EFFECT OF COMMUNITY MOBILIZATION INTERVENTION ON SELF MEDICATION WITH ANTIMICROBIALS AMONG HOUSEHOLDS IN NYALENDA INFORMAL SETTLEMENT, KISUMU COUNTY, KENYA

BY

ISABEL AKOTH OWUOR

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DECLARATION

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ISABEL AKOTH OWUOR
PhD/PH/00192/2014

Signature…………………………………Date…………………………………………….

This thesis is submitted for examination with our approval as university supervisors:

1. Prof. Collins Ouma, PhD
Department of Biomedical Sciences and Technology,

School of Public Health and Community Development,

Maseno University, Maseno, Kenya.

Signature…………………………………...Date………………………………………….

2.   Dr. Harrysone Atieli, PhD
Department of Public Health,

School of Public Health and Community Development,

Maseno University, Maseno, Kenya.

Signature………………………………….Date………………………………………….

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DEDICATION

I dedicate this work to my husband Benjamin and my children Janes, Habakkuk and Christian.

ABSTRACT

Self-medication with antimicrobials (SMWA) is a common practice in the world, especially in economically deprived communities with loose regulatory systems. Previous studies in Nyalenda B Ward, found 76.9% of the households perceiving the practice as convenient and appropriate. The SMWA could result into missed diagnosis, misdiagnosis, delay in appropriate treatments and emergence of human pathogens resistance. The Nyalenda informal settlement is not empowered with knowledge of risks of SMWA nor ability to negotiate their inclusion in the health system. The aim of this study was developed in response to unsolved SMWA. The main objective of the study was to determine the effect of community mobilization intervention on SMWA among households in Nyalenda informal settlement. The specific objectives were to establish the reasons for SMWA by households, to evaluate the association of Participatory Learning and Action (PLA) with the different domains of SMWA empowerment (power within, power with and power over) and to determine the effect of empowerment on SMWA. This study was a quasi-experimental trial of a community mobilization intervention that used community empowerment as an intervention strategy, and approached through participatory learning and action (PLA). Based on the sub-divisions in Nyalenda, the intervention took place in Nyalenda B Ward and NyalendaA Ward was used as a control. Baseline and end line survey for the case and the control group used a cluster sampling method with a sample size of 380 households determined by Fisher's formula and the study population was all households in Nyalenda A (9,392) and Nyalenda B (10,443). The intervention had two samples, the first was determined arbitrarily and chosen randomly from all the households in Nyalenda B (1501) and the second was determined and chosen purposively from Nyalenda B CHVs (30). Data was collected through structured questionnaires. Chi square analyses were used to establish the socio-demographic characteristics of and reasons for SMWA by Nyalenda informal settlement before and after the intervention. Binary logistic regression analysis evaluated the association of PLA and different domains of empowerment and also determined reasons for SMWA and socio demographics influencing self-medication with antimicrobials among the intervention group. Difference in differences determined the effect of community empowerment on SMWA. Statistical significance was tested at $P \leq 0.05$. The intervention and the control group showed similarities in their reasons for SMWA from both their baseline and end line surveys but the intervention group decision to SMWA was informed. The association between PLA domains and all empowerment domains revealed that the odds that each and every PLA domain is associated with every empowerment domain is more than 2 (the range is 2.2-8.6) and at a $P < 0.0001$. Community empowerment on SMWA resulted to an effect size of 52.6% (95% CI=0.469-0.563) and a study on the case community after the intervention revealed that the socio demographics and the reasons for SMWA associated with SMWA were illness or symptoms of illness (OR=1.324, 95% CI=1.129-1.554, $P=0.001$), age (OR=0.647, 95% CI=0.431-0.973, $P=0.037$) and information leading to the SMWA (OR=0.732, 95% CI=0.613-0.873, $P=0.001$). Health insurance schemes [health insurance cover (OR=1.772, 95% CI=0.652-2.887, $P=0.133$) and Universal Healthcare Services (OR=1.165, 95% CI=0.922-1.472, $P=0.201$)] had no effect on SMWA. Community mobilization is a successful method for increasing public knowledge and understanding of antimicrobial resistance and appropriate use of antimicrobials, it also reduces SMWA proportion especially when strengthened with structural modification such us improvement of access to antimicrobial prescription among the households in Nyalenda informal settlement in Kisumu County. This intervention should be prolonged to offer sustained change, while the health system should implement policies and laws restricting inappropriate sale of antimicrobials.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AB   -   Antibiotics

CH   -   Community Health Extension Officer

CHHV   -   Community Health Volunteer

CI   -   Confidence index

CM   -   Community Members

CU   -   Community units

HHS   -   Households

KDHS   -   Kenya Demographic Health Survey

NHSSP II   -   National Health Sector Strategic Plan II

NPM   -   Nonprescription only medicine

OTC   -   Over the counter only medicine

PLA   -   Participatory Learning and Action

PMO   -   Prescription only medicine

PRA   -   Participatory Rural Appraisal

RRA   -   Rural Rapid Appraisal

SMP   -   Self-medication with prescription only medicine.

SMWA   -   Self-medication with Antimicrobials

SPSS   -   Statistical Package for Social Sciences

WHO   -   World Health Organization

OPERATIONAL DEFINATION OF TERMS

Antimicrobials in this study: only antibiotics and antimalarials for oral use

Community mobilization: It is an intervention that builds individual and collective community response to a health behaviour, through their full participation in the intervention from its initiation stage through planning, implementation, monitoring and control to its closure with the researcher coming in as a facilitator

Empowerment: When individuals develop self-confidence, self-respect with increased awareness of a health behaviour and desire to change. They also realize the strength that comes from associating with others and especially ability to access and control resources

Empowerment techniques: They are techniques or strategies that provide emotional support to individuals and create supportive and trusting group atmosphere.

Self-medication: The obtaining and consuming of a drug without the advice of physician either for diagnosis, prescription or surveillance of treatment.

Participatory Learning and Action. Free interactive flexible learning and listening and interactive evaluation of the outcome in a comfortable environment

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background

Self-medication is the obtaining and consumption of a drug without the advice of physician either for diagnosis, prescription or surveillance of treatment (Yousef, Al-Bakri, Bustanji, & Wazaify, 2008) or the use of medication by a patient on his own initiative or on the advice of a pharmacist or a lay person instead of consulting a medical practitioner (Rather, Kim, Bajpai, & Park, 2017; WHO, 2000). The laws governing appropriate use of antimicrobials exists in Kenya. However, weak enforcement of these laws regulating the use of antimicrobial agents has posed a major challenge due to inadequate capacity and oversight to monitor compliance to regulations. Self-medication when properly practiced can provide some benefits to individuals and health systems. It saves time spent queuing up for medical consultations, saves scarce medical resources from being used on minor conditions, lightens the workload of doctors, decreases health care cost and reduces absenteeism from work (Nepal & Bhatta, 2018). Antimicrobial resistance reported in several countries is likely to be associated with irrational use (Kotwani, Wattal, Joshi, & Holloway, 2012; McCombie, 2002).

Despite these potential benefits obtained from practicing self-medication, there are many undesired outcomes that may result from inappropriate self-medication use, especially with antibiotics (Nwokike, Clark, & Nguyen, 2017). The common inappropriate antimicrobial uses are, use without proper indication, administering wrong dosages, incorrect treatment duration, late or absent downscaling of treatment, poor adherence to treatment, and use of poor quality or substandard antimicrobials. Inappropriate drug use predisposes patients to drug interactions, masking symptoms of underlying disease and development of microbial resistance (Nepal & Bhatta, 2018).

Self-medication with antibiotics (SMA) contributes to the emergence and spread of antimicrobial resistance (AMR) (Nepal & Bhatta, 2018; Tornimbene *et al.*, 2018). Antibiotic resistance is shrinking the range of effective antibiotics and is currently listed as a global health problem. WHO global report on antibiotic resistance reveals serious, worldwide threat to public health. It clearly mentions serious threat is no longer a prediction for the future, as it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country (WHO, 2014). Moreover; lack of knowledge is a major factor responsible for inappropriate antimicrobial use and hence resistance globally (WHO, 2001). One of the effective strategies to prevent antimicrobial resistance (AMR) had been, staying one step ahead of the pathogens through discovery of new antibiotics. This could no longer be as productive since 15 out of the 18 largest pharmaceutical companies, owing to the financial burden over other drugs such as those used for chronic illnesses, abandoned the antibiotic field (Ventola, 2015). One of the weapons of saving the currently effective antibiotics from developing resistance is therefore handling them with care. Antimicrobial use has been regulated mainly under

The Kenya Pharmacy and Poisons Act (Cap 244) and related professional laws. The legislation is in support of the National Action Plan on Prevention and Containment of Antimicrobial Resistance policy whose goal is to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them. The first objective of this policy is to increase public knowledge and understanding of AMR and use of antimicrobials (Kenya-Government, 2017).

1.1.1 Reasons for self-medication with antimicrobials

Self-medication with prescription only medicine (SMP) is a common practice in the world, especially in economically deprived communities with loose regulatory systems

(Togoobaatar *et al*., 2010). It is estimated that more than 50% of antibiotics worldwide are purchased privately without a prescription from pharmacies or street vendors in the informal sector (Cars & Nordberg, 2005; Morgan, Okeke, Laxminarayan, Perencevich, & Weisenberg, 2011). 80% of these are from Low and Middle-Income Countries (LMIC) of which about 20–50% are used inappropriately (Auta *et al*., 2019) . The reasons for the practice may also vary from country to country especially in Africa. Socio-economic factors such as low income/high rate of unemployment and low level of education, poor access to health care, informal access to antibiotics, storage of antibiotics at home and health-seeking behaviours of the general population have been reported in other studies from Asia, the Middle East, South Eastern Europe and Africa (Liberati *et al*., 2009; Nwokike *et al.,* 2017).

The prevalence of self-medication with antibiotic (SMA) ranges from 48% in Saudi Arabia to 78% in Yemen and Uzbekistan (Tatyana *et al*., 2014), in Sudan, Khartoum State 73.9% of a study population had self-medicated with antibiotics and/or antimalarials (Awad, Eltayeb, Matowe, & Thalib, 2005). The prevalence of self-medication in Kenya is 53.4%, in Nyanza 59.2% and in Kisumu 44.6% (KIHBS, 2005/06). In Magwagwa Ward, Nyamira County 60% of adults practiced self-medication with antibiotics (Nyambega, 2017), in Kisumu City, Western Kenya 74% of households had self-medicated for malaria (Kimoloi, Okeyo, Ondigo, & Langat, 2013) and Nyalenda B Sub-location in Kisumu County 76.9% households self-medicated with antimalarial/antibiotics (Owour, Alwar, & Oyugi, 2015).

Self-medication is practiced because it can readily relieve acute medical problems, save time spent in waiting to see a doctor, save life in a cute condition and may contribute to decreased healthcare cost (Hughes, McElnay, & Fleming, 2001; Noone & Blanchette,

2018), however, it may result in wasting of resources, increase in pathogens resistance, drug interactions, adverse drug reactions, prolonged suffering and drug dependence (Lescure, Paget, Schellevis, & van Dijk, 2019; Mahmoud *et al.*, 2020). The practice has the potential of harming society at large as well as the individual patient (WHO, 2001).

A systematic study of 44 European and Anglo-Saxon countries that are self-medicating with antibiotics demonstrated that the practice is enhanced since the medications are stored at home and there is poor access to healthcare (Lescure *et al.,* 2019). Residents of a rural District of Kilimanjaro region, North-eastern Tanzania practice SMWA (58%) during emergency illness or because of health facility charges and proximity of pharmacy to home (HorumpendeI *et al.*, 2018). A study on self-medication with antimalarials in Kisumu City, Western Kenya indicated that households were self-medicating with antimalarial drugs because of the far distance to the nearest health care facilities, perceived mild severity of illness, perceived effectiveness of self-medication, cost effectiveness, to save time, previous successful self-treatment, ease of access to drug sources, public medical education, family or friend influence and as initial treatment before visiting an hospital (Kimoloi *et al.,* 2013). A study on antibiotic use and misuse among adults in Magwagwa Ward, Nyamira County in Kenya revealed that the respondents were practicing SMWA because of the availability of the medicine that remained from the pharmacy or those that remained from previous illness and friends/relatives. Their reason for the practice was emergency illness, proximity to the pharmacies, availability of old drugs and old prescription (Nyambega, 2017).

The households in Nyalenda B Ward in Kisumu County in Kenya practice SMWA (76.9%) because they perceive it to be convenient and appropriate (Owour *et al.*, 2015). A consumer's view of a product or a service is unique to individuals or members of a particular culture (Kretch, Crutchfield, & Ballachey, 1962; Solomon, 2012). These

studies are giving different reasons for self-medication with antimicrobials use implying reasons for SMWA in Nyalenda informal settlement is unique to them Given the need to determine the effect of community mobilization intervention on self-medication with antimicrobials among the households, establishing reasons for self-medication with antimicrobial use before and after the intervention was necessary. As such, the current study established by households in Nyalenda informal settlement.

1.1.2 Community Mobilization

Community mobilization is broadly defined as individuals taking action organized around specific community issues (Fawcett, Francisco, & Hyra, 2000). Early community mobilization efforts attempted to view the individual in relationship to the community for example family or the neighborhood to better understand the interplay of individual characteristics, health conditions, and environmental factors (Freire, 1972). It is operationalized as an intervention that seeks "to create and harness the agency of the marginalized groups most vulnerable to a health behavior, enabling them to build a collective, community response, through their full participation in the design, implementation and leadership of health programmes and by forging supportive partnerships with significant groups both inside and outside of the community" (Campbell & Cornish, 2010). There are four community mobilization models currently in use in the social sciences and public health; participatory action research, community-based participatory research, collaborative betterment, and community empowerment (Freire, 1972; Shediac Rizkallah, 1998). Under Community Empowerment Model (CEM), communities initiate the coalition process through community organizing, and community representatives can assume power and control over the mission, decision-making, and action plans. Institutions outside the community generally provide support to the coalition's goals, but do not play a primary role. The process, then, is guided and

controlled by community representatives and not institutions outside the community (Labonte & Laverack, 2008). Community empowerment therefore is an essential strategy for achieving community mobilization for this study.

Community mobilization involves community participation, which is defined as a method of people working together through community structures in order to raise awareness and identify local ideas, concerns, priorities, and opportunities so as to enable them to achieve sustained provision of appropriate services (Sarah, 2014).

Two conceptual approaches to community participation have been identified, vertical and horizontal. Vertical participation implies a centralized development of research objectives by policy makers with responsibility to engage the community, whereas horizontal participation entails facilitating communities to identify and define problems from their perspective and subsequently to help tailor solutions to specific context and needs. The horizontal approach is known to engender sustainability of community-oriented programs through self-efficacy, social identity and empowerment (Atkinson, Vallely, Fitzgerald, Whittaker, & Tanner, 2011). It is the horizontal approach, which is embraced in the community empowerment model.

Successful disease control at community level needs to take human behavior, socio-cultural and economic context into account in parallel with biomedical interventions (Heggenhougen, 2003). Community mobilization has been endorsed as one of the structural interventions that improve health and social issues of poor and marginalized populations as largely explained through empowerment (Chambers, 2006; McDonald, Bammer, & Deane, 2009).

There is a large evidence base where community mobilization through horizontal approaches have been successful due to a strong partnership between community and

program implementers (Amambia *et al.*, 2018; Asthana & Oostvogels, 1996; Cornish 2010; Ghose *et al.*, 2008; Pillai, Bhattacharjee, Ramesh, & Isac, 2011; Swendeman, Basu, Das, Jana, & Rotheram-Borus, 2009; Wetmore & Theron, 1998). The key elements of these programs are generation of a feeling of empowerment, local ownership and responsibility and the application of action oriented and participatory approaches.

Horizontal participatory approaches, such as the participatory rural appraisal and participatory learning and action (PLA) aims at facilitating participants to identify and explore issues that are important to them with regard to an identified problem, and to identify opportunities for change and set priorities among action steps to achieve desired goals in an innovative and productive way (Chambers, 2006; McDonald *et al.*, 2009). This is achieved by engendering visualization through the use of cards on which participants write or draw illustrations, promoting an active participation process including facilitation and participation in small and large group sessions. Participants are considered to be synergistic and self-motivated with an overarching assumption that those who respond to invitations are more concerned with the problem to be studied (Wakeford & Singh, 2008). Participatory Learning and Action (PLA) has been used in a wide range of situations for supporting empowerment goals (Rifkin & Pridmore, 2010). This led the study to use PLA as a methodology for achieving empowerment since it enables groups to engage meaningfully and contribute with ease to academic research. A study conducted in the Republic of Ireland, which aimed at including migrants in primary healthcare participation, used PLA research to access and engage with 'hard-to-reach' migrants in primary healthcare research. The PLA enabled access and meaningful engagement of the migrants in primary health care and it was qualitatively evaluated using *emic* and *etic* criteria (O'Reilly-de Brún, 2016). Studies in Little Karoo, South Africa; Odibo, Namibia,

various communities in Zambia, and Northern Cape Province, South Africa on PLA initiatives based on strengthening self-reliance and sustainability proved to be appropriate strategy for development (Wetmore & Theron, 1998) and a pilot study in Kisumu, a city in Kenya explored the utility and effectiveness of participatory action research as an approach for youth-led peace building in marginalized communities and proved it a valuable methodological approach (Amambia *et al.*, 2018). However, these studies did not show how PLA associates with empowerment. The study therefore realized the importance of establishing the proportion of each domain of PLA and how each one of them associates with each domain of empowerment. Therefore, these arguments led to the decision to assess the association of Participatory Learning and Action (PLA) and the different domains of empowerment on self-medication with antimicrobials in Nyalenda informal settlement in Kisumu County.

