors so as to bring about changes in perceived social norms around sanitation. In the recent sanitation interventions and CLTS, perceptions around unacceptability of open defecation as a social norm has been in focus. There is a proposition that shaming and stigmatising community members, norms, indirectly effects one's emotional satisfaction with the current sanitation status (Novotny', *et al.*, 2017). However, the method has been critiqued. The establishment of informal and formal sanctions, follow-up, monitoring and support by community health workers, natural leaders and other partners also has a lot of influence in motivating people to sustain their ODF practices (Mukherjee, 2012). Follow-up and support together with incentives ensures that households have access to latrines and plays an important role in sustaining behaviour change (Singh, & Balfour, 2014). Even though the sanitation status of Migori County has been looked at and the impact of open defecation in the

population clearly stated, little is known about why the people engage in the harmful behaviour and the county leadership has stated the need for equipping the staff with key skills and knowledge in order to effectively carry out sanitation activities (WSP, 2014). This study sought to find out the existence of social norms in Suna West Sub-County, the existence of sanctions within the communities and their role in determining the sustainability of ODF status since no such study has been done.

2. 6 Conceptual Framework

The sustainability of open defecation free status is influenced by several factors, the sanitation hygiene practices adopted after certification and the social norms embedded in the community.

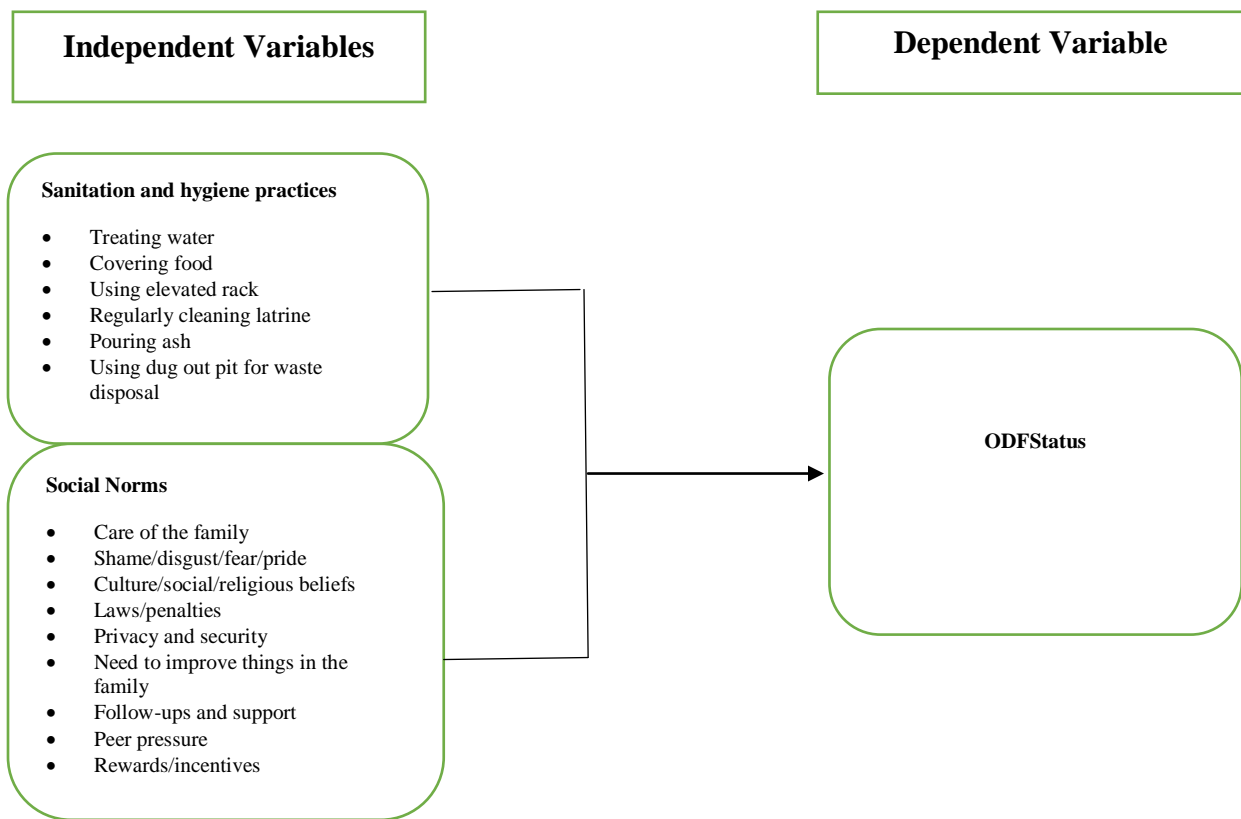


Figure 1.1: Conceptual framework

Figure legend: Any perceived intermediary/modifying variables were not included

CHAPTER THREE
MATERIALS & METHODS

3.1 Study Area

The study was done in Suna West Sub-County, Migori County. The Sub-County, one among eight others, has four wards and is bordered by Kuria West Sub-County to the south-east, Nyatike Sub-County to the west, Suna East Sub-County to the North-eastern side and Tanzania to the South-west. It has a population of 117,539, giving it a population density of 406 persons per km². The number of households within the sub county is 29,251(KNBS, 2019). As of 2020, the 8 sub counties within the county had been declared ODF (CLTS Hub, 2019). Suna West Sub-County stood out from the rest as it had all the villages being declared ODF within the given timelines unlike the other sub counties that had pockets of villages being declared ODF long after the rest. The updates on ODF status of Kenya, Migori County and the 8 sub counties within Migori County are in Table 3.1.

Table 1.2: ODF status of Kenya, Migori county and the 8 sub counties

NAME	TOTAL VILLAGES	VERIFIED	CERTIFIED
KENYA	76,870	18,691	16,865
MIGORI COUNTY	2,769	2,769	2,767
AWENDO SC	258	258	258
KURIA EAST SC	297	297	297
NYATIKE SC	572	572	572
RONGO SC	288	288	288
SUNA EAST SC	324	324	324
SUNA WEST SC	343	343	342
URIRI SC	351	351	351
KURIA WEST SC	318	318	317

Table legend: The figure from other sub counties were not used in the study

In order to determine the ODF status, re-verification was done using the verification tool focussing on the non-negotiable indicators used during the sub county verification and third-party certification. These indicators were; no exposed faecal matter, access to latrine (individual or shared), privacy on superstructure, squat hole cover and hand washing facility near the latrine.

3.2 Research Design

A cross-sectional study design was used because it allowed the collection of data on the many different variables at the same time and point, it is also inexpensive and most appropriate for this particular study. This method has been applied in several studies (Aranda, 2016; Odagiri, 2017).

3.3 Target Population

The study featured households in the villages that had been certified as ODF in the two wards purposively chosen for having attained ODF status in all the villages at least one year to the study. The target population was the household heads and key informants. The Key Informants were 6 in number; 2 public health professionals (WASH coordinator, ward PHOs) and 4 community leaders (Natural leaders, women, youth and religious leaders' representatives) within the community.

3.4 Sampling Design

3.4.1 Sample Size Determination

The sample size for households in the village featured in the study was determined using the statistical formula as used by Fisher and colleagues (Hasnain, *et al.*, 2017).

$$n = \frac{z^2 p(1 - p)}{d^2}$$

Where:-

n - The sample size

z - The standard normal deviation, set at 1.96, which corresponds to 95% confidence level

p - The proportion in the target population with the desired characteristic. Estimate of 50% was assumed in this case (the study used 0.50).

q = 1.0 – p

d = the margin of error (degree of precision). In this case a value of 0.05 (5%) was accepted for the households while 0.1 (10%) was accepted for villages.

