

**THE INFLUENCE OF SOCIAL NETWORKS ON BEHAVIORAL CHANGE AND
PROMOTION OF BASIC SANITATION SERVICES IN MZIMBA, MALAWI**

MSc (SANITATION) THESIS

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MZUZU UNIVERSITY

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**THE INFLUENCE OF SOCIAL NETWORKS ON BEHAVIORAL CHANGE AND
PROMOTION OF BASIC SANITATION SERVICES IN MZIMBA, MALAWI**

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**A THESIS SUBMITTED TO THE FACULTY OF ENVIRONMENTAL SCIENCES,
DEPARTMENT OF WATER, AND SANITATION IN FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF A MASTER OF SCIENCE (MSc) DEGREE
IN SANITATION**

MZUZU UNIVERSITY

OCTOBER 2022

DECLARATION

I hereby declare that this thesis titled “*The influence of social networks on behavioral change and promotion of basic sanitation services in Mzimba, Malawi*” has been written by me and is a record of my research work. All citations, references, and borrowed ideas have been duly acknowledged. It is being submitted in fulfillment of the requirements for the award of the Degree of Master of Science (MSc) in Sanitation at Mzuzu University. None of the present work has been submitted previously for any degree or examination at any other University.

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CERTIFICATE OF COMPLETION

The undersigned certifies that this thesis is a result of the author's work and that to the best of my knowledge, it has not been submitted for any other academic qualification within the Mzuzu University or elsewhere. The thesis is acceptable in form and content, and that satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate through an oral examination held on: **01 / 07 / 2022**

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DEDICATION

This thesis is dedicated to my parents, Vincent and Pulkeria Mbemba who have been at the forefront to make sure that I had their support throughout my studies. You made sure that I get educated through your inspiration, guidance, prayer, and love. May God Almighty bless you abundantly and give you long lives.

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ABSTRACT

The global coverage of basic sanitation services is progressing too slowly to achieve universal basic sanitation by 2030, and in one out of seven countries, the use of basic sanitation is decreasing. Progress needs to accelerate to achieve Sustainable Development Goals 6 target 1.4; *universal access to basic sanitation services by 2030*. The study sought to investigate the influence of social networks on behavioral change and the promotion of basic sanitation services in Mzimba, Malawi. A cross-sectional study, involving 145 participants in Traditional Authority Mpherembe Mzimba was conducted. The study design adopted a mixed-method approach (qualitative and quantitative) in which Focused Group Discussions, questionnaires, and Key Informants Interviews were methods for data collection. Statistical Package for Social Sciences version 24 was used to analyze quantitative data and thematic analysis was used for analyzing qualitative data. Results showed that social networks were key in sanitation and hygiene information sharing. The most shared information was personal hygiene (91%). The study found out that networks could be very important in resource mobilization. Close to half of the respondents (44%) did not have a basic sanitation service because of lack of funds. Social networks significantly influenced individual sanitation and hygiene behaviors; environmental cleaning ($p = 0.046$), open defecation ($p = 0.005$), latrine sharing ($p = 0.001$), latrine utilization ($p = 0.059$), and building latrine ($p = 0.032$). These variables were significant at a 5% level of significance. In conclusion, social networks were identified to influence the promotion of basic sanitation services and behavioral change. The inclusion of social networks as a strategy for the promotion of basic sanitation and behavioral change in the sanitation policy would be recommended.

Keywords: Basic sanitation services, behavioral change, hygiene, influence, social networks.

ACRONYMS AND ABBREVIATIONS

BCC	Behaviour Change Communication
BRAC	Bangladesh Rural Advancement Committee
CLTS	Community-Led Total Sanitation
FGD	Focus Group Discussion
HIP	Health Improvement Project
IRC	International Reference Centre for Community Water Supply
JICA	Japan International Cooperation Agency
JMP	Joint Monitoring Programme
KII	Key Informants Interview
MDGs	Millennium Development Goals
NCST	National Commission for Science and Technology
NGO	Non-Governmental Organization
NPS	National Sanitation Policy
NSO	National Statistical Office
ODF	Open Defecation Free
PHAST	Participatory Hygiene and Sanitation Transformation
SDG	Sustainable Development Goals

SHSA	Senior Health Surveillance Assistant
SLTS	School Led Total Sanitation
SPSS	Statistical Package for Social Sciences
TA	Traditional Authority
UN	United Nations
UNICEF	United Nations International Children’s Emergency Fund
USAID	United States Agency International Development
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WSP	Water and Sanitation Program

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CHAPER ONE: INTRODUCTION

1.1 Background information

Basic sanitation service is defined as the use of an improved facility that is not shared with other households (WHO/UNICEF, 2015b). Improved facilities include; flush or pour-flush facilities connected to a piped sewer system, septic system, or pit latrine; pit latrines with slabs; composting toilets; or ventilated improved pit latrines (WHO/UNICEF, 2015b; USAID, 2016; UN-water, 2016). Sanitation plays a major role in the development of the country at all levels; from households to the community. Sustainable Development Goal (SDG) 6 has called for access to adequate and equitable sanitation and hygiene for all and to end open defecation by 2030, which implies eliminating inequalities in sanitation service levels (USAID, 2016).

Investments in sanitation play a critical role in interrupting the cycle of poverty and diseases (UN IGME, 2015). Proven sanitation interventions such as the availability of sanitation facilities and behavior change strategies can reduce the incidence of diarrhea by 30 to 40 % (Cairncross *et al.*, 2010). Behavior change is a critical component in preventing contamination and redressing associated problems in the water, sanitation, and hygiene (WASH). For example, hand-washing with soap is one of the most cost-effective interventions to end preventable child deaths (Cairncross and Valdmanis, 2006) and to reduce the risk of enteric and respiratory infections (Rabie and Curtis, 2006; Ejemot *et al.*, 2008). However, the behavior is practiced by less than one in five people in the countries where it is most needed (De Buck *et al.*, 2017). Treating water at home can significantly reduce diarrhoeal death even when not in combination with additional measures (Fewtrell *et al.* 2005; Clasen *et al.* 2007). It has become evident that providing access to sanitation services is not enough to change behavior (University of Malawi, 2018).

Globally, in 2015; 5 billion people used an improved sanitation facility that was not shared with other households, and thus are classified as having at least basic sanitation services (UNICEF, 2015). In addition, 600 million people (8% of the population) used improved but shared facilities that are classified as limited sanitation services. The use of basic sanitation services has increased more rapidly globally, than the use of basic drinking water services, at an average of 0.63 % points per year between 2000 and 2015. However, coverage is generally lower for basic sanitation than for basic water, and no SDG region is on track to achieve universal basic sanitation by 2030, except for Australia and New Zealand, where coverage is already nearly universal (UNICEF/WHO, 2017).

The global coverage of basic sanitation services indicated that 9 out of 10 countries where more than 5% of the population lacked basic sanitation in 2015 are progressing too slowly to achieve universal basic sanitation by 2030 (WHO/UNICEF, 2019). The majority of the 2.3 billion people who still lacked a basic sanitation service either practice open defecation (892 million) or use unimproved facilities such as pit latrines without a slab or platform, hanging latrines, or bucket latrines (856 million). The remaining 600 million use improved sanitation facilities that are shared with other households (UNICEF/WHO, 2017). These limited sanitation services reflect both cultural practices and socio-economic constraints in densely populated areas. While universal use of private toilets accessible on-premises remains the ultimate goal, high-quality shared sanitation facilities may be the best option in the short term in some low-income urban settings. By 2015, 154 countries had achieved over 75% coverage with basic sanitation services (UNICEF/WHO, 2017).

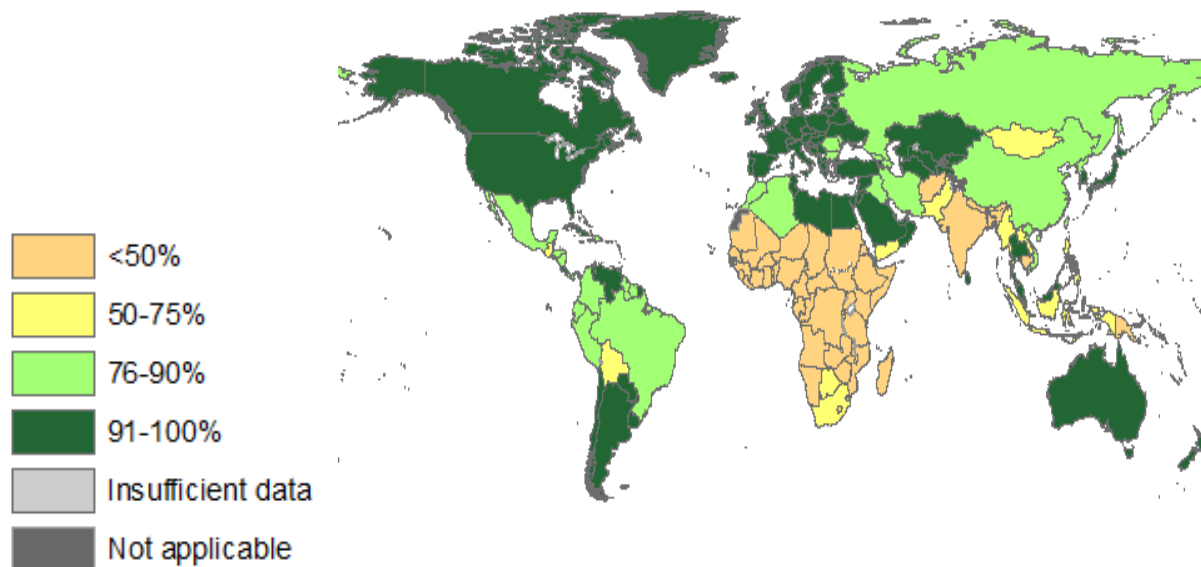


Figure 1 1: Proportion of national population using at least basic sanitation services in 2015 (UNICEF/WHO, 2017).

In 2015, Sub-Saharan Africa did not meet the Millennium Development Goals (MDGs) of halving the share of the population without access to safe drinking water and sanitation between 1990 and 2015. Sanitation was one of the worse indicators (UNICEF, 2018). Despite encouraging progress on sanitation from the Millennium Development Goals (MDGs) period there remain large disparities in access. Almost all developed countries have achieved universal access, but sanitation coverage varies widely in developing countries. Improved access to basic sanitation is increasing but at a very slow pace compared to water and sanitation in the region. Since 2000 the number of countries with less than 50% of the population using a basic sanitation facility has declined only slightly, from 56 to 49, and countries with the lowest coverage are concentrated in sub-Saharan Africa (WHO/UNICEF, 2019).

Malawi Government in collaboration with non-governmental organizations (NGOs) had put in more efforts towards achieving sanitation MDGs targets through the establishment and implementation of the National Sanitation Policy (NSP) and Open Defecation Free (ODF) Strategy in 2008 and 2011, respectively. On one hand, the overall objective of NSP is “*to achieve universal access to improved sanitation and safe hygiene practices*” (Ministry of Irrigation and Water Development, 2008). On the other hand, the ultimate objective of the ODF strategy was “*to eliminate the practice of open defecation by the year 2015*” (Ministry of Agriculture and Water development, 2011). In line with the NSP, the zero-subsidy approach was adopted and applied by all implementers, and availability and utilization of the sanitation services were considered an individual’s responsibility (Ministry of Agriculture and Water development, 2011).

Despite such efforts, Malawi was off target in achieving MDGs sanitation targets in the year 2015, the new targets need to be met by 2030 (UNICEF, 2018). Some of the problems slowing down sanitation progress in Malawi include; unorganized space and leadership for sanitation and hygiene, poor financing for sanitation, weak sectoral and cross-sectoral coordination and integration, limited capacity, and unwillingness to pay for sanitation services in taking sanitation as a business (Holm *et al*, 2014; University of Malawi, 2015; Water Aid, 2016). By 2017, Malawi had at least basic sanitation coverage at 26% with a slight improvement from 21% in 2000 (UNICEF, 2018). The progress is positive but still very slow (WHO/UNICEF, 2019) and open defecation was at 6% (UNICEF, 2018).

A social network is a social structure that consists of two elements generally known as actors (or nodes or points) and ties (sometimes referred to as links or relationships) (Ennis and West, 2010). The networks are influenced by both economic and non-economic activities and this feature is referred to as the social embeddedness of the economy.

A social network consists of existing groups such as school, religious, youth, women, agricultural, savings, and credit (Marouf, 2007). The use of social networks has been noted in various sectors of development including sanitation and agriculture. In Zambia, India, and Bangladesh, positive results were yielded in the field of sanitation (Baetings *et al.*, 2015).

In Malawi, the information on how social networks are playing a part or contributing to the sanitation sector is limited. However, from limited literature, the use of social networks in promoting basic sanitation services and behavioral change hasn't been used rather the use of social networks in promoting other developmental sectors such as business start-ups and agriculture among others has been used. This study aimed to explore the influence of social networks in the promotion of basic sanitation services and behavioral change in Malawi.

1.2 Problem statement

The global coverage of basic sanitation services is progressing too slowly to achieve universal basic sanitation by 2030, and in one out of seven countries, the use of basic sanitation is decreasing. Progress needs to accelerate to achieve SDG 6 target 1.4; *universal access to basic sanitation services by 2030* (UNICEF/WHO, 2017). The elimination of open defecation is identified as a top priority and is closely associated with wider efforts to end extreme poverty by 2030. Much remains to be done, especially in rural areas, where open defecation has been declining at a rate of just 0.7 percentage points per year. This rate would need to more than double to eliminate open defecation in rural areas by 2030 (WHO/UNICEF, 2019).

In Mzimba, 42% of the population has no access to basic sanitation services and open defecation is at 5% (Mzimba SEP, 2017). Promotion of sanitation and influencing behaviors requires community involvement at all levels of the sanitation ladder (Baetings *et al.*, 2015).

Weak community participation results in poor sanitation promotion and behavioral change initiatives. One of the key notable ways of involving the community is through social networks (Marouf, 2007). Social networks provide a platform for community involvement where groups of people with common interests are associated and build relationships through a shared community of interest (Stelzner, 2009; Hartshorn, 2010). The use of social networks has proved to have influenced behaviors and promoted latrine use in India since such networks created a platform for sharing of ideas and practices (Bicchieri, 2017). Empirical evidence and data are limited on how Social networks influence behavioral change and improve sanitation service delivery in the district, towards accelerating universal access to basic sanitation services and eliminating open defecation by 2030.

1.3 Aim of the study

1.3.1. Main objective

To assess the influence of social networks on the promotion of basic sanitation services and behavioral change in Mzimba, Malawi.

1.3.2. Specific objectives

- a) To determine the significance of social networks on behavioral change and promotion of basic sanitation services.
- b) To analyze the effects of social networks on individual sanitation and hygiene behaviors.
- c) To identify the perceptions of social networks on behavioral change and promotion of basic sanitation services.

1.3.3. Research Questions

- a) Are social networks significant for behavioral change and promotion of basic sanitation services?
- b) What effects do social networks have on individual sanitation and hygiene behaviors?
- c) What are the perceptions of social networks on behavior change and promotion of basic sanitation services?

1.4. Significance of the study

The study had the potential to offer a wide range of benefits in terms of informing and helping program and policy planners and developers, academic institutions, and communities with practical solutions in the field of sanitation. In academics, the research findings were used to improve academicians' competencies, teaching, and learning process. The findings also informed a potential area for further research areas which were limited in Malawi and promoted proper designs of behavioral change interventions or strategies that suit the local context and in the most viable manner. For program and policy planners, the study findings were critical in helping stakeholders to make better decisions following the evidence brought by the study thereby creating and strengthening the link between research, policy, and programs, and increasing the use of evidence in program design and policy formulation. The research findings were critical towards informing how best the national sanitation policy would be put into practice in promoting sanitation and behavioral change by using community-owned solutions. The study was community-oriented; the results were an eye-opener for the community to fully understand how they would utilize available social networks in all aspects of development including sanitation to transform their own lives in matters concerning their communities.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter reviewed the research concepts more broadly; explained social networks, sanitation behavioral change approaches, theories, and promotion techniques used globally. It also provided deeper insights into practices in WASH and social networks regarding study objectives, by tracing the roots, theoretical and practical foundation of the concept of the social network in various disciplines including sanitation and also societies. It also provides a review of landmark scholarly work done by other researchers in line with the study objectives.

2.2. Definition of sanitation ladder

The sanitation ladder is a new way of analyzing sanitation practices that highlighted trends in using improved, shared, and unimproved sanitation facilities and the trend in open defecation (WHO/UNICEF, 2017). Table 1 shows the new definition of a sanitation service ladder as described by the global targets and indicators, SDG. The Joint Monitoring Programme (JMP) had also put its measures to monitor the population that practiced open defecation, which was an explicit focus of SDG target 6.2. The JMP is the only drinking water and sanitation monitoring mechanism that provides information allowing comparison between countries and over-time (WHO/UNICEF, 2018).

Table 1.1. *The new JMP ladder for sanitation service (WHO/UNICEF, 2017)*

Service level	Definition
Safely Manage	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite.
Basic Service	Use of improved facilities that are not shared with other households.
Limited Service	Use of improved facilities shared between two or more households.
Unimproved Service	Use of pit latrines without a slab or platform, hanging latrines, or bucket latrines.
Open Defecation	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches, or other open spaces, or with solid waste.