Self-medication with antimicrobial practice is not likely to benefit patients as it is associated with potential risks both to the patient and the community. Expanding access to social entitlements will facilitate the reduction of the proportion of self-medication with antimicrobials and promote rationale use of antimicrobials and minimizing risk. Self-medication with antimicrobial intervention studies that applied Public Health Education using functional health literacy or conventional approaches or used vertical approach did not yield the desired result in the affected regions. These programs also did not identify, recruit, and train trustworthy community members to provide education addressing attitudes and behavioral skills as well as health information (Huttner, Herman, Theo, & Stephan, 2010; Mainous, Diaz, & Carnemolla, 2009). Responding to these needs requires a shift in emphasis from trying to scare people into healthy behavior to empowering them with the tools for exercising personal control over their health habits

(Albert, 1994). In these studies, establishing a cause-effect relationship between the campaigns and a reduction in the use of antibiotics was further complicated by methodological limitations (Elder *et al.*, 1986; Mainous *et al.*, 2009; Murray, 1995). This study therefore used empowerment as a community mobilization strategy and determined its effect on self-medication with antimicrobials in Nyalenda informal settlement.

1.2 Statement of the Problem

It is estimated that a quarter of the world's urban population lives in slums and out of every ten urban residents of the world more than seven are in developing countries (UN-Habitat, 2013), 60% of Kisumu urban population are in informal settlements, this makes the informal settlement a good representation for self-medication.. Informal settlements are characterized by high population density, poor sanitation and lack of consistent access to clean water. These characteristics promote the spread of infectious diseases and the demand for antibiotics (UN-Habitat, 2016). This contributes to informal settlement being more vulnerable to self-medication with antimicrobials as compared to other settlements. Approximately 50% of antibiotics worldwide are purchased privately without a prescription from pharmacies or street vendors in the informal sector, 80% of these are from Low and Middle-Income Countries (LMIC) of which about 20–50% are used inappropriately. Previous studies in Nyalenda B Ward, found 76.9% of the households practicing SMWA which is higher compared to the prevalence of self-medication in Kenya (53.4%,), Nyanza (59.2%) and Kisumu (44.6%)(KIHBS, 2005/06). Nyalenda is the only informal settlement in Kisumu City with government health facilities, yet they perceive the practice to be a convenient and appropriate (Owour *et al*., 2015). Majority of this population are engaged in small-scale businesses throughout the day and better part of the night. These facilities are understaffed and with limited equipment. The residents

have limited access to better health care from these facilities and therefore not able to appreciate its difference from self-medication. The pharmaceutical system in this region is compromised by the existence of illegal medicine outlets and limited or no access to registered pharmaceutical personnel, therefore, the public has limited access to technical support for appropriate antimicrobial use. The positive outcomes of SMWA are not expected in such a setup but consequences of inappropriate antimicrobial use. The patient and the community meet the risk because they have inadequate or lack of knowledge and understanding of the risks associated with inappropriate self-medication with antimicrobials. Infectious diseases are a major cause of outpatient morbidity and acceleration of resistance to available and affordable antimicrobials may complicate the situation. Improved knowledge and understanding SMWA may enhance appropriate use of antimicrobials and thus limit the progress of resistance. The Kenya Laws that regulate antimicrobial use is in support of the Kenya National Action Plan on Prevention and Containment of Antimicrobial Resistance policy. This policy calls for increased public knowledge and understanding of AMR and use of antimicrobials. Nyalenda informal settlement is vulnerable to SMWA. Public Health Education on SMWA using functional health literacy or conventional approaches or vertical approaches have been applied in other areas other than this study area and did not yield the desired result but horizontal approaches have been successful in other intervention other than SMWA. Therefore, this study implemented community mobilization intervention on self-medication with antimicrobials through empowerment strategy and Participatory Learning and Action as a tool (a horizontal approach) and determined its effect on the SMWA among households in Nyalenda informal settlement.

1.3 General Objective

To determine the effect of community mobilization intervention on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County.

1.3.1 Specific Objectives

1. Establish reasons for self-medication with antimicrobial by households in Nyalenda informal settlement in Kisumu County.

2. Evaluate the association of Participatory Learning and Action and Community Empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County.

3. Determine the effect of Community Empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County.

1.3.2 Research Questions

1. What are the reasons for self-medication antimicrobial use by households in Nyalenda informal settlement in Kisumu County?

1.3.3 Hypothesis of the study

H_{01}: Participatory learning and action (PLA) do not significantly associate with Community Empowerment on self-medication with antimicrobials in Nyalenda informal settlement in Kisumu County.

H_{02}: Community empowerment do not significantly reduce the proportion of self-medication with antimicrobials among the households in Nyalenda informal settlement in Kisumu County.

1.4 Significance of the Study

Inappropriate drug use predisposes patients to drug interactions, masking symptoms of underlying disease and development of microbial resistance. The underlying causes of Antimicrobial Resistance (AMR) and current barriers to addressing it in Kenya include, limited awareness of its implications in human among the general public and inappropriate drug use as a result of high levels of irresponsible SMWA and mismanaged prescription antimicrobials. The reasons for SMWA were crucial in pointing to the health system the necessity of enhancing quality healthcare facilities with easy access and the existence of only licensed pharmaceutical practice. The community gained an entirely new perspective of self-medication with antimicrobials (SMWA) therefore enabling them to make informed decision on self-medication with antimicrobials and to consider facility management and consulting or purchasing only from licensed pharmaceutical premises. Therefore, the intervention reduced cases of missed diagnosis, misdiagnosis, delay in appropriate treatments and emergence of human pathogens resistance. Community empowerment also increased public participation in health program decision making and reinforcement of Community Health Strategy.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents a cross-section of conceptual, theoretical and empirical literature on use of self-medication with antimicrobials and its consequences, community mobilization, empowerment as strategy and Participatory Learning and Action as a tool. This will enable the understanding of the risks associated with SMWA, development and operationalization of domains of empowerment and PLA, effective implementation and evaluation of community mobilization.

2.2 Concepts of Self-Medication with antimicrobials

Self-medication, an important driver of antibiotic overuse, is common, particularly in developing countries where antibiotics can be bought over the counter in pharmacies or in local market places, but it occurs also in Europe, mainly in southern and eastern countries (Campos *et al.,* 2007). Direct sales via the internet are also increasing and it is difficult to (Hughes *et al*., 2001) counter antibiotics and counterfeit drugs that may contain sub-optimal active antibiotic concentrations. Moreover, bacteria are rapidly developing when antibiotics are misused.

2.2.1 Reasons for Self-Medication with Antimicrobials

Self-medication with prescription only medicine can readily relieve acute medical problems, but most importantly, it can save the time spent in waiting to see a doctor, and even save life in a cute condition and may contribute to decreased healthcare cost (Hughes *et al*., 2001).The reason(s) why individuals decide to use medicines designated as prescription only without any guidance from a health professional are unique to different settings and are reflective of a matrix of health system, societal, economic and

health factors (Radyowijati & Haak, 2003). It is in record the medications stored at home, poor access to healthcare (Lescure *et al.,* 2019)emergency illness, health facility charges proximity of pharmacy to home (HorumpendeI *et al.*, 2018), far distance to the nearest health care facilities, perceived mild severity of illness, perceived effectiveness of self-medication, cost effectiveness, to save time, previous successful self-treatment, ease of access to drug sources, public medical education, family or friend influence as initial treatment before visiting an hospital (Kimoloi *et al.,* 2013)availability of the medicine that remained from the pharmacy, remains from previous illness and friends/relatives, local shops, emergency illness, proximity to the pharmacies, availability of old drugs, and old prescription (Nyambega, 2017).

The most common indications for the practice are headache, fever, cough, cold and sore throat diarrhea (Ateshim *et al*., 2019; Gupta, Bobhate, & Shrivastava, 2011). These potential benefits of SMWA are shared among patients, healthcare professionals, healthcare system, and the pharmaceutical industry. The pharmaceutical industry increased access to the products results in more profits; health professionals avoid unnecessary consultations with patients having minor symptoms; healthcare costs to government are reduced as individuals meet their healthcare bills and patients gain greater empowerment thus improving patient-clinician relationship (Hughes *et al*., 2001). These positive attributes of self-medication, further reinforce community use of antimicrobial self-medication in management of prevalent illnesses.

2.2.2 Progress of Antimicrobial Resistance

Antimicrobials disrupt essential structures or processes in microbes. This in turn either kills the microbe or stops them from multiplying. Microbes have in turn evolved many antimicrobial resistance mechanisms to withstand the actions of antimicrobials. There are two main ways for microbes to withstand the effects of an antimicrobials. They either stop the antimicrobial from reaching its target by pumping the antimicrobial out from the cell, decreasing permeability of the membrane that surrounds the cell, destroying the antimicrobial using inactivating enzymes, modifying the antimicrobial by adding different chemical groups to antimicrobial. The other way is they Modify or bypasses the target of the antimicrobial by camouflaging the target, expressing alternative proteins, reprogramming the target. There is intrinsic resistance and acquired resistance (MartÃnez & Baquero, 2014; Walsh, 2000).

Globally, microorganisms are becoming extremely resistant to existing antibiotics, in particular Gram-negative rods (e.g., *Escherichia coli*, Salmonella *spp.*, Klebsiella *spp.*, *Pseudomonas aeruginosa*, Acinetobacter *spp.*), which are resistant to almost all currently available antibiotics in some settings. Resistance can be combined with virulence, acting as a potentially deadly duo, as observed in the recent large epidemic outbreak of E. coli 0104:H4 in Europe, notably in Germany (Buchholz *et al*., 2011). Many alarming facts regarding AMR have accumulated, particularly over the last few years. This includes, an increase in global resistance rates in many bacterial species responsible for both community and health care related infections, examples being, staphylococci, enterococci, gonococci, and enterobacteria (including *E. coli*, Salmonella *spp.* and Shigella *spp.*), Pseudomonas *spp.*, Acinetobacter *spp.*, and *Mycobacterium tuberculosis* (Carlet *et al*., 2011). The burden of bacteremia due to *E. coli*, one of the most common

human pathogens, is increasing in Europe, mainly due (but not only) to resistant strains (Gagliotti *et al*., 2011).

Emergence and dissemination of new mechanisms of resistance, e.g., novel extended-spectrum beta-lactamases (ESBL) and carbapenemases (Kumarasamy *et al*., 2010; Meir, Weber, Zbinden, Ruef, & Hasse, 2011), the spread of the new resistance gene, the New Delhi metallo-betalactamase 1 (NDM-1), or other *Carbapenemases* in *Enterobacteriacae* is alarming because these "superbugs"are resistant to most available antibiotics and can disseminate worldwide very rapidly, in particular as a consequence of medical tourism (Kumarasamy *et al.*, 2010). The rapid increase in the multi-resistance of Gram-negative rods stands in contrast to a steady decrease in methicillin-resistant *Staphylococcus aureus* (MRSA) rates following the implementation of successful infection control programmes in several high-income countries, such as Belgium, France, United Kingdom (UK), and the USA 13 (Van Gastel, Costers, Peetermans, & Struelens, 2010; Wilson *et al.,* 2010). In some other countries, resistance to both Gram-positive and negative bacteria is very high (USA for community-acquired (CA)-MRSA; Greece, Italy, Portugal, UK, the USA, and many eastern European and Asian countries for vancomycin-resistant enterococci [VRE]).

In Africa where many health systems are weak, the likelihood of AMR increasing and the consequences of AMR infections are particularly high, and drug resistance has already been documented for HIV and the pathogens that cause malaria, tuberculosis, typhoid, cholera, meningitis, gonorrhea, and dysentery (Essack, Desta, Abotsi, & Agoba, 2016). Understanding the full extent of AMR and its impact in Africa is challenged by a lack of continent-wide AMR surveillance data, especially for pathogens that require complex

testing methods (Essack *et al.*, 2016). Although gains have been made in collecting data on resistance to some pathogens, such as HIV, *Mycobacterium tuberculosis*, and *Plasmodium spp.*, several challenges remain, including inadequate demand by clinicians for diagnostic testing, laboratory infrastructure, resources to continuously collect, transport, and test specimens for AMR surveillance, use of standardized protocols, quality assurance, systematic surveillance of AMR in animals and their products in Africa, and collaboration between the human and animal health sectors (Center for Disease Dynamics, 2016; Nkengasong, Yao, & Onyebujoh, 2018).

In Kenya, the bacterial infections that contribute most to human disease are often those in which resistance is most evident. Examples are multidrug resistant enteric bacterial pathogens such as typhoid, diarrhoeagenic *E. coli* and invasive non-typhi salmonella, penicillin resistant *S. pneumoniae*, vancomycin resistant enterococci, methicillin resistant *S. aureus* and multidrug-resistant *M. tuberculosis*. Resistance to medicines commonly used to treat malaria is of particular concern, as is the emerging resistance to HIV drugs. Often, more expensive medicines are required to treat these infections, and this becomes a major challenge in resource poor settings (GARP-KWG, 2011).

Studies reported that self-medication with prescription only medicine results in wasting of resources, increase in pathogens resistance and generally entail serious health hazards such as risk of drug interactions, adverse drug reactions, prolonged suffering and drug dependence (Hughes *et al.*, 2001; Kiyingi & Lauwo, 1993). The purchase of small samples is exceedingly common, particularly for most customers, who buy without prescription (Lausang, Lucas, & Tupase, 1990).

2.2.3 Consequences of Antimicrobial Resistance

In the European Union, antibiotic resistance causes 25,000 deaths per year and 2.5m extra hospital days (ECDC/EMEA, 2009). In India, over 58,000 babies died in one year as a result of infection with resistant bacteria usually passed on from their mothers (Laxminarayan *et al.*, 2013). In Thailand, antibiotic resistance causes 38,000+ deaths per year and 3.2m hospital days (Pumart *et al.*, 2012) and in the United States, at least 2.8 million people get an antibiotic-resistant infection, and more than 35,000 people die per year (CDC, 2019).

This creates a high chance of propensity to using last-line therapy (e.g., carbapenems) for treating health care related and community acquired infections triggered by a fear of infections caused by ESBL-producing *Enterobacteriaceae*, despite the fact that these antibiotics should be preserved as our last weapons against multi resistant Gram-negative bacteria. It also leads to re-use of old drugs with poor safety and efficacy profiles and uncertain pharmacokinetic/pharmacodynamics characteristics (e.g., colistin) due to a lack of alternative drugs (Couet, Gregoire, Marchand, & Mimoz, 2012).

Serious financial consequences of bacterial resistance have been reported (ECDC/EMEA, 2009; Roberts *et al*., 2009). Multidrug resistant organisms (MDROs) result in massive extra health care costs and productivity losses of at least 1.5 billion Euros each year in Europe (ECDC/EMEA, 2009). In the USA, the annual cost of AMR in hospitals is estimated at more than US$ 20 billion with an even wider clinical impact than human immunodeficiency virus (HIV)-related disease (Roberts *et al.*, 2009). These figures were calculated before the pandemic with multi resistant Gram-negative rods, therefore, morbidity, mortality, and the associated economic burden are very likely to increase

dramatically during the next decade (Couet *et al.*, 2012). The antibiotic pipeline has become extremely dry (Hughes *et al.*, 2001).

Several new powerful compounds active against Gram-positive cocci have been made available in the last few years, but this is not the case for Gram-negative bacteria and almost no new antibiotic class active against multi resistant Gram-negative rods can be anticipated in the near future. Although hard to imagine, the reality is that many clinicians will soon face a therapeutic dead end in the treatment of certain types of severe bacterial infections since we are losing one of the most important drugs discovered in the previous century.