In substitution, the number of households to take part in the study was computed as follows and the sample size distribution shown in Table 3.2.

$$n = \frac{1.96^2 * 0.5(1 - 0.5)}{0.05^2}$$

$$n = 384$$

Table 1.3: Sample Distribution

WARD	VILLAGES	TOTAL HOUSEHOLDS	SAMPLE SIZE	PERCENTAGE HOUSEHOLD (%)
WASWETA II	Kiabaroge A	31	17	4.4
	Ombo	50	27	7.1
	Ndonyo C	76	41	10.7
	Bondo B	45	25	6.4
	Nyarombo C	51	28	7.2
	Kababu A	78	42	11.0
	Nyamome B	65	35	9.2
	Sagero A	35	19	5.0
RAGANA	Masagisagi B	50	27	7.1
	Nyaruatha A	50	27	7.1
	Complex A	48	26	6.8
	Pawlweny C	62	34	8.8
	Wuoth Ogik C	66	36	9.3
TOTAL		707	384	100

Table legend: The villages were sampled proportionately

3.4.2 Sampling Procedure

Wasweta II and Ragana-Oruba wards were purposively chosen as they had attained full ODF status in all the villages within the given required time period. Thirteen villages (8 from Wasweta II and 5 from Ragana ward) which represent 10% of the total villages within the two wards, were sampled using simple random sampling technique. Households were identified through the same technique. The unit of analysis was the household, the respondent being the household head. To select the participant households from each village, a computer program was used to randomly pick numbers representing the households as found in MOH 513 which is the household register maintained by the Community Health Volunteers (CHVs). The number of households was proportionate, extra households were sampled in case there would be need for replacements. The population within the villages and was based on the following formula.

$$\text{Households per village} = \frac{\text{No. of households in each village}}{\text{Total no. of households}} * \text{Sample size}$$

3.5 Inclusion and Exclusion Criteria

3.5.1 Inclusion Criteria

1. Households that had participated in the initial verification process.

3.5.2 Exclusion Criteria

1. Any child-headed (under 18years) household.

3.6 Pre-testing of Study Tools

A pre-test was conducted in 39 eligible households in Suna East Sub-County which is also part of Migori County and had been declared ODF. The respondents for the pre-test were drawn from Suna East in villages that shared the same characteristics with the actual villages targeted by the study. The purpose of conducting the pre-test was to ensure that the research instruments adequately measured what they were supposed to measure.

3.7 Data Collection Tools and Procedure

Data collection tools used were structured questionnaire, observation checklist in 384 households and interview guide for Key Informant Interview. Observation checklist was valuable in capturing information such as presence, incidence and frequency of observed variables during the study, this provided information to corroborate or refute claims made by respondents in questionnaires. Key Informant Interview gave in-depth information and helped in validation of information on the objectives.

The student provided scientific oversight of this study including training and technical support for the research team and oversaw the development of coding frame and data analysis. Informed consent procedures and other ethical standards for the study were ensured. Data was backed up on a daily basis and cleaned for analysis and report writing. Under supervision, the research assistants helped in recruitment and obtaining informed consent from the participants to take part in the study. The RAs administered the survey questionnaire (Appendix I). At the end of each day the RAs also participated in data back up and cleaning of study data. The research assistants walked from one sampled household to the next to get participant household heads. Households that were missed were systematically replaced by the extra households selected during the sampling procedure. Completed questionnaires were saved after the completion of the interview and backed up after they were verified for completeness and accuracy in completing the

questions. The backups were saved in a secure server. In order to ensure data safety, the following measures were carried out. Everyone to participate in the data collection were trained on all the rules and regulations beforehand and all data was doubly transcribed into soft copy and verified. All information was recorded using study identification numbers, rather than participant names. No personal identifiable information was used in data collection process but a study identification number.

3.8 Study Variable

The study variable and their measurements are described in Table 3.3.

Table 1.4: Independent and dependent variable and their measurements

Variable	Variable definition	Variable measurement
Dependent Variables		
Access to a latrine	Individual latrine, Shared latrine/neighbours.	Direct observation. Yes/ No
Privacy	Door or some form of barricade provided for each superstructure	Direct observation Yes/No
Squat hole cover	Provided for every squat hole and in use	Direct observation Yes/No
Hand washing facility	Tap/leaky tin near latrine with water inside, soap/ash available.	Direct observation Yes/No
No exposed faeces	No faeces visible within the surrounding of the home	Direct observation Yes/No
Independent Variables		
Treating water	Use of water treatment method; mechanical methods e.g., boiling or use of chemicals	Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely, not at all)
Covering food	Using lid over cooking pots when cooking and during storage	Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely, not at all)
Using elevated racks	Structure constructed to hold utensils off the ground while drying	Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely,

			not at all)
Regular cleaning of latrine	Frequency of cleaning the latrine		Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely, not at all)
Pouring ash	Application of ash around & the squat hole of latrine		Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely, not at all)
Using dugout pit for waste disposal	A large hole on the ground used for solid waste and grey water disposal		Likert scale: always, most of the time, sometimes, rarely, not at all. Score was pooled into two; Yes (always, most of the time, sometimes), no (rarely, not at all)
Care of the family	Empirical & normative expectation regarding health of the family		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Shame/disgust/fear/pride	Regrettable occurrence/unpleasant emotion that cause a feeling of resolution		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Cultural/social/religious beliefs	Person's belief alignment as pertaining culture, society and religion		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Laws/penalties	Rules within a given set up and punishment imposed for breaking the set rules		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Need to improve things in the family	Empirical & normative expression of obligation to make things better		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Follow ups and support	The subsequent actions following CLTS and material assistance for the same		Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)

Rewards/incentives	Some form of payment given in recognition of work done or to stimulate greater output	Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)
Peer pressure	The empirical & normative expectation regarding consistent latrine use.	Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. Score was pooled into two; Yes (agree and strongly agree), No (strongly disagree, disagree, neutral)

3.9 Data Analysis and Presentation

Data from the study was coded using Statistical Package for the Social Sciences (SPSS) version 21.0 software and analysed to establish both descriptive statistics (such as means, medians and standard deviations) and inferential statistics. Summation for the observed non-negotiable indicators was done to determine the ODF status. All the 5 non-negotiables counted and had to be in every household for it to be declared ODF. Wilcoxon signed-rank test was conducted to determine if there was a significant difference in ODF status as at the time of the study and verification; that is the expected 100%. Chi-square test of independent was used to determine association between sanitation and hygiene practices, social norms and ODF status and Binary logistic regression was done to determine the relationship between sanitation hygiene practices, social norms and ODF status. Qualitative data from KII was collected by audio recording thereafter transcribed and analysed thematically.

3.10 Validity and Reliability of Research Instruments

3.10.1 Reliability

Reliability concerns the degree to which a particular research instrument gives the same results on repeated trials. Cronbach's alpha was computed to test for reliability of data collection instrument and output yielded result of an internal consistency of 0.7.

3.10.2 Validity

This study ensured content, construct and criterion-related validity of the tools applied. The validity of the research was improved by applying triangulation; data was collected through questionnaires as well as observation and Cochran's formula was used to ensure sampling validity. The researcher discussed the contents of the questionnaire and checklist with the experts

i.e., the supervisors and public health experts. The research assistants were also trained before taking on the data collection exercise.

3.11 Ethical Considerations

3.11.1 Ethical Approval

To ensure the study met ethical standards, the study was subjected to a review by NACOSTI and the Maseno University Ethics Review Committee. At the county level authority was sought from the county director of health.