2.3. Approaches toward improving sanitation services delivery

There are several approaches to the promotion of sanitation services and changing people’s behaviors. These approaches have been key and also shown to bring impact on the communities, and have proven to have much influence on the promotion of sanitation services in rural areas. Most of these approaches are people-centered or demand-driven approaches where, power and responsibility are invested in individuals to have a sanitary facility and also to take care of their behaviors (Favin, 2004; Ministry of Agriculture and Water development, 2011).

2.3.1. Total behavioral change

The total behavioral change in hygiene practices and sanitation means that households or institutions do not just construct and use toilets but the approach includes a behavioral change in personal and household hygiene and sanitation in all socio-economic groups in the society (Gurung and Amrit, 2010). Regarding this study, the aspect of total sanitation was very key as the study was focused on social networks which are part of social-economic groups in the community. The Community total behavioral change process uses commonly known techniques namely Community-Led Total Sanitation (CLTS), School Led Total Sanitation (SLTS), and Participatory Hygiene and Sanitation Transformation (PHAST) (Kloot & Wolfer, 2010; Ministry of Education, Science, and Technology, 2014).

A) Community-Led Total Sanitation

The CLTS aims to curb open defecation within a community rather than facilitating improved sanitation only to selected households (Kar & Chambers, 2008; ODF Strategy, 2011; CLTS-site, 2011; Chambers, 2011). The awareness of local sanitation issues is raised through a walk to open defecation areas and water points (walk of shame) and a calculation of the number of excreta caused by open defecation. Traditionally sanitation programs relied on the provision of subsidies, sanitation promotion, and hygiene education. The shortcomings of the established programs to the development of the new CLTS approach, shifting the focus on personal responsibility and low-cost solutions. In the light of prior approaches, CLTS and SLTS indicated a shift from top-down, technological, supply-based, and subsidy-driven approaches to a knowledge-based participatory, demand, and non-subsidy-driven approach (Khale & Dyalchand, 2009; IDS, 2009; Kloot & Wolfer, 2010).

In this approach, people are considered knowledgeable and have the potential to jointly learn, decide on their fate and come up with solutions (Kloot & Wolfer, 2010). Demand-led programs like CLTS are seen to be a step forward in this direction and grants of several million have been allotted over the past years to organizations such as Plan USA, WaterAid, Project Concern, and BRAC (Gates Foundation, 2012).

Combined with hygiene education, the approach aims to make the entire community realize the severe health impacts of open defecation. Since individual carelessness may affect the entire community, pressure on each person becomes stronger to follow sanitation principles such as using sanitary toilets, washing hands, and practicing good hygiene. To introduce sanitation even in the poorest households, low-cost toilets are promoted, constructed with local materials. The purchase of the facility is not subsidized so the household must finance its toilets. CLTS does not identify standards or designs for latrines but encourages local creativeness. Despite being a result-oriented approach to behavior change the method has some disadvantages such as the use of shaming and disgust during the triggering process (Kloot & Wolfer, 2010).

B) School-Led Total Sanitation

In SLTS, the school is taken as an entry point for children, clubs, and teachers to trigger communities in the school catchment area to achieve ODF (Ministry of Agriculture and Water development, 2011-2015). There is evidence from other countries that School-Led Total Sanitation is an effective approach to creating ODF communities (Ministry of Agriculture and Water development, 2011-2015). Involvement of school children and teachers through SLTS has been effective and the approach has been scaled up to all districts in Malawi. The current approach involves triggering children in the village to prepare slogans or songs and help locally monitor ODF progress.

This is supported by including teachers in CLTS triggering (and even targeting them as facilitators of CLTS) so that they can provide complementary support from the schools (WSP, 2012).

C) Participatory Hygiene and Sanitation Transformation

PHAST is an innovative approach to promoting hygiene, sanitation, and community management of water and sanitation facilities. It builds on people's innate ability to address and resolve their problems (IDS, 2009). It aims to empower communities to manage their water and control sanitation-related diseases, and it does so by promoting health awareness and understanding which, in turn, lead to environmental and behavioral improvement (JICA, 2007). The approach was replaced by CLTS in Malawi (Ministry of Agriculture and Water Development, 2011).

2.3.3 Behaviour Change Communication

The behavior change communication (BCC) program, encompasses a broad range of activities and approaches, which focus on the individual, community, and environmental influences on behavior (Favin, 2004). Its focus has grown to encompass any communication activity whose goal is to help individuals and communities select and practice behavior that will positively impact their health (Heaney & Israel, 2008). The BCC is a process that motivates people to adopt and sustain healthy behaviors and lifestyles. Sustaining healthy behavior usually requires a continuing investment in BCC as part of an overall health program (SNV, 2016).

2.3.4. Sanitation Marketing

Sanitation marketing is a new approach that ensures that people get toilets and is done using a commercial marketing approach (USAID/HIP, 2009; Ministry of Agriculture and Water Development, 2011).

Sanitation marketing uses commercial marketing techniques to promote the adoption of behavior that will improve the health or well-being of the target audience or society as a whole (WSP, 2011). The use of a marketing approach to sanitation is not just about advertising; it also ensures that appropriate sanitation options are made available and that suppliers have the necessary capacity to provide the desired services (Cairncross, 2004; Devine, 2010; Nhelma, 2012).

Social marketing offers a more promising approach to promoting positive hygiene behaviors compared to traditional, health education-based approaches (WSP, 2000; USAID/HIP, 2009). It relies on commercial marketing concepts and tools to influence the voluntary adoption of adequate sanitation. It discourages subsidies but where subsidies are applied they could be used to promote demand. The subsidy is not applied in a way that undermines the existing private providers in the market (USAID/HIP, 2010). Sanitation marketing has four main components namely *product*: latrine designs must respond to what people want, rather than what sanitary engineers believe they should have. *Price*: keeping costs down and marketing a range of products with various price tags has been more successful than subsidizing one kind of product, where the subsidy budget limits the number of installations. *Place*: the supply chain must reach each home (Devine, 2010). *Promotion*: communication with consumers about the product or service include advertising, competitions, prizes and door-to-door sales, credit sponsored by local traders, and mutual assistance schemes to help the economically poorest with the cost and the elderly with the digging (USAID/HIP, 2010).

Figure 2 shows a model that combines CLTS and social marketing to stop open defecation practices and help households move up the sanitation ladder. In this study, this conceptual model was very critical in understanding how social networks combine commercial marketing techniques and CLTS in promoting basic sanitation services and behavioral change, to help households move up the sanitation ladder.

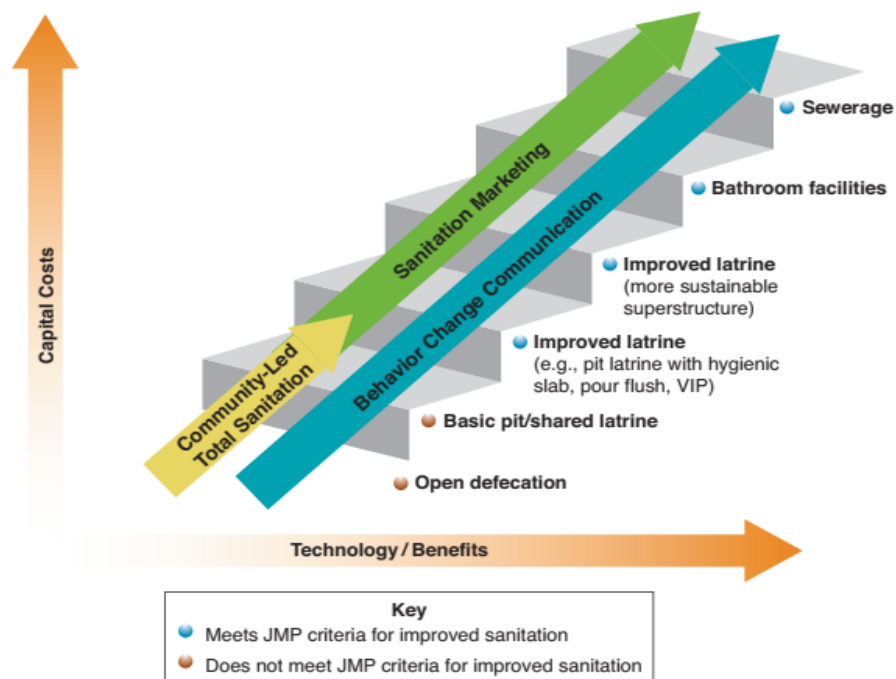


Figure 2 1: A conceptual model for changing sanitation behaviors and moving up the sanitation ladder (source – WSP, 2011)

Figure 3 illustrates a SANIFOAM conceptual behavior change framework that can be used both in community-led and sanitation marketing approaches. The framework has four elements; focus, opportunity, ability, and motivation. Focus; it looks at desired sanitation behaviors and the target population. Opportunity; places its emphasis on an individual’s chance to perform the behavior. Ability; the capability of the individual to perform the behavior. Motivation; interest of the individual to perform the behavior.

The SANIFORM framework helped in establishing how the four elements were applicable in the promotion of basic sanitation services and behavioral change in social networks by assisting in designing and informing the conceptual framework for the study (Figure 5).

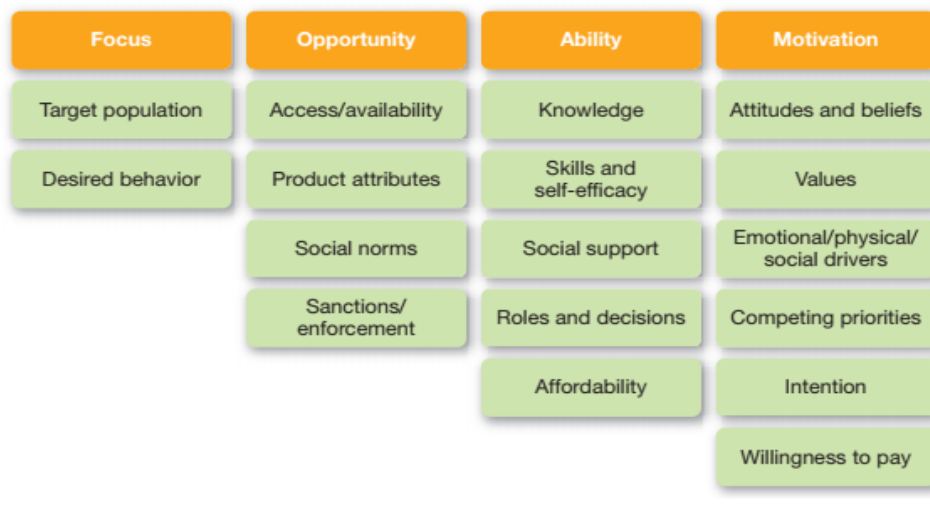


Figure 3 1: SANIFOAM behavior change framework (Source: WSP, 2011)

2.4. Components of implementation in sanitation services delivery

2.4.1. Sanitation enabling environment

A strong enabling environment in sanitation requires equitable policies, adequate resources, supportive social norms, and good governance with strong management and accountability. Typical enabling environment activities include technical assistance and capacity building with a focus on supporting strong leadership, institutions, and civil society, to make sanitation both a private and public issue (Holm *et al.*, 2014; USAID, 2016). Appropriate regulation with pervasive enforcement, regular monitoring, and adaptive management at national, sub-national, and local levels are three aspects of the enabling environment in particular that are a strong determinant of successfully scaling up sanitation improvements (Holm *et al.*, 2018).

2.4.2. Sanitation Software

It is better to invest in market-driven solutions for sanitation than the traditional top-down, supply-driven or highly subsidized sanitation projects focused only on infrastructure or the construction of latrines (USAID, 2016). Examples of market-driven approaches include product development, behavior change, and habit formation activities to reduce open defecation or improve the marketing of basic sanitation facilities to households.

Demand generation is a key component of market-driven service delivery for sanitation and requires social and cultural behavior changes at the community level. Demand-led, at-scale approaches such as CLTS and Sanitation Marketing are focused on pride, shame, status, and disgust to stop open defecation (WSP, 2004 & USAID, 2016).

2.4.3. Sanitation Hardware

To enable the adoption of improved sanitation behaviors, households need access to appropriate infrastructure and an adequate supply of products and services. Hardware, or infrastructure, includes both the latrine and the services that safely manage the fecal waste through the entire sanitation service chain. Effective and sustainable supply activities should focus on strong private sector engagement and facilitate a robust market of sanitation products and services (Holm *et al.*, 2014). Activities can include working with the private sector to improve supply chains, quality of services, redesigning products to be more aspirational and affordable, distributing smart subsidies, and leveraging financial schemes such as village savings and loans, conditional cash transfer, and microfinance to increase purchasing power and reduce the need for subsidies (USAID, 2016).

The three components of implementation in sanitation services delivery by USAID (2016) helped in coming up with the study's conceptual framework (Figure 5) to understand how the components in sanitation service delivery influence social networks in promoting basic sanitation services and behavioral change.

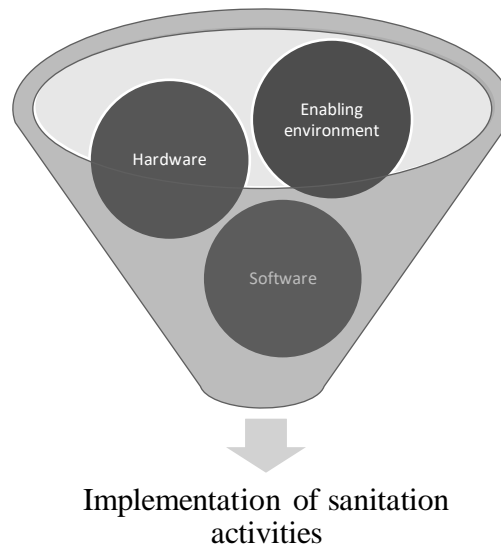


Figure 4 1: Adapted from components of sanitation delivery (USAID, 2016)

2.5. Theories to behavioral change being applied in the Study

The study utilized two theories to understand and analyze the concepts better. The theories included; the theory for reasoned actions and the social network support theory. Theory for reasoned action was used to understand better the individual practices versus behavioral change while the social network theory was used to understand, analyze and unpack the entire social network support process and its application in the field of sanitation.

2.5.1. Theory of reasoned action

According to this theory, behavior and behavioral change are a combination of the attitude (positive or negative) toward the behavior, the belief that a given outcome will occur if the person performs the behavior the evaluation of the outcome, and the influence of the social environment (that person's 'opinion leaders') on the behavior (Campbell, 2001). This also implies that what is considered important or significant by some and what motivates persons to act is influenced and molded by other people's wishes or desires (Ajzen, 2002a). The theory of reasoned action may benefit further from an assessment of the ability of a person to adopt new practices.

In this light, factors such as time, freedom, training needs and, means (for example; money, soap, implements) are examined (IRC, 2010). This theory informed the study because it had an interest in how individuals influence other individuals' behaviors. It was very important in understanding and explaining the following objectives; to analyze the effects of social networks on individual sanitation and hygiene behaviors and to identify the perceptions of social networks on behavioral change and promotion of basic sanitation services. As both objectives had a keen interest in behavioral change. The theory also informed the construction of a conceptual framework (Figure 5).

2.5.2. Social networks (Social Support Theory)

Networks are formed by people or organizations which have interrelationships based on friendship, cooperation, or advice (Cross *et al.*, 2002). They can be based on kinship (such as; extended family, clans), voluntary groups based on proximity (for example; neighborhoods), shared activities and interests (literacy, sports), and characteristics (age and sex-based groups). Networks can have different functions, for example; learning, and providing social support.

Social support may be emotional, practical, and informational and may also facilitate a process of appraisal (giving feedback) (Rimer and Glanz, 2005; IRC, 2010). Network analysis has been receiving attention for the diffusion of public health practices. Its research findings can be used to speed up behavior change by identifying opinion leaders and forming groups around them (Koka *et al.*, 2006).

Target interventions to already existing groups, link up with existing groups with respected change agents, and focus on networks that are neither too dense (many people with close contacts) nor too sparse because, in the former, people are less open to change; and in the latter, immediate and widespread change is harder to achieve, and identifying the innovators within the groups (those who are most open to change) and reach them with the help of mass media, and then encourage them to influence more reluctant persons through inter-personal contacts (IRC, 2010). The theory was the back born of the study because it was used to help in making a deeper analysis of the social network concept and its application in the field of sanitation. It also helped in devising the conceptual framework for the study (Figure 5).

2.6. The influence of social networks

Social networks play an important role in our day-to-day activities. The persistence of large family and ethnically oriented business groups in advanced economies, the extent, and source of innovation, and its diffusion (Milward & Provan, 2006). Position in a social group and its central influence on productivity, the role of social networks in real labor markets are also explained by social networks, based on these examples it is clear that social networks are crucial for the flow of ideas and practices (Sankar *et al.*, 2015).

Valente (2012) discussed that identifying the relationships between social network characteristics and health risks helps in designing disease prevention and control strategies. He further argued social network characteristics and health outcomes suggest that intervening in people's social networks can potentially accelerate behavior change and improve health at the collective level. Although social network interventions appear promising in tackling public health problems, they are more difficult to implement and evaluate compared with individual-based interventions (Provan & Kenis, 2005).