2.2.4 Underlying conditions that potentially influence self-medication with antimicrobials

The underlying conditions that potentially influence use of self-medication are (Radyowijati & Haak, 2003), lack of policies or their inadequate implementation therefore enabling easy over the counter access of antibiotics (WHO, 2011). A study done in Northern Uganda found over half (59.3 %) of community members who practiced antimicrobial self-medication not aware of any restrictions on their non-prescription use in the country (Ocan *et al.,* 2014). The SMWA practice was occurring in this region in spite the existence of national drug policy formulated in 2002 that limits antibiotics to prescription only use, irregular supply of drugs to the public health facilities which limits community access to healthcare (Okeke *et al.*, 2005). Inadequate or lack of knowledge and understanding of the risks of self-medication is shown in a study done among Medical Sciences Faculty students of Jimma University to assess knowledge, attitude and practice of self-medication in which 68.42% students agreed to practice self-medication

19

despite the risk awareness (69.1%) (Nasir, Dargicho, & Mulugeta, 2012). In Yemen, Saudi Arabia and Uzbekistan awareness of the dangers of antibiotic use correlated inversely with self-medication but understanding of the appropriate use of antibiotics was limited (Tatyana *et al.*, 2014). Studies from American, Asian and European countries indicate that between 22% and 70% of parents have misconceptions about the appropriate applications and efficacy of antibiotics and often use them without a prescription (Belongia, Naimi, Gale, & Besser, 2002; Huang et al., 2007). Self-medication studies in Nigeria, Ghana (Afolabi, 2008; Donkor, Tetteh-Quarcoo, Nartey, & Agyeman, 2012), have recommended public health education as an intervention for prevention.

2.3 Concepts of Community Mobilization

The concept of community is broad and varies by discipline such as psychology, sociology, public health and by emphasis of prevention/intervention initiatives (targeting neighborhoods, entire cities, or particular social or cultural groups). One broad definition of community used in the social science and public health literatures refers to people who share a concern, geographic area, or one or more population characteristics like culture, age (Fawcett *et al.,* 2000). The inclusion of community in these literatures represents a shift in theory and practice, from addressing individual and single causative agents of health and social issues to addressing psychosocial and socio-cultural factors and their interactions. Community mobilization is broadly defined as individuals taking action organized around specific community issues (Fawcett *et al.,* 2000). Early community mobilization efforts attempted to view the individual in relationship to the community to better understand the interplay of individual characteristics, health conditions, and environmental factors (Cloward & Ohlin, 1969). Community mobilization is based on the premise that active participation of community members and groups will lead to greater

effectiveness and efficiency in addressing problems (Putnam, 2000). Central to this concept is emphasis on community building and social capital to foster positive connections among individuals, groups, neighborhoods, and organizations and empowerment-based interventions to strengthen the norms and problem solving resources of the community (Joffres, Langille, Rigby, & Langille, 2002). Community mobilization therefore operates on the basis of a coordinative process to address community health concerns. This interactive process includes several stages that bring people together to address community health issues. First stage prepares the ground and it involves the creation of a steering group to explore community issues, setting priorities during initial planning, making contact with relevant community groups and leaders (both formal and informal) and identifying available resources and a management structure. The next stage is developing capacity and it involves building capacity for strategic planning, interpersonal communication, and group processes. The third stage is assessment, which consists of assessing the needs and issues most important to the community. The fourth stage is implementation and it involves performing targeted community interventions to foster behavior change. The final stage is evaluation and it focuses on documenting the progress, identifying barriers to progress, and redirecting efforts to activities that may be more effective (Fawcett *et al.,* 2000).

When grounded in a framework for collaborative public health action, community mobilization can be seen as an iterative process that engages communities in assessment, planning, and targeted action to change communities and promote healthy development (Institute of Medicine, 2003). Key mobilization processes, such as strategic planning, can facilitate implementation of a community mobilization framework for community change.

This process can enhance individual and collective efficacy and empowerment over local conditions (Wandersman, 2003).

In community mobilization, researchers and community members together identify the causes of problems to determine whether they are internal or external. These key issues guide the relationships and roles of participants, the type of information they acquire, the level at which change is addressed (e.g., system versus individual), program delivery and policy implications (Rifkin & Pridmore, 2001).

2.3.1 Community Mobilization Approaches and Models

It was not until the 1990s, however, that researchers and specialists increasingly applied community mobilization approaches to public health issues. The relationship between researchers and communities is in two ways: top-down (led by experts) and bottom-up or grassroots (community driven). The top-down approach has the advantage of bringing outside expertise (e.g., researchers) to determine the prevention or intervention strategies most likely to be effective in addressing community health and social issues (Grisso, Christakis, & Berlin, 1995). A top-down approach however, can fail to obtain the knowledge, involvement and support of community leadership, especially the true concerns, interests, and social and cultural structures of a community. In contrast, the bottom-up or grassroots approach has the advantage of including a wide spectrum of community members and institutions in efforts to reduce community identified problems (Eisen, 1994). Community members however, may not have the expertise to design and implement effective strategies to address those problems (Grisso *et al.*, 1995). Yet these two broad approaches are not mutually exclusive and may be better characterized as a continuum. Community mobilization approaches bring about change both by bringing

resources into the community and by mobilizing or reorganizing existing community assets (de Graaf, 1986). In all community mobilization approaches, a process of research, education, and action encompass a broad partnership of individuals and groups.

Four community mobilization models currently in use in the social sciences and public health are participatory action research, community-based participatory research, collaborative betterment, and community empowerment (Freire, 1972; Shediac Rizkallah, 1998).

Participatory Action Research

Participatory action research (PAR) is a systematic investigation of social and health problems that actively involves disadvantaged communities through a collaborative process of research, education, and social change. A key element of PAR is the relationship between researcher sand community members, in which researchers provide specific research skills and community members provide resources and knowledge about the community (B. A. Israel, Eng, Schul, & Parker, 2005). Through a reciprocal transfer of knowledge, skills, capacity, and power, researchers and community members attempt to solve problems together (Stevens & Hall, 1998). This partnership generates new knowledge (e.g., community identified issues and analysis) and solutions (e.g., policy change, service delivery) that can raise consciousness and effect change.

Community Based Participatory Research

Similar to PAR, CBPR is based on a collaborative process of research, education, and action, where researchers provide tools by which community members identify health needs and community members provide meaningful information about the community to researchers (B. Israel, Schulz, Parker, & Becker, 2001; Stevens & Hall, 1998).Where

PAR focuses more on individuals in a community, CBPR is a systemic approach that empowers individuals and groups. It is a collaborative effort by all partners (researchers, community, and organizational members), in which each contributes his or her strength to the integration of knowledge and action, to improve community-identified health concerns (Israel *et al.,* 2001). All partners are involved in all phases of the research process: planning, data collection, analysis, and dissemination (Baum, MacDougall, & Smith, 2006; Israel, Schulz, Parker, & Becker, 1998; Webb, 1990).Through their participation, a shift in community members' understanding of health occurs, from one that emphasizes reliance on the healthcare system to one in which health is seen as a resource that comes from the community (Labonte, 1990). The understanding and approach of researchers also shifts, from interventions that target the micro level to those targeting the macro levels.

Collaborative Betterment Model

The Collaborative Betterment Model (CBM) uses a top-down approach to address community health problems. Under CBM, large public, private, or non profit institutions (e.g., universities or government agencies)initiate and form coalitions with communities to address community health needs (Wijaya, 2010). Those external organizations, rather than community members, generally guide and control the process. Although community representatives, in advisory roles, may inform the design of action plans, they are generally excluded from decision making and resource allocation. Thus, CBM is not necessarily designed to transfer power or ownership to communities, but rather to deliver services and programs (Tobirin, 2018). Nevertheless, community building and service and program delivery do occur and, in the process, coalitions contribute "better practices" for addressing community health needs (Sopandi, 2010).

The Community Empowerment Model

The Community Empowerment Model (CEM), similar to CBM in concern for community building, service and program delivery, and policy advocacy in addressing community health concerns, differs in the way institutions and communities relate to community organizing, leadership development, power, and ownership. Rather than serving as objects of research and intervention, community representatives are subjects of their own research and intervention. Thus, they serve to enhance their community's capacity to establish goals and to control resources to address health challenges. Under CEM, communities initiate the coalition process through community organizing, and community representatives can assume power and control over the mission, decision-making, and action plans. Institutions outside the community generally provide support to the coalition's goals, but do not play a primary role. The process, then, is guided and controlled by community representatives and not institutions outside the community (Labonte & Laverack, 2008).

Although these community mobilization models vary in the relationship between researcher and community, they are not mutually exclusive. Other scholars (Himmelman, 2001) maintains that CBM and CEM can serve as guides to the coalition process between institutions and communities. A critical aspect of community mobilization models is that community members become involved in a social process whereby community needs are addressed through social action. Partnership building highlights the idea of communities as social networks and social ties and is integral to the construct of social capital. Partnerships may be in the form of strategic partnerships that are involved in the development of policies, the understanding of problems and issues, and the shaping of the political will to tackle these problems and issues; tactical partnerships that involve

establishing committees and developing legislation, targets, budgets and resources to deal with issues and operational partnerships that focus on action. The structure of partnerships can vary and may include formal organizations as well as individuals and grassroots organizations that have been formed around a recent event or an ongoing local concern (Bracht *et al.*, 1994; Rosenstone & Hansen, 1993; Treno & Holder, 1997). Community empowerment enhances individual and collective efficacy and empowerment over local conditions therefore a sustainable way of reversing the dominance of other stakeholders that created and sustained the current situation of self-medication.

2.3.2 Community Mobilization Empirical Literature

A community intervention study to decrease antibiotics use for self-medication among Latino adults exposed the community to health educational messages through multimedia sources, indicated that focusing on education alone may not be sufficient to address the problem (Mainous *et al*., 2009). A study that reviewed characteristics and outcomes of 22 National and 6 Regional campaigns aimed at improving the use of antibiotics in high income countries between 1990 and 2007 stated that the interventions were quite expensive, the duration was quite long and the outcome for majority of the intervention was not evaluated. Most campaigns that were formally evaluated seemed to reduce antibiotic use. Establishing a cause-effect relation between the campaigns and a reduction in the use of antibiotics was further complicated by methodological limitations. Most campaigns did not have a control population and pre-intervention trends were rarely assessed. There was no evaluation of different indicators for measuring the effect of public awareness campaigns on the use of antibiotics in outpatients. The paper proposed identification of the most successful methods for sustained changes in public perception and attitudes towards the misuse of antibiotics (Huttner *et al.,* 2010). In the area of HIV

prevention, community mobilizing interventions have demonstrated successes in increasing condom use (Kerrigan, Telles, Torres, Overs, & Castle, 2008) improving service access and quality (Lippman *et al*., 2012), increasing social capital or social cohesion (Kerrigan *et al*., 2008; Pronyk *et al.*, 2008) and most recently in promoting uptake of HIV counseling and testing (Sweat *et al.*, 2011).

Intervention projects that have successfully used community mobilization strategy as an intervention mechanism (Blanchard *et al*., 2013; Kelly, 1999), had a strong emphasis on changing social norms regarding risk behaviors and increasing the social acceptability of risk avoidance. They used trained community peer volunteers to deliver the health messages as a primary means of influencing social norms, building acceptance and support for the project (CDC, 1996). The trained community peer life circumstances and characteristics closely resembled those of the target population therefore giving them a higher opportunity of influencing acceptance of health messages (Janz *et al*., 1996). The programs were unique in the extensive effort given to identifying, recruiting, and training trustworthy community members to provide education addressing attitudes and behavioral skills as well as health information. Such an approach emphasized intensive educational and skills building interventions aimed at high-risk individuals and messages reaching across an entire community. They identified high-risk subsets of the larger population and employed a highly refined approach to intervention tailoring. The communities and subgroups they targeted were relatively small and more homogenous thus, getting identifiable social groups to change specific behaviors with discrete levels of individual risk which was more achievable than developing multiple interventions designed to motivate numerous subgroups of varying risk found within a broad geographically defined community hence focusing community and ecological approach

on changing group norms and, as a result, the social environment. Such an approach emphasized (1) intensive educational and skills building interventions aimed at high-risk individuals and (2) messages reaching across an entire community (CDC AIDS, 1999). Responding to these needs requires a shift in emphasis from trying to scare people into healthy behavior to empowering them with the tools for exercising personal control over their health habits (Bandura, 1994). This calls for empowerment model as a community mobilization strategy.

2.4 Community Empowerment

This study looked at literature on Community Empowerment Model, Nutbeam Health Literacy Model, Bandura Social Cognitive Theory, Dimensions of Empowerment, Implications of Different Dimensions of Power and Principles that Guide Empowerment, in order to identify the domains of empowerment and to operationalize empowerment at community level. The study identified and operationalized three domains of empowerment. Power within which includes; expanded knowledge, development of self-respect and self-confidence, realizing inner strength and capacity to act on one's aspirations and achieving them. Power with which includes; cohesiveness inclusiveness and organized, realizing the strength that comes from associating with others, acting to realize individual and collective goals. Power over which includes; community ability to access and control resources or having a say in decisions related to particular resources.

Community Empowerment Model (see Table 2.1) explains that only communities that are knowledgeable, confident, cohesive, inclusive and organized (Power within) can become agents of change and are able to participate in decision making to uphold their basic social, political, economic and environmental rights (Wallerstein, 1992). Empowering communities is therefore a sustainable way of reversing the dominance of other

stakeholders that created and sustained the current situation of self-medication. Power cannot be bestowed upon individuals it has to be self-generated (Rissel, 1994). This process of empowerment starts when individuals acquire self-respect, confidence and realizes their inner strength (awakening or power within). The next stage is realizing the strength that comes from associating together and networking (mobilization or power with) and act to realize individual and collective goals (action) (Reza-Paul *et al.*, 2008). The phase of awakening, when individuals gain self-respect, confidence and awareness of their inner strength is the beginning of agency, which is the capacity to act on behalf of one's aspirations and to achieve them. This phase, when taking control over their lives by individuals is crucial, to the success of empowerment process and self-medication reduction (Israel, Checkoway, Schultz, & Zimmerman, 1994).

Table 2.1: Community Empowerment Model

INDIVIDUAL AND COLLECTIVE EMPOWERMENT	
	Individual empowerment
Capacity and Knowledge	Individuals who are educated and confident can achieve their personal objectives and improve their lives.
Confidence and attitude	Self-confidence, determination, creativity and imagination of empowered individuals play the most important role in overcoming barriers and creating opportunities.
	Collective empowerment
Community inclusiveness and cohesion	Individuals alone cannot meet strategic long-term needs of the poor.
Community cooperation and organization	Collective action is needed to achieve long – term strategic needs of the communities, to increase their access to resources and economic opportunities, obtain basic services, and participate in local governance.
Community participation and influence	Individuals who are educated and confident, feel more secure economically and socially and are healthy, can contribute more effectively to collective action and take the lead on it.
INDIVIDUAL AND COLLECTIVE EMPOWERMENT PROCESSES ARE COMPLEMENTARY AND MUTUALLY REINFORCING	

Source: (SDN, 2016)

The need for empowerment is critical when one feels powerless. It is important to identify conditions within a community that foster sense of powerlessness. Then empowerment tactics or strategies can be used to remove them. The removal of external conditions however is not always possible therefore the strategies and tactics should provide personal efficacy information to the powerless. There are several sources by which individuals directly receive information about their personal efficacy this includes, enactive attainment, vicarious experience, verbal persuasion, personal competence expectancy (Albert, 1977, 1986). When people are given responsibility along with training to acquire knowledge and skill (using level 3 of Nutbeam health literacy model) they have an opportunity to test their efficacy, this makes one feel capable and hence empowered (Beer, 1980), this is enactive attainment. During training modeling techniques are usually used to empower individuals, enabling the observation of similar others performing successful responsibilities (Albert, 1986; Bennis & Nanus, 1985) (Vicarious experience). Word of encouragement and praises, verbal feedback and other forms of social persuasion (Verbal persuasion) are used by leaders to empower individuals (Conger, 1986). People who are persuaded verbally that they possess the capabilities to master given tasks are likely to mobilize greater sustained efforts than if they harbor self-doubt and dwell in personal deficiencies when difficulties arise (Albert, 1986). Empowerment techniques are strategies that provide emotional support to individuals and create supportive and trusting group atmosphere (Neilsen, 1986) and can be more effective in creating efficacy beliefs (Personal competence expectancy). Level 3 of Nutbeam (Nutbeam, 2000) model of health literacy (critical health literacy), reflects the cognitive and skills development outcomes which are oriented towards supporting effective social and political action, as well as individual action. Within this paradigm, health education may involve the communication of information, and development of

skills, which investigate the political feasibility, and organizational possibilities of various forms of action to address social economic and environmental determinants of health. This type of health literacy can be more obviously linked to population benefit, alongside benefits to the individual. Health education in this case would be directed towards improving individual and community capacity to act on these social and economic determinants of health. This is highlighted in the Nutbeam Model of Health Literacy (Table 2.2).