3.11.2 Informed Consent

Informed consent was gotten from the participants and was translated to local languages and back translated to English to ascertain correct language use. The participants were also informed that taking part in the study was out of free will and that they were free to withdraw from the study at any time.

3.11.3 Privacy and Confidentiality

To protect the privacy and anonymity of participants, their personal identifying information was not recorded in the questionnaires or checklists and households were reported as numbers. The data was coded to secure the privacy and anonymity of participants.

3.11.4 Risks and Benefits

There was disclosure regarding the nature of the study, its purpose, what it involves, the procedures to be done, risks-if any by taking part in the study and since the study did not involve experimental drugs or procedures used in the study, the study posed no significant risk to participants. The results of the study will be communicated through the office of the director of health as the authorizing body at the county level. The study did not involve under-age household heads.

CHAPTER FOUR

RESULTS

4.1 Introduction

The objective of this chapter is to report the findings on the ODF status of Suna West Sub-County and the role sanitation hygiene practices and social norms on sustainability of ODF status.

4.2 Socio-demographic Characteristics of Respondents and Households in Suna West Sub-County between 2019-2020

Of the 384 participants, 241 (62.8%) were female, 282 (73.4%) of the participants were in the 25-59 years age category. On the level of education, majority 225 (58.6%) of the participants had primary education, 122 (31.8%) had secondary education. On socio-economic status, the vast majority 289 (75.3%) had a household income of KES. 0-5,000. A total of 204 (53.1%) participants stated that their household had at least one person in the 0-5 age bracket and about 104 (27.1%) had at least one member with a disability or chronic illness as shown in Table 4.1

Table 1.5: Socio-Demographic Characteristics of Respondents from households of Suna West sub-County between 2019-2020

	Variable	Frequency (n)	Percentage (%)
Gender	Male	143	37.2
	Female	241	62.8
Respondents' Age	18-24 years	58	15.1
	25-59 years	282	73.4
	60 and above	44	11.5
Level of Education	No education	26	6.8
	Primary education	225	58.6
	Secondary education	122	31.8
	Tertiary education	11	2.9
Level of Income	0-5,000	289	75.3
	5,001-10,000	72	18.8
	10,001-20,000	6	1.6
	20,001-30,000	3	0.8
	30,001-40,000	6	1.6
	40,000 and over	8	2.1
Household composition	With persons 0-5 years.	204	53.1
	With persons 6-12 years.	278	72.4
	With persons 13-24 years.	299	77.9
	With persons 25-59 years.	354	92.2
	With persons above 60 years.	72	18.8
	Persons with disability or chronic illness	104	27.1

*Table legend: The average exchange rate as at the time of the study was **KES 106.488***

4.3 Status of Households in ODF certified villages in Suna West Sub-County between 2019-2020

Using the national expectation for sustainability that all the five non-negotiable indicators used during the initial verification stage will be present in all the households at all times, that is 100%, of the 384 households surveyed only 33.9 % (n=130) were found to be ODF one year after certification. When the indicators were analysed singly, it was observed that access to latrine and no exposed faeces were at 100%; with 95.3% (n=366) owning individual latrines while the remaining 4.7% (n=18) reporting to use shared latrines. All the other indicators fell below the 100% expectation as summarised in Table 4.2. Results of other indicators include; households with clean latrines 85%, households with hand wash in use 78.9%, with soap available 68.2%, no scattered litter or stagnant waste water 72.1% and those that had a covered waste pit were 78.4%.

Table 1.6: Results on status of households in ODF certified villages in Suna West Sub-County between 2019-2020

Indicator	Median percentage (%)	P value	No. of villages reporting 100%
Access to latrine	100	1.0	13 (100%)
Squat hole cover present	63	0.002	0 (0%)
Privacy	82.4	0.002	0 (0%)
Hand washing facility	82.4	0.004	2 (15%)
No exposed faeces	100	0.056	8 (61.5%)

4.3.1 Results from key Informants on status of households on ODF certified Villages

According to key informants, it was unanimous that at certification and as at the time of the study; the villages were clean and all the households had latrines or were sharing with a neighbour as at the time of certification even though some of the latrines were very basic, everyone had a hand washing facility.

“The village was clean and there were no open defecation sites since the CHVs and members of the sanitation committees ensured no one was defecating in the open, if defecation was found around one’s home, they would be forced to dig it up and dispose of it the latrine” (Key informant 2).

Among the listed by the key informants as things that should be done to encourage ODF practice or sustainability with the community/village included; continued follow-up by health workers and natural leaders even after being declared ODF.

“Households should be encouraged to improve their sanitation facilities, build more permanent ones to prevent issues of collapsing latrines during long rains-season, in fact in villages where the CHVs insisted on improved structures (Choo bora) and not just Bora choo (basic latrine), issues of latrines collapsing do not exist” (Key informant 1).

Also, it came out that there was need for technology that is affordable to the community members in order to make use of latrines easier for the elderly and persons with disability.

“There is need for cost friendly technologies to enable the elderly who cannot squat and the disabled have toilets they can use with ease” (Key informant 1).

4.4 Association between Sanitation and Hygiene Practices and ODF status in households of Suna West Sub-County

The responses which were on a 5-point Likert scale, were pooled into binary variables; Yes (always, most of the time and sometimes) and No (rarely, not at all). Except for ‘covering food’, this study found significant association between sanitation and hygiene practices and ODF status as shown in Table 4.3.

Table 1.7: Results on association between sanitation and hygiene practices and ODF status in households of Suna West Sub-County between 2019-2020.

Characteristic		ODF	NOT ODF	P Value
	Use	N	N	
Treating water	Yes	123	225	0.015
	No	5	29	
	Missing	0	2	
Covering food	Yes	128	250	0.305
	No	0	4	
	Missing	0	2	
Using elevated racks	Yes	117	211	0.027
	No	11	43	
	Missing	0	2	
Regular cleaning of latrine	Yes	128	236	0.026
	No	2	18	
Pouring of ash	Yes	121	193	<0.001
	No	9	61	
Dug out pit for waste disposal	Yes	122	196	<0.001
	No	8	58	

The results showed that households that; treated water, used elevated racks, regularly cleaned their latrines, poured ash over the pit of the latrine and used dug out pits for waste disposal were more likely to be ODF as shown in Table 4.4.

Table 1.8: Relationship between sanitation and hygiene practices and ODF status in households of Suna West Sub-County between 2019-2020.

Characteristic	ODDS RATIO	95% CI	P value
Treating water	3.17	1.20 - 8.40	0.020
Using elevated racks	2.17	1.08 - 4.37	0.030
Regular cleaning of latrine	4.88	1.12 - 21.37	0.035
Pouring of ash	4.25	2.04 - 8.87	<0.001
Use of dug out pit	4.51	2.09 - 9.78	<0.001

4.4.1 Results from Key Informants on association between sanitation hygiene practices and ODF status

About latrine usage by children, elderly and disabled.

“Children are using latrines. For those who are still too young to use, their guardians have trained them to use potty and for those who cannot afford to use newspaper then collect the faeces and throw into the latrine” (Key informant 3).

“Some of the elderly and disabled find it hard using the squat latrine” (Key informant 4).

On the common sanitation hygiene practices that are carried out currently in the community/household were treating water, handwashing, using elevated racks and use of cloth line.

“Most households are treating water. There are household water treatment commodities available in shops and subsidised by partners. There are commodities like purr given to mothers attending clinic, we also have chlorine-based products like aqua-tabs given by public health department periodically to CHVs to distribute to community members especially during dry spell when water is scarce and people rely on unclean sources” (Key informant 6).