Zhang *et al* (2015) hinted that altering people's network connections is probably more difficult than intervening with existing network members. Social networks impact health behaviors through four primary pathways namely: provision of social support; social influence, social engagement and, attachment; and access to resources and material goods. Both Valente (2012) and Zhang *et al* (2015) concluded that social networks can influence one's behavior and accelerate behavioral change. Social structure is an important predictor of behavior and examining the nature of social norms is key to understanding the reasons behind the persistence of open defecation (Ashraf *et al.*, 2017). The strength of social network theories rests on the assumption that the characteristics of the network itself are largely responsible for determining individual behavior. A host of theories and evidence supports the view that social networks, giving rise to various social functions such as social influence, social comparison, companionship, and social support, influence people's behaviors (Berkman *et al.*, 2000; Heaney & Israel, 2008; Valente, 2012).

Social network sites have the potential to transcend the boundary between online and offline relationships and have become more and more common tools for managing social networks of friends and acquaintances (Gibbs *et al.*, 2006; Ellison *et al.*, 2007).

Social network sites provide users with opportunities to maintain existing relationships with old friends regardless of geographical distance or temporal difference (Ellison *et al.*, 2007; Joinson, 2008), keep up with acquaintances, or turn latent connections (friends of friends) into acquaintances (Ellison & Boyd, 2013; Haythornthwaite, 2005).

Burt (2001) explained that through using social networks, people can obtain a variety of resources or social capital. Several scholars distinguish bonding from bridging social capital. Bonding social capital is obtained from close personal friends and family, who can provide benefits such as emotional support. Bridging social capital is obtained from a more diverse set of people who can provide things such as instrumental resources and information. This is in line with the findings of Asokan (2016) who alluded that social networks are a place for sharing ideas and information.

Social perspective, centralized utilities do not recognize the role of social actors or consumers in the sustainability of the systems because they are designed on technological and economically biased approaches (Provan & Kenis, 2005). According to Vliet (2006), centralized sanitation systems are large technical systems whose management systems seem to be restricted to big actors, like managers, regulators, NGOs, and the likes while citizens-customers are the subjects of change, qualified as end-users, consumers, or simply the demand side. He further explained that some of the sanitary interventions are more technical and economical, only the suppliers have knowledge and expertise while the community is seen as the receipt of the interventions.

Community ownership is a community's state or fact of exclusive rights and control over property, which may be an object, infrastructure, or intellectual property (Joshi, 2011). Community-owned asserts or institutions are those that are owned and controlled through some representative mechanism that allows a community to influence their operations or use or enjoy the benefits arising from them.

It necessitates strategic coordinated action of the community and collective movements. Planning and control of activities and performance matters in which community-owned institutions (formal and informal), can act on their own (Aiken *et al*, 2008). The theory of Community participation as an alternative approach in development planning is, however, not shared by everybody (Besette, 2004). Abraham and Plateau (2004) warn that power based on structures that exist in paternalistic societies, the process of participation may be inherently subject to elite capture. Mansuri and Rao (2004) extended this observation by noting that the exercise of voice and choice as advocated in participatory development may add some costs to the poor.

Parfitt (2004) kept it very clear that participation is simply another attractive method used by development agencies to pursue top-down development agendas. This is the same argument that was advanced by Hickey and Mohan (2004). They noted that at times the process of participation may mutate with existing power structures and political systems thus further depriving the poor. Studies on this basis using experimental public goods games, economic models of peer pressure, microfinance institutions, and natural resource usage; peer pressure mechanism is found to increase cooperative behavior. The strategy has been used in the case of sanitation in Zambia, India, and Bangladesh (Baetings *et al*, 2015).

These programs are known to use shaming, as a strategy in this scheme. However, this negative peer pressure might not work if shaming and other such practices are considered to be illegitimate. These negative practices can lead to non-participation or result in reciprocal negative reactions (Milward & Provan, 2006). Social networks and human social motives can be structured to enact social influence within a community. Specifically, it discussed how to leverage existing social ties and create new social ties to prompt social interactions for attitude and norm change within the community (Berkman *et al.*, 2000).

2.7. Enabling environment in social networks

Traditionally, rural areas have had their own social, economic, and cultural circumstances distinct from those of their urban counterparts. Certain patterns of economic activity and low population density characterize rural regions, including agricultural communities, fishing communities, and logging communities, for example. These unique ways of life in rural areas, tied closely with the natural environment, have fostered close social relationships and attachments to place among residents (Burt, 2001; Koka *et al.*, 2006).

Yuan *et al* (2018) argued that use of the social network sites has been shown to lead to social capital and connections people can rely on for support. However, there are some barriers such as legal, linguistic, cultural, and others that make it impossible to interact with all friends and acquaintances on a single site.

Residents' opinions and attitudes toward unique rural economic, environmental, and social conditions are necessary to promote localized community development (Dickson & Weaver, 1997). Considering people's opinions and attitudes towards other factors such as social-cultural factors would be crucial in social networks overcoming challenges such as language barriers (Powell *et al.*, 2005).

Incorporating technical and economic factors in sanitation and water services programs is not enough; many social and cultural aspects impact the implementation of services (Schilling & Phelps, 2005). Overlooking the importance of these aspects can lead to project failure and this leaves people without access to necessities of life, which they have the basic human right (Graddy & Chen, 2006).

If the systems are not designed in a way that is a good cultural fit for the local community, the development interventions may fail, wasting valuable resources and leaving communities without access to vital water and sanitation facilities (Dunlop & Holosko, 2004). Understanding how programmers can better design and deliver sustainable water and sanitation solutions that are socially and culturally appropriate, and using democratic and participatory processes that protect the safety of those involved, are necessary steps to reducing the suffering of those who lack access to adequate water and sanitation systems (Fuber 2012). Jowitt (2006) also called for an increased understanding of the interface between infrastructure, and social and cultural concerns. Whilst engineers must remain experts in their particular fields, they must also understand and play an active part in the interactions between infrastructure and development.

Toilet use was predicted more by the behavior of young people in an individual's network as compared to the behavior of older people (Ahuja, 2000). This was consistent with the claim that young people may be particularly influential trend-setters Ashraf (2017). He further suggested that interventions that focus on the behavior of young people may have more influence on the rest of the community than those which target senior members.

He provides an insight into the kind of social networks that could be result-oriented and that are not result-oriented crucial for this study especially looking at how social networks could key in behavioral change. Communities in the discourse have generated and beholden social-cultural acceptance and appropriateness through discussing open defecation, toilets, and waste are no longer regarded as an embracement and a taboo (Joshi, 2011).

2.8. Conceptual Framework

Social networks consist of existing groups; school, religious, youth, women, agricultural, and savings and credit (Alaybe *et al.*, 2015). These structures can be key in sharing ideas and information regarding the promotion of basic sanitation services and also influence people's behavior (Askon, 2016). Enabling the environment in social networks such as social-cultural factors could have a key influence on the behaviors of the members of the social networks and the social networks could influence social-cultural factors (Yuan 2015; Joshi, 2016).

Social networks can provide social support to members of the networks and this can have a direct influence on individual behaviors and the promotion of services (Zhang *et al.*, 2015). Individual factors such as perception/attitudes can influence the relationship in the social networks and social networks could also influence individual perceptions among members (Berkman *et al.*, 2000; Heaney & Israel, 2008; Valente, 2012). In the end, this could influence the promotion of basic sanitary facilities and also a change in behaviors.

The conceptual framework was constructed to help understand how social network support was relevant to sanitation promotion and behavioral change. It assisted in unpacking how various social networks in the community influenced the promotion of basic sanitation services and behavioral change and also helped in explaining how other factors such as individual and social-cultural issues hindered or promoted sanitation issues in social networks.

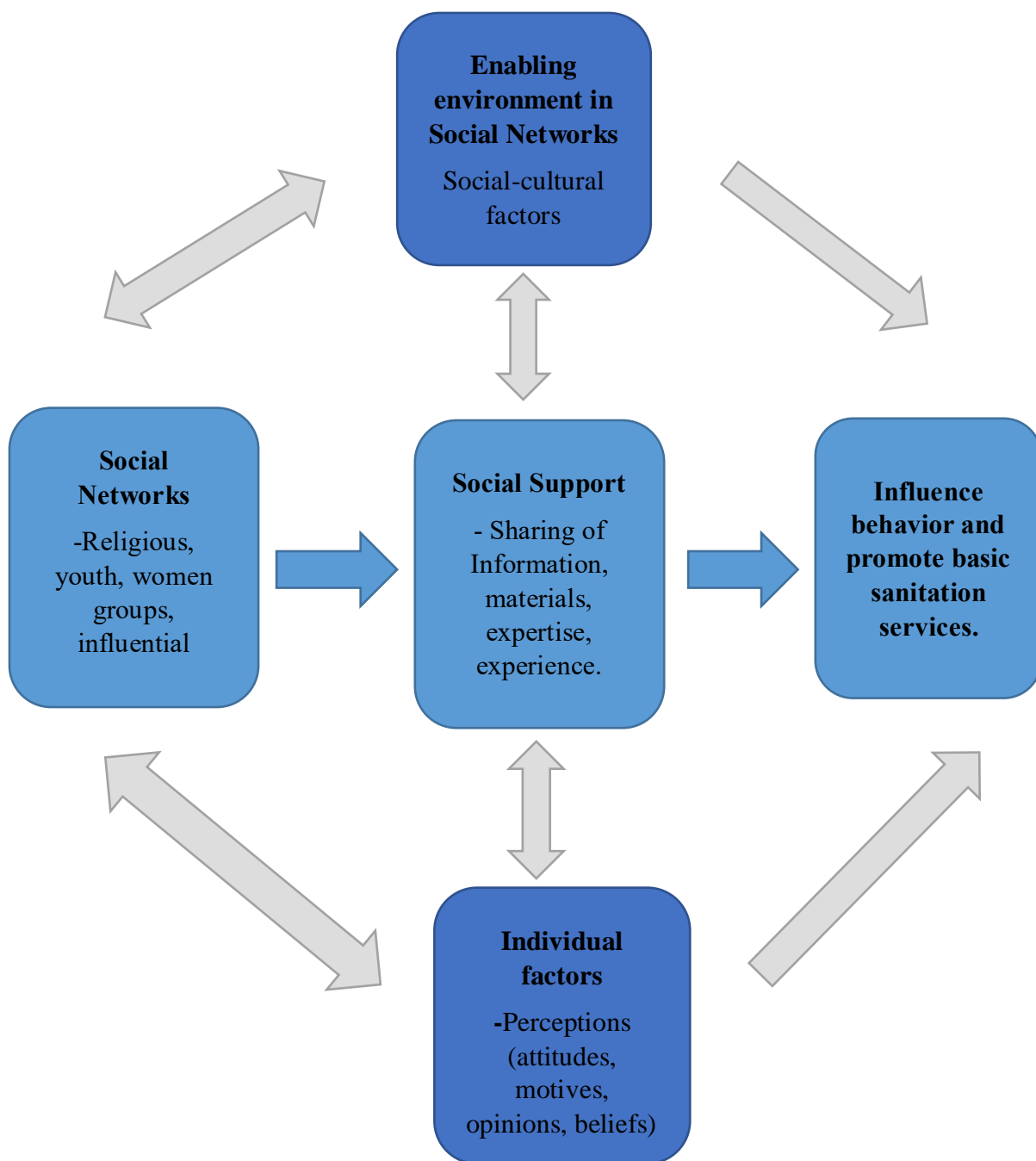


Figure 5 1: Conceptual Framework

CHAPTER THREE: METHODOLOGY

3.1. Description of the study area

3.1.1. Study Site

This study was conducted in Mzimba District, north of Malawi. It is bordered by Rumphi District to the north, Nkhata Bay District to the east, Kasungu District to the south, and Zambia to the west. It is situated about 280 km north of Lilongwe (the capital city of Malawi) and about 100 km southwest of Mzuzu, the main city in the north of the country. The district is directly linked to the national main road and therefore easily accessible to major urban areas in the country. Mzimba is the largest district by size in the country. It covers 10,382 km², representing 8.8% of the total country area (M'mbelwa District Council, 2017). Most of the people in the district depend on subsistence farming for their income while the minority are engaged in small-scale businesses and others are employed. The most common tribes in the district include; Tumbuka and Ngoni people. The district has generally a warm tropical climate and has a total population of 940,184, consisting of 502,87 females and 467,937 males (NSO, 2018). This study particularly focused on TA Mpherembe in the northern part of the district. It is located about 120 km northwest of Mzimba Boma and 71km west of Mzuzu city. The area is characterized by hills, natural drainages, and steep slopes.

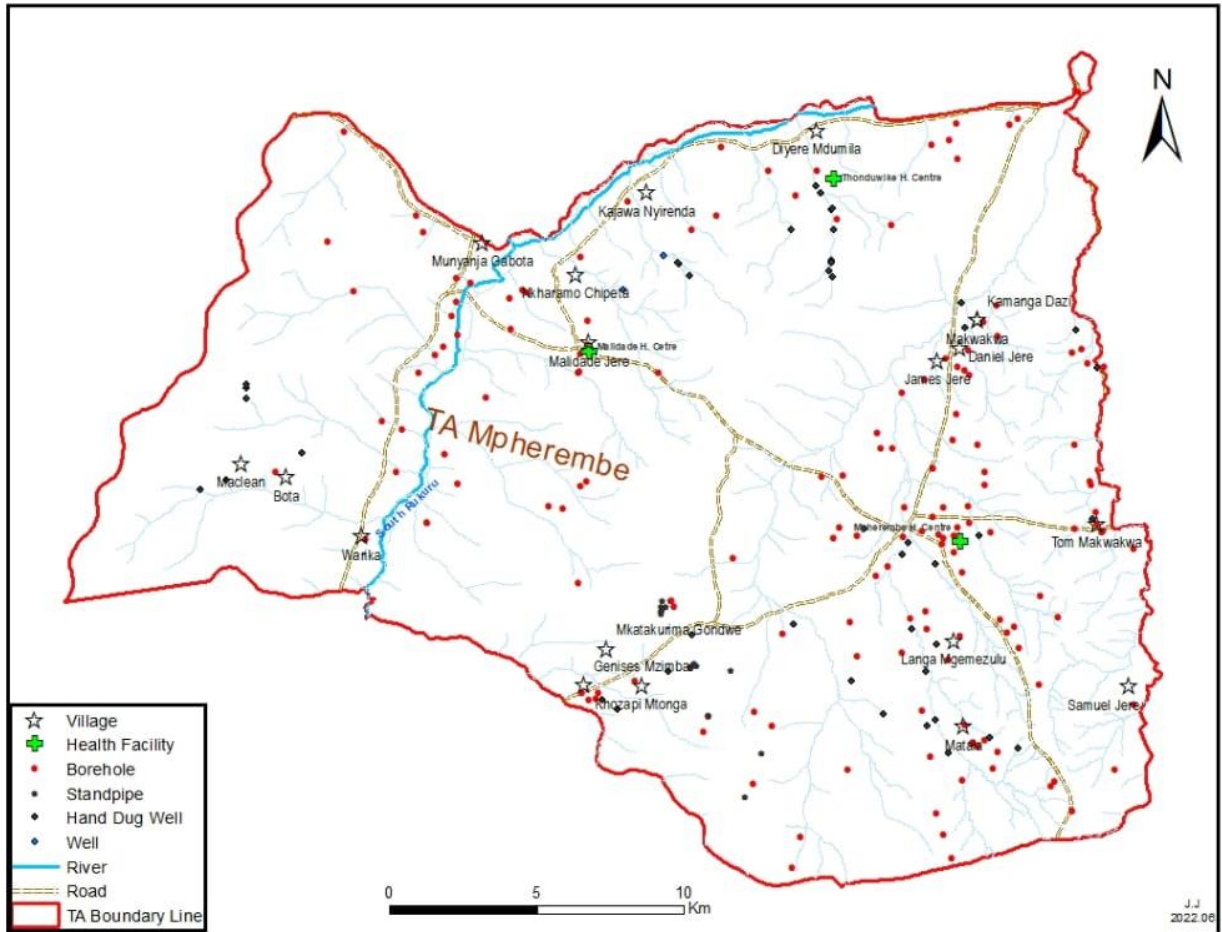


Figure 6 1: Map showing the study area

3.2. Study design and research methods

The study was a cross-sectional study where a mixed-method (both qualitative and quantitative methods) research design was used. For, qualitative design, the phenomenology approach was used, to understand people’s experiences on how social networks functions and how their experiences impact the views on sanitation. The phenomenological approach focused on the commonality of a lived experience within a particular group, to construct the universal meaning of the event, situation, or experience and arrive at a more profound understanding of the concept (Creswell, 2013).

A quantitative design was used to accurately and systematically describe the situation on the ground in terms of basic sanitation services and behavioral change in the community.

3.3. Study participants

The study participants were members of social networks in the community such as school, religious, youth, women, and agricultural cooperatives and key informants included the following; village head, Senior Health Surveillance Assistant (SHSA), parish minister, headteacher, and forest assistant.

3.3.1. Inclusion Criteria

The study participants were drawn from different social networks that existed in the area of study, duty bearers in institutions or facilities in the study area were part of the study and members of households in the selected villages in the study area were eligible to take part in the study.

3.3.2. Exclusion Criteria

The study did not include members of households who were not in the selected villages in the study area and members who did not hold any decision-making position in institutions or facilities in the study area.

3.4. Sampling Techniques and Sample Size

3.4.1. Sampling Techniques

The study used purposive and snowball sampling techniques for qualitative data collection. Purposive sampling was used to select key informants because, it had the power of selecting participants who are knowledgeable about the study topic (Creswell, 2011).