Table 2.2: Nutbeam Model of Health Literacy: Levels of Health literacy

Health literacy level and educational goal	Content	OUTCOME		Examples of educational activities
		Individual Benefit	Community benefit	
Functional Health literacy: Communication of information.	Transmission of factual information on health risks and health services utilization.	Improved knowledge of risks and health services, compliance with prescribed actions.	Increased participations in population health programs.	Transmission of information through existing channels, opportunistic interpersonal contact and available media.
Interactive Health Literacy: Development of personal skills.	As above and opportunity to develop skills in a supportive environment.	As above and improved capacity to act independently on knowledge, improved motivation and self-confidence.	As above and improved capacity to influence social norms, interaction with social groups.	As above and tailor health communication to specific need, facilitation of community self-help and social support groups, combine different channels for communication.
Critical health literacy: Personal and community empowerment.	As above and provision of information on social and economic determinant of health and opportunities to achieve policy and or organizational change.	As above and improved individual resilience to social and economic adversity.	As above and improved capacity to act on social and economic determinants of health, improved community empowerment.	As above and provision of technical advice to support community action, advocacy communication to community leaders and politicians, facilitate community development.

Source: (Nutbeam, 2000)

2.4.1 Dimensions of Empowerment

Empowerment is referred to as the processes by which those who have been denied the ability to make choice acquire such ability (Kabeer, 2003). There must have been the ability to choose differently and if the alternative does exist for you. The concept of empowerment exists in three dimensions.

2.4.1.1 The Resource Dimension

This includes economic, human, social, political and cultural resources that serve to enhance the ability to exercise choice. They are acquired through multiplicity of relationships conducted in various ways, which make up an institutional domain (family, market, community). Access to such resources will reflect the rules and norms to govern distribution and exchange in different institutional arena, these rules and norms gives certain actors authority over others in determining the principles of distribution and exchange so that the distribution over a locative resources tends to be embedded within the distribution of authoritative resources (Giddens, 1979). Resources are the medium through which agency is exercised.

Economic empowerment seeks to ensure that people have the appropriate skills, capabilities and resources and access to secure and sustainable incomes and livelihoods. Related to this, some organizations focus heavily on the importance of access, ownership entitlement to assets and resources. Human and social empowerment as a multidimensional social process that helps people gain control over their own lives. This is a process that fosters power (that is, the capacity to implement) in people, for use in their own lives, their communities and their society, by being able to act on issues that they define as important (Page & Czuba, 1999). Political empowerment is the capacity to analyze, organize and mobilize. This results in the collective action that is needed for

collective change. It is often related to a rights based approach to empowerment and the empowering of citizens to claim their rights and entitlements (Piron & Watkins, 2004). Cultural empowerment is the redefining of rules, norms and recreation of cultural and symbolic practices (Stromquist, 1993). This may involve focusing on minority rights by using culture as an entry point.

Resource translates into realization of choice through the concept of control and this means having a say in relation to the resource in question (Sathar & Kazi, 1997), access and control are equated with having a say in decisions related to particular resources within their jurisdiction. An analysis states that concepts of access, control and decision-making are all used in relation to resources, with control sometimes referring to ownership and sometimes to decision-making (Jejeebhoy, 1997). Another analysis also indicates that empowerments control indicators vary between control in relation to resources like earnings and expenditures; control in terms of self-reliance, control as decision-making and control as choice (choosing a health service) (Kishor, 1997).

2.4.1.2 The Agency Dimension

It is the ability to define one's goals and act upon them. Agency is about observable action; it also encompasses the meaning, motivation and purpose, which individuals bring to their activity, their sense of agency, or `the power within'. While agency tends to be operationalized as decision-making in the social science literature, it can take a number of other forms. It can take the form of bargaining and negotiation, deception and manipulation, subversion and resistance as well as more intangible, cognitive processes of reflection and analysis. It can be exercised by individuals as well as by collectivities. Agency has both positive and negative meanings in relation to power. In the positive sense of the power to, it refers to people's capacity to define their own life choices and to

pursue their own goals, even in the face of opposition from others. Agency can also be exercised in the more negative sense of power over, in other words, the capacity of an actor or category of actors to override the agency of others, for instance, through the use of violence, coercion and threat. However, the form of agency which appears most frequently in measurement and hence the one we will be focusing on here, relates to decision making agency. This is not surprising since decision-making in some form is at the heart of some of the best-known attempts to conceptualize power (Lukes, 1974; McEloy, 1992). Measures of decision-making are usually based on responses to questions asking people about their roles in relation to specific decisions, with answers sometimes combined into a single index and sometimes presented separately.

2.4.1.3 The Achievement Dimension

Resources and agencies make up people's capabilities, which is their potential for living the life they want. The term achievement refers to the extent to which this potential is achieved or fails to be achieved, that is to the outcomes of people's efforts.

2.4.2 Implications of Different Dimensions of Power

Insights from gender theory into the empowerment debate have increased clarity over the concept and operation of power, most notably that power is about more than just 'power over' people and resources. Rowland categorizes four types of power relations to stress the difference between power over (ability to influence and coerce) and power to (organize and change existing hierarchies), power with (power from collective action) and power within (power from individual consciousness) (Rowlands, 1997). This is highlighted in Table 2.3.

Table 2.3: Implications of Different Dimensions of Power

Type of power relation	Implications for an understanding of empowerment
Power Over: Ability to influence and coerce.	Changes in underlying resources and power to challenge constraints.
Power To: Organize and change existing hierarchies.	Increased individual capacity and opportunities for access.
Power With: Increased power from collective action.	Increased solidarity to challenge underlying assumptions.
Power from Within: Increased individual consciousness.	Increased awareness and desire for change.

Source: (Rowlands, 1997).

An entitlement approach, states that, empowerment may occur by expanding peoples access to social entitlements such us knowledge and skills (Sen, 1999). Intended beneficiaries of programs need to be able to negotiate their inclusion in the health system and demand adequate care and for public health to succeed; it must be redrafted in a framework that locates organized and active communities at the centre as initiators and managers of their own health (Lancet, 2000). In this paradigm, nongovernmental, governmental, private sector, and international stakeholders form the periphery listening to and learning from the people, then, discussing and making decisions jointly.

The model of deliberative justice is the least developed and the hardest to assess, it presents a challenge to public health and the health service research community to incorporate this innovative concept into a solid contribution to benchmarks of fairness in health care (Aday, 2000). It has also been recognized that community mobilization strategies must be complemented by structural interventions to bring about comprehensive changes in the social, economic, legal and political structures that led to disempowerment in the first place (Asthana & Oostvogels, 1996; Kerrigan, Ellen, & Moreno, 2003). This is supported by the some theoretical views which emphasize moving

beyond empowerment for the individual, to welfare enhancement for achieving lasting social transformation (Kabeer, 2003; Sen, 1999).

2.4.3 Principles that Guide Empowerment Practice

The ten principles that have been identified by (Wandersman *et al.*, 2005) aim to guide empowerment practices and form a conceptual framework, they are; Improvement, where the evaluator aims to help the program (its participants, staff and so forth) achieve positive and/or successful outcomes as decided by the relevant stakeholders; Organizational learning through systematic inquiry into consequential changes in order to promote new knowledge through problem solving; community ownership in which the community has the right to make decisions about actions that affect their lives. The underlying rationale is that an evaluation will be most beneficial to a community where it enables them take command of choices which affect them; inclusion, in this instance, is the invitation and encouragement of legitimate stakeholders' participation in terms of decisions to be made; democratic participation is based on the premise that with appropriate access to information, relevant stakeholders are able to make rational, informed decisions about what action needs to be taken. Thus, in order for this to be attained, deliberation and genuine collaboration are crucial activities, which need to occur during the evaluation process. Additionally, the democratic ideals of fairness, due process, and transparency are also vital; social justice implies a commitment to just and equitable distribution of resources, prospects, responsibilities, and authority empowerment evaluators need to recognize that societal inequalities are present in many contexts and it is their role to help restructure these conditions and improve the lives of communities; community knowledge in empowerment evaluation relates to the recognition that information known by relevant stakeholders is valuable and useful and

should be shared because it is an essential resource. Thus, the evaluator should develop a variety of methods to uncover, validate, disseminate, and alter knowledge within the evaluation context; evidence-based strategies. Accordingly, empirical information is viewed, as an important source for developing interventions to address community needs; although such strategies should not be employed without considering the contextual issues within the community; capacity building is one of the main aims of empowerment evaluation. The goal is to enhance stakeholders" abilities to conduct their own evaluations in order to improve program development and execution this principle enhances the mainstreaming of evaluation and demystifies the process. Consequently, the evaluator's involvement will decrease over time as communities' capacities are enhanced; accountability. Through gathering information on the program's processes, results based accountability can be achieved (Wandersman *et al*., 2005). Thus, program staff can be held responsible for their plans and actions in terms of self-driven evaluations.

The facets of empowerment evaluation are training; that involves teaching stakeholders to conduct their own evaluations with the intention of promoting self-reliance, illumination; that refers to the idea that the processes, techniques, and the underlying philosophy of evaluation are revealed to stakeholders since they are regarded as active scholars in empowerment evaluations, facilitation; which entails the coaching, guidance and supervision of stakeholders in evaluation techniques and teaching of evaluation processes by the facilitator, advocacy; allowing program personnel to decide on the nature and purpose of the evaluation therefore determining their own solutions through active participation and social transformation and liberation; where program personnel develop new capacities and skills to allow them to redefine their future roles and objectives (Fetterman, 1996).

2.4.4 Empirical Literature on Empowerment

This study surveyed the studies that had used empowerment strategy to achieve community mobilization and highlighted how empowerment domains were operationalized. Studies on Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases (Swendeman *et al*., 2009), mobilizing collective identity to reduce HIV risk among sex workers in Sonagachi, India (Ghose *et al*., 2008), the necessary contradictions of 'community-led' health promotion: a case study of HIV prevention in an Indian red light district (Cornish & Ghosh, 2007) emphasized the importance of power within, as a means to develop individuals' self-esteem, confidence, and consciousness of the sources of their vulnerability.

Studies in the South African mine on selling sex in the time of AIDS (Campbell, 2000), strategies used by Indian sex workers to win local support for their HIV prevention prospects for community-based strategies among female sex workers in Madras (Asthana & Oostvogels, 1996) emphasized the need for collective empowerment or power with others, to effectively address power imbalances and to achieve social transformation. It is being increasingly recognized that individual empowerment (power within) is not sufficient to address the entrenched power imbalances or to achieve broader goals on a societal level (Kerrigan *et al*., 2014). Developing power on a collective basis is therefore necessary to allow people to address multi-leveled sources of vulnerability (Bracht *et al.*, 1994; Easterling, Gallagher, Drisko, & Johnson, 1998; Newby, 1981; Reza-Paul *et al.*, 2008). In this view, power with is an important means by which power within can be achieved. Certain theories on collectivization as a social development strategy stresses the importance of creating a collective consciousness or identity to strengthen the power of marginalized groups (Anisur, 1993).

Programs on People's Self-Development in Dhaka (Anisur, 1993) and studies on impact of two vulnerability reduction strategies, collectivization and participation in savings activities on risk reduction among FSWs in Bangalore (Pillai *et al.*, 2011), indicated that domains of power within and power with must be complemented by the ability to exert power over resources in order to give marginalized groups the power to make decisions and act in ways that will reduce their vulnerability and change their society (Newby, 1981).

Community empowerment strategy has been used to effect behavioral changes in other areas other than control of SMWA in many developing countries. More than half of the urban population in developing countries live in informal settlement and in Kisumu an estimated 60% of the population lives in informal settlements, with the majority living in abject poverty (Secretariat, 2003). This study focused on the need of using empowerment as an effective and sustainable community mobilization strategy to control self-medication with antimicrobial in Nyalenda informal settlement. This study addressed this by using community empowerment as a community mobilization strategy and determined its effect on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County.

2.5 Participatory Learning and Action Approach

This study laid focus on the principles of Participatory Learning and Action (PLA), levels of learning from Blooms Taxonomy, Typology of Participation, Participatory Learning and Action empirical literature to enable identification and operationalization of domains of PLA.

The focus of both community participation and empowerment at present is placed on participatory approaches. Participatory Learning and Action is another variation of Participatory Action Research that began in rural development research. The three foundations of PLA are outsiders facilitate, but do not dominate meetings, facilitators use methods that emphasize openness over closed discussion, group identity over individuals, visual over verbal learning, and comparisons over measurements and there is emphasis on sharing information and experiences among researchers and participants as well as between participating organizations (Shah, 1999). These foundations mean that the researchers learn from the community and make sure that community members are in charge of developing the research plan, analyzing data and creating an action plan. The researchers are there to facilitate the community members' activities and to draw out diverse members and opinions of the community Participatory Learning and Action calls for significant involvement from all members of the community that is participating in the research process and its approaches promote a process that enables intended program beneficiaries to define, implement, monitor, and evaluate program of their choice. The theory and practice of PLA (Chambers, 1997), recognizes the ability of the non or poorly educated people to make and carryout rational and successful decisions and action that were formerly the responsibility of experts, allows innovation to be spread by peer groups not only by professionals and brings about a role reversal where local people become colleagues of professionals, there by generating a change in attitudes and behaviors of the professionals. Using visualizations, role plays and draw and write techniques as the basis for generating information, Participatory Learning and Action has been used in a wide range of situations for supporting empowerment goals (Rifkin & Pridmore, 2010).

Participatory Learning and Action is an approach for learning and organizing local communities and groups for interacting with them, understanding them and learning from them. It helps in initiating a participatory process, in sustaining it and in opening up vistas of avenues for participation. It enables the local people to express, enhance, share and analyze their knowledge of life and condition and to plan and act. It is a means of understanding and facilitating and evoking their participation and also opening ways to which such groups can participate in decision making, project design, planning, execution and monitoring (Mukherjee, 2001).

2.5.1 The Principles of Participatory Learning and Action (PLA)

There are 6 main principles of PLA:

a. Listening and Learning; listening and learning progressively through participatory interaction. The local people have the knowledge, experience, history and culture they also have their views, ideas, priorities and preferences. Listening to them helps in portraying their world view which otherwise remains latent and not revealed. The greater the interaction with people in the capacity of a listener rather than a speaker the greater the learning achieved. Such learning can increase progressively. Proper learning can take place with appropriate mental and physical set up of a learner (Chambers, 1997).

b. Offsetting biases; Researchers tend to appraise samples at convenient locations, time and people for their quick results. Participatory Learning and Action encourages relaxed listening and learning, seeking participation from people who are relatively worse off and at their convenience.

c. Utilization of precious community time; Learning should be focused to utilize community time in the best possible way.

d. Seeking diversity; which involves learning from diverse conditions and functions.

e. Cross checking; it is an important principle for minimizing errors and doing midway corrections. It involves checking the reliability and validity of data by subjecting it to different tests. This is done by changing methods, groups, teams, and even timing.

f. Optimal ignorance and appropriate impression; knowing which is worth knowing and knowing enough to serve the purpose. This helps in making learning iterative, in facilitating participatory session, in making such process interactive, innovative and informal with effective use of time.

2.5.2 The pillars of Participatory Learning and Action

Foundation of PLA is based on four pillars where each has a critical role to play while influencing the other.

Attitude, belief and behavior; participatory Learning and Action calls for a flexible mindset which is opened up to the paradigmatic shift (Chambers, 1997). The mindset is structured in safe, secure and predictable environment and we are looking for fixed answers and solutions to our problems. People are virtually caged in a complex labyrinth of our prejudices, biases, our limited knowledge, training, experiences and the environment surrounding us. They are in control of our thought process and we find it difficult to think and interpreter differently. People therefore miss out on new outcomes, experience, knowledge, vision and ways of looking at ourselves. The conventional mindset should change because it blocks many opportunities for augmenting our knowledge frontier and learning new lessons, practices and ways of doing things. In the event of "I know it all" attitude real learning becomes difficult. Changing the mindset will help in realizing that for any outcome there must be multiple stakeholders and multiple views. Stereotyped solutions to ever increasing problems runs the risk of ignoring their determinant forces often beyond the comprehension competency and control of limited

mindset. Flexible mind is able to create space for people's knowledge and initiative as an alternative resource beyond sustainable ways of overcoming problems by involving the stakeholders.

The mindset can be deconstructed through training, self-learning, reflecting, practicing, mentoring, counseling, role modeling, role reversing, exposure visits, peer group pressures (Chambers, 1993). They all follow the principle of learning by doing. The main issues in the context of participatory approaches are, are we ready to learn? Do we have the mindset of a learner? Do we have the skills accompanying this? This calls for appropriate behavior of the outside as a listener with personal quality of embracing error and showing respect in the process. The outsider should also have the right belief and attitude, which is supportive of participation of the local people. The local people are knowledgeable and have a vast repository of experience, which is relevant to development and worthy of respect. They have their own worldview and capability of analyzing their problems and acting, through rational decision making, implementing, monitoring and assessing these decisions. This is an opportunity for an outsider to learn. Learning should be from one level to another. Blooms taxonomy was developed in 1956 to give a direction on what a learner can do at different levels. Ways of learning and role reversal also improves the attitude and behavior of participants.