“There are also chlorine dispensers that were placed near communal water sources within communities, so water treatment is quite a common practice today” (Key informant 5).

“Community Health Volunteers always teach households on water treatment, using proper waste disposal methods, latrine cleanliness and using elevated racks among other sanitation and hygiene best practices in their routine household visits” (Key informant 1).

It also came out that there is an increase in handwashing practise due to COVID-19. Among the reasons given as to why the sanitation hygiene practices were not commonly practiced included; maintaining handwashing facilities is hard due to inconsistent water availability, children make away with the portable hand washing containers for carrying water to schools or fetching water from rivers and bad attitude towards handling of the aperture cover.

“Household heads are always saying it is the children who take the jerricans used to make hand washing facilities to school when they are told to carry water to school” (Key informant 3).

On the issue of aperture cover.

“Most people make basic latrines and often complain it is expensive and cannot able to afford the doors. Many use things like gunny bags and polyethene to provide temporary privacy during verification and certification process just so the village can be declared ODF, these wear out after a while and not replaced” (Key informant 2).

4.5 Association between Social Norms and ODF status in households of Suna West Sub-County between 2019-2020.

Questions were asked reflecting the different aspects to social norms and the responses were pooled into binary variables; Yes (Agree and Strongly agree) and No (Strongly disagree, Disagree and Neutral). This study found association in a number of the beliefs/expectations and ODF status, further, no association was found in some other beliefs/expectations and ODF status as shown in Table 4.5. Households that said that laws and penalties force them to be ODF and that incentives and rewards motivates them to be ODF were found to be less likely to be ODF as well as those that said need to improve the health of the family motivates them to be ODF. Households that agreed to the statements that; materials for constructing and/or maintaining latrines were expensive, that most people do not have latrines and that it was not a problem to defecate in rivers/bushes/dams were also less likely to be ODF. Further, 78.4% of the household heads interviewed were aware their village had been declared ODF and 76% said there were sanctions in their village for persons found defecating in the open.

Table 1.9: Results showing association between social norms and ODF status in Households of Suna West Sub-County between 2019-2020.

Social Norms		NOT ODF N	ODF N	P value
Latrine accessible to all	Yes	235	123	0.44
	No	19	7	
Care for the family	Yes	241	128	0.10
	No	13	2	
Shame/disgust/fear/pride	Yes	238	122	0.96
	No	16	8	
Cultural/social/religious beliefs	Yes	217	116	0.30
	No	37	14	
Subjection to laws/penalties	Yes	187	60	<0.001
	No	67	70	
Privacy and security	Yes	239	123	0.84
	No	15	7	
Convenience	Yes	239	130	0.003
	No	15	0	
Need to improve things	Yes	228	106	0.023
	No	26	24	
Follow-ups and support	Yes	234	115	0.05
	No	15	15	
Peer pressure	Yes	189	101	0.60
	No	62	29	
Expectation of rewards/Incentives	Yes	205	60	<0.001
	No	49	70	
Construction/maintenance expensive	Yes	176	70	<0.001
	No	51	50	
Majority should use latrine	Yes	206	94	0.11
	No	48	33	
It is acceptable to defecate in the open	Yes	141	81	0.35
	No	105	49	
Embarrassing to see people defecate in open	Yes	193	91	0.08
	No	54	39	
Majority ashamed for not having latrine	Yes	203	86	0.05
	No	49	41	
Okay to defecate in rivers/bushes/dams	Yes	214	84	<0.001
	No	36	46	

The relationship between social norms and ODF status shown in Table 4.6 below, reveals that the odds of households exhibiting social norms were less likely to be ODF.

Table 1.10: Results showing the relationship between Social Norms and ODF status in households of Suna West Sub-County between 2019-2020

Social Norms	ODDS RATIO	95% CI	P value
Laws/Penalties	0.31	0.20-0.48	<0.001
Need to improve things	0.50	0.28-0.92	0.025
Rewards/Incentives	0.21	0.13-0.33	<0.001
Construction/maintenance materials are expensive	0.52	0.33-0.80	0.003
Most people don't have a latrine	0.40	0.25-0.64	<0.001
It's okay to defecate in bushes/rivers/dams	0.31	0.19-0.51	<0.001

4.5.1 Results from Key informants on association between social norms and ODF status

Some of the social norms surrounding sanitation in the communities were that; it is illegal to defecate in the open and that there are sanctions for those who were found defecating in the open. Some of the social norms listed were that the embarrassment due to not having a latrine caused some of the community members to build their own latrines and also that since the introduction of sanitation committees, defecating in the dams and was greatly reduced and has since ended.

“The introduction of sanctions has greatly reduced open defecation” (Key informant 6).

CHAPTER FIVE

DISCUSSION

5.1 Status of households in ODF certified villages

This study found that a third (33.9%) of the households were ODF one-year post-ODF indicating a partial reversion of 66.1%. This high reversion is similar to findings of previous studies that have found sustainability of ODF achievements to be a major challenge in Kenyan communities, since more than 70% of villages were found to have reverted back to non-ODF status (UNICEF, 2015). Such high reversion rate (92%) has previously been recorded in a study done in Uganda, Kenya, Ethiopia, and Sierra Leone when the 5 indicators used during the initial verification process was used as a measure of sustainability (Tyndale-Boscoe, *et al.*, 2013). These initial indicators included; functional latrine, means of keeping flies away (water seal or squat hole cover), absence of faecal matter, presence of hand washing facility with soap/ash and evidence of latrine use (Tyndale-Boscoe, *et al.*, 2013).

The observed high reversion rate in this study was supported by key informants' admission that among the non-negotiable indicators not commonly provided by community members were handwashing facility, aperture cover and provision for privacy. This is similar to a study done in Bangladesh which revealed that among the challenges identified were means of keeping the latrines clean and training on handwashing (Vernon, & Bongartz, 2016). On the issue of provision of privacy, it was noted by the ward PHOs and village leaders that at the time of verification, only some of the households had permanent doors on their latrines. Most of the community members improvised with temporary items such as polythene, gunny bags or curtains during verification and certification just to ensure the village was declared ODF. These quickly degraded shortly after certification leaving the superstructures without privacy. As in this study, previous studies have shown that poor infrastructure were a major challenge in most ODF communities and there was need for technical support (Robinson, & Gnilo, 2016a).

According to community leaders and public health officers, children, the elderly, and persons with disability had partially contributed to open defecation in the past albeit with the rigorous follow-ups during CLTS, there has been remarkable improvement. They noted that most families that had children disposed of their faeces in the latrine and attempted to train their children to use the latrine at a tender age. These findings are similar to that of previous studies that found that

lack of ease to use latrines by children and elderly contributed to reversion to non-ODF status (UNICEF, 2014). Additionally, results from KII showed that while the elderly and the persons with disability in their villages mostly used latrines, their physical limitations, in some cases, made it difficult to efficiently use the sanitary facilities provided. This is similar to previous studies that reported that persons with disability were at higher risk of having inadequate sanitation facilities and sometimes the facilities provided were inconsiderable of their conditions (Oliver, 2016; Mukherjee, 2012).

It is important to note that this study was conducted during the COVID-19 first wave scare, hand washing practice, among other practices received a lot of emphasis as a key measure placed to curb the spread of the pandemic. There may have been an influence on the actual data on hand washing facility stations and usage according to information by the public health staff and leaders at the community. Some households which had done away with their hand washing stations used during verification made new ones to be used by all while some of the households revamped the existing hand washing stations which had been abandoned and non-functional after certification. This added to the number of handwashing stations in use at the time of data collection. On the flip side, other households placed hand washing stations at the centre of their homes for easy access by everyone, visitors included. To the latter, it was realised that the original hand washing stations placed near the latrines were then abandoned, reducing the number of handwashing facilities in use according to CLTS standards. This study however, focussed only on the hand washing facilities stationed near the latrines as is the guideline of CLTS.