Snowball sampling was used to select social networks in the community; school, church, women, youth, and agricultural cooperative networks. This technique provided room for the chain referral process which allowed the researcher to reach populations that are difficult to sample (Sebranek and Kamper, 2006). This technique was important in getting other social networks in the community that the researcher does not know of their existence. Households were sampled through systematic sampling. Systematic sampling was used to select households according to a random starting point but a fixed, periodic interval to reduce the risk of data manipulation (Creswell, 2014).

3.4.2. Sample Size

The sample size was 45 participants for data collected qualitatively Focused Group Discussions (FDGs) and Key Informants Interviews (KIIs). The FDGs ($n = 5$) were conducted, each FDG had a minimum and maximum of 6 and 9 people, respectively, totaling 40 participants. The KIIs ($n = 5$) were conducted. Sebranek and Kamper (2006) proposed a sample size should be large enough to sufficiently describe a phenomenon of interest and address the research question at hand but at the same time, a large sample size risks repetitive data in a qualitative study. They further argued that a sample size of 5-50 participants in qualitative research will enable the attainment of saturation in a study. Creswell (2007) stated, that adding more participants to a qualitative study does not result in obtaining additional perspectives or information. The arguments made the by above scholars meant that including more than 50 participants in FDGs and KIIs would not make any difference since saturation is attained by 5-50 participants. The sample size for household surveys was ($n=100$).

3.5. Data collection Tools

The research used FDGs, KIIs, and questionnaires. The FDGs were used to get information from various social networks. The KIIs were used to get information from the crucial informants namely the village head, parish minister, SHSA, headteacher, and forest assistant. During data collection for FDGs and KIIs, an audio recorder was used to audio record all discussions and interviews to avoid missing out on key information from the participants. Data for the households was collected using the software ODK/Kobo collect whereby a questionnaire was uploaded to the application for data collection. ODK Collect is an android application that is used to administer surveys and collect and organize the survey data (Brunette *et al.*, 2013). This application allowed for non-use of paper as well as immediate data validation in the field, and ODK is an open-source data collection software platform designed to support humanitarian and research organizations to facilitate non-paper based and online data collection (Dauenhauer *et al.*, 2018).

3.6. Data analysis

Qualitative data was analyzed through thematic analysis as demonstrated by White *et al.*, (2012). FDGs and KIIs were audio-recorded transcribed and translated from Tumbuka into English. To improve interpretation reliability, the written transcripts were reviewed independently by the researcher and 2 research assistants before analysis. The analysis of the transcriptions and the notes taken during the FDGs and KIIs were coded manually using Microsoft Word (2016). Coding was done through an inductive approach and bottom-up analysis based on the study objectives. An inductive approach was key in using collected data to come up with the definition of the whole process as advocated by (Creswell, 2007). Coding categories (sub-themes) were developed from codes and further grouped into themes based on their relationship.

Quotes were selected to illustrate themes. For quantitative, data was entered, analyzed, and presented in charts, tables and graphs using Statistical Package for Social Sciences (SPSS) version 24. The analysis involved both descriptive and inferential statistics. The study used the Pearson Chi-square test for the significance of the association between the independent and dependent variables and the binary logistic regression analysis was conducted to predict the outcome (category of the dependent variable) for each category of the independent variables using $P < 0.05$ as the level of significance.

3.7. Research dissemination strategy

The full study report (thesis) has been submitted to the Faculty of Environmental Science, Department of Water and Sanitation in fulfillment of the degree (MSc. in Sanitation). Presentations at national and international conferences, manuscript publications, and newspaper articles would be used to disseminate the study findings.

3.8. Ethical considerations

Ethics is very significant in research, as it ensures and promotes more benefits and minimizes the risk of harm (Creswell and Clark, 2011). The researcher obtained ethical clearance from the National Commission for Science and Technology (NCST) (Reference number.P.02/20/456) and Mzuzu University, Department of Water and Sanitation, Faculty of Environmental Science. Participation was based on informed, written consent (or use of a thumb mark in the case of illiteracy). Participants were assured of free participation and withdrawal from the study at any point of the interview. The authorities such as the group village head were briefed on the purpose of the study and its significance. No names were used in the study to ensure the confidentiality and anonymity of research participants. All secondary sources were acknowledged.

3.9. Study Limitations

The study had two major limitations namely the language barrier and the non-availability of baseline data regarding social networks. The former was a key constraint during data collection and got resolved through the engagement of research assistants who were conversant with the local languages of the area. The latter was resolved by probing other related issues in line with social networks and the study topic during data collection. Desktop studies and reviews of published research articles conducted elsewhere also helped to resolve the limited baseline data and helped to shape the understanding of the research design.

CHAPTER FOUR: RESULTS

4.1 Introduction

The chapter presents the results based on the study objectives. The objectives of the study included; to determine the significance of social networks on behavioral change and promotion of basic sanitation services, b) to analyze the effects of social networks on individual sanitation hygiene behaviors, and c) to identify the perceptions of social networks in influencing behavioral change and basic sanitation services

4.2 Demographic characteristics of participants

The section presents the demographic characteristics of the study participants summarized in Table 2. Slightly above half of the study participants were females (51.1%, $n = 74$). The participants came from across all age ranges but were dominated by participants ranging from 15 to 24 and those from 40 and more years, having shared an equal percentage of (37.7%, $n = 55$). Close to about half of the participants (44%, $n = 64$) did not have any source of income (Figure 7). Most of the respondents (66.6%, $n = 97$) attended secondary school. The results show that the study recruited more married individuals (57.7%, $n = 84$) followed by singles (35.5%, $n = 52$).

Table 2.1: Demographic characteristics of study participants

Characteristic	Description	Percentage (%)
Gender	Females	51.1
	Males	48.8
Age range	15-24 years	37.7
	25-30 years	13.3
	31-39	11.1
	>40 years	37.7
Marital status	Divorced	4.4
	Married	57.7
	Single	35.5
	Widowed	2.2
Level of education	None	0
	Primary	26.6
	Secondary	66.6
	Tertiary	6.7

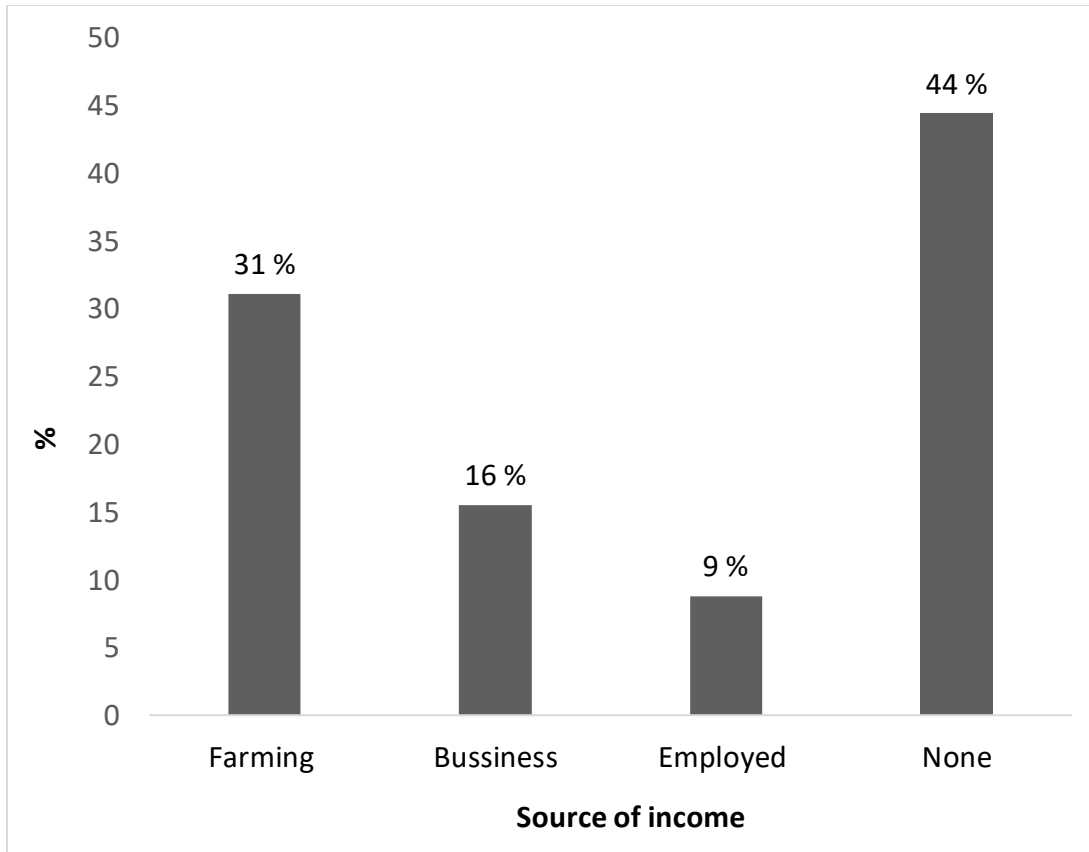


Figure 7 1: Sources of income for the participants

4.3. Significance of social networks on behavioral change and basic sanitation

Table 3.1: Importance of social networks on behavioral change and promotion of basic sanitation

Initial sub-categories / sub-themes	Main themes
<p>Information sharing</p> <p>The smooth and rapid flow of information to a wide population.</p> <p>Learning from others.</p> <p>Effective source of information.</p> <p>Incident-based sharing.</p> <p>Sharing during meetings.</p> <p>Access to information for everyone</p>	<p>Information sharing</p>
<p>Enquiring resources from institutions.</p> <p>Material resource sharing.</p> <p>Making contributions to purchase resources.</p> <p>Easy to access loans</p>	<p>Resource mobilization</p>
<p>Intervention ownership.</p> <p>Community and political leaders should be at the center of the intervention.</p> <p>Community-Led initiatives.</p> <p>Collective participation in all processes.</p> <p>Stakeholders in the community.</p> <p>Steering committees.</p> <p>Rules and regulations.</p> <p>Self-responsibility</p> <p>Community sensitization and mobilization.</p>	<p>Community-owned and based interventions</p>

4.3.1. Information sharing

The study inquired about the significance of social networks in the promotion of basic sanitation and behavior change. Participants emphasized that social networks can be very key in information sharing among those sharing common values and needs and even beyond social networks since people may share with others whatever they have learned in social networks. Respondents stressed that social networks would be very important in reaching wider, diverse, and dynamic populations since information flow would be very smooth and easy.

Participants highlighted that social networks would facilitate frequent sharing among members on issues to do with sanitation such as personal hygiene and toilet use among others

As they frequently meet, it helps them share information during times of emergency and challenges such as outbreaks. In addition, the study results showed that people learn from each other within social networks as a result some members may act as role models for other members and this encourages other members to do well.

Participants expressed information sharing as follows:

“If we can use groups, information will be moving very fast and reach many people at once since everyone will keep sharing where ever they go” (Village Headman)

“It is very important to share information without considering the type of social network one belongs to, this will help to spread the information faster reaching out to those people who do not have easy access to information” (Agricultural cooperative network, FDG)

This highlighted how fast information would move in the community and how the information would reach a larger audience through the use of social networks in the community.

As shown in Figure 8, qualitative results were confirmed by the results obtained quantitatively whereby the majority of participants (91%) indicated information regarding personal hygiene was shared most among social networks, followed by environmental cleanliness (80%), owning and utilization of latrines (79%) and general prevention of diseases (68%). The study results clearly showed that groups, friends, and neighbors are key in information sharing.

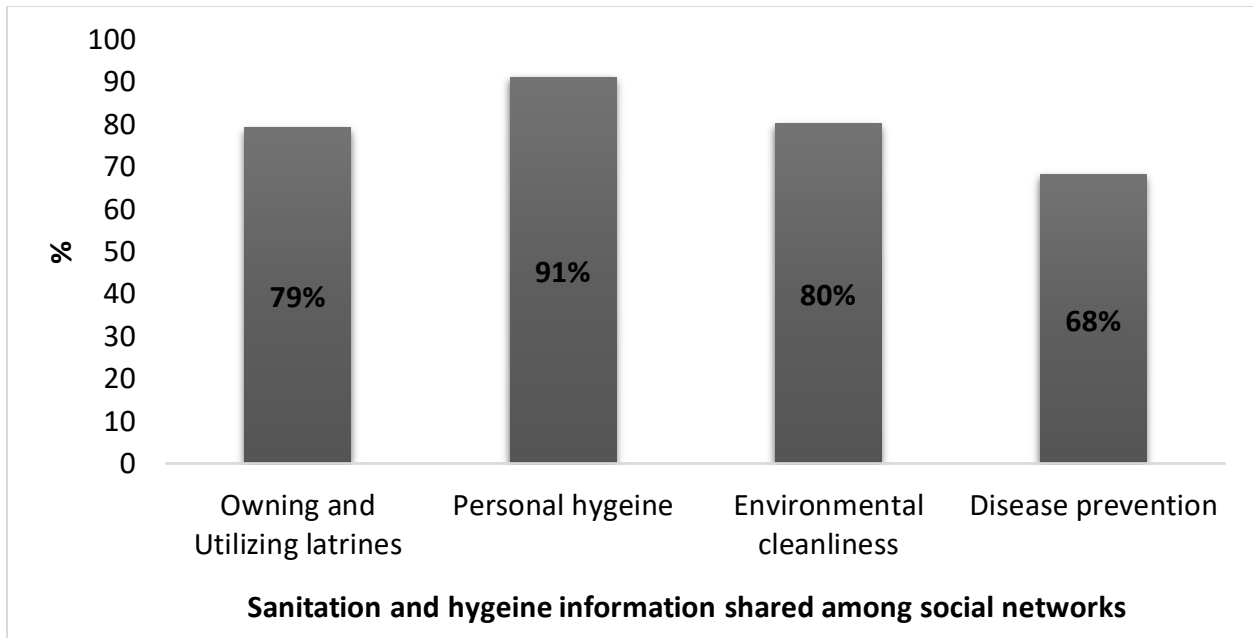


Figure 8 1: Sanitation and hygiene-related information shared among social networks

4.3.2. Resource Mobilization

The study participants elaborated that one of their main reasons for not having basic sanitation services was due to lack of resources to build basic sanitation services. They were optimistic about using social networks as a system that would help them in procuring materials for the construction of basic sanitation services.

Participants stated, that through social networks, it is easy to access bank loans. Results further highlighted that participants would also be able to give each other loans as members of social networks and this would help them procure material resources to build basic sanitary services and they stated that it would be easy to ask for materials for the construction of basic sanitation services from institutions as a group compared to individuals and this would allow fair distribution of resources among members of various networks and they elaborated the possibility of making contributions among themselves in social networks to procure material resources as an effort of ensuring that every member in a social network has a basic sanitation service.

Participants conveyed resource mobilization as follows:

“In our group, if we have discussed to buy materials and we cannot afford, we as a group can then agree to get a loan to buy the materials and we will pay back the loan as a group” (School network, FDG)

This highlighted how social networks could be crucial in getting loans as a group to ensure that material resources are available for everyone in the network and this would imply that everyone would have a chance of having basic sanitation services in their households.

“The support we can offer each other is thorough procuring resources for each other, especially for those who are in need” (Women network, FDG)

The participants also explained that they can offer each other support by providing material resources for building basic sanitation services for members in the social networks especially those who are needy. This is to ensure efforts are available towards bridging the gap between poverty and access to basic sanitation services.

“If we require materials we can contribute and get materials” (School network, FDG)

The study reviewed members are capable of contributing monetary resources among themselves and such contributions may help them in ensuring everyone in the network has a basic sanitation service.

Quantitative results reviewed that that the majority households (53%) had their latrines compared to those who shared latrines (47%) (Figure 9).

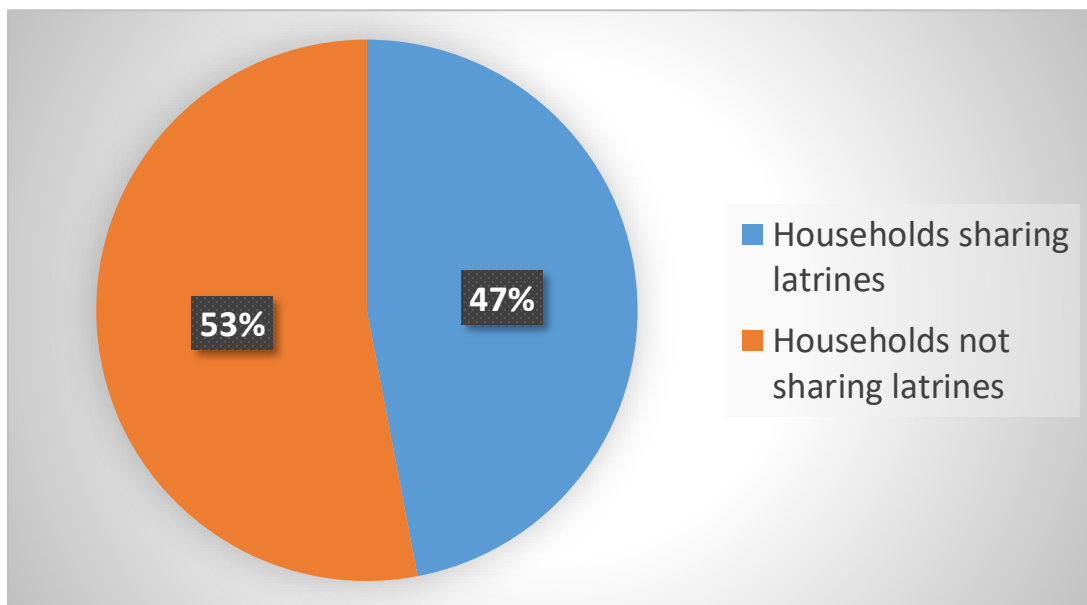


Figure 9 1: Latrine sharing among households

Further results on latrine sharing indicated that latrine sharing was most common among 2-4 households (81%), followed by 5-8 households (14%) and lastly 9 households (5%). Latrine sharing practice is contributing to the slow progress towards achieving access to basic sanitation services. This would be a result of a lack of resources for households to own their latrines. Hence, the use of social networks would help facilitate the availability of resources and make sure latrine-sharing practices stopped.