Blooms Taxonomy shows how the learning objectives are structured in a hierarchical order. At the lowest level students are required to know, memorize, repeat and list information and at the higher-level students are required to judge, criticize, resolve, invent, and make recommendations. Each of the levels builds in complexity from the previous level. Verbs are used to involve learners in thinking differently at each level.

Verbs are identified below to clarify this point in understanding the function of the hierarchical way of thinking involving students in this process (see Table 2.4).

Table 2.4: Structure of Bloom's Taxonomy

LEVELS	THE VERBS USED
Level I: Knowledge (knowing isolated information)	Know, list, recall, repeat, record, Define, locate Memorize, restate, identify
Level II: Comprehension (understanding/making connections)	Discuss, describe, explain, match, find, Reword Review, translate, express, report
Level III: Application (using the knowledge in a variety of ways)	Display, simulate, apply, demonstrate, practice Operate, compute, present, sketch, use
Level IV: Analysis (comparing and contrasting information)	Analyze, compare, contrast, probe, inquire Investigate, classify, organize, examine, dissect
Level V: Synthesis (developing new information)	Compose, invent, develop, construct, create Hypothesize, predict, speculate, role-play Generalize
Level VI: Evaluation (expressing personal values	Judge, infer, evaluate, advise, conclude, consider, determine. Recommend

Source: (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956)

2.5.3 Process of participation

It implies the way in which participation takes place. It is important for answering questions such as who participates in the activities, how it happened, with whom did it happen, why and where, how long it took. This would indicate the nature, quality, breadth and depth of the participation. It involves a process of rapport building, which is time consuming. The community might not be willing to participate beyond appoint and therefore it is important to go through the community musclemen (Myers & Hobley, 2013). Types of participation are clarified in the Typology of participation (Table 2.5).

Table 2.5: Typology of Participation

Passive Participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management without any listening to people's responses.
Participation in information giving	The information being shared belongs only to external professionals. People participate by answering questions posed by extractive researchers using questionnaire surveys or such similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research are neither shared nor checked for accuracy.
Participation by consultation	People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.
Participation for material benefits	People participate by providing resources such as labour, in return for food, cash or other material incentives. Much on farm research falls in this category, as farmers provide the fields but are not involved in experimentation or the process of learning. It is very common to see this called participation yet people have no stake in prolonging activities when incentives end.
Functional participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement tends not to be at early stages of project cycles or planning, but rather after major decisions have already been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
Interactive participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple objectives and make use of systematic and structured learning processes. These groups take control/ownership over local decisions, and so people have a stake in maintaining structures or practices.
Self-mobilization	People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

Source:(Pretty & Guijt, 1995; Pretty Jules & Guijt, 1995)

2.5.4 Diverse participatory method

Attitudes and behavior conducive to participation are essential prerequisites for PLA but they are not sufficient since skills in method, skills in facilitations and also the roles adopted by the facilitators are also important.

A range of participatory ways, tools and techniques are used which includes timeline, participatory mapping, semi-structured interviews, transect walk, vector scoring, matrix scoring and others. The menu of methods enables local people to participate in knowledge building exercises, investigate and analyze their problems, evaluate constrains and opportunities, take informed decisions for persisting goals of sustainable developments (Mukherjee, 2001).

2.5.5 The process of sharing

It is dissemination of learning arising from participatory sessions and activities. It enriches the learning process and helps in highlighting local perspectives, increases transparency and understanding, reinforces mutual learning, enriches analysis, provides opportunity to clarify issues, fill gaps, alter, add and make changes, helps in overcoming barriers to communications, provides opportunities for exchanging ideas, discussions and follow up, cross checking error and omissions, identifying areas of coordination and cooperation (Christopher, Watts, McCormick, & Young, 2008).

2.5.6 Participatory Learning and Action Empirical Literature

Participatory Learning and Action has been used in a wide range of situations for supporting empowerment goals (Rifkin & Pridmore, 2010). A systematic review of 55 intervention studies on irrational use of antibacterial of which 10.9% were from Africa, 63.6% from Asia, 9.1% from Latin America, and 16.4% from Southeastern Europe, 7.3%

were community based. These studies revealed that community-based education interventions experienced a mean reduction of 30.5% on antibacterial use. The goal of the education measures was to inform the communities through trainings, printed materials and media based approaches (Bbosa, Wong, Kyegombe, & Ogwal-Okeng, 2014).

A study conducted in the Republic of Ireland which aimed at including migrants in primary healthcare participation used Participatory Learning & Action research to access and engage with 'hard to reach' migrants in primary healthcare research. PLA enabled access and meaningful engagement of the migrants in primary health care. PLA was qualitatively evaluated using *emic* and *etic* criteria (O'Reilly-de Brún, 2016).

A pilot study in Kisumu City in Kenya explored the utility and effectiveness of participatory action research as an approach for youth-led peace building in marginalized communities and proved PLA a valuable methodological approach and studies in Little Karoo, South Africa; Odibo, Namibia, various communities in Zambia, and Northern Cape Province, South Africa on PLA initiatives based on strengthening self-reliance and sustainability proved to be appropriate strategy for development (Wetmore & Theron, 1998). Participatory Learning and Action has been used in developing countries to enable groups to engage meaningfully and contribute with ease to academic research but these reviewed studies did not show how PLA impacts on empowerment. The current study therefore realizes the importance of using PLA as a methodology for achieving SMWA empowerment in Nyalenda informal settlement. There was also need in establishing the level of each domain of PLA and how each one of them impacts on each domain of SMWA empowerment hence assessing the role of Participatory Learning and Action (PLA) on strengthening the different domains of empowerment on self-medication with antimicrobials in Nyalenda informal settlement in Kisumu County.

2.6 Theoretical Frameworks

Community mobilization intervention is based on Community Empowerment Model and it is explained in some community mobilization theoretical and program literature (Anisur, 1993; Kabeer, 2003; Sen, 1999), Nutbeam Model of Health Literacy, Bandura Social Cognitive Theory.

The study concludes that only communities that are knowledgeable, confident, cohesive, inclusive and organized (Power within) can become agents of change and are able to participate in decision making to uphold their basic social, political, economic and environmental rights. Therefore, empowering communities is a sustainable way of reversing the dominance of other stakeholders that created and sustained the current situation of self-medication. Power cannot be bestowed upon individuals it has to be self-generated which this study achieved through participatory learning and action. Within this strategy health education involved participatory communication of information, and development of skills which investigated the political feasibility and organizational possibilities of various forms of action and addressed social economic and environmental determinants of self-medication perceptions. This type of health literacy is more obviously linked to population benefit, alongside benefits to the individual. Health education in this case was directed towards improving individual and community capacity to act on these social and economic determinants of self-medication use. The process of empowerment refers to people's capacity to define their own life choices and to pursue their own goals, even in the face of opposition from others. It starts when individuals acquire self-respect, confidence and realize their inner strength (awakening or power within) and this is the beginning of agency, which is the capacity to act on behalf of one's aspirations and to achieve them. The next stage is realizing the strength that comes from associating together and networking (power with) and act to realize individual and

collective goals (action or power over). Power over is possible when communities can access and control resources and this is equated with having a say in decisions related to particular resources within their jurisdiction. Resources and agencies make up people's capabilities, which is their potential for living the life they want. The term achievement refers to the extent to which this potential is achieved or fails to be achieved, that is to the outcomes of people's efforts. Other authors (Rowlands, 1997) categorizes four types of power relations to stress the difference between power over (ability to influence and coerce) and power to (organize and change existing hierarchies), power with (power from collective action) and power within (power from individual consciousness). It has also been recognized that community mobilization strategies must be complemented by structural interventions to bring about comprehensive changes in the social, economic, legal and political structures that led to disempowerment in the first place.

2.6.1 Summary of the concepts of participatory Learning and action and empowerment

Participatory Learning and Action; Participatory communication of information and development of skills. Its domains are Flexible learning and listening, Participatory evaluation, and Participatory interaction.

Power within includes; expanded knowledge, development of self-respect and self-confidence, realizing inner strength and capacity to act on one's aspirations and achieving them.

Power with includes; cohesiveness inclusiveness and organized, realizing the strength that comes from associating with others, acting to realize individual and collective goals.

Power over includes; community ability to access and control resources or having a say in decisions related to particular resources.

INDEPENDENT VARIABLES	INTERMEDIATE VARIABLES	DEPENDENT VARIABLE

Reasons for self-medication with antimicrobials use: use of health Insurance schemes., reasons for SMWA, indications for SMWA, SMWA information, the cohort using SMWA, methods of requesting SMWA, duration between onset of disease symptoms and SMWA use, repeat SMWA purchase on response, repeat SMWA purchase on none response

Participatory learning and Action: Flexible learning and listening, Participatory evaluation, Participatory interaction

Empowerment: Power within, Power with, Power over

Self-medication with antimicrobials

Figure 2.1: Conceptual Framework (Source: Self conceptualization, 2015)

CHAPTER THREE

MATERIALS AND METHODS

3.1 Introduction

This section presents information on the key components of the research study including research design, study area, sampling frame, method of sampling and sample size, research instruments that were used and their validity. It further presents data collection procedures and how validity and reliability were ensured, data analysis and presentation.

3.2 Study Area

Nyalenda B ward (case) and Nyalenda A ward (control)

Nyalenda informal settlement is an urban slum in Kisumu County (Appendix I). It has a population of approximately 65,024 people (KPHC, 2019). Nyalenda is the second largest informal settlement in Kisumu, after Manyatta, and is situated to the south of the CBD. Nyalenda lies between latitudes 0 ° 6` 0``S and longitude 34° 45`0``E. The area is bound by Ring Road to the North and marshlands to the South and consists of two separate settlements or wards, Nyalenda A ward and Nyalenda B ward. Nyalenda A ward is subdivided into four major units (Central, Dago, Kanyakwar and Western), while Nyalenda B ward features five major units (Kilo, Got Owak, Dunga, Nanga and Western), the two slums occupy an area of 3.2 and 4.7 sq. km, respectively. In Kisumu an estimated 60% of the population lives in informal settlements, with the majority living in abject poverty (Secretariat, 2003). Majority of this population are engaged in small-scale businesses throughout the day and better part of the night. The area has only two government health facilities. These facilities are understaffed and with limited equipment. The residents have limited access to better health care from these facilities thus seeking medical attention from Kisumu East County Hospital, private health facilities and pharmaceutical outlets (UN-HABITAT, 2008). The choice of the study area was

informed by the proportion (76.9%) of self-medication with antimicrobials among the households in Nyalenda B ward, yet it is the only informal settlement in Kisumu served by two government health facilities. It also has the highest percentage of households below the adjusted urban poverty line (Nyalenda A is 78% and Nyalenda B 65.3%) (IIED, 2010). Achievement of the SDGs will therefore not be possible without efforts made to control self-medication with antimicrobials. Self-medication with antimicrobials has been identified as a form of health seeking behavior that results in wasting of resources and prolonged suffering (Hughes *et al*., 2001; Kiyingi & Lauwo, 1993).

3.3 Study Population

Nyalenda B ward (case) and Nyalenda A ward (control)

Nyalenda Location has a population of 65,024, 32,094 males, 32,830 females and 19, 385 households. Nyalenda A ward has a population of 30,019, 15,094 males, 14,927 females, 9,392 households and a population density of 8,142 people per sq. km and Nyalenda B ward has a population of approximately 34,905, 17,000male, 17,903 female, 10,443 households and a population density of 6,121 people per sq. km) (KPHC, 2019). The study population for the control group was all households in Nyalenda A ward (9,392). The study population for the case group was all households in Nyalenda B ward (10, 443). The study population for the intervention group was all households in Nyalenda B ward (10, 443) and the Community Health Volunteers from Nyalenda B ward of Kisumu County. The sample population of 380 households was drawn from Nyalenda A ward households (control) and 380 households from Nyalenda B ward (case) households for both baseline and end line surveys. A sample population of 1501 was also drawn from the Nyalenda B ward households and 30 CHVs from Nyalenda B ward CHVs for the intervention purpose.

Inclusion and exclusion criteria

Baseline surveys and endline surveys included all types of households that were sampled within the identified clusters for the case and control. The participants for the intervention were the households sampled from all the households in the identified clusters and the CHVs sampled from all the CHVs in these clusters in Nyalenda B Ward.

3.4 Study Design

Nyalenda A ward (control) and Nyalenda B ward (case)

This was a quasi-experimental trial of a community mobilization intervention. This study used Community Empowerment as community mobilization intervention strategy that was approached though Participatory Learning and Action. The intervention took a period of 3 months in Nyalenda B ward (case) and Nyalenda A ward remained a control. Nyalenda A ward as a control group was left to run its normal programmes uninterrupted and this study did not introduce any new program since a quasi-experimental study in itself is blinded. The intervention was delivered through real-life systems with routinely available resources and in every-day delivery contexts. The subjects did not know that outcomes are observed and used to establish treatment effectiveness. Neither did they know that they have been exogenously "assigned" to treatment and control groups, this therefore reduced the likelihood of biases due to compensatory rivalry and resentful demoralization respectively (Bärnighausen *et al.*, 2017; Misra, 2012; Saretsky, 1972).

Nyalenda A ward is subdivided into four major units (Central, Dago, Kanyakwar and Western), while Nyalenda B ward features five major units (Kilo, Got Owak, Dunga, Nanga and Western). The study used only 3 units from Nyalenda A ward (Central, Dago and Kanyakwar) as a control community and 3 units from Nyalenda B ward (Got Owak, Dunga,and Nanga) as a case community. The other units were left out as a buffer

community to prevent contamination. Nyalenda A and B ward baseline and end line survey adopted a descriptive survey design and the data was collected through structured questionnaire. This involved administration of structured questionnaires with closed ended questions to 1520 sampled households' heads. The end line survey took place 7 months after the onset of the intervention.

3.4.1 The Intervention Process

Nyalenda B ward

The intervention took place in Nyalenda B ward within Nyalenda informal settlement. A PLA workshop team was formed and a planning meeting was held by the researcher, and involving the Nyalenda B Community Health Extension Worker (CHEW), Kisumu County community Focal Person, Kisumu East Sub-County Community Focal Person and selected community representatives to prepare for the PLA implementation. Members discussed and agreed on the dates for the workshop and the mode of CHVs invitation. Discussions for this study were held in collaboration with the Nyalenda Health Centre health Officer in charge. To gain access to the sample for intervention, the researcher went through the community gatekeepers, that is, the Nyalenda informal settlement Area Chief and the ward administrators.

There were two groups that were empowered on SMWA through PLA. The first group was 30 CHVs that were trained as peer researchers and the second group was the 1501 households. At the household level, it was the household head that went through PLA. This brought a total of 1531 people directly empowered on SMWA through PLA.

To recruit effectively and systematically, 30 CHVs from Nyalenda B ward were purposively selected through the CHEW and 1501 households were randomly chosen by the CHVs. This criterion took care of participation bias, retention, and attrition.

The random sampling considered the 3 clusters in Nyalenda B and 10 CHVs were assigned to each cluster. Each cluster was geographically subdivided into 10 regions and each CHV was assigned a region. Within a region a CHV numbered the homesteads and chose 5 by secret balloting. Within a homestead a CHV numbered the houses and chose 10 by secret balloting. Where the homestead had few residents two neighboring homesteads were united.

The 30 CHVs from Nyalenda B ward were empowered on self-medication with antimicrobials (SMWA) through PLA as peer trainers. The PLA workshop on SMWA was conducted followed by 150 PLA open learning sessions for 1501 households (Appendix II). This was facilitated by the trained CHVs. Each trained CHV facilitated 5 open learning sessions composed of 10 households and administered a PLA and evaluation questionnaire to each individual at the end of each session. The PLA and empowerment were evaluated soon after the training to ensure accurate recall. All the learning sessions were conducted in groups to take care of social desirability, response bias and response fatigue effect.

3.4.1.1 PLA workshop

On the first day of the CHV PLA workshop, team introductions and community representation were done. Explanations of PLA technique and its principles were provided and the problems associated with self-medication, with antimicrobials was explained by the facilitator. The participants were explained to what self-medication with

antimicrobials is and the consequences of SMWA. The participants were then given an opportunity to flexibly discuss the subject. On the second day the CHV PLA workshop randomly formed 6 breakout groups. Participants were asked to first take part in their group with interest. Each group nominated a group facilitator together with a note-taker. Groups ran concurrently and each group discussion session lasted about 2 hours with breaks. Groups recorded notes on cards and flipcharts and presented at the end of the session. On the third day the group gave feedback, an opportunity was given to the participants to further elaborate any of their ideas or clarify any idea they felt had not been captured in perspective. Data synthesis following CHVs' PLA workshop was then done. Note-takers first presented the outcome of their group discussions followed by brief feedback or further input from the wider group. Finally, after all group presentations and feedback, participants were asked to evaluate whether their expectations had been met. From group work, issues identified by participants as major root causes of SMWA, their proposed actions towards its management, the process towards achievement of the desired actions as well as the responsibility of stakeholders were presented.