This study recorded a high of 82.4% on availability of hand washing facilities. This is incongruent with other studies that recorded much lower coverage. In a study done in Nakuru, issue of availability of hand washing facilities was identified as one major challenge. This is because the containers and the soap were often stolen due to the high demand for recyclable (Pasteur, *et al.*, 2015). While this present study found that 21% of households presented no evidence of the use of a hand-washing facility and 46% households did not wash their hands with soap and water always after using a latrine, in a study done by (Tyndale-Boscoe, *et al.*, 2013), there was an overall reversal rate of 17% for signs of use of a handwashing facility and 75% for consistent handwashing with soap and water. Slippage for consistent hand washing with

soap and water in Homabay and Kilifi stood at 83% and 67%. Thus, this study recorded much lower reversal rate on consistent hand washing with soap as compared to previous studies and this may be due to interference by COVID-19 pandemic. As earlier mentioned, the data was collected during the hype of COVID-19 pandemic and as reported by the key informants, there was an increase in hand washing practice which they attributed to the social mobilisation due to the pandemic. In other findings, low reversion rate had been observed in other implementing countries. These include (8%) in Ethiopia and Ghana after one year of CLTS implementation, and (14.5%) in Indonesia after two years of ODF certification. In these studies, latrine presence - latrine status and usage – was used as the measure for sustainability (Crocker, Saywell, & Bartram, 2017; Odagiri, et al., 2017). In Kenya, Nambale sub-county recording the lowest reversion rate (22%) three years after certification among seven sub-counties featured in their study (UNICEF, 2015). In Uganda, Kenya, Ethiopia, and Sierra Leone two years after CLTS, a 13% reversion was reported when latrine presence was used to measure sustainability. In all these studies, latrine presence was used as a single indicator to measure sustainability, the possible reason for the low reversion rates reported. These findings are consistent with the findings of this particular study which found that ‘latrine access’ when looked at singly, recorded 0% reversion.

While governments and most organisations have been very successful in getting households to build and retain latrines, less success has been achieved in improving sanitation behaviour change which is the major aim of CLTS (Tyndale-Boscoe, *et al.*, 2013). Overall, the findings of this study suggest that there is need to harmonise indicators that define ODF status. While the protocol is very clear on the non-negotiable indicators, there is need to re-look at them and their role in defining ODF status, this will help in defining concepts up front in developing any kind of monitoring tool of post-ODF status. Further, the quality of CLTS process was found to greatly impact the sustainability of ODF status (UNICEF, *et al.*, 2013) this may be looked into especially in regards to addressing the 3 non-negotiable indicators that contributed to the high reversion rates.

5.2 Association between Sanitation and Hygiene Practices and ODF Status in households

According to the findings of this study, there was significant association between sanitation hygiene practices and ODF status and that households that complied with the sanitation hygiene

practices were more likely to be ODF. This resonates with results from other studies conducted in Indonesia, participants from better performing villages on ODF outcomes reported that messages around sanitation promotion and good hygiene had been constantly promoted through mosques. Further, local groups carried out monitoring after CLTS implementation in an effort to promote hand washing with soap, treating of drinking water, proper food handling, solid and liquid waste management by households(Odagiri, *et al.*, 2017).

This validates the statements from key informants, it came out clearly that issues of hand washing, treating water, latrine cleanliness, using elevated racks and proper waste disposal were among the key sanitation practices checked during CLTS follow-ups. During the follow-ups, those with earthen-floor latrines were always encouraged to manage the smell and keep off flies by applying the ash from the household's kitchen in and around the aperture cover. A previous study showed that 93% of households in urban settlements threw their grey water to the streets and only 7% connected to septic and 64% threw garbage in the open fields(Jabeen, *et al.*, 2011).This negative finding however, is incongruent with the results from this study in which households that used dug out pit for grey water had higher odds of being ODF.

According to key informants, pouring of ash significantly encouraged consistent latrine use by all members of the household by managing smell and thus enabling ODF status. Thus, there was significant association between pouring of ash and ODF status and households that adhered to the practice were found to be more likely to be ODF. Further, regular cleaning of the latrine was associated with higher odds of being ODF. These findings are incongruent with that of previous studies which reported that smelly and unimproved latrines turned people back to open defecation and in Ethiopia and latrine usage by women was tampered with negatively as a result of perceptions around latrine cleanliness and smell inside(Mukherjee, 2016).In this present study, the elderly that had previously been turned away due to bad smell as reported by the community's key informants were able to use the facilities. These findings differ to that of a previous study in East Java in which, open pit users were not contented with their facilities as they deemed them disgusting and not safe for children and the elderly(Mukherjee, 2012). While latrine use by both children and adults remained high and dumping of children's faeces in the open or in garbage was low, other sanitation practices such as hand washing, use of squat hole cover and privacy remained below full compliance. It is impossible to maintain hygienic latrines

and hand washing facilities with both soap and water if you do not have access to water within the home (Moran, 2017). Among the issues mentioned by key informants as a hindrance to maintaining handwashing facility was intermittent water supply. Many of the households relied on rain water for clean water for hand washing and other domestic use in the kitchen and so during dry spells when water supply goes down, hand washing facilities also remained dry and unused. This is congruent with previous findings in Bangladesh where, training on handwashing with soap was a major challenge and lack of clean water for drinking and other uses was the most important risk to health (Jabeen, *et al.*, 2011).

This present study showed significant association between treating water and ODF status and that households that treated water were more likely to be open defecation free. In Indonesia, post-ODF monitoring played a key role in promoting hand washing with soap, household water treatment, food hygiene, solid and liquid waste management (Odagiri, *et al.*, 2017). These results are similar to that of a study done in Chad in which the individual perception to treating water was rated high. Respondents thought positively about the issues of water treatment and did not perceive it to be taking much effort, time or cost (Lilje, Kessely, & Mosler, 2015). In Suna West Sub-County, water treatment commodities were available in public health offices and distributed by CHVs during dry seasons. Other commodities were offered at the health facilities to mothers attending clinic and further, there were chlorine dispensers strategically situated in communal water points. All these efforts, together with health education was put overtime in a bid to increase access to safe water. According to key informants, water treatment was one of the sanitation and hygiene practices that was highly practiced.

Previous studies have shown that, knowledge, awareness, belief and feelings about hygiene practices play an important role in determining health behaviour. This is at the individual level and by focussing on intrinsic motivation, concerns or constraints then an individual is able to have sustained behaviour change (Sigler, *et al.*, 2014). Further, once an individual realises the need for change and has knowledge to do so then they begin to influence others - what is called collective action. Ongoing and consistent hygiene promotion messaging is essential for habitual hygienic practices (Moran, 2017).

Overall, the study found that sanitation and hygiene practices were greatly influenced at individual-level, outcomes which have been found to influence ODF outcomes positively. This mirrors previous studies that have shown an improvement in sanitation status following WASH promotion (Odagiri, *et al.*, 2017; Gizaw, 2020). In Suna West Sub-County, the sanitation hygiene practices had significantly influenced ODF status positively.