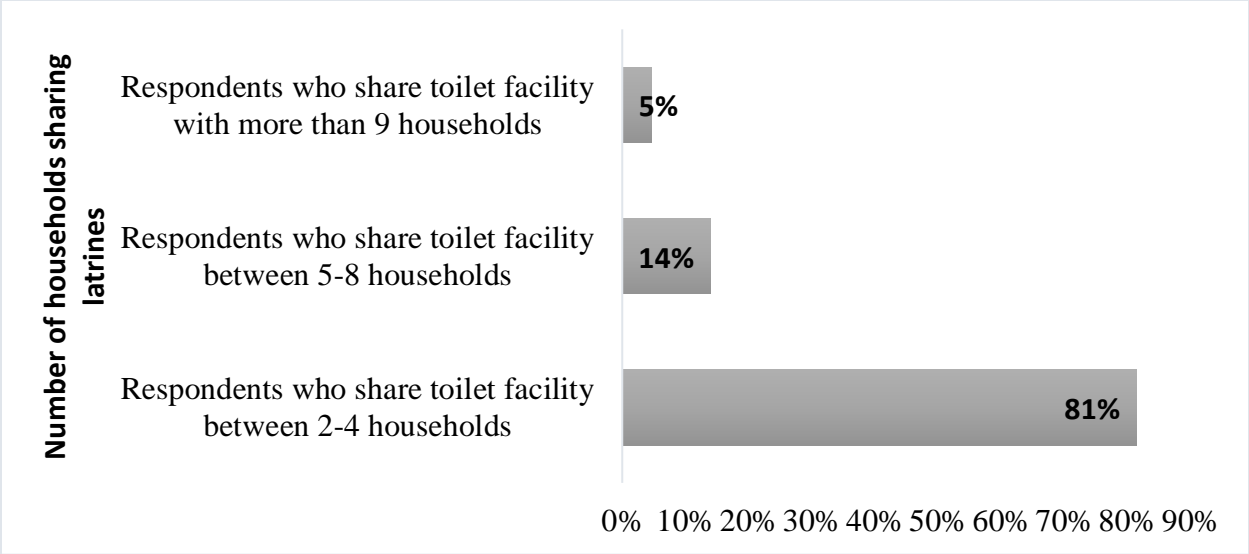


Figure 10 I: Number of households sharing latrines

The quantitative results confirmed that social networks would be key in mobilizing resources for people to own a basic sanitation service. (52%) agreed, (20%) strongly agreed, (17%) strongly disagreed, (10%) disagreed, and (1%) neither disagreed nor agreed (Figure 11).

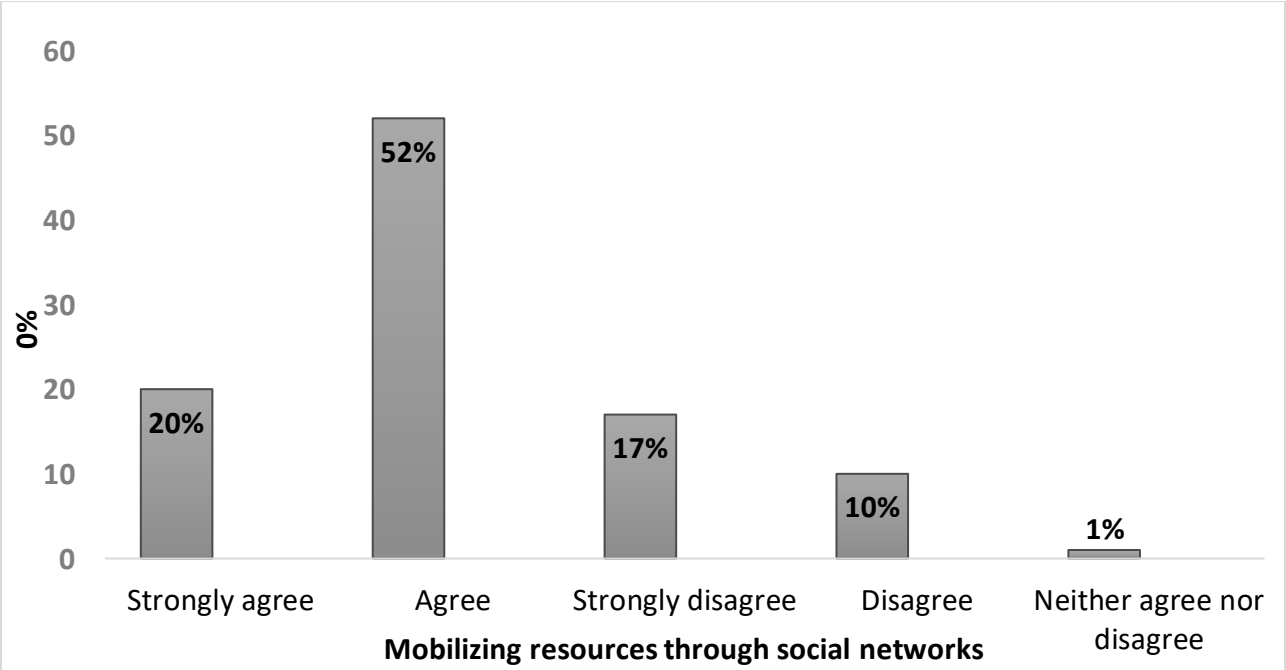


Figure 11 I: Possibility of social networks to mobilize resources

4.3.3 Community-owned and based interventions.

Participants described the use of social networks for behavioral change and promotion of basic sanitation services as a community-owned and based intervention. This was so because social networks are of members within the communities. They explained that because of such, the likelihood of social networks being a key successful intervention in the promotion of basic sanitation services and behavioral change is very high. Some of the things that participants elaborated on social networks would lead to community ownership of all sanitation interventions, especially that social networks bring together members of the communities, however, they stressed the need for community/ traditional leaders to be part of the social networks and taking lead in mobilizing community members to be part of the networks.

They further stated that community leaders should put up strict rules and regulations to ensure that members comply, for instance, introducing punitive laws; paying if one is not part of a network and does not comply with the agreements made in social networks.

Participants also highlighted that all stakeholders in the community should take part in supporting social networks in their communities.

“All stakeholders in as far as leadership is concerned should be fully involved in social networks and accept that this is for the benefit of the community” (Parish Minister)

They explained the need of bringing together all stakeholders in the community to be part of social networks and also help to offer support to social networks for the benefit of the entire community since sanitation is a household priority.

“When people build toilets using their resources then it becomes a sustainable approach” (Forest Assistant)

The study participants highlighted that intervention ownership by the community is also very critical to bringing sustainable change in the community.

“The chiefs should take part in encouraging community members to join social networks since it will be a platform for learning about good sanitation practices, if chiefs take a role in mobilizing members, people will be taking part ” (School network, FDG)

“The Area Development Committees, Councillors, and Members of Parliament, these people know very well more about their area so they can help to spread information and encourage people to take part” (Village Head)

Participants stressed the fact that community and political leaders and committees have the mandate to push members to be part of networks because it is in such groups they will learn more about basic sanitation services and behavioral change.

“If you do not meet, plan, monitor, evaluate together you cannot go further, but the most important thing is you come together, you plan then you say we will implement the following and these are the methods we will use to implement and this is the person who will be assigned to do the work after some time you come back as a group to monitor and evaluate to see where you’re doing right and where you’re going wrong and then you re-strategize by so doing things work and become sustainable” (Head Teacher)

Participants expressed the need for collective roles/participation in all interventions as a network for the success of interventions.

4.4. Effects of social networks on individual sanitation and hygiene behaviors

Table 4.1: Influence of social networks on individual sanitation and hygiene behaviors

Initial sub-categories / sub-themes	Main themes
Personal hygiene. Environmental cleanliness	Infection prevention
Failure to accept behavior change Sanitation is not a priority Poor sanitation practices	Resistance to change

4.4.1. Infection prevention

Participants highlighted the influence of social networks on individual sanitation and hygiene behaviors. It was indicated that the most behaviors that are influenced by others are personal and environmental hygiene behaviors. They further stated that they learn these behaviors from peers, neighbors, or people who they admire in their communities. These learned behaviors are both positive and negative.

“We learn that; if you do not have a toilet, you do not wash hands, bath and you do not have a pit for waste then as a person you’re not serious” (Church network, FDG)

The study participants highlighted some of the personal and environmental care initiatives that people learn from each other and they further explained that; the lack of adoption of some of these initiatives shows a lack of seriousness among individuals.

“Defecating and urinating beside the toilet hole” (Youth network, FDG)

The study reviewed further, that people learn different behaviors from their peers and people surrounding them in their communities. The behaviors can be positive and negative and this was evident in the above quote where individuals learn improper use of toilets from their peers.

“I have learned from others, as for me as a woman when you wake up you are supposed to start bathing then it’s when you can start preparing food because when you are sleeping you scratch everywhere and those things remain in the hands, so if you don’t bath first then it is being unhealthy, it means you might affect others. Another thing is sweeping the compound, when drawing water, the bucket should have a lid. If the water is from the river then boil the water let it cool then keep it” (Women network, FDG)

People learn how to take care of their bodies and their surrounding from their friends or networks around them in the community.

Bivariate analysis was conducted where each of the independent variables was analyzed with the dependent variables to determine if there was a significant association. This analysis involves two variables called dependent (Y) and independent (X) variables. The dependent variable is also called the response variable, and the independent variable is also called the explanatory variable.

The null and alternative hypotheses were set as;

H_0 = There is no association between the dependent variable and independent variables

H_1 = There is an association between the dependent variable and independent variables

The variables were tested at a 5% level of significance where a p-value less than 0.05 lead to the rejection of the null hypotheses in favor of the alternative hypotheses

The dependent variable in the study was the influence of social networks on sanitation and hygiene practices. The results from Table 5, have shown a significant association between the dependent variable and explanatory variables; Environmental cleaning ($p = 0.046$), open defecation ($p = 0.005$), latrine sharing ($p = 0.001$), building latrine ($p = 0.032$), while the variables; personal hygiene ($p=0.295$) and latrine utilization (0.059) were not significant.

Table 5.1: Pearson chi-square test of independence between influence of social networks and each of the explanatory variables.

Variable	Pearson Chi Square value	Degrees of freedom	P value
Personal hygiene	1.099	1	0.295 ^{ns}
Environmental Cleaning	4	1	0.046*
Open defecation	7.84	1	0.005*
Latrine sharing	10.176	1	0.001*
Latrine utilization	3.56	1	0.059 ^{ns}
Building latrine	4.596	1	0.032*

*=significant at 5% and ns = not significant at 5%

4.4.1.1. Binary logistic regression model results

In the binary logistic regression model, only those explanatory variables which are significant at a 5% level of significance in the chi-square test of independence were entered. The significance of individual parameter estimates for the binary logistic regression model was tested using the Wald test. Wald test is used for testing the statistical significance each of coefficient of the model. If the test is significant for a particular explanatory variable, the parameter associated with this variable is non-zero (Agresti, 1996).

The values of the independent variable for each category are taken as 1 if the given variable falls in the corresponding category and it is taken as 0 if the given variable does not fall in the corresponding category. Results displayed in Table 6 can be interpreted in terms of odds ratio ($EXP(\beta)$). Since all the explanatory variables are categorical, it was interpreted in such a way that a category of a given variable with odds ratios greater than 1 shows that the event was more likely to happen in the given category than in the reference category, odds ratios equal 1 indicates that the event was equally as likely to happen in the two categories whereas odds ratios less than 1 indicate that the event was less likely to happen in the given category than in the reference category.

Using the results in Table 6, Environmental cleanliness ($p = 0.034$), latrine sharing ($p = 0.089$) added significantly to the model at 5% and 10% levels of significance respectively, while open defecation ($p = 0.131$) and latrine use ($p = 0.330$) did not add significantly to the model.

The odds of being influenced by social networks on sanitation and hygiene practices were 0.291 times less for the respondents that practiced environmental cleanliness (Yes) than those that did not practice environmental cleanliness (No). Further, the odds of being influenced by social networks on sanitation and hygiene practices were 2.566 times more for the respondents that did not share their latrine (disagree) than those that did not strongly share latrine (strongly disagree).

Table 6.1: Binary logistic regression model for Influence of social networks on sanitation and hygiene practices

Variable	B	S.E.	Wald	df	P value	95% C.I.for		
						OR	Lower	Upper
Environmental cleanliness								
No (Rf)								
Yes	-1.233	0.582	4.485	1	0.034*	0.291	0.093	0.912
Open defecation								
Strongly disagree (Rf)								
Disagree	0.743	0.492	2.282	1	0.131	2.103	0.802	5.515
Latrine sharing								
Strongly disagree (Rf)								
Disagree	0.942	0.554	2.898	1	0.089**	2.566	0.867	7.593
Latrine use								
Strongly agree (Rf)								
Agree	0.500	0.513	0.950	1	0.330	1.649	0.603	4.510
Constant	-0.581	0.325	3.182	1	0.074**	0.560		

*=significant at 5% and **=significant at 10% level of significance, Rf=reference category, B=regression coefficient, S.E=standard error of estimation parameter, OR=Odds Ratio, df=degrees of freedom, and C.I=confidence interval

The model summary helps to determine the explained variation. It contains the Cox and Snell R, and the Nagelkerke R Square. Sometimes, they are referred to as pseudo R² values. Using Table 7, the explained variation in the dependent variable based on the model was 16.7% (Cox and Snell R) and 22.2% (Nagelkerke R square). However, Hassan (2020) stressed that unlike the R² in multiple linear regression, these values have to be interpreted with caution.

Hosmer and Lemeshow test the null hypotheses that the predictions made by the model fit perfectly with the observed group members. Here, a chi-square statistic is computed comparing the observed frequencies with those expected under the linear model.

A non-significant chi-square value ($p > 0.05$) indicates that the data fit the model well. Based on the results in table 7, the p-value is 0.915. Hence we conclude that our data fit the model well.

Table 7.1: Model summary and Hosmer and Lemeshow test

Model Summary			Hosmer and Lemeshow Test		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	df	P value
120.375	0.167	0.222	2.046	6	0.915

df=degrees of freedom

Both qualitative and quantitative results showed that people do learn behaviors from their networks. However, personal hygiene was not significant, in other words, social networks did not influence personal hygiene and latrine utilization as found in the qualitative results.

4.4.2. Resistance to change.

One of the themes developed for objective number two was resistance to change. Participants described that despite several interventions or initiatives done to ensure a behavioral change in the community some people do not change their behaviors, some are not ready to change, at some point change is very slow among other people, and some change just for a very short period for the sake of the benefits coming with the interventions since sanitation issues are not of priority to some people and some change only if interventions are accompanied with punishments set by leaders.

“2 years ago 2017-2018, we had a good percentage of adoption of latrines because we had some by-laws from the top authorities but now adoption has dropped because we no longer have by-laws, if these groups can come up with by-laws it can work, because people may be mandated to pay if there are not following what they agreed in social networks” (Senior HSA)

The study reviewed that there was a need for rules and regulations in running social networks so that people should comply with what they plan and agree as a group, this should be cemented by community leaders championing such initiatives. This showed that people need strict rules and regulations for them to change otherwise they go back to past behaviors.

“Most people here in the communities are used to open defecating in the bush despite the information being delivered to them they still choose to use bush” (Cooperatives network, FDG)

The study identified interventions toward raising awareness for behavioral change in the community are always happening but people choose to remain with their poor behaviors which they are already used to doing in their lives.

“There are other people who would say they cannot waste money just for a toilet, a toilet where I will put in my waste” (Youth network, FDG)

Participants indicated that people have different priorities in households and some other households' sanitation is not a priority hence making investments towards having a basic sanitation service is a waste of money.

Quantitative results reviewed that people have mixed reactions towards behavioral change. The study inquired about several issues regarding their attitudes towards sanitation and hygiene. For example, individual responsibility towards sanitation.

It was observed that (51%) of the respondents disagreed that sanitation was their responsibility, (45%) strongly agreed, (3%) of the respondents agreed, and (1%) strongly disagreed. The majority of participants disagreed that matters of sanitation are not their responsibility; this could be a reason why there is resistance to change in behaviors.

The study inquired whether open defecation would not pose a health threat (50%) disagreed, (44%) strongly disagreed, (4%) strongly agreed, and (2%) neither disagreed nor agreed. This showed that the respondents were aware of the implications that come along with the open defecation practice.