Each group ranked the most important root causes of self-medication with antimicrobials by rearranging the causes in order of "changeability", from most changeable to least changeable and identification of potential strategies for addressing root causes of SMWA. The team then formed one major group and used index cards for direct ranking. Index cards bearing similar concerns/ideas were grouped together and tallied. This was followed by data interpretation.

3.4.1.2. Participatory Learning and Action session at the household level

Every group of 10 household representatives was taken through SMWA problem statement and problem analysis using the problem tree, identification of root causes,

identification of most important root causes and identification of possible solutions to the problem. Objective analysis, identification of root causes that are both important and changeable and ranking potential strategies to address root causes (important and changeable) of self-medication was done at the household level. On a later date, the team held a meeting and identified barriers to the progress of SMWA control. The community was positive toward acquisition of medicine through prescriptions but nothing had changed at the local health facilities. Days for household PLA open learning sessions varied, it depended on the flexibility and comfort of the households.

To mitigate for the barriers or to implement structural intervention, the study gave a feedback report to the local community health facility management on their findings. The study was expecting the facility management to implement some of the communities' measures on SMWA control. Integrated Health Outreach Services was then planned for and implemented to mitigate for some of the local health facilities inadequacies.

3.4.2 The control in Nyalenda A ward

Nyalenda A as a control group was left to run its normal programmes uninterrupted and this study did not introduce any new program since a quasi-experimental study in itself is blinded (Bärnighausen *et al*., 2017; Misra, 2012; Saretsky, 1972).

3.5 Sample Size Determination

Sample size determination for Nyalenda A ward (control) and Nyalenda B ward (case) baseline and end line survey

The sample size was calculated using the formula below:

n=Z^2p (1-p)/d^2(Fisher, Laing, & Stoeckel, 1985)

n=sample size

Z= Statistics corresponding to a chosen level of confidence

P=Expected prevalence or std Dev

d= Precision or confidence interval

This formula was applied in a study done among university students in South West Nigeria (Sapkota, Coker, Rosenberg Goldstein, Atkinson, & Sweet, 2010) and among households in urban slum community in Asia (Gupta *et al*., 2011) to establish factors influencing self-medication with prescription only medicine among the targeted population.

Nyalenda A ward (control)

Using this formula, the sample size is calculated at 95% confidence interval

P = stdDev = 0.5

Z=1.96 at 95% confidence level

d= confidence interval = +- 5% = 0.05

$n = Z^2 p (1-p)/d^2$

n= (1.96)(1.96) x 0.5 (1-0.5

           (0.05)(0.05)

n= (1.96) (1.96) x (0.5) (0.5)

           0.0025

n= .9604 / .0025 = 384.16. The sample size was thus N= 380 arbitrarily.

Nyalenda B Ward (case)

The study used $n = Z^2 p (1-p)/d^2$ (Fisher *et al*., 1985). Likewise, this study had 380 as the sample size for Nyalenda B.

Sample size determination for the intervention group in Nyalenda B ward

The sample size for the households was calculated using arbitrary method (10% of the population). The study needed a larger sample to boost the likelihood of achieving significance of the effect size. The number of households in Nyalenda B = 10,443.

Therefore, 10% of 10,443= 1044.3, but 30 peer researchers reached a population of 1501 households. The sample size for the CHVs was decided on by the researcher and it was based on the number that the study could afford to train and work with. Therefore, the sample size for CHVs was 30. Therefore 1501 households plus 30 CHVs gave a total of 1531 PLA trainees.

3.6 Sampling Method

Nyalenda A ward (control) and Nyalenda B ward (case)

Cluster sampling method was used for both Nyalenda A (control) and NyalendaB (case) baseline and end line survey. Efficient sample design requires that clusters be used to control costs but also that the design effect be kept as low as possible in order for the results to be usably reliable. To keep the design effect as low as possible, the sample design should use as many clusters as is feasible, the smallest cluster size in terms of number of households that is feasible, a constant cluster size rather than a variable one, a systematic sample of households at the last stage, geographically dispersed rather than a segment of geographically contiguous households (Secretariat, 2003). Nyalenda informal settlement is already subdivided into 9 aerial clusters. This study used 3 clusters from each Ward (Nyalenda A and Nyalenda B) for the survey. The other 3 clusters were left out as a buffer zone. Systematic sampling was used to identify the 380 respondents from Nyalenda A and Nyalenda B. The 380 were sub-divided proportionally among the 3 clusters for each survey and each ward. Table 3.1 below shows the ratio of the households

from the six chosen clusters and the number of the household to be sampled (hhsTBS) from each cluster. Systematic sampling was made possible because of the household mapping done by the research team.

Table 3.1: The number of households sampled from each cluster in Nyalenda A ward (control) and Nyalenda B ward (case)

Nyalenda B (case) Villages (clusters)	Ratio	No of households	No of (hhsTBS)	Nyalenda A (control) Villages (clusters)	Ratio	No of households	No of (hhsTBS)
Dunga	0.320	1773	122	Central	0.388	2095	146
Nanga	0.340	1886	129	Dago	0.138	739	51
Got Owak	0.340	1886	129	Kanyakwar	0.483	2649	183
Total	**1**	**5545**	**380**		**1**	**5481**	**380**

The sample interval for each cluster is the ratio of households sampled in a cluster to the total population of households in that cluster. Table3.2 shows the sample interval for each cluster.

Table 3.2: The sample interval for each cluster in Nyalenda A ward (control) and Nyalenda B ward (case)

Nyalenda B (intervention) Villages (cluster)	No. of households	No. of (hhsTBS)	SI	Nyalenda A(control) Villages (clusters)	No. of households	No. of (hhsTBS)	
Dunga	1773	122	15	Central	2095	146	14
Nanga	1886	129	15	Dago	739	51	14
Got Owak	1886	129	15	Kanyakwar	2649	183	14
Total	**5545**				**5481**		

The study used a sample interval of 15 for Nyalenda B ward and 14 for Nyalenda A ward. The first household was picked randomly by getting a central place in the village and numbering the households in vicinity, each number was then be assigned a piece of paper and one of them unconsciously picked and became that was the first household

60

interviewed. The next household was picked after an interval of 15 households for Nyalenda B ward and 14 for Nyalenda A ward until a total of number of households to be sampled in each cluster was achieved. This was guided by a sampling frame generated from the household mapping we had done earlier.

3.7 Study Instrument

3.7.1 Data Collection for Nyalenda A ward (control) and Nyalenda B ward (case) baseline and end line survey

This study used structured questionnaires with close-ended questions that were responded to as the questions suggested for baseline and end line survey (Appendix III). Nyalenda B end line survey was augmented with the report from PLA sessions. The structured questionnaires contained items assessing the self-medication with antimicrobials pattern of use among households and were administered to the sampled households following informed consent. The head of each sampled household was the respondent, and in the absence of the household head, the interview was postponed to a later date. Help of Community Health Volunteers was taken to establish rapport with the respondents. To develop this questionnaire this study looked at other studies on SMWA use in other areas that had used closed ended structured questionnaires. Examples are studies done in Eastern Tanzania on Prevalence, determinants and knowledge of antibacterial self-medication (Horumpende *et al*., 2018), among community in Mbeya city, Tanzania on practices and predictors for self-medication with antibiotics and anti-malarials (Kajeguka & Moses, 2017), in northern Uganda Patterns and predictors of self-medication with antimicrobials (Ocan *et al.*, 2014) and among adults in Magwagwa Ward, Nyamira County in Kenya on antibiotic use and misuse (Nyambega, 2017).

Questionnaires provide a high degree of data standardization and adoption of generalized information amongst any population. They are useful in a descriptive study where there is need to quickly and easily get information from people in anon-threatening way (Kukathas, 2003). The questionnaires were self-administered by the respondent in the presence of an enumerator to aid the respondents in understanding the questions wherever necessary. The questionnaire was structured so as to get definite responses, which the study required, in a relatively short time and to cover a larger number of respondents. Adequate sample size was necessary for establishing a significant intervention effect size.

3.7.1.2 Data collection for the intervention in Nyalenda B ward

During PLA there is need for flexibility therefore, data was collected by the nominated note-takers for every group as they naturally evolved. Groups recorded notes on cards and flipcharts and presented at the end of the session. Structured questionnaires for the assessment of PLA and empowerment were then administered to all the trainees at the end of PLA. The CHVs received training on data collection, key components of the study, including the objective, detailed content of the questionnaire, and its administration in a way that protected the identity and privacy of the respondents. The questionnaire was pre-tested in a sub-section of the CHVs and necessary corrections were made on questions that were not clear. The questionnaire contained closed-ended questions on socio-demographic characteristics of the trainees and questions in a Likert scale of 4 for evaluation of all domains of PLA and Empowerment. This study developed a Participatory Learning and Action and Empowerment Evaluation (PLAEE) tool (Appendix IV) that had the type of questions used for measuring the level of all the PLA and empowerment domains and the measurement procedure. This tool was developed by adopting relevant ideas from Growth and Empowerment Measure (GEM) survey

(Haswell, 2010), the Trocaire awareness index tool (Ciara Kirrane, Cliona Sharkey, & Lars Otto Naess, 2012), a Community Ownership and Preparedness Index (COPI) tool (Thomas, 2011), and a summative evaluation type tool (Tyler, 1974). Studies that measured the level of PLA and empowerment (Vassall *et al.*, 2014) and those based on participants perceptions and valuation using *etic* and *emic* criteria and analysis (O'Reilly-de Brún, 2016) were reviewed. Finally, theoretical literature on PLA and empowerment was reviewed. The Growth and Empowerment Measure (GEM) survey tool comprised of a 14-item Empowerment Scale. The GEM was developed as a tool to measure the process and outcomes of empowerment interventions such as Family Wellbeing (FWB). The GEM gave some of the measurable characteristic of empowerment like self-capacity, inner peace, strength, happiness and connectedness. This was assessed using questions in a Likert scale. The Trocaire awareness index tool was used for assessing the effectiveness of empowerment by asking questions on awareness of rights, knowledge and duties. A Community Ownership and Preparedness Index (COPI) tool and a Behavioral Tracking Survey (BTS) were carried out to assess the levels of preparedness of the CBOs and their members and to determine the strength of community mobilization. The BTS used an interview tool with coded questions on behaviors and perceptions concerning participation in-group activities, beliefs about collective action, safe sex practices and STI treatment seeking. A summative evaluation type assessed the worth of the workshop activities (Tyler, 1974).

The intervention tool had structured questionnaires with standardized set questions in a 4 Likert scale and close-ended questions that was responded to as the questions suggests. This enabled objective assessment of participatory learning and action and empowerment domains. The instrument also offered anonymity, further reducing social pressure and

hence social desirability bias (McLeod, 2008). Likert scale allows individuals to make decisions on their level of agreement and so tapping into the cognitive and affective components of attitudes (Likert, 1932). Each item has equal value therefore the scores were for the respondents therefore enabling quantification of a qualitative data, which is fast and easy to analyze.

The reliability analysis was done for the tool and the Cronbach's Alpha of 0.894 was recorded. PLA and empowerment theoretical literature identified PLA domains as flexible learning and listening, participatory evaluation, participatory interaction and empowerment domains as power within (Increased awareness and desire to change), power with (Increased solidarity to challenge underlying assumptions), and power over (changes in underlying resources and power to challenge constraints).

The PLAEE (Appendix IV) tool contained questions for PLA (for each domain) and empowerment (for each domain) assessment in a Likert scale of 4 and they were coded as 1= Very good, 2=Good, 3=Somehow, and 4=No. Each variable (domain) was assessed using 3 or more questions.

3.8 Validity and Reliability

Validity

It refers to whether the measure actually captures the intended construct or to the index or scale measuring exactly what it is supposed to measure, for a measure to be valid it must also be reliable, whereas a reliable measure is not necessarily valid.

The tools used in collecting data were reviewed for quality content to ascertain their presentation of all or most of the dimensions of the abstract concept in order to obtain

content valid measure of the variables. The measures related in a way that they were consistent with the theoretically derived hypotheses of the concept.

Reliability

It refers to the consistency of a measure and is directly related to the amount of random error. The reliability was estimated though internal consistency technique and the questionnaire was pretested. In this technique reliability increases with increase in the number of items in the scale and increase in the inter-item correlation. Cronbach's alpha is a measure of internal consistency that is, how closely related sets of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency). Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items. Below, for conceptual purposes, is the formula for the standardized Cronbach's alpha:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

Here N is equal to the number of items, c-bar is the average inter-item covariance among the items and v-bar equals the average variance. One can see from this formula that if you increase the number of items, you increase Cronbach's alpha. Additionally, if the average inter-item correlation is low, alpha will be low. As the average inter-item correlation increases, Cronbach's alpha increases as well (holding the number of items constant) (Cronbach, 1951). A high coefficient (>0.7) implies that items in the scale correlate highly among themselves and consistently measure the construct of interest. The study used SPSS version 24 to get the Cronbach's alpha. The PLEE tool had a Cronbach's alpha of 0.894.

The research assistants were trained for one day on objective data collection. A pretest for the tool used for baseline and end line survey was done on the households that were not part of this survey and on the CHVs that were not to undergo PLA. The purpose of the pretest was to ascertain the appropriateness of data collection instruments and to identify any issue that could affect their administration besides correcting areas where ambiguity and weaknesses were identified and to confirm that the enumerators understood the instrument well.

3.9 Data Analysis and Presentation Techniques

Nyalenda A ward (control) and Nyalenda B ward (case)

Statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS, version 24) and Excel software.

To establish the reasons for self-medication with antimicrobials use among households in Nyalenda informal settlement in Kisumu County. This study then investigated reasons for SMWA, indications for SMWA, SMWA information, the cohort using SMWA, methods of requesting SMWA duration between onset of disease symptoms and SMWA, repeat SMWA purchase on response, repeat SMWA purchase on none response and the proportion of self-medication with antimicrobial among households in both Nyalenda A ward and Nyalenda B ward before and after the SMWA community mobilization intervention. In this study, the coded and cleaned data were used to calculate frequencies and proportions of the socio-demographic characteristics of the 1520 household representatives and responses to SMWA use questions.

To evaluate the association of Participatory Learning and Action and community empowerment on self-medication with antimicrobials by the households in Nyalenda informal settlement. This study assessed the level attained by of each domain of PLA and each domain of empowerment and established how each level of participatory learning and action (PLA) domains developed each domain of empowerment to what level among Nyalenda B Ward households. The coded and cleaned data were used to calculate frequencies and proportions of the socio-demographic characteristics of the 1531 PLA trainees and responses on PLA and empowerment questions. The mean of all the questions for every domain of PLA and empowerment was calculated and their corresponding frequencies established to determine the value coded to a domain for all the 1531 PLA trainees.

To establish the level of each domain of empowerment and PLA and to know whether there is PLA and empowerment achieved or not for every trainee, a Likert scale code was recorded. 'Very good' and 'good' was equated to *yes* taking up the mean value of 1 through 2. 'Somehow*'* and 'No*'* was equated to *No* taking up the mean values of 2.01 through 4. Then the percentage frequencies of *Yes* and *No* was calculated for all the domains of empowerment and PLA. *Yes* is empowerment and PLA and *No* is no empowerment achieved and PLA not effectively conducted. The 1531 trainees existed as 30 groups of 50 households except for 1 group that had 51 households and 1 group of 30 CHVs. Chi-square analysis was used to establish every category of socio demographic characteristics that was highly empowered through PLA and to verify association between PLA domains and empowerment variables. Odd Ratio, 95% CI and p-values for each PLA domain were obtained using binary logistic regression for each empowerment.

For all analyses, *P*≤0.05 was considered statistically significant. The structural modification (outreach services) outcome was also recorded.

To determine the effect of community empowerment on self-medication with antimicrobials among Nyalenda informal settlement households. The study determined the effect of community empowerment on the proportion of SMWA among the households in Nyalenda informal settlement by calculating empowerment effect size. Effect size was computed as the relative gain in the intervention group, calculated as the net difference between the percentage improvement in the intervention group and the percentage improvement in the comparison group. Any difference between the 'after' and 'before' measurements of the control group (C2 - C1) was calculated and it would be due to uncontrolled variables. Differences between the 'after' and 'before' measurements in the experimental group (E2 - E1) would be the result of the experimental variable plus the same uncontrolled variables affecting the control group. Isolating the effect of the experimental variable is simply a matter of subtracting the difference in the two measurements of the control group from the difference in the two measures taken from the experimental group. The WHO recommended the same formula for outcomes measured as percentages. The effect size was calculated as =(%POST–%PRE) intervention – (%POST–%PRE) control (WHO, 2009).