5.3 Association between Social Norms and ODF Status in households

The study found association between a given number of normative and empirical expectations and ODF status a reflection of the existence of social norms within Suna West Sub-County. This is in spite the fact that the households that exhibited the social norms were found to be less likely to be ODF. In this particular study, while majority (76%) reported that there were sanctions for persons found defecating in the open, high reversal rate was still registered in the sub county. Further, those households that agreed that laws/penalties cause them to be ODF were found to be less likely to be open defecation free. This is incongruent with previous studies in which the communities that were ODF reported presence of community sanctions of naming and shaming, fines and social services for sanitation offenders. On the flip side however, communities that were not ODF findings reveal that sanctions were hardly enforced (Mukherjee, 2012). Strong social cohesion was associated with the better performing villages in Indonesia. That is, among the social norms associated ODF status were collective action towards owning a latrine and stopping open defecation, a reflection of informal sanction (Odagiri, *et al.*, 2017).

The study found no association between cultural/moral/religious beliefs and ODF status. These findings are key considering that several studies have emphasized the importance and influence of social norms on people's behaviour (Shulman, 2017; Bicchieri, & Noah, 2017). In East Java, defecating in the rivers had a high social acceptance and open defecators found it comfortable with their actions and felt no need to change as they found their open defecation convenient. These posed a great challenge to CLTS and fear of disease and of harming others were used as motivators to bring about behaviour change (Mukherjee, 2012). Through other findings, it was found that open defecation was a highly endorsed social norm in Madagascar thus was highly practiced in the country. However, when through CLTS, a new social norm that associated open defecation with disgust, filth, and shame was established, the practice (open defecation) significantly reduced (Gaya, *et al.*, 2015). This study however, found no association between

shame/disgust and ODF. This is incongruent with previous studies in which shame/disgust motivated households into behaviour change. They were disgusted as their minds were triggered into realising that by defecating in the open, they ended up ingesting their own faeces and caused others to do the same (UNICEF, 2014). Shame of being found defecating in the open as they believe others expected them to use a latrine was a motivator in another study (WaterAid, 2011). In this particular study, results found that a good number of respondents (96.1%) agreed and that the need to improve things in the family (87%) motivates them to be ODF. This is similar to other studies in which the most prominent motivator towards ODF status was concern for the health of the family. Households believed that stopping open defecation resulted in reduction in diarrheal diseases thus motivating them to stop open defecation (UNICEF, 2014). In another study in Timor-Leste, it was reported that health, even though may not have been a driver for the initial defecation behaviour change, people did continue to make effort to maintain and use latrine due to their health and that of the family (Moran, 2017). However, this study found no association between these perceptions and ODF status studies. This is incongruent with other studies done in Indonesia in which cleaner and healthier living as a motivator was associated with lower odds of slippage back to non-ODF status (Odagiri, *et al.*, 2017).

Unlike results from other studies, this study, even though recording high number of the respondents agreeing to the statement that latrine accessibility and convenience motivated them to be ODF, the odds of them being ODF were less likely. In the study done in Indonesia, satisfaction with the condition of their latrines was associated with consistent latrine use (Odagiri, *et al.*, 2017). Further, convenience, safety and time saved from not having to walk long distance to a shared facility were motivators to ODF status (Mukherjee, 2016). While this study found no association between privacy/security offered by latrine and ODF status, in a previous study, provision for privacy for superstructure and perceptions around privately owned latrines were found to be important drivers for women in respect to building latrines in Indonesia (Odagiri, *et al.*, 2017). In a study conducted in East Java, communities that showed sustainability reported monitoring by key agencies after certification as a key element (Mukherjee, 2012). The quality of CLTS in those villages that reported highest sanitation status showed that follow-up was done effectively during the CLTS process and all had functional sanitation committees formed immediately after triggering (Mukherjee, 2012). While it was

expected that follow-up would be picked by natural leaders after certification, this was not always the case and studies in Bangladesh reveal that there was need for more funding for follow-ups to ensure sustainability (Vernon, & Bongartz, 2016). Further, studies have shown that most monitoring tools do not capture the happenings post-ODF. For a better understanding of CLTS sustainability, focus needs to be directed towards this to monitor sanitation-hygiene practices as well as social norms beyond certification (Odagiri, *et al.*, 2017; Vernon, & Bongartz, 2016).

In other study done on sustainability, some of the enablers of sustainability were natural leaders working together and post-ODF follow-up by CHVs. These helped community members have improved sanitary facilities by building latrines that were durable and safe to avoid reverting back to OD when the latrines deteriorated due to environmental factors or high cost of maintenance/repair (UNICEF, 2014). In a study done in South Ethiopia, when latrines began to deteriorate, they were disused and when the shallow pits filled up fast, the cost of rebuilding was often too high causing such households to revert back to OD (Novotny, *et al.*, 2017). According to Key Informant 1, in villages the CHV together with the natural leaders insisted on ‘*choo bora*’ and not just ‘*bora choo*’, those latrines stood the test of time and were not brought down during the rainy season that swept a good number of the latrines. Further, Key Informants also suggested that social norms could best be established through post-ODF follow-up. This study found that those who perceived that construction/maintenance materials were expensive (factual belief) and that rewards/incentives motivated them to be ODF were less likely to be open defecation free. This resonates with studies done previously that found that high cost of building, maintenance and repair of latrines were among the reasons for reversion back to non-ODF status (Mukherjee, 2016). In East Java, lack of money was given as major reason for not having latrines I poor performing villages while findings from the ODF villages showed that the community members did not wait for subsidy but had their own initiatives (Mukherjee, 2012). According to key informants on what should be done to encourage ODF sustainability in the communities it came out that some of the community members insisted that they cannot afford to build proper latrines. For such households, rebuilding latrines became harder and often reverted back to open defecation or used shared latrines which were not used consistently. There were further suggestions from the key informants for introduction of low-cost technologies that can be

afforded by indigents (Mukherjee, 2012). Findings of a study in Bangladesh suggest that though CLTS was a zero-subsidy strategy, there was need for incorporation of sanitation marketing to CLTS to help those who can afford make informed choice from the onset of the CLTS process (Mahbub, 2011). However, this must be addressed with at most care as findings have shown in other studies that households that received some form of subsidy did not become ODF (Mukherjee, 2016). It was discovered that subsidy was divisive since it was never enough for all households and thus hampered collective action, also, incentives has been found to have the capacity to corrupt intrinsic motivation (Mukherjee, 2016; Bicchieri, & Noah, 2017). However, in order to manage high cost of latrine construction and maintenance, community leaders initiated means for households to acquire durable pit covers/pans. These subsidies were from among the community members as a social solidarity measure which was more sustainable as members felt accountable to the larger community (Mukherjee, 2016).

While 78.4% of persons interviewed reported to be aware that their village was ODF, in a previous study results showed that from the villages with poor ODF results, fewer members of the community collectively did know that their community was ODF verified (Odagiri, *et al.*, 2017). Further, the study reported that when there was a conflict between empirical and normative expectations e.g., peer pressure forces me to use latrine, other people think I should use latrine, empirical expectation e.g., most people do not have latrine predicted decision due to dysfunctional punishment system. Social sanctions, though reported to be present in Suna West Sub-County failed to create significant behaviour change. Findings on normative and empirical perceptions that have previously been motivators to improved sanitation and ODF status were found to be incongruent with findings of previous studies. Social norms are important instrumentally, as sanitation outcomes depend on the level to which social influences are able to shape the perceptions of benefits or risks on sanitation-related awareness in positive ways (Novotny, *et al.*, 2017). Weak social norms have been associated with reversion to open defecation practices (Odagiri, *et al.*, 2017). In conclusion, social norms in Suna West Sub-County failed to influence the perceptions of benefits and/or risks on sanitation-related awareness in a positive way.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION AND RECCOMENDATIONS

6.1 Summary of Findings

The study found that 33.9% of the households of Suna West Sub-County were open defecation free one year after certification and that 66.1% of the households had partially reverted back to non-ODF status. The high reversion rate recorded were due to the use of all the five non-negotiable indicators used during the initial verification process. Had latrine access and no exposed faeces been used as a measure, then the reversion rate would have been at 0%. When the indicators were however looked at singly, sustainability was registered in latrine access and no exposed faeces while provision for privacy, squat hole cover and hand washing facility being the major contributors to reversion to non-ODF status.