Table 8.1: Attitudes toward sanitation and hygiene

Item	Strongly agree	Agree	Disagree	Strongly disagree	Neither disagree nor agree	Total
It is an individual's responsibility to ensure proper sanitation and hygiene practices are adhered to.	45%	3%	51%	1%	0%	100%
Open defecation is not a health threat to people in the community.	4%	0%	50%	44%	2%	100%

4.5. Perceptions of social networks on behavioral change and promotion of basic sanitation services

Table 9.1: Beliefs of social social networks on behavioral change and promotion of sanitation

Initial sub-categories / sub-themes	Main themes
Incentives. Partnerships. Periodic follow-ups.	Motivational factors
Culture. Language. Personal beliefs	Individual and societal issues

4.5.1. Motivational factors

Participants of the study elaborated that perceptions of people in social networks are influenced by the benefits that come with interventions or projects addressing sanitation issues which act as motivational factors. Respondents explained that projects bring a lot of sanitation benefits to the community but for them to do well or to keep on doing well they require to have materials or activities to motivate them and inform of incentives. They also indicated that being visited by relevant authorities including other stakeholders from health centers, NGOs and many others motivates them a lot. These motivational initiatives encourage them to work since they feel their work is being recognized, absences of motivational factors do not encourage members to work

since they feel that their efforts are not being recognized and appreciated. These motivational factors may influence people's attitudes towards sanitation.

The results indicate that an individual's perceptions can be positive or negative based on the availability or non-availability of motivational factors.

“We should be given material resources and even incentives because that is what we love but if it's just a message we do not attend. We love to receive something when it's just free we feel like time wastage” (Women network, FDG)

Participants clearly stated that motivational initiatives are very key for them to work on the ground, absences from motivational activities do not push them to work and sometimes they do not even take part in activities. Motivational factors are key to creating positive attitudes toward sanitation interventions.

“It needs some partners to come in to give them incentives or medals not necessarily to pay them, if some social networks are doing better they can receive t-shirts or bicycles to motivate them. In the past we had model villages, we used to give them plates and pails but this no longer exists” (Senior, HSA)

“NGOs at first seem to be very serious to bring change but when the project ends they stop visiting us, by the time they come again they find that people have stopped taking care of the toilet since the projects come with benefits like money or awards so when they are no such, people stop whatever they were doing, because they do things by force at the end there is no sustainability” (Cooperatives network, FDG)

Participants indicated that the presence of partnerships, incentives, and periodic follow-ups usually keep people or communities working but the sustainability of motivational factors such as incentives, partnerships, and follow-ups is an issue as a result when the project ends people in the community also stop work right away.

Respondents were asked if it was possible to own and use a latrine without being supervised by officials from the health sector and NGOs. (47%) agreed, (20%) strongly disagreed, (18%) strongly agreed, (14%) disagreed, and (1%) neither agreed nor disagreed (Figure 11).

This meant that people are aware that their health is their responsibility, however, some feel that there is a still need for them to be followed up for them to own and utilize a latrine

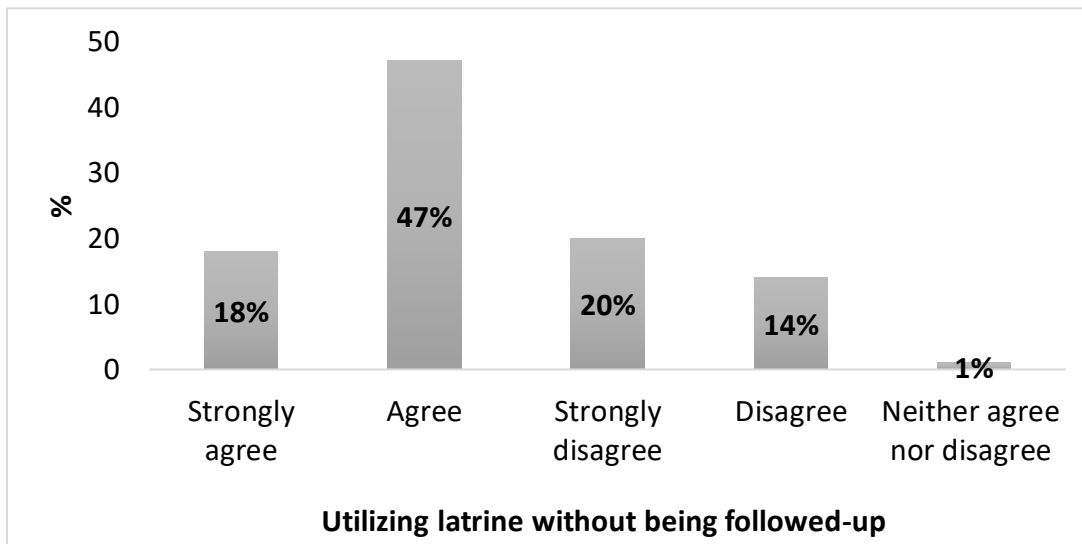


Figure 12 1: Possibility of owning and utilizing a latrine without being followed-up

The results illustrated that most people in the community look up to receiving incentives that come together with sanitation intervention to act as motivational factors for them to work or to keep on working on influencing sanitation matters in their community. As the results stated, participants like receiving gifts such as pails, awards, t-shirts or anything that will act as an incentive for the members and they appreciate being continuously visited even when the project has come to an end since this acts as a way of encouraging them so that they should keep on working despite the project coming to an end for the sustainability of results brought by the project. These motivational factors are key in influencing people’s attitudes towards basic sanitation services and behavioral change interventions.

4.5.2. Individual and societal issues

Participants described that there are individual and societal issues that influence them to promote basic sanitation services and behavioral change in the community since such issues influence individuals or groups' decisions towards sanitation matters.

The information was supported by the statements as quoted from the study participant

“The ngoni people are very much rigid to accept some of these things, they do not want to do things on their own, they want to be pushed and be supported most of the times, I think that this is a sort of a cultural behavior that has been planted, thus a negative behavior” (Parish minister)

The participants revealed, that based on the cultural aspects of the ngoni they do not easily accept change and people need to be pushed in whatever they are doing. This may be a determinant for social networks to promote or not to push for basic sanitation services and behavioral change.

“A lot of people believe it’s not proper to use toilets but the bushes since pigs feed on the waste and also increase the fertility of the soil” (Forest assistant)

Participants explained that people have personal beliefs, these influence how they operate and make decisions in their daily lives as individuals, and this may be applied during decision-making in social networks.

“When you are in this place you find that they can’t accept another person so you need to learn their language so that you interact with them so that you become part of them” (Parish minister)

Participants highlighted that language is one of the key factors in social networks to ensure that networks are functional.

CHAPTER FIVE: DISCUSSION

The chapter discusses the research findings in comparison with related literature and research studies conducted elsewhere, and also provides deeper analysis and understanding of all key study findings.

5.1. Significance of social networks on behavioral change and promotion of basic sanitation

5.1.1. Information Sharing

The findings reviewed the need for access to sanitation information regardless of the nature or type of the social network one belongs to. For example, regardless of being a religious, agricultural, women, banking and financing groups' sanitation information should still be discussed among social networks since sanitation is a household priority and sanitation issues affect each and everyone in the community. Figure 8 further shows that social networks are a tool for information sharing whereby (91%) of participants indicated information regarding personal hygiene was shared most among social networks, followed by environmental cleanliness (80%), owning and utilization of latrines (79%), and general prevention of diseases (68%). Different scholars have discussed, that communities with different groups of people who have little in common with one another are rarely highly united. What is important is that new links have been formed between diverse groups, and these open up opportunities for information and other resources to flow between groups where none previously existed (Cheong, 2006; Jaffe, 2006; Letki, 2008, Ennis and West, 2010). This showed that through networks there is a window of opportunity for information and resource sharing within the community regardless of their diversity and this conquers with the study results.

Ennis and West (2010) explained that the links between individuals and organizations are key to sharing of information and resources, and mobilization for change. They looked at the significance of the links between individuals and organizations being very key in information and resources sharing and mobilization.

Askon (2016) illustrated, that the persistence of large families and ethnically oriented business groups in advanced economies, extent, and source of innovation and its diffusion, position in a social group and its central influence on productivity, the role of social networks in real labor markets are also explained by the social networks, based on these examples it is clear that social networks are crucial for the flow of ideas and practices.

He clearly showed that social networks are key to productivity especially since there are flow of ideas and practices within networks and also room for innovations which is very critical in the community. Rogers (2010) stressed, that greater bridging social capital is associated with more opportunities to gain new information and facilitates innovation. According to the results of this study, innovation was not discovered to be related to social networks but their results were in an agreement whereby the study also uncovered that social networks are crucial in the flow of ideas, gaining of new information, and practices. Although their arguments were not made in the context of sanitation while this study focused on sanitation the concept of social networks remains the same regardless of the nature of the network, as the same social networks can be used for sanitation.

The study found out that sanitation was for everyone and sanitation issues can be discussed by everyone and in any social network regardless of its core functionality. This meant there was no need of establishing new social networks, rather use already existing networks in advancing the sanitation agenda. Zhang *et al* (2015) hinted that altering people's network connections was probably more difficult than intervening on existing network members. The above scholar explained the diverse roles that existing social networks would play in the community. The notion by the scholar was in line with the study findings.

The results further unpacked that in social networks people learn from each other or their close peers so this would be a critical mechanism for getting people involved since people can also receive assistance among themselves and it would be an effective source of assistance within the community. The study findings are in agreement with other scholars i.e. Berkman *et al.*, 2000; Heaney & Israel, 2008; Valente, (2012) who developed, a host of theories and evidence that supports the view that social networks, give rise to various social functions such as social influence, social comparison, companionship, and social support, influence people's behaviors.

Wilson (2005) explained, that social connections are not always positive, they can serve to oppress and reproduce dominant and unjust ideologies and systems. The study results did not identify any issues regarding the views shared by Wilson (2005) who found out that social networks also have negativity within the community as a tool for oppression and unjust ideologies and systems.

5.1.2. Resource Mobilization

The results showed that through social networks people can get loans from banks and also loans from each other within the social networks. This would create a simplified mechanism for getting loans since loans could be obtained by a group and not by an individual and loans could be paid back by the group. This can facilitate the availability of resources among members of the social networks and would help every individual in the social network to own a basic facility.

The findings confirmed that social networks would be key in mobilizing resources for people to own a basic sanitation service. (52%) agreed, (20%) strongly agreed, (17%) strongly disagreed, (10%) disagreed, and (1%) neither disagreed nor agreed (Figure 12). The study results are in agreement with the argument made by Burt (2001) who explained, that by using social networks people can obtain a variety of resources or social capital. Several scholars distinguish bonding from bridging social capital. Bridging social capital is obtained from a more diverse set of people who can provide things such as instrumental resources and information. Gargiulo & Benassi (2000); Quan-Haase, Wellman, Witte, & Hampton (2002), bridging social capital encompasses several dimensions one of them being allowing people to expand their existing pool of resources and increasing coordination.

The study uncovered that social networks are a source of resources where members of networks can pool resources through group loans. Results also emphasized that using social networks could allow members of social networks to enquire about resources from institutions and also open room for making contributions among members of social networks to purchase material resources.

This showed how social networks could ensure that people have basic sanitation facilities in their households since access to material resources is made simple. Glanville and Bienenstock (2009) posited that, just like a monetary investment, different forms of social capital are required in the social investment portfolio so that individuals can make use of appropriate capital as they see fit.

The results of this study hinted it would be easier for participants to get resources from institutions such as churches and non-governmental organizations as groups and not as individuals. Ennis and West, (2010) urged, that thinking in terms of the connections between people, groups and organizations can assist workers and communities to focus not only internally on their communities (and the strengths and resources within them) but externally to consider the links to broader social structures that impact them. The above notion by Ennis and West (2010) was in agreement with the study results.

The study discovered that access to material resources for basic sanitation services cannot be an issue if social networks are used as a strategy, as a result, this would have an impact on the health of people in the community. Berkman *et al.* (2000) proposed a conceptual model of how social networks impact health. Social networks impact health behaviors through four primary pathways: provision of social support; social influence; social engagement and attachment; and access to resources and material goods. His conceptual model included access to resources and material goods this cements the role of social networks on the availability of material resources. The study results conquered with Beckman's conceptual model.

Maton (2008) found that the social support provided through empowering relationships with members of a community action organization created structures that fostered collective social change value systems. In turn, these relationships, paired with values of social change, provided the context in which organizational members could engage in collective action activities aimed at addressing existing community inequities. Because of inequalities in the community access to resources is a big issue but when people are in social networks then collective actions are taken to address inequalities that expose people to poor health or living conditions.

Collins (2003), collective action provides a foundation for residents to mobilize resources, influence local policy decisions, and affect their social, political, and economic environment. Arguments by Matron (2008) and Collins (2003) highlighted the power of collective actions toward addressing inequalities in the community.

This study found out that members of social networks are willing to make contributions to ensure the availability of the material resources among members themselves to make basic sanitation services available for every member including the needy members, this was a strategy that participants explained that could be used to bridge the gap between poverty and access to basic sanitation services.

Social connections to others of higher social and economic rank can provide instrumental favor, or access to tangible and intangible resources such as financial support, career advantages, or information exchange (Poldony & Baron, 1997). The above authors described some of the dimensions that a very critical in the use of social networks to obtain resources such as the differences in the socio-economic ranking between people in the social networks or outside networks and their impacts.

They stressed the fact that having good relationships with people of higher social and economic ranking in or outside the community would provide favor in terms of making resources available and this would benefit the social networks however the study results did not uncover much of the impacts to do with the differences in socio and economic ranking versus availability of resources.

5.1.3. Community-owned and based intervention

The results demonstrated that the use of social networks was very critical in ensuring ownership of interventions in the community since social networks are composed of the people in the community and are led by members of the community. In addition, initiatives done in social networks are community-centered since people are part of all processes of the interventions. Parfitt (2004) kept it very clear, that community participation was simply another attractive method used by development agencies to pursue top-down development agendas. Chambers (1987) stated it is very important to include people in decisions that affect them such as in ensuring the availability of basic needs and goods.

The study discovered that social networks would create a simple platform for community members to be involved in all processes of the interventions regarding sanitation. The top-down approach empowers community members to take a lead and own interventions in the community. Joshi (2011) stated that community ownership is a community's state or fact of exclusive rights and control over property, which may be an object, infrastructure, or intellectual community-owned assets or institutions are those that are owned and controlled through some representative mechanism that allows a community to influence their operations or use or enjoy the benefits arising.

Whittington *et al*, (2009) explained that the concept is anchored in the idea of community participation which advocates greater beneficiary involvement in water service production and management. It includes beneficiaries taking the initiative to demand improved water services while at the same time taking a leading role in project design, implementation, development, and sustainability. The results further relieved the need for stakeholders and steering committees in the operation of networks and cemented the role of traditional leaders in being part of the networks as a way of mobilizing community members to be part of the networks.

The study results further uncovered the need for rules and regulations in social networks in governing the affair of the networks to deliver results. These rules and regulations should be championed by traditional leaders in the community since they influence their members. The use of community leaders was said to have yielded results in the community sometime back. Aiken *et al* (2008) stated, that community mobilization necessarily entails a new kind of awareness building. It necessitates strategic coordinated action of the community and collective movements.

Planning and control of activities and performance matters in which community-owned institutions (formal and informal), can act on their own. This argument was very critical and in line with the study results since the study learned that the social network approach empowers the community to own interventions and work in coordination with different structures within the community.

The findings discovered that trust and unity are key issues that came out strong in terms of working as a social group, results uncovered that if people do not trust each other it is difficult for them to work together on a particular issue in the community including sanitation. Trust is a critical element for a functional social network.

Ostrom (2000) contended that collective action as a function of individuals acting in a way that advances their benefit is enabled through individuals' real and perceived trust among group members. This work suggested that individuals may be more likely to engage collectively if they have strong social relationships of trust and norms of reciprocity (such as bonding social capital).

5.2. Effects of social networks on individual sanitation and hygiene behaviors

5.2.1. Infection Prevention

The findings indicated that social networks significantly influenced individual sanitation and hygiene behaviors; environmental cleaning ($P=0.046$), open defecation ($P=0.005$), latrine sharing ($P=0.001$), and latrine utilization ($P=0.059$), and building latrine ($P=0.032$). The study results uncovered that individuals learn from their fellows about different positive and negative sanitation and hygiene practices. A study by Bicchieri *et al.*, (2017) found, that the use of social networks proved to have been an important predictor of behavior and has also promoted latrine use among close networks in India. Researchers in Benin found that neighborhood levels of latrine adoption were significantly associated with an increased probability that households in those neighborhoods would build a latrine (Jenkins and Cairncross, 2010). These studies indicated that there is a relationship between the change of behavior versus connections with peers, neighbors, or any social contact.

Different scholars argued, that the strength of social network theories rests on the assumption that the characteristics of the network itself are largely responsible for determining individual behavior, identifying the relationships between social network characteristics and health risks help in designing disease prevention and control strategies (Berkman et al., 2000; Heaney & Israel, 2008; Valente, 2012).

They further explained that social network characteristics and health outcomes suggest that intervening in people's social networks can potentially accelerate behavior change and improve health at the collective level. Based on arguments made by these scholars the use of social networks is likely to be used as an intervention to prevent and control diseases but the results are likely to depend on the characteristics of the network.