Columns were used for presenting and illustrating the results for the experiment group and the control group. On each column there is a bar. The bars can either overlap or not. When they don't overlap then the difference between the two groups is significant. 95% Confidence Interval for the difference in the intervention group, the difference in the control group and the effect size was worked out using the formula

Confidence interval =

$$(\hat{p}_1 - \hat{p}_2) \pm 1.96 \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

p_1 is probability of SMWA among the treatment group

p_2 is probability of SMWA among the control group

n_1 and n_2 is the sample size. The CI bars were constructed for the difference in the intervention group and the difference in the control group. When the bars don't overlap then the ES is significant.

The study also used Chi-square analysis to verify the association between socio-demographics on self-medication with antimicrobial and SMWA by the households in the intervention group. Odds Ratio, 95% CI and *P*-values for SMWA were obtained from the intervention group using binary logistic regression for every use of SMWA and socio demographic characteristics. For all analyses, $P \leq 0.05$ was considered statistically significant.

3.10 Ethical Consideration

The Maseno University Ethics Review Committee approved the current study (Appendix V). The permission to conduct the study within Nyalenda informal settlement was provided by the area chief (Appendix VI). The informed consent of the respondent was sort by stating the purpose of the study, the duration of the survey and assuring the respondents that their participation was voluntary and that high levels of confidentiality would be maintained during and after the study (Appendix VII and VIII). The study also considered the participants who were below 18 years and prepared an assent form. We did not get the respondents that were below 18 years. Participants gave their informed consent prior to inclusion in the study upon which an agreement was signed on the provided questionnaire.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the study findings. The findings of each objective are separately presented.

4.2 Reasons for self-medication with antimicrobial by households in Nyalenda informal settlement.

To achieve this objective this study established the socio-demographics for the respondents and the reasons for self-medication with antimicrobials use in Nyalenda A (control) and Nyalenda B (case) baseline and end line.

4.2.1 Socio-demographic characteristics of Nyalenda informal settlement [Nyalenda A ward (control)) baseline and end line, Nyalenda B ward (case) baseline and end line]

The study population for baseline and end line survey comprised of 1520 households (Nyalenda A baseline 380 hhs, endline 380 hhs and Nyalenda B baseline 380 hhs, end line 380 hhs). Majority of the respondents from Nyalenda A baseline, Nyalenda A end line, Nyalenda B baseline, Nyalenda B end line surveys are in the category of 26-25years (50.0%, 44.5%, 40.0%, 37.4%) of female gender (55.3%, 59.5%, 57.9%, 60.8%) married (75.8%. 70.5%, 62.9%, 68.4 %) and a mother (47.6 %, 52.9%, 55.3%, 58.2%,). Most of the respondents are of secondary (31.1%, 34.5%, 41.3%, 38.2%) followed by primary (35.8%, 30.8%, 25.0%, 28.2%) level of education and majority is self-employed (51.1%, 45.3%, 47.9%, 48.6%) followed by unemployment (35.0%, 39.7%, 34.2%, 37.2%), respectively (table 4.1). The socio-demographic characteristics of the respondents show a similarity in all the four surveys.

Table 4.1: Socio-demographic characteristics of Nyalenda informal settlement households [Nyalenda A ward (control)) baseline and end line, Nyalenda B ward (case) baseline and end line]

	Nyalenda A baseline (%)	Nyalenda A endline (%)	Nyalenda B baseline (%)	NyalendaB baseline (%)
Age				
15-25	20.3	22.4	21.3	23.9
26-35	50.0	44.5	40.0	37.4
36-50	23.7	26.6	30.8	28.9
above 50	6.1	6.6	7.9	9.7
Gender				
Male	44.7	40.5	42.1	39.2
Female	55.3	59.5	57.9	60.8
Marital status				
Single	15.8	19.2	25.3	20.3
Married	75.8	70.5	62.9	68.4
Divorced	3.2	3.9	3.9	2.9
Widowed	2.6	4.5	4.7	5.8
Separated	2.6	1.8	3.2	2.6
Family status				
Father	40.8	38.9	32.9	30.0
Mother	47.6	52.9	55.3	58.2
Son or Daughter	9.5	7.9	9.2	9.7
Others	2.1	0.3	2.6	2.1
Education level				
Illiterate	3.7	3.9	3.2	4.5
Read and write only	9.5	11.1	7.9	10.5
Primary school	35.8	30.8	25.0	28.2
Secondary school	31.1	34.5	41.3	38.2
College and above	20.0	19.7	22.6	18.7
Occupation				
Student	3.9	4.5	4.7	3.8
Government employee	1.3	1.8	3.2	1.2
Self employed	51.1	45.3	47.9	48.6
Employed by a private business	8.7	8.7	10.0	9.2
Unemployed	35.0	39.7	34.2	37.2

Chi-square test was used for the analysis.

4.2.2 Reasons for self-medication with antimicrobial by households in Nyalenda informal settlement [Nyalenda A ward (control) baseline and end line, Nyalenda B ward (case) baseline and end line]

In all the four groups the highest cohort reported using SMWA is the child under 12 years of age (60%,56.8%, 41.1%, 39,7%); Majority of the respondents reported using SMWA for respiratory tract infections (62.1%, 65.8%, 39.5%, 57.6%), followed by gastrointestinal tract infection (22.9%, 19.0%, 17.0%, 14.8%), respectively, except for Nyalenda B ward baseline survey with headache rating second (4.5%, 7.6%, 30.0%, 12.0%); SMWA is mostly used for emergency (55.5%, 51.3%, 51.3%, 51.6%) followed by need for saving money or time and its acquisition is mainly within 24 hours of noticing the symptoms of illness (63.7%,63.7%, 38.2%, and 57.3%), respectively, except for Nyalenda B ward baseline households reporting majority using SMWA after 1 week of experiencing the symptoms of illness (33.7%, 33.7%, 60.0%, and 40.3%). The main source of information for SMWA use is the medical practitioners (42.9%, 41.3%, 37.6%, and 36.9%) followed by the respondent own initiative (26.6%, 39.5%, 20.8%, and 31.3%) and majority of the respondents acquired medication by mentioning the symptoms of their illnesses (43.9%, 43.9%, 35.0%, and 41.8%) followed by giving the name or the group of the medicine they need (37.6%, 37.6%, 27.1%, and 35.0%), respectively. Around half of the respondents reported not repeating SMWA purchase to enhance their response to treatment except for the Nyalenda B end line survey that more than three quarters would not repeat purchase for the same purpose (48.7%, 57.2%, 52.9%, and 78.7%). More than three quarters of the respondents would not repeat purchase of SMWA in case of none response except for Nyalenda B that reported around half before intervention and more than more than three quarters after the intervention (78.8%, 82.9%, 58.4%, and 89.2%) (Table 4.2).

The intervention and the control group showed similarities in their reasons for SMWA in both their baseline and end line surveys. Use of self-medication with antimicrobial drugs in management of disease symptoms is a common practice among the non-empowered and the communities empowered with knowledge on SMWA. Except for Increased number of the respondents from the intervention group that are reported not repurchasing self-medication for another try or for enhanced response meaning overuse has reduced.

Table 4.2: Reasons for self-medication with antimicrobial use by households in Nyalenda informal settlement [Nyalenda A ward (control) baseline and end line, Nyalenda B ward

	Nyalenda A Baseline (%)	Nyalenda A End line (%)	Nyalenda B Baseline (%)	Nyalenda B End line (%)
(The cohort consuming SMWA). Was the person you bought medicine for				
Pregnant?	5.3	3.9	4.7	5.3
Breast feeding?	9.7	7.9	8.9	9.7
Had a chronic disease (Diabetes)	1.6	1.6	11.6	12.1
Child under 12 years	60.3	56.8	41.1	39.7
>12 years	23,2	29.7	38.7	33.2
What illnesses would you not seek a doctor for?				
Respiratory tract infections	62.1	65.8	39.5	57.6
Gastrointestinal diseases	22.9	19.0	17	14.8
Sexually transmitted diseases	4.5	2.6	5	8.2
Eye diseases	2.6	1.3	2.4	3,2
Headache or fever	4.5	7.6	30	12.0
Skin diseases or injury	0.0	1.1	0.0	0.0
Maternal or menstrual disorders	1.6	1.6	2.4	1.6
NA	1.8	0.8	2.1	2.1
How long is the duration of sickness before seeking self-medication?				
within 24 hrs	63.7	63.7	38.2	57.3
1 to 4 weeks	33.7	33.7	60.0	40.3
5 to 12 weeks	0.5	0.5	0.5	0.5
over 12 weeks	0.3	0.3	0.0	0.2
Why did you resort to self- medication?				
Emergency use	55.5	51.3	51.3	51.6
Disease is not serious	5.0	6.6	12.4	20.0
For prevention of known or unknown diseases	2.4	3.7	9.5	14.0
Prior experience about the drug	1.3	1.8	2.6	4.4
Less expensive in terms of time and money	35.0	35.3	22.9	8.9
NA	0.8	1.3	1.3	1.3
How did you request for these medicines?				
By mentioning the name of the drug	37.6	37.6	27.1	35.0
By mentioning the group to which the drug belongs e.g. antibiotic	9.2	9.2	19.0	11.8
By telling the symptoms of your illness	43.9	43.9	35.0	41.8
By showing an old sample or package of the drug	2.9	2.9	10.0	4.7
By presenting a piece of paper on which the name of the drug is written	5.0	5.0	7.4	5.6
NA	1.3	1.3	0.3	1
What were your sources of information or advice on SMWA?				
Received no advice because the respondent knows about the drug	26.6	39.5	20.8	31.3
Read label or leaflet or promotion material of the drug	19.37	9.5	21.1	20.3
Advised by neighbors friends or relatives	8.4	8.4	19.5	8.9
Suggested by traditional healers	1.1	0.0	0.5	1.3
Advised by doctors nurses health workers but without a prescription	22.9	23.4	13.7	23.7
Recommended by pharmacists or those working at the pharmacy	20.0	17.9	23.9	13.2
NA	1.3	1.3	0.5	1.3
When you buy medicine and it made you feel better do you repurchase so as to improve your condition further?				
Yes	51.3	48.8	47.1	21.3
No	48.7	57.2	52.9	78.7
In case you don't respond to medication do you repurchase the same medication to make another try?				
Yes	21.7	17.1	41.6	10.8
No	78.3	82.9	58.4	89.2

P-values generated by Chi-square analyses and is significant at <0.05

4.3 Evaluation of the association of Participatory Learning and Action and community empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement, Kisumu County. To achieve this, the study determined the socio--demographic characteristics in relationship with all the empowerment domains, highlighted the PLA workshop and structural modifications findings and finally determined the association of all the PLA domains and empowerment domains among the intervention group.

4.3.1 The socio-demographic characteristics of all the 1531 PLA trainees (trained CHVs inclusive) and the empowerment domains achieved

A total of 1531 Nyalenda B ward community members went through PLA (CHVs and household representatives) on SMWA and responded to the questions on empowerment and PLA evaluation. Based on the data the community members aged between 26-35 years is associated more with power with relative to the rest of the age categories (48.3%; $P=0.008$), the females is associated more with power within compared to the males (79.0%; $P<0.0001$) and the mother, in comparison to other family members is associated more with categories of empowerment (power within 68.9%; $P=0.002$, power with 68.2%; $P<0.0001$, power over 70.3%; $P<0.0001$). Furthermore, the community members with secondary level of education were associated more with empowered in all categories in comparison to other levels of education (power within 35.0%; $P=0.025$, power with 34.2%; $P<0.0001$, power over 34.2%; $P<0.0001$) and the self-employed is associated more with power with significantly more than others in their respective categories (52.5%; $P=0.002$). Likewise, those that had an average income of less than Ksh 5000 is associated more with power with significantly more (70.0%; $P=0.02$) and those that spent less than Ksh 500 on purchasing drugs is associated more with power with and power

over (power within 64.7%; *P*=0.008, power over 64.3%; *P*=0.025) in comparison to the relevant categories. Finally, the Christian protestant significantly is associated more with power over (43.9%; *P*<0.0001) and caretakers of children below 12 years is associated more with all categories of empowerment (power within 37.7%; *P*=0.018, power with 38.5%; *P*<0.0001, power over 39.2%; *P*=0.007) as compared to other relevant categories. These socio-demographic characteristics of the study participants and SMWA empowerment domains are shown in Table 4.3.

Table 4.3. Socio-demographic characteristics of 1531people (household representatives [hhr] and CHVs) and SMWA empowerment domains

Socio demographic characteristics	Power within		P value	Power with		P value	Power over		P value
	Yes	No		Yes	No		Yes	No	
Age									0.029
15-25	367(85.3)	63(14.7)	0.603	293(68.1)	137(31.9)	0.008	262(60.9)	168(39.1)	
26-35	600(83.1) 46.9*	122(16.9)		531(73.5) 48.3*	191(26.5)		398(55.1) 46.7*	324(44.9)	
36-50	247(82.9)	51(17.1)		227(76.2)	71(23.8)		153(51.3)	145(48.7)	
above 50	65(80.2)	16(19.8)		49(60.5)	32(39.5)		39(48.1)	42(51.9)	
Gender									0.816
Male	268(77.2)	79(22.8)	<0.0001	251(72.3)	96(27.7)	0.816	195(56.2)	152(43.8)	
Female	1011(85.4)	173(14.6)		849(71.7)	335(28.3)		657(55.5)	527(44.5)	
Marital status									
Single	286(84.1)	54(15.9)	0.072	241(70.9)	99(29.1)	0.121	198(58.2)	142(41.8)	0.134
Married	876(82.5) 79.0*	186(17.5)		766(72.1) 77.2*	296(27.9)		576(54.2) 77.2*	486(45.8)	
Divorced	18(100.0)	0(0.0)		12(66.7)	6(33.3)		13(72.2)	5(27.8)	
Widowed	77(91.7)	7(8.3)		56(66.7)	28(33.3)		53(63.1)	31(36.9)	
Separated	22(81.5)	5(18.5)		25(92.6)	2(7.4)		12(44.4)	15(55.6)	
Family status									
Father	252(80.0)	63(20.0)	0.002	233(74.0)	82(26.0)	<0.0001	174(55.2)	141(44.8)	<0.0001
Mother	881(86.0) 68.9*	144(14.0)		750(73.2) 68.2*	275(26.8)		599(58.4) 70.3*	426(41.6)	
Son or Doughier	70(78.7)	19(21.3)		62(69.7)	27(30.3)		38(42.7)	51(57.3)	
Others	76(74.5)	26(25.5)		55(53.9)	47(46.1)		41(40.2)	61(59.8)	
Educational level									
Illiterate	74(81.3)	17(18.7)	0.025	63(69.2)	28(30.8)	<0.0001	65(71.4)	26(28.6)	<0.0001
Read and write only	130(90.3)	14(9.7)		127(88.2)	17(11.8)		108(75.0)	36(25.0)	
Primary school	304(81.3)	70(18.7)		278(74.3)	96(25.7)		202(54.0)	172(46.0)	
Secondary school	448(81.5) 35.0*	102(18.5)		376(68.4) 34.2*	174(31.6)		291(52.9) 34.2*	259(47.1)	
College level	323(86.8)	49(13.2)		256(68.8)	116(31.2)		186(50.0)	186(50.0)	
Occupation									

Student	101(82.1)	22(17.9)	0.392	96(78.0)	27(22.0)	0.002	71(57.7)	52(42.3)	0.071
Government employee	68(87.2)	10(12.8)		56(71.8)	22(28.2)		54(69.2)	24(30.8)	
Self employed	651(84.9) 50.9*	116(15.1)		577(75.2) 52.5*	190(24.8)		432(56.3) 50.9*	335(43.7)	
Employed by a private business	107(83.6)	211(6.4)		87(68.0)	413(2.0)		66(51.6)	62(48.4)	
Unemployed	352(80.9)	83(19.1)		284(65.3)	151(34.7)		229(52.6)	206(47.4)	
Average monthly income									
less than 5,000	897(85.0) 70.1*	158(15.0)	0.065	770(73.0) 70.0*	285(27.0)	0.020	586(55.5) 68.8*	469(44.5)	0.868
5000 to 10, 000	264(80.0)	66(20.0)		218(66.1)	112(33.9)		187(56.7)	143(43.3)	
> 10, 000	118(80.8)	28(19.2)		112(76.7)	34(23.3)		79(54.1)	67(45.9)	
Approximate drug expenditure									
< 500	827(82.0) 64.7*	182(18.0)	0.008	745(73.8) 67.7*	264(26.2)	0.025	548(54.3) 64.3*	461(45.7)	0.183
500 to 1, 000	193(82.8)	40(17.2)		165(70.8)	68(29.2)		142(60.9)	91(39.1)	
> 1, 000	259(89.6)	30(10.4)		190(65.7)	99(34.3)		162(56.1)	127(43.9)	
Religion									
Christian Orthodox	180(83.7)	35(16.3)	0.056	161(74.9)	54(25.1)	0.063	156(72.6)	59(27.4)	<0.0001
Christian protestant	640(86.1) 50.0*	103(40.9)		517(69.6) 47.0*	226(30.4)		374(50.3) 43.9*	369(49.7)	
Muslim	27(77.1)	8(22.9)		23(65.7)	12(34.3)		21(60.0)	14(40.0)	
Christian catholic	378(79.9)	95(20.1)		344(72.7)	129(27.3)		254(53.7)	219(46.3)	
Others	54(83.1)	11(16.9)		55(84.6)	10(15.4)		47(72.3)	18(27.7)	
Health condition of the drug consumer									
Pregnant	86(88.7)	11(11.3)	0.018	81(83.5)	16(16.5)	<0.0001	62(63.9)	35(36.1)	0.007
Breast feeding	154(78.2)	43(21.8)		139(70.6)	58(29.4)		107(54.3)	90(45.7)	
Has a chronic disease	77(77.8)	22(22.2)		59(59.6)	40(40.4)		56(56.6)	43(43.4)	
Child under 12 years	482(86.2) 37.7*	77(13.8)		423(75.7) 38.5*	136(24.3)		334(59.7) 39.2*	225(40.3)	
13 -59 years	440(82.2)	9517.8		361(67.5)	174(32.5)		265(49.5)	270(50.5)	
> 59 years	40(90.9)	4(9.1)		37(84.1)	7(15.9)		28(63.6)	16(36.4)	

Note: 1: Values in bracket (), are % socio-demographic characteristic within a specified category. 2: Values with * are % socio-demographic characteristic within a specified category of empowerment P-values generated by Chi-square analyses and is significant<0.05

4.3.2 Participatory Learning and Action conduct

The trainer highlighted self-medication with antimicrobial problem statement and allowed the team to discuss it freely. All the 100% members were not aware that buying medicine from a pharmacy without a prescription is self-medication 76.7% assumed headache is malaria, 80% indicated that any pain in the chest after a cold period is pneumonia, 83.3% agreed that after taking antimalarials and the headache persist then typhoid should be managed, 53.3% agreed that *Mara Moja* or *Sona Moja* treats malaria and 60% said amoxicillin and cotrimoxazole were good for management of common cold. About 100% of the members had used self-medication for themselves or their family members in the last 3 months. The team was then trained on the effect of SMWA to the individual and to the community by highlighting the nature and the effect of antimicrobials' prolonged use, over dosages, under dosages, reuse, misuse, and missed diagnosis (The progress and consequences of antimicrobial resistance is shown in section 2.2.2 and 2.2.3).