On sanitation hygiene practices, there was significant association between sanitation hygiene practices and ODF status in households of Suna West Sub-County and that the odds were higher for being ODF in households that carried out these practices. This was a reflection that when messages around sanitation are constantly promoted, better ODF outcomes are recorded, this is because knowledge and awareness about sanitation-hygiene practices play an important role in determining health behaviour. Further, the study found that sanitation and hygiene practices were greatly influenced at individual-level, outcomes which were found to influence ODF outcomes positively. With regards to social norms, there was significant association between social norms and ODF status in households of Suna West Sub, however, the odds of being open defecation free were found to be significantly lower for households that reported the social norms. Social sanctions, though reported to be present in Suna West Sub-County failed to create significant behaviour change. The social norms in Suna West Sub-County were weakly embedded and thus failed to influence the perceptions of benefits and/or risks on sanitation-related awareness positively.

6.2 Conclusions

There was partial reversion to non-ODF status in households one year after certification of Suna West Sub-County mainly attributed to 3 major indicators; provision of hand washing facility, squat hole cover and privacy. The findings therefore, rejects the null hypothesis that there was no significant difference in ODF status of households in open defecation free villages between the

time of certification and at re-verification. Secondly, there was significant association between sanitation-hygiene practices and open defecation free status and that there were higher odds of sustained ODF status in households that carried out the sanitation hygiene practices in Suna West Sub-County. The findings thus, rejects the null hypothesis that sanitation hygiene practices are not significantly associated with ODF status of households of Suna West Sub-County.

Finally, there was significant association between social norms and ODF status however, the odds of being ODF were significantly lower due to the weakly embedded social norms that failed to influence the perceptions of benefits and/or risks on sanitation-related awareness positively. The findings of this study thus, rejects the null hypothesis that social norms are not significantly associated with ODF status of house of Suna West Sub-County.

6.3 Recommendations

- i. Measures should be put in place from the onset of CLTS to ensure emphasis on all the non-negotiable indicators so as to enable sustainability ODF status.
- ii. More effort needs to be exerted towards sanitation hygiene promotion and emphasis be placed for households to adopt all sanitation hygiene practices and to adopt improved sanitation technologies. Funding should be channelled to provide incentives to entrepreneurs to stimulate technologies that are low cost and affordable to motivate sustained ODF status.
- iii. There is need for thorough follow-up post-certification to embed social norms around proper sanitation hygiene practices as a key element in ensuring sustainability of ODF status.

6.4 Suggestions for Further Research

- i. There is need for further studies on the quality of the CLTS process.
- ii. There is need for further studies on sanitation and hygiene practices that could be compensatory in ensuring total sanitation.
- iii. Further studies also need to be conducted to investigate identify the factors other than social norms that potentially impact on ODF status.

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APPENDICES

Appendix I: Consent Form

Survey Consent Form

I understand that I am being asked to represent my household and take part in a survey activity that is part of Naomi Roosevelt's (name of student) required coursework at Maseno University. I understand that this survey/study seeks to collect information about sanitation, hygiene, and the sustainability of open defecation free status.

I have been generally informed about this project and the types of questions to expect to be asked. It is my understanding that the survey will be conducted in person and that it will take roughly 15 minutes of my time to complete.

I understand that taking part in this study is absolutely voluntary. I also understand that I can decline to take part in the study at any time before or at any point during the activity without any consequences. I understand that all the information I provide will be treated with confidentiality, used solely for the purposes of completing this assignment, and shall in no circumstance be used such as to expose my identity.

All the responses I provide and notes or records taken from me or relating to my household will be kept securely. All notes and records will be destroyed by the researcher within four months after the survey. Also, at my request, a copy of the findings of the study will be provided to me.

It is my understanding that the results of this project will be used exclusively in Naomi Roosevelt's Maseno University course assignment and no information provided by me will be made public. It is my understanding that participating in this activity exposes me to no risks beyond those experienced in everyday life.

I hereby confirm that I have read and understood the information above. By signing this form and returning it to the researcher or his/her assistant, I consent to take part in this study.

Participant name: _____ Signature: _____ Date: _____

For any questions concerning your participation in this study, please contact

Student name: Naomi Roosevelt

Telephone number: +254 722114773

Email address: roosenash@gmail.com

Or

Secretary, Maseno University Ethics Review Committee:

Telephone number: +254 057 351 622 Ext. 3050

Email address: muerc-secretariat@maseno.ac.ke

Thank you for agreeing to take part in this project.

Appendix II: Questionnaire

Section A: Household Background Characteristics

Please answer all the relevant questions if you can:

1. What is your gender?
 Male Female
2. What is your age category?
 18-24 24-59 60 and above
3. What is your highest level of education?
 None Primary Secondary Tertiary Other (specify)
4. Approximately, what is your total household monthly income level in Kenya shillings?
 0-5,000 5,001-10,000 10,001-20,000
 20,001-30,000 30,001-40,000 40,000 and over
5. Please state the number of people in your family within these age categories
 0 - 5 years 5 - 12 years 13 - 24 years 24- 59 years Above 60 years
6. Does your household have a person with a chronic illness or physical disability?
 Yes No Not sure (Specify)

Section 2: Sanitation and Hygiene Practices

7. Does your household have a latrine/toilet? (please skip Q8 below if Yes, and skip Q9 if No)
 Yes No
8. If no (in 7 above) where do members of your household defecate or dispose faeces?
 Shared latrine Bush/thicket/forest Open ground
 Body of water/stream Other (explain)
9. If yes (in 7 above), who is using the latrine?
 Children and adults Only adults Only children Not sure
10. How do you dispose of children's stools?
 Child uses latrine/toilet Put/rinsed into latrine or toilet
 Put/rinsed into ditch or drain Left in the open/ground Thrown in garbage
 Other (specify)
11. Kindly tick one choice per statement in the table below:

1=Always, 2= Most of the time, 3 = Sometimes, 4= Rarely, 5= Not at all

Statement	1	2	3	4	5
We cover the latrine squat hole					
We treat our drinking water?					
We cover our stored food and water					
We use an elevated racks for drying utensils					
How often do members of my household use the latrine to defecate					
How often do members of my household wash their hands with water and soap or ash					
We clean our latrine floor, walls and seat of the latrine					
We pour ash over faeces in a pit after defecation to reduce contact with flies					
We dispose of grey water and solid waste in a safe, covered pit					

12. Statement on latrine condition

1. What is the condition of your latrine?

1 = Excellent 2 = Good 3 = Fair 4 = Poor 4 = Very poor

2. How satisfied are you with the condition of the latrine?

1 = Very satisfied 2 = Satisfied 3 = Dissatisfied 4 = Very dissatisfied

Section 3: Perception on Social Norms

Scale variables

13. Think about the people in your village such as your friends, family or neighbours. Out of 10 in your village, how many do you think said that members of their family always use a latrine?

14. Out of 10 people in your village; family, friends and neighbours, how many do you think said that people should use a latrine because it is the right thing to do?

15. What is your level of agreement with the following statements relating to the sustainability of an open defecation free (ODF) environment by your household?