Social networks can be key in accelerating behavior change. The characteristics of the networks are likely to determine the behaviors of individuals in the social networks. A study by Shakya, Christakis, & Fowler, (2015) in rural India programs has found a link between the community and individual behavior. This means an individual can change his or her behavior by learning from what others are doing in the community. The behavior can be positive or negative but an individual can learn because it's from peers, neighbors, or close contact. Through the same, people can learn from practices being done by others in their social networks which means if positive behaviors are enhanced through social networks adoption of that behavior is likely to yield desirable results. Research on work contagion has suggested that a wide variety of health-related social behaviors and outcomes may spread from person to person through social networks in both observational and experimental settings (Christakis and Fowler, 2007, 2012; Fowler and Christakis, 2010; Rosenquist *et al.*, 2010).

Network studies that looked at connection offer additional insight by demonstrating how the structural position of an individual might impact that individual's behavior. Centrality measures, for instance, indicate which individuals are most connected within a network, and are positively correlated with their ability to influence others, and their tendency to be influenced (Christakis and Fowler, 2010b; Christley *et al.*, 2005; Gayen and Raeside, 2010b; Rothenberg *et al.*, 1995).

Intervention strategies are increasingly focused on targeting the most central individuals with the idea that they will be able to positively influence others to adopt an innovation (Fujimoto et al., 2009; Valente, 2005). For example, Banerjee *et al.* (2013) studied the network diffusion of the decision to participate in a microfinance program among villagers in rural India. They found that the overall participation in microfinance programs was significantly higher when the introduction of information occurred among more centrally positioned individuals (Banerjee *et al.*, 2013).

On the other hand, the most central individuals are also at a higher risk if the behavior or outcome being transmitted through the network is negative such as substance abuse, or infectious disease (Christakis and Fowler, 2010b). The study results conformed with (Christakis and Fowler, 2010b) where the results identified some elements of negative influence from peers or neighbors such as improper utilization of latrines among some individuals.

5.2.2. Resistance to Change

The results indicated that people do receive a lot of sanitation interventions in the community but some may choose not to change their behaviors. This could result from learning poor sanitation behaviors such as open defecation from close contacts hence do not want to change behavior.

It was observed that (51%) of the respondents disagreed that sanitation was their responsibility, (45%) strongly agreed, (3%) of the respondents agreed, and (1%) strongly disagreed. The majority of participants disagreed that matters of sanitation are not their responsibility; this could be a reason why there is resistance to change in behaviors. The study inquired whether open defecation would not pose a health threat (50%) disagreed, (44%) strongly disagreed, (4%) strongly agreed, and (2%) neither disagreed nor agreed (Table 8, page 52). This showed that the respondents were aware of the implications that come along with the open defecation practice.

The findings also showed that some people do not consider sanitation as a priority in their households hence no need of having a basic sanitation service and also change their behaviors. Ashraf *et al.*, (2017) explained that social structure is an important predictor of behavior, and examining the nature of social norms is key in understanding the reasons behind the persistence of open defecation.

One of the most prominent behaviors that were identified from the data is open defecation, where some individuals with or without latrines have been using bushes as a place to defecate despite several interventions being implemented by different stakeholders. This was a direct claim towards open defecation where he discussed that social structures such as networks can be an important component in predicting people's behaviors. Following the claim in social networks members can learn both positive and negative behaviors.

Collective behaviors, such as open defecation, can be categorized in multiple ways, depending on which factors drive behavior (Bicchieri, 2006; 2016). The same behavior can be a custom, a descriptive norm, or a social norm, and therefore be supported by different motivational factors and so should be targeted by different kinds of interventions.

To classify a collective behavior, we must determine whether an individual's willingness to engage in the behavior is contingent on what other people do, and possibly also on what other people think is appropriate. Open defecation is usually a custom, a behavior that most people engage in to meet their needs, not conditional on what other people do or approve of (Bicchieri 2016).

Previous research studies by Coffey *et al.*, (2014; 2017); and Routray *et al.*, (2015) uncovered that according to WASH experience in other settings, such as Pakistan, access to a latrine does not guarantee use. This was also evident from the results where participants discussed that many of them have latrines but usage of the latrines is an issue. This shows the availability of a basic sanitation service is not an issue but availability should be accompanied by usage of the services.

The findings uncovered that in Mpherembe issues of taboos were contributing factors to open defecation and these were some of the issues outlined to hinder behavioral change. For example, father-in-law and a daughter-in-law cannot use the same toilet. This meant that if there is no other toilet around one would opt for open defecation. In some developing world communities, the practice of open defecation may be simply a descriptive norm and persist because it is commonly practiced. In other areas, however, the practice may be an injunctive norm, and those who attempt to transgress may be ridiculed or criticized. For instance, researchers in Kenya discovered that normative taboos around defecation include the belief that the feces of a father-in-law and daughter-in-law should not mix, and therefore open defecation is a means by which this restriction is protected (Bwire, 2010). These findings in Kenya are in agreement with the study findings in Mpherembe, Mzimba.

5.3. Perceptions of social networks on behavioral change and promotion of basic sanitation services

5.3.1. Motivational Factors

The results illustrated that most people in the community look up to receiving incentives that come together with sanitation intervention to act as motivational factors for them to work or to keep on working on influencing sanitation matters in their community.

As the results stated, participants like receiving gifts such as pails, awards, t-shirts or anything that will act as an incentive for the members and they appreciate being continuously visited even when the project has come to an end since this act as a way of encouraging them so that they should keep on working despite that the project came to an end for the sustainability of results brought by the project. These motivational factors are key in influencing people's attitudes towards basic sanitation services and behavioral change interventions.

Availability of motivational factors determines the success or failure of interventions, as illustrated in the results, non-availability of the motivational factor may affect the sustainability of the intervention as evidenced in the past interventions which were implemented in the community. The problem with motivational initiatives is attached to certain projects when the projects end motivational initiatives also come to an end and people stop practicing whatever the project brought since they do not get benefits right away.

Berkman *et al.*, (2000) explained, that social networks and human social motives can be structured to enact social influence within a community. Specifically, it discussed how to leverage existing social ties and create new social ties to prompt social interactions for attitude and norm change within the community.

He discussed that social networks and their motives can be structured to enact social influence within the community which is just in the same regard as the results have shown; the motivational initiatives directly influence the success and sustainability rate of sanitation interventions. This was evident from the findings whereby participants explained the need for incentives such as t-shirts, pails, and, any other motivational initiatives, lack of incentives means no work to be done as illustrated by participants.

Hennig Thureau *et al.*, (200) discovered four types of motivations in groups: social benefits, economic benefits, concern for others, and self-enhancement. Social benefits refer to the idea that consumers gain a sense of belonging from participating in an online community, whereas economic factors refer to any payment a reviewer may receive. Concern for others reflects an individual's desire to assist others in a purchase decision, and self-enhancement refers to the desire of individuals to be seen as experts in their field.

This study results identified that participants are more interested in motivational initiatives in form of the provision of materials, partnerships, and also being visited by designated authorities. Figure 13, page 55 shows the possibility to own and utilize a latrine without follow-ups by officials from the health sector and NGOs. (47%) agreed, (20%) strongly disagreed, (18%) strongly agreed, (14%) disagreed, and (1%) neither agreed nor disagreed. Some members still insisted that follow-ups or visits by authorities were important in motivating them. The study did not find out any motivations to do with economic benefits, concern for others, and self-enhancement but social benefits were somehow explained by the participants indirectly, for instances participants stated that social networks bring people of diverse backgrounds together and share the same goals, this brings in a sense of belonging among members of the social networks.

5.3.2. Individual and Societal Issues

The theme was developed after considering that the results reviewed that the availability of individual and societal factors in the community and within the social networks can influence the promotion of basic sanitation services and behavioral change within the social networks.

Individual and societal factors such as language, culture, and personal beliefs are some of the social-cultural factors that can influence sanitation matters in the network as indicated by the study results. For example, someone's beliefs, language, and culture can either push or pull off someone from contributing to or promoting basic sanitation services and behavioral change in the social networks.

The study findings reviewed that language is one of the factors that determine the success or failure of social networks because it unites or creates a gap between people. Language is a key factor in information sharing within the networks since it facilitates the flow of ideas. Yuan (2015) stated, that the use of social network sites has been shown to lead to social capital, connections people can rely on for support, however, for some people, legal, linguistic, cultural, and other barriers make it impossible to interact with all friends and acquaintances on a single site. Following this argument, it indicated that language and culture can be barriers for individuals to interact with fellow individuals in social networks. This means it will be difficult for an individual to be part of the network or to promote basic sanitation services and behavioral change as this may hinder the flow of ideas and practices.

Burt (2011) discussed that traditionally, rural areas have had their own social, economic, and cultural circumstances distinct from those of their urban counterparts. For example, certain patterns of economic activity and low population density characterize rural regions, including agricultural communities, fishing communities, and logging communities. These unique ways of life in rural areas, tied closely with the natural environment, have fostered close social relationships and attachments to place among residents.

This concept simply explained that the way of life in rural areas has fostered close social relationships. Based on this argument an element of economic differences between individuals is discussed to influence the way people may interact noting that people in rural areas could easily come together and interact because their economic status or activities are likely not to be very different themselves compared to urban residents. This explained how different individual and societal issues can influence conservation between people.

This study did not uncover any issues to do with how economic differences between people or members of networks would affect their work in the communities or social networks but rather identified social networks as opportunities to bridge the economic gap between members of the networks in the area of development.

Communities in the discourse have generated and beholden social-cultural acceptance and appropriateness through discussing open defecation, toilets, and waste are no longer regarded as an embracement and a taboo. Toilets, waste, and issues to do with open defecation are no longer difficult issues to discuss in the communities (Joshi, 2011).

Based on the above statement, personal beliefs and cultural values play a huge role in fostering conversations among different individuals. Following the example made above, were talking of toilets, waste, and issues to do with open defecation used to be taboos were no longer taboos because people's beliefs had changed based on how they viewed the concepts of open defecation. Cross-sectional studies about latrine use show that people's beliefs about others' latrine use correlate with their use (Haider *et al.*, 2016; Odagiri *et al.*, 2017).

Such correlations do not necessarily imply that one causes the other. One may very well expect members of one's network to defecate in the open, but this belief may not have causal relevance in one's decision to do the same.

The study findings highlighted that personal beliefs influence how people would stay together in social networks and promote basic sanitation services and behavioral change. Personal beliefs can create a conducive or toxic environment for open discussions. A study by Bicchieri (2016) suggested that beliefs about what other people do often influence our behavior. Bicchieri's study results are in line with the study findings.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

The study aimed at assessing the influence of social networks on the promotion of basic sanitation services and behavioral change in Mzimba, Malawi. It employed a mixed-method approach where both qualitative and quantitative methods were used. Purposive and snowball sampling was used to recruit study participants for FDGs and KIIs while systematic sampling was used during data collection from the households. FDGs and KIIs were used to collect qualitative data, data analysis was guided by thematic analysis while questionnaires were used to collect quantitative data, and analysis was done through SPSS version 24. The study had three objectives; a) *to determine the significance of social networks on behavioral change and promotion of basic sanitation services*, b) *to analyze the effects of social networks on individual sanitation hygiene behaviors*, and c) *to identify the perceptions of social networks in influencing behavioral change and basic sanitation services*.

6.1.1. Significance of social networks on behavioral change and promotion of basic sanitation.

The study findings highlighted that, the most shared information in social networks was personal hygiene (91%). The results also indicated that social networks are very important in resource mobilization (72%) and also showed that the use of social network was important in ensuring ownership of sanitation interventions. The study concluded that social networks are key in information sharing, resource mobilization and for community ownership of interventions.

6.1.2. Effects of social networks on individual sanitation and hygiene behaviors.

Social networks significantly influenced individual sanitation and hygiene behaviors; environmental cleaning ($p = 0.046$), open defecation ($p = 0.005$), latrine sharing ($p = 0.001$), latrine utilization ($p = 0.059$), and building latrine ($p = 0.032$). These variables were significant at a 5% level of significance. The study concluded that social networks can influence individual sanitation and hygiene behaviors.

6.1.3. Perceptions of social networks on behavioral change and promotion of basic sanitation.

The study found out that language, culture and, personal beliefs are pull or push factors for social networks to be effective and findings also highlighted that it was difficult for social networks to operate without motivational factors such as incentives. The study concluded that social-cultural and motivational factors are very key in ensuring social networks operate successfully.

6.2. Recommendations

The study has shown that social networks are important in the sanitation sector. The recommendations have been made according to the study objectives.

6.2.1. Significance of social networks on behavioral change and promotion of basic sanitation.

- Government through relevant ministries should work on the inclusion of the use of social networks in the sanitation policy and other related policies to strengthen the role of social networks in sanitation at a community level in areas of awareness creation and resource mobilization.
- Non-governmental Organizations (NGOs), should provide mentorship programs to social networks to strengthen their capacity in resource mobilization and information sharing.

6.2.2. Effects of social networks on individual sanitation and hygiene behaviors.

- NGOs, should work hand in hand with social networks during community projects especially those related with behavioral change.
- Social networks, should create a clear agenda on sanitation issues regardless of the core functions of the networks so as to ensure appropriate behaviors are learned among networks.

6.2.3. Perceptions of social networks on behavioral change and promotion of basic sanitation.

- Gatekeepers should encourage people to join social networks regardless of their differences.
- Partners such as NGOs should support social networks with resources where applicable.

6.2.4. Area of further research

- Roles of social networks in ensuring sustainability of ODF status in the communities.

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APPENDICES

Appendix 1: Focused Group Discussion Guide.

1.1 Introduction

Thank you for agreeing to participate in this study. You have been asked to participate in this study because you are members of a social network in your community. We believe you have knowledge about various social networks in relation to sanitation services and behavioral change in your community. This is because as members you're responsible for taking care of your own lives and that of your fellow members. As a member of a social network in your community your experiences and views are very important to us, so feel free to share your experiences and views even if they are different from other group members.

- a. *In order to moderate this discussion in an orderly manner, I will request all the participants to speak one at a time.*
- b. *We request that you select the name/number you would prefer to use during the entire session of the discussion and place it in front of you.*
- c. *During the discussion if you want to agree or disagree or add an opinion to what a member is saying, do feel free to interject.*
- d. *We request that for the entire session of the discussion, refer to fellow group member with the name they have selected and placed in front of them.*
- e. *The discussion will be audio taped and we request everyone to respect each other's privacy by not disclosing the content of issues addressed here with non-participants.*
- f. *All your views will be confidential and only your arbitrary names will be included in the final report. The discussion will last approximately one hour and 30 minutes.*
- g. *My fellow researcher will be taking notes while I will be listening, asking questions and ensuring that everybody get a chance to participate.*
- h. *Before we proceed I would like everybody to go through the informed consent form supplied and sign it. The informed consent form provides the overall information about the study.*
- i. *Furthermore, I would like to ask if any of the group members have a question. Questions are addressed after which the tape recorder turned on then the session begins.*
- J. *We would like to reiterate that your participation is voluntary and confidential. Please let me know if you would like to stop the interview at any time.*

2.1 Contact Details

If you wish to ask questions later or seeking clarifications, you may contact my supervisor: Dr Russell Chidya, Mzuzu University, and Department of Water and Sanitation Development, P/Bag 201, Mzuzu. Email; russelchidya@gmail.com Cell; 0888023509.

Researcher; Erasmo Mbemba, David Gordon Memorial Hospital, Post Office Box 5, Livingstonia
Email: mbembablessings@gmail.com . Cell: 0882384002 / 0991788042.

Definition of terms

1. ***A basic sanitation service***- is defined as the use of an improved facility that is not shared with other households (Improved facilities include flush / pour flush to piped sewer systems, septic tanks or pit latrines; Ventilated Improved Pit latrines (VIP), composting toilets or pit latrines with slabs).
2. ***Social network*** - is any existing community group such as school groups, religious groups, youth groups, women groups, agricultural groups and savings and credit groups as well as key informants within the community.
3. ***Behavioral change*** - Transformation or modification of human behavior.
4. ***Promotion*** - Process to call for change or adoption of a service.

Opening question

We will start with everybody saying their selected names/numbers and their role in the social network.

a. To determine the significance of social networks on behavioural change and promotion of basic sanitation services.

1. Are there any sources of information and material resources sharing for basic sanitation services and behavioral change in your community? 1. Yes 2. No

2. If yes, what are the common sources information and material resources for basic sanitation services and behavior change in your community? Please elaborate how they work?

3. Where would you seek for information and materials regarding basic sanitation services and behavioral change? And why such choice and what will you consider to make such decision?

4. Have you considered discussing or sharing of information and materials to do with basic sanitation services and behavioral change with your peers or in your social networks?
1. Yes 2. No

5. Do you think it is important to share information and materials resources regarding basic sanitation services and behavior change in your social networks or with your peers?
1. Yes 2. No

6. If yes, what could be the
6 (a) Advantages and
6 (b) Disadvantages of using social networks to provide information and material resources with regard to basic sanitation services and behavioral change?

7. Do you share information and material resources regarding basic sanitation services and behavioral change in social networks or with your peers? 1. Yes 2. No

8. If yes, how frequent?
8 (a) it is a sustainable approach?
8(b) If no, what could be the reason?

b. To analyze the effects of social networks on individual sanitation and hygiene behaviors.

9. Do people around you influence your sanitation and hygiene behaviors? 1. Yes 2. No

10. If yes, what are some of the sanitation and hygiene behaviors that you have learnt from people around you, peers or in your social networks? Both positive and negative behaviors?

11. Are the behaviors sustained? 1. Yes 2. No

12. If no, what could be the possible reason?

13. Do social networks in your community promote sanitation and hygiene behaviors?

Yes 2. No

14. If yes, what are the common sanitation and hygiene practices promoted in the social networks?

15. Do people adopt the promoted behaviors? 1. Yes 2. No

16. If no, what could be the reason?

17. Is it possible to support each other in ensuring everyone in your social network is using a basic sanitation service and following proper sanitation and hygiene behaviors?

Yes 2. No

18. If yes, what kind of support could you offer each other? If no, why?

19. Do you think the use of social networks is critical in influencing your sanitation and hygiene behaviors? Should it be adopted as an intervention? 1. Yes 2. No

20. If yes, why? If no why?

c. To identify the perceptions of social networks towards promoting basic sanitation services and behavioural change.

21. Is it important to discuss basic sanitation services and behavioral change in your various social networks regardless of the nature of the networks? 1. Yes 2. No

22. If yes, why?

23. Do you think / believe social networks can do enough in putting up measures to enhance basic sanitation services and behavior change in your community? 1. Yes 2. No

24. If yes, why? If No, why?

25. What could be the motives of social networks to promote basic sanitation services and behavioral change in the community?

26. How could those motives be promoted and sustained within and by the networks?

27. What could be the possible attitudes of members in various social networks towards promoting basic sanitation services and behavioral change?

28. Do you think there could be some social-cultural factors that could influence social networks to promote basic sanitation services and behavioral change? 1. Yes 2. No

29. If yes, what could be some examples of these social-cultural factors? (Both positive and negative factors)? Can you elaborate more?

30. How could the positive social-cultural factors be promoted to ensure they contribute to the promotion of basic sanitation services and behavioral change?

31. What could be the possible ways of dealing with the negative social-cultural factors?

Ending question

Our discussion today was meant to help us understand the influence of social networks in promoting basic sanitation services and behavioral change. Before we conclude I would like to invite anyone who may want to add anything.

Thank you for your participation.

Appendix 2: In-depth Interview Guide: Key Informant

Introduction

I am Erasmo Mbemba, a Master's of Science at Mzuzu University under the department of Water and Sanitation. Am studying the influence of social networks on promotion of basic sanitation services and behavioral change. The main purpose of the interview is to get your feedback on your understanding of social networks and how they apply in the field of sanitation in your community. Therefore, I would appreciate if you could spend some time to do an interview. It will take 60 minutes to 90 minutes.

Participant Selection

You have been asked to participate in this study because of your position. We believe you have knowledge about various social networks in relation to sanitation services and behavioral change in your community and you reside within the study area, hence considered to have useful information and comments. This exercise has nothing to do within your personal life. However, you are encouraged to participate and provide the needful feedback.

Ethics and Confidentiality

Be assured that the interview will be treated anonymous and your comments will be handled with high confidentiality. The data from the interview will be analyzed and the findings will be used for academic purposes only. No names will be used.

Duration and risks

It is expected that this work will take a month from the day of the interview. There are no risks in participating in this research. Answering will be optional, if questions do not make sense or a question makes you uncomfortable feel free not to answer.

Reimbursements

Nothing will be rewarded in exchange of your participation. However, your participation is highly appreciated and an acknowledgement will be sent to each participant.

Who to contact for more information

If you wish to ask questions later or seeking clarifications, you may contact my supervisor: Dr Russell Chidya, Mzuzu University, and Department of Water and Sanitation, P/Bag 201, Mzuzu. Email; russelchidya@gmail.com Cell; 0888023509.

Researcher; Erasmo Mbemba, David Gordon Memorial Hospital, Post Office Box 5, Livingstonia. Email: mbembablessings@gmail.copm . Cell: 0882384002 / 0991788042.

Declaration and Certificate of consent

I have been asked to help giving information related to this research. I have read the foregoing information, and hereby agree to voluntarily be a participant.

Thank you.

Sign (Interviewer)

Sign (Interviewee)

.....
.....

2.1 Biographical data

Basic Participant Info

Gender:	Level of Education:	Age range
Current Position:	District:	15-24 <input type="checkbox"/>
Region:	Participant Code:	25-30 <input type="checkbox"/>
Date:		31-40 <input type="checkbox"/>
Interviewer name:		40 – Above <input type="checkbox"/>

a. To determine the significance of social networks on behavioural change and promotion of basic sanitation services.

First we would like to learn about the importance of social networks on information and material resources sharing in relation to sanitation services and behavioural change.

1. What are the common sources for basic sanitation services and behavioral change information and material resources in your community?
2. What can you say about the effectiveness of the sources (both information and materials)? Do you think the existing sources are doing enough? If not enough, why? If enough, why adoption of basic sanitation services and behavioral change still low?
3. Do you think it is possible to seek, discuss and share information and material resources to do with basic sanitation services and behavioral change in various social groups, peers or networks in your community regardless their core functions?
4. Based on your experience are social networks doing enough in sharing of basic sanitation services and behavioral change information and material resources?
5. What could be the
 - 5 (a) Advantages and
 - 5 (b) Disadvantages of using social networks in information and material resources sharing?
6. What could be the frequency of the information sharing within social networks or among peers for desired change?
7. What community structures could be put in place to ensure information and materials for basic sanitation services are available and behavioral change is being promoted? Why the proposed community structure?
8. What could social networks or groups do
 - (a) to ensure sanitation information is shared or discussed within network and materials resources are available for anyone to have a basic sanitary services?

(b) what strategies could be there to strengthen the approach for desired change?

b. To analyze the effects of social networks on individual sanitation and hygiene behaviors.

Now we would like to discuss about the influence of social networks on individual behaviors.

8 Do people change sanitation and hygiene behaviours from learning from each other?

1. Yes 2. No

9 What are some of the sanitation and hygiene behaviors that people around each other, peers or social groups learn from each other? Both positive and negative behaviors?

10 Are the behaviors usually sustained?

11 What are your experiences for the possibility to support each other in ensuring everyone in your social network is using a basic sanitation service and following proper sanitation and hygiene behaviors?

12 What kind of support could you offer each other? How could the support be strengthened to ensure it is sustainable?

13 Do you think the use of social networks should it be adopted as an intervention that influences people's behaviors for desired change? If yes, why? If no why?

c. To identify the perceptions of social networks towards promoting basic sanitation services and behavioural change.

We would also like to talk about the perceptions of social networks in relation to sanitation services and behavioural change.

14. Is it important to discuss about basic sanitation services and behavioral change in your various social networks regardless of the nature of the networks? 1. Yes 2. No

14 (b) If yes, why?

15 Do you think / believe social networks can do enough in putting up measures to enhance basic sanitation services and behavior change in your community? 1. Yes 2. No

16 If yes, why? If No, why?

- 17 What could be the motives of social networks to promote basic sanitation services and behavioral change in the community?
- 18 How could those motives be promoted and sustained within and by the networks?
- 19 What could be the possible attitudes of members in various social networks towards promoting basic sanitation services and behavioral change?

Lastly, we would like to learn from you about the social-cultural factors that could play a role in promotion of basic sanitation services and behavioural change.

Do you think there could be some social-cultural factors that could influence social networks to promote basic sanitation services and behavioral change? 1. Yes 2. No

- 20 If yes, what could be some examples of these social-cultural factors? (Both positive and negative factors)? Can you elaborate more?
- 21 How could the positive social-cultural factors be promoted to ensure they contribute to the promotion of basic sanitation services and behavioral change?
- 22 What could be the possible ways of dealing with the negative social-cultural factors?

Thank you for your participation.

Appendix 3: Household Questionnaire

1.1. Background Information

1.1.1 Introduction

I am Erasmo Mbemba, a Master of Science student at Mzuzu University under the Department of Water and Sanitation. Am studying the influence of social networks on promotion of basic sanitation services and behavioral change. The main purpose of the interview is to get your feedback on your understanding of social networks and how they apply in the field of sanitation in your community. Therefore, I would appreciate if you could spend some time to do an interview. It will take not more than 60 minutes.

Participant Selection

You have been asked to participate in this study because you reside within the locality in which this study is being done, hence considered to have useful information and comments. We believe you have knowledge about sanitation and hygiene in relation to social networks in your community. This exercise has nothing to do within your personal life. However, you are encouraged to participate and provide the needful feedback.

Ethics and Confidentiality

Be assured that the interview will be treated anonymous and your comments will be handled with high confidentiality. The data from the interview will be analyzed and the findings will be used for academic purposes only. No names will be used.

Duration and risks

It is expected that this work will take a month from the day of the interview. There are no risks in participating in this research. Answering will be optional, if questions do not make sense or a question makes you uncomfortable feel free not to answer.

Reimbursements

Nothing will be rewarded in exchange of your participation. However, your participation is highly appreciated and an acknowledgement will be sent to each participant.

Who to contact for more information

If you wish to ask questions later or seek clarification, you may contact my supervisor: Dr Russell Chidya, Mzuzu University, and Department of Water and Sanitation, P/Bag 201, Mzuzu. Cell; 0888023509, Email; russelchidya@gmail.com.

Researcher; Erasmo Mbemba, David Gordon Memorial Hospital, P.O BOX 5, Livingstonia. Cell: 0882384002, Email: mbembablessings@gmail.com.

Declaration and Certificate of consent

I have been asked to help giving information related to this research. I have read the foregoing information, and hereby agree to voluntarily be a participant.

Thank you.

Sign (Interviewer)

Sign (Interviewee)

.....
.....

1.0. Socio Demographic Data

1. Gender

- a. Male b. Female c. Other (specify).....

2. Marital status

- a. Married b. Single c. Divorced d. Widow e. Widower f. Other
(specify).....

3. Religion

- a. Christian b. Muslim c. Other (specify).....

e. Other (specify).....

3. What diseases can one suffer due to lack of good sanitation and hygiene?

a. Diarrheal diseases

b. Respiratory diseases

c. Skin diseases

d. Do not know

e. Cannot suffer any disease

f. Other (specify).....

4. What is the reason of having a latrine and hand-washing facility at a household level?

a. Dignity

b. Help to reduce spread of diseases

c. Promoting a clean environment

d. Privacy

e. Persuaded by health worker / NGO / social network

f. Not sure

g. Other (specify).....

5. What are the signs or evidences of lack of sanitation and hygiene in your surrounding?

a. Faeces (human and animal)

b. Garbage and waste water

c. Bad smell

d. No latrine

e. Do not know

f. Other (specify).....

6. What kind of sanitation and hygiene related knowledge is shared among social networks (groups, friends, neighbors)?

- a. Owing and utilizing a latrine
- b. Personal hygiene
- c. Environment cleanliness
- d. General prevention of Sanitation and hygiene diseases
- e. Other (specify).....

B. Practices

7. Do you have a toilet facility at your household?

- a. Yes
- b. No

8. If yes, do you use the toilet facility?

- a. Yes
- b. No

9. If yes, what kind of toilet facility do members of your household use for excreta disposal?

- a. Pit latrine with a slab
- b. Pit latrine without a slab
- c. Bush
- d. Open field
- e. Bucket
- f. Others (specify).....

10. If no in 7 above, what is the reason of not having a toilet facility?

- a. Not a priority
- b. Do not have money to build one
- c. Do not need it

- d. I had but it fell
- e. No materials to build
- f. No one to build
- g. Others (specify).....

11. Is the toilet facility shared with other households?

- a. Yes
- b. No

12. If yes, how many households use this toilet facility?

- a. 2 – 4
- b. 5-8
- c. More than 9

13. Do you wash hands?

- a. Yes
- b. No

14. If yes, when do you wash hands?

- a. After visiting the latrine
- b. Always when hands are dirty
- c. After eating
- d. After cleaning children
- e. Before breastfeeding
- f. Others (specify).....

15. What is the reason of washing hands?

- a. To be clean
- b. Free from bad smell
- c. Prevent diseases
- d. Because a health worker or NGO told you to be washing hands
- f. Others (specify).....

16. If no, why don't you wash hands?

- a. No water supply
- b. I do not know how to wash hands
- c. It has no benefit
- d. Have never got sick because of not washing hands
- e. it's a choice
- f. Others (specify).....

17. Did people around you / social networks influence your sanitation and hygiene practices?

- a. Yes
- b. No

18. If yes, what kind of sanitation and hygiene practices?

- a. Hand-washing
- b. Latrine use
- c. Open defecation
- d. Disposing wastes in rubbish pit
- e. Others (specify).....

a. Attitudes

19. It is an individual's responsibility to ensure proper sanitation and hygiene practices are adhered to?

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. Neither agree nor disagree

20. Open defecation is not a health threat to the people in the community?

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. Neither agree nor disagree

21. Latrine sharing with other households is safe?

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. Neither agree nor disagree

22. It is possible to own and use a latrine without being supervised by officials from health sector and NGOs

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. Neither agree nor disagree

23. It is possible to build own latrine without zero subsidy but through social network support?

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly disagree

5.0. Household observation Guide

Areas of observations	YES	NO	Comment
1. Is there a pit latrine (<i>with a slab or not</i>)?			
2. It is being used (<i>check for presence of flies, faeces, smell</i>)?			
3. Is it clean?			
4. Is it being shared with other households?			
5. Is there a hand-washing facility with water and soap?			
6. Is the hand-washing facility being used? (<i>Check for presence of water, condition of the facility</i>)?			

Thank you for your participation.

Appendix 4: Informed Consent Form



Centre of Excellence in Water and Sanitation

Mzuzu University

P/Bag 201, Mzuzu 2, Malawi

Informed Consent Form

Introduction

I am a student studying Master of Science in Sanitation at Mzuzu University. I am doing research on the influence of social networks on behavioral change and promotion of basic sanitation services. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or of another researcher.

Purpose of the research

This research aims to investigate the influence of social networks on behavioural change and promotion of basic sanitation services.

Type of Research Intervention

This research will involve your participation in a group discussion.

Participant Selection

You are being invited to take part in this research because you are members of a social network in your community.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate nothing will change. You may skip any question and move on to the next question.

Duration

The research takes place over 12 months in total.

Risks

You do not have to answer any question or take part in the discussion if you feel the question(s) are too personal or if talking about them makes you uncomfortable.)

Reimbursements

You will not be provided any incentive to take part in the research.

Sharing the Results

The knowledge that we get from this research will be shared with you and your community before it is made widely available to the public. Following, we will publish the results so other interested people may learn from the research.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact: Dr Russell Chidya, Mzuzu University, and Department of Water Resources and Development, P/Bag 201, Mzuzu. Email; russelchidya@gmail.com Cell; 0888023509.

Researcher; Erasmo Mbemba, Family Planning Association of Malawi, B424 Lilongwe. Email: mbembablessings@gmail.com. Cell: 0882384002.

This proposal has been reviewed and approved by NCST, which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the IRB, contact Mr. Mike G Kachedwa, Chief Research Services Officer, Health, Social Sciences and Humanities Division, National Commission for Science and Technology, P.O. Box 30745, Capital City, Lilongwe 3, Malawi, Office Phone: +265 1 771 550/774 869.

Do you have any questions?

Part II: Certificate of Consent

I have been invited to participate in research about influence of social networks on behavioral change and promotion of basic sanitation services.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions. I consent voluntarily to be a participant in this study

Print Name of Participant _____

Signature of Participant _____

Date _____

Day/month/year

If illiterate 1

1 A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness _____

Thumb print of participant

Signature of witness _____

Date _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the research project. I confirm the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent _____

Date _____

Appendix 5: Research Approval Letter from National Commission for Science and Technology



NATIONAL COMMISSION FOR SCIENCE & TECHNOLOGY

Lingadzi House
Robert Mugabe Crescent
P/Bag B303
City Centre
Lilongwe

Tel: +265 1 771 550
+265 1 774 189
+265 1 774 869
Fax: +265 1772 431
Email: directorgeneral@ncst.mw
Website: <http://www.ncst.mw>

**NATIONAL COMMITTEE ON RESEARCH IN THE
SOCIAL SCIENCES AND HUMANITIES**

Ref No: NCST/RTT/2/6

10th March 2020 **Mr**

Erasmo Mbemba,

Principal Investigator,

C/O Mr Erasmo Mbemba,

Chitedze Research Station,

P.O. Box 158,

Lilongwe.

Email: mbembablessings@gmail.com

Dear Mr Mbemba,

**RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR
PROTOCOL NO. P.02/20/456: THE INFLUENCE OF SOCIAL NETWORKS
ON BEHAVIOURAL CHANGE AND PROMOTION OF BASIC SANITATION SERVICES
IN MZIMBA, MALAWI**

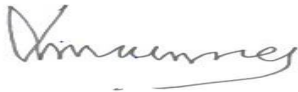
Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in

the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the National Committee on Research in the Social Sciences and Humanities (NCRSH) in a format that is available at the Secretariat. Once the study is finalized, you are required to furnish the Committee and the Commission with a final report of the study. The committee reserves the right to carry out compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Wishing you a successful implementation of your study.

Yours Sincerely,



Yalonda .I. Mwanza

NCRSH ADMINISTRATOR

HEALTH, SOCIAL SCIENCES AND HUMANITIES DIVISION

For: CHAIRMAN OF NCRSH

Committee Address:

***Secretariat, National Committee on Research in the Social Sciences and Humanities,
National Commission for Science and Technology, Lingadzi House, City Centre, P/Bag
B303, Capital City,***

***Lilongwe3, Malawi. Telephone Nos: +265 771 550/774 869; E-mail address:
ncrsh@ncst.mw***

HEALTH, SOCIAL SCIENCES AND HUMANITIES DIVISION