1= strongly disagree, 2= disagree, 3 = neutral, 4= agree, 5= strongly agree

Statement	5	4	3	2	1
It is easy to maintain ODF because the latrine is accessible for all household					
Shame, disgust, fear, or pride, motivate us to maintain an open-defecation free environment					
We are forced to maintain an ODF environment because of laws, threats or risk of being penalised					
We use the toilet/latrine because I am motivated to improving things for our family					
A lot of people think materials for constructing and maintaining a latrine are expensive					
Most people in your village do not have a latrine					
In this village, it is acceptable to defecate in the open					
Most people feel ashamed to not have a latrine in their homes					
It is not a problem defecating in the river, bushes, dam					

16. Are there any sanctions by village members for persons found defecating in the open?

1 = Yes 2 = No:

Explain

17. Are you aware that your village has been declared ODF?

1 = Yes 2 = No

18. In your view, what factors motivate the sustainability of open defecation free?

19. It not easy for my household to maintain an ODF environment because/due to:

(Kindly tick one choice per statement in all the tables below)

1= strongly agree, 2= agree, 3 = neutral, 4= disagree, 5= strongly disagree

Statement	1	2	3	4	5
The latrine is inconvenient, lacks comfort/lacks privacy					
The toilet is too far or hard to reach					
Risk being harmed due to slab collapsing or latrine falling					

Maintaining or emptying the pit/latrine is too difficult/costly					
Regular cleaning is too much effort/ the latrine is very smelly.					
Lack of time to build/repair					
The presence of a young child, older adult or disabled person					
The latrine is shared with others					
We receive no support					
Environmental factors such as unfavourable soil conditions/ filling of pits by groundwater					

20. Which intervention do you think is necessary to avoid engaging in open defecation and unhygienic behaviour?

Appendix III: Observation Checklist

1. Does the household have a latrine?
 Yes No
2. Is the latrine in use? (Yes, if any one of these is observed)
 - a) Visible path to latrine walked in.
 - b) Anal cleansing material is observed
 - c) Detected faeces in the pit using a spot light
 - d) Slab is wet
 - e) Smell coming from the latrine Yes No
3. Is there a cover over the squat hole?
 Yes No
4. Does the latrine/toilet have a superstructure that provides for privacy to the person using it?
 Yes No
5. The floor, walls and bowl of the toilet/latrine are all clean (free of urine and faeces)
 Yes No
6. Are faeces visible in the open or around the homestead?
 Yes No
7. Is the latrine/toilet free of flies?
 Yes No
8. Is there is a hand washing facility near the latrine?
 Yes No
9. Is there soap/ash at the hand washing facility?
 Yes No
10. Are there signs that the hand washing facility is being used (such as evidenced by the newness, water and softness of soap)?
 Yes No
11. Are sanitary products or children's diapers visible around the household or nearby bushes?
 Yes No
12. Are children's faeces visible in the open or around the homestead?
 Yes No
13. Is the latrine located more than 30m away from a water point (well, borehole etc.)?
 Yes No
14. Are there signs that all stored food and water is covered?
 Yes No Not Sure
15. No litter or stagnant water is visible around the household.
 Yes No Not Sure
16. There is a covered waste water pit near the household for litter and for the disposal of children's diapers and sanitary products
 Yes No Not Sure

Appendix IV: Key Informant Guide

1. Basic information

Title _____

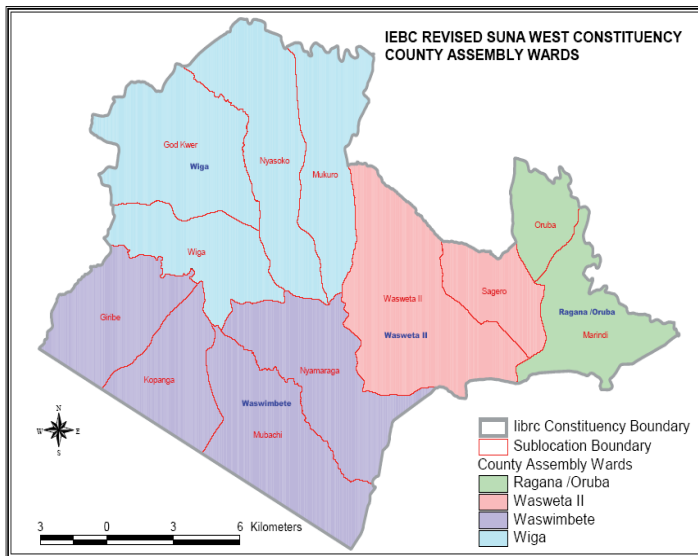
Sex _____

Designation/Position/ Role in the community/ _____

Date _____

1. What would you say about the sanitation and hygiene status in _____ household/village/community at the time the village was certified to be ODF?
2. What would you say about the sanitation and hygiene status in _____ household/village/community today?
3. What would you say about latrine coverage and use in/by your household/village/community?
4. What would you say about latrine usage by young children, elderly persons and persons with disability in your household/village/community?
5. What are the common sanitation and hygiene practices that the household/village/community carry out currently?
6. In what ways have the common sanitation and hygiene practices in your household/village/community encouraged ODF/OD practice?
7. What ODF- related sanitation and hygiene practices are not commonly practiced in your household/village/community?
8. Why do you think these hygiene and sanitation practices are not commonly done in your household/village/community?
9. In this household/village/community, what are the social norms surrounding sanitation and hygiene?
10. In what ways have the village's/ community's social norms impacted on OD or ODF practice?
11. What do you think should be done to encourage ODF practice or sustainability in your household/village/community?

Appendix vi: map



APPENDIX V: MUERC Permit



MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

FROM: Secretary - MUERC

DATE: 30th April, 2020

TO: Naomi Roosevelt Aluoch
PG/MPH/PH/00022/2017
Department of Business Administration
School of Business and Economics
Maseno University
P. O. Box, Private Bag, Maseno, Kenya

REF: MSU/DRPI/MUERC/00821/19

RE: Role of Sanitation-Hygiene Practices and Social Norms on Sustainability to Open Defecation Free Status in Households of Suna-West Sub-County, Migori County. Proposal Reference Number MSU/DRPI/MUERC/821/19

This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 30th day of April, 2020 for a period of one (1) year. This is subject to getting approvals from NACOSTI and other relevant authorities.

Please note that authorization to conduct this study will automatically expire on 29th, April 2021. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 15th March, 2021.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 15th March, 2021.

Please note that any unanticipated problems resulting from the conduct of this study must be reported to MUERC. You are required to submit any proposed changes to this study to MUERC for review and approval prior to initiation. Please advise MUERC when the study is completed or discontinued.

Thank you.

Dr. Bonuke Anyona,
Secretary,
Maseno University Ethics Review Committee.




Cc: Chairman,
Maseno University Ethics Review Committee.

MASENO UNIVERSITY IS ISO 9001:2008 CERTIFIED




APPENDIX vii: NACOSTI certificate



REPUBLIC OF KENYA
National Commission for Science, Technology and Innovation


Ref No: 974116



**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Date of Issue: 18/May/2020

RESEARCH LICENSE



This is to Certify that Ms. NAOMI ROOSEVELT ALDOCH of Maseno University, has been licensed to conduct research in Migori on the topic: **ROLE OF SANITATION-HYGIENE PRACTICES AND SOCIAL NORMS ON SUSTAINABILITY TO OPEN DEFECATION FREE STATUS IN HOUSEHOLDS OF SUNA-WEST SUB-COUNTY, MIGORI COUNTY for the period ending: 18/May/2021.**

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