The team was given opportunity to ask questions and to add their views. One of the team members said, "*It is advertised through the radio that we use Mara Moja for severe headache and it controls my headache and when the headache keeps on recurring then I consult with the pharmacy.* Another member interjects, *"Normally that is just malaria and in my case I just buy AL"* and yet another one said, *"and when it continues then it is typhoid".* Another member said, *"Amoxyl works best for me when I get a common cold".* There were similar statements from some members. Such statements were freely discussed and a consensus obtained.

The team was then split into 6 groups and each group identified the chain of events that leads to self-medication with antimicrobials, most important root causes, and solutions to SMWA. Direct ranking of the most important root causes (they were encouraged to have "changeability" in mind, from most changeable to least changeable) and potential strategies addressing the root causes of SMWA was done. It was established through PLA that, reasons for SMWA are ignorance, high cost of prescription medicine, unavailability of time, distance from preferred health facilities, wrong information or advice, accessibility to self-medication, fear of HIV status exposure at the facility. The solutions to these problems as enumerated included community mobilization on SMWA, improvement of the management of the local health facilities and the attitude of the health personnel towards efficient and effective service and strengthening of the community health strategy.

4.3.3 Structural modification

The study established that the main barrier to the community mobilization on SMWA was the community perception of their local health facility services, which were poor services. They highlighted the poor attitude of the health personnel towards efficient and effective service, inadequate examination equipment, limited types of drugs for treatment of malaria and other infections and they hoped for 24-hour system of operation. They also hoped that HIV screening be made voluntary, counseling services be put in place and that health education services be provided at the facility. This called for mitigating for the barriers or structural intervention. A feedback report was given to the local health facility management representatives. The management representatives did not take up these comments positively and blamed the CHVs for misinforming the public. This called for redirecting efforts to

activities that may be more effective. A conflict management meeting was then organized by the researcher, the CHEW for the Nyalenda B ward CHVs and the health management representatives. The CHVs encouraged themselves to continue with the household health promotion and especially community mobilization on self-medication with antimicrobials. A 5-monthly Integrated Health Outreach Services (IHOS) within Nyalenda B was planned for and implemented to fill in the gap for the community perception of poor health service at their local facility and to mitigate for time factor and distance. The IHOS reached a total of 575 people of which 154 were children below 5 years.

4.3.4 The Association of PLA domains and all Empowerment domains for all the 1531 PLA trainees

In order to establish the association of PLA domains and all empowerment domains, the Odd Ratios, 95% CI and p-values were obtained using binary logistic regression. The results shows that flexible learning and listening may increase power within by 5 times (OR=5.361, 95% CI=3.101-9.268 $P<0.0001$,), power with by 6 times (OR=6.160, 95% CI=3.437-11.039, $P<0.0001$) and power over by 2 times (OR=2.261, 95% CI=1.293-3.954. $P<0.0001$), Participatory evaluation may increase power within by almost 8 times (OR=7.711, 95% CI=5.184-11.459, $P<0.0001$), power with by 5 times (OR=5.012, 95% CI=3.375-7.443, $P<0.0001$), power over by more than 3 and a half times (OR=3.618, 95% CI=2.375-5.509, $P<0.0001$), Participatory interaction may increase power within by almost 8 times (OR=7.823, 95% CI=4.798-12.763, $P<0.0001$), power with by 8 and a half times (OR=8.610, 95% CI= 4.987-14.866 $P<0.0001$), power over by 4 times (OR=4.003, 95% CI=2.325-6.693, $P<0.0001$) (Table 4.6).

The odds that each and every PLA domain may have strengthened each and every empowerment domain is more than 2 (the range is 2.2- 8.6) at a *P*<0.0001. The study rejected the null hypothesis and accepted the alternative hypothesis'

Table 4.4. The association between PLA domains and all empowerment domains as outcome variables for 1531 SMWA PLA trainees in Nyalenda B Ward

	Power within			Power with			Power over		
	P	**OR**	**95%CI**	**P**	**OR**	**95%CI**	**P**	**OR**	**95%CI**
Flexible learning and listening	<0.0001	5.361	3.101- 9.268	<0.0001	6.160	3.437- 11.039	<0.0001	2.261	1.293- 3.954
Participatory evaluation	<0.0001	7.711	5.184- 11.459	<0.0001	5.012	3.375- 7.443	<0.0001	3.618	2,375- 5,509
Participatory interaction	<0.0001	7.823	4.798- 12.763	<0.0001	8.610	4.987- 14.866	<0.0001	4.003	2.325- 6.693

Note: Odds Ratio, 95% CI and p-values were obtained using binary logistic regression.

4.4 The effect of community empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County.

To achieve this objective this study established the effect size of community empowerment on the proportion of SMWA in Nyalenda informal settlement and the use of self-medication with antibiotics and socio demographics influencing self-medication with antimicrobials among households in the intervention group.

4.4.1 The effect size of community empowerment on the proportion of SMWA in Nyalenda informal settlement.

The proportion of self-medication with antimicrobials among households in Nyalenda A ward and Nyalenda ward B before and after the intervention to enable the calculation of the

empowerment effect size on SMWA among households in Nyalenda informal settlement. The proportion of household practicing SMWA in Nyalenda A ward (control) before and after the intervention was 76.3% and 79.7%, respectively, and Nyalenda B ward (case) before and after the intervention was 76.9% and 20.9%, respectively (Figure 4.1). Columns were used for presenting the results and the bars on the column showed the difference in the experimental group and the control group. Since the bars did not overlap, the effect of community empowerment on self-medication with antimicrobials is significant (Figure 4.2).
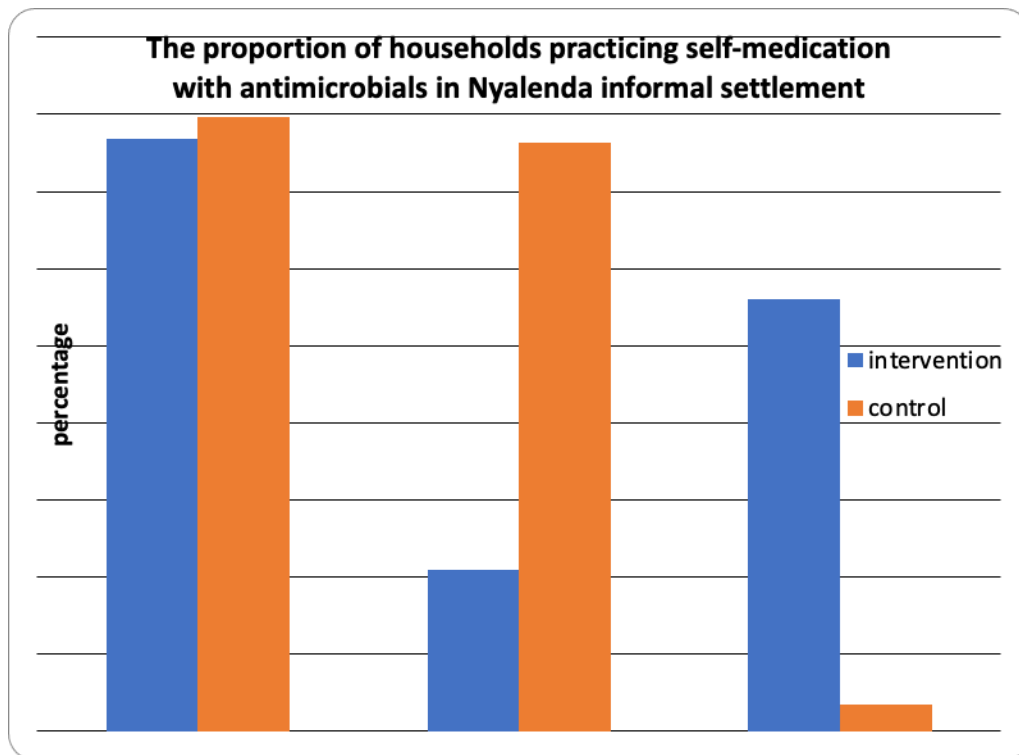
Figure 4.1. Relative gain analysis from Excel. *ES=52.6%, 95% CI = 0.4694-0.5826*

P ≤ 0.05.

Figure 4.2. Confidence interval limit around ES provides a measure of reliability of the ES. *The intervention bar is from. 49.59% to 62.41%, the control bar is from -2.49% to 9.29%*

The measure of the effect and the effect size (ES) was established as percentage and by subtracting the difference between the 'after' and 'before' measurements of the control group (C2 - C1) from the differences between the 'after' and 'before' measurements in the experimental group (E2 - E1).

(C2 - C1) =   3.4 %. (0.034), 95% CI= -0.025-0.093,

(E2 - E1) = 56% (0.56), 95% CI=0.496-0.624.

ES = (E2 - E1) - (C2 - C1) = 52.6% (0.526), 95% CI=0.469-0.563

The effect size of community empowerment on SMWA is (76.9%-20.9%) - (79.7%-76.3%) = 52.6%, 95% CI= 0.469-0.583 (see Figure 4.1). Since the effect size measures the strength of association between two variables or the magnitude of the difference in outcomes between two groups, the findings indicate that community empowerment reduced SMWA by 52.6%. Confidence interval limit around ES provides a measure of reliability of the ES. The 95% CI lower limit for the difference in the intervention (0.496) and the upper limit for the difference in the control group is (0.093). This shows that the ES is significant at $P<0.005$ because the two does not overlap. Therefore, the study rejected the null hypothesis and accepted the alternative hypothesis that community empowerment significantly reduces the proportion of self-medication with antimicrobials among the households in Nyalenda informal settlement in Kisumu County by 52.6%.

4.4.2 The association between socio-demographics on self-medication with antimicrobial and SMWA by the households in the intervention group

In a regression model, assessed were the use of NHIF for outpatient services, use of Universal Healthcare Services, age, gender, marital status, educational level, occupation, average monthly income, religion, health condition of the drug consumer, illness or symptoms of illness that does not need a doctor, reasons for not seeing a doctor, methods of acquiring self-medication, sources of information or advice on self-medication and how they relate to SMWA. Results revealed that age (OR=0.647, 95% CI=0.431-0.973, $P=0.037$) is significantly related to SMWA, use of NHIF for outpatient services (OR=1.772, 95% CI=0.652-2.887, $P=0.133$) and use of Universal Healthcare Services (OR=1.165, 95% CI=0.922-1.472, $P=0.201$) does not have an effect on SMWA. Likewise, sources of

information or advice on self-medication (OR=0.732, 95% CI=0.613-0.873, *P*=0.001) and illness or symptoms of illness may (OR=1.324, 95% CI=1.129-1.554, *P*=0.001) significantly influenced SMWA practices (Table 4.3). The health insurance schemes have no effect on SMWA, age and information leading to the SMWA are risk factors but illness or symptoms of illness may significantly influence SMWA in the intervention group.

Table 4.5. The association **between socio-demographics on self-medication with antimicrobial and SMWA by the households in the intervention group**

Variables	SMWA			
	P-value	OR		95% CI
			Lower	Upper
Use of NHIF card for outpatient services	0.133	1.772	0.840	3.739
Use of the Universal Health Care services	0.404	1.372	0.652	2.887
Age	0.037	0.647	0.431	0.973
Gender	0.604	1.206	0.595	2.445
Marital status	0.228	1.233	0.877	1.732
Educational level	0.146	0.777	0.553	1.092
Occupation	0.659	1.062	0.813	1.387
Average monthly income	0.155	1.392	0.882	2.197
Religion	0.559	1.087	0.821	1.441
Health condition of the drug consumer	0.736	1.055	0.772	1.444
Illness or symptoms of illness that does not need a doctor	0.001	1.324	1.129	1.554
Reasons for not seeing a doctor	0.201	1.165	0.922	1.472
Methods of acquiring self-medication	0.057	1.296	0.992	1.694
Sources of information or advice on self-medication	0.001	0.732	0.613	0.873

Analyses performed using logistic regression analyses. OR=Odds Ratio, 95% CI

CHAPTER FIVE

DISCCUSSION

5.1 Introduction

This chapter presents the discussion of the study in line with the objectives

5.2 The reasons for self-medication with antimicrobial use by the households in Nyalenda informal settlement [Nyalenda A ward (control) baseline and end line, Nyalenda B ward (case) baseline and end line]

5.2.1 Self-medication with antimicrobial use by the households in Nyalenda informal settlement [Nyalenda A ward (control) baseline and end line, Nyalenda B ward (case) baseline and end line]

5.2.1.1 Reasons for SMWA

The most common reason for SMWA is emergency use and need for saving time and money. These findings are similar to the findings of a study on self-medication with antimalarias in Kisumu City, Western Kenya which indicated that households were self-medicating with antimalarial drugs because of the far distance to the nearest health care facilities, cost effectiveness, to save time and ease of access to drug sources (Kimoloi *et al.,* 2013). Another study on antibiotic use and Misuse Among adults in Magwagwa Ward, Nyamira County in Kenya also revealed that the respondents were practicing SMWA because of emergency illness, proximity to the pharmacies. Availability of old drugs and old prescription (Nyambega, 2017). These observations in the current study are also similar to the findings of a cross-sectional study in North-Eastern Tanzania in which the most commonly reported reasons for self-medication with anti-bacterials were emergency illness, health facility charges and proximity of pharmacy to home place (Horumpende *et al.,*

2018)and among the Silte Zone community, South Ethiopia where majority of the respondents practiced self-medication to avoid waiting time at health facilities (Mossa, Wabe, & Angamo, 2012). The convenience and easy accessibility in SMWA practice when faced with time constraint and cost of prescription medicine could be due to the much lower density of doctors per 1000 population in African countries (0.21) as compared to the density in Eastern Mediterranean (0.74), South East Asia (0.52), and 3.2 doctors in EU (Pagán, Ross, & Yau, 2006). Many studies have also cited reasons such as high absenteeism, poor quality of services, rampant corruption and long travel distances as prominent reasons for poor access of public sector health facilities (Kitikannakora & Sitthiworranan, 2009; Sarahroodi, Arzi, & Sawalha, 2010; Skliros, Merkouris, & Papazafiropoulou, 2010). Therefore, when medications are easily accessible in pharmacies and even in local shops, self-medication seems a "quick and cheap" method for people's self-management of their self-diagnosed illness (Widayati, Suryawati, de Crespigny, & Hiller, 2011). The SMWA is more convenient and easily accessible because of the proximity to the 24-hour system pharmaceutical practice at zero consultation fee when compared with diagnostic and consultative healthcare services.

5.2.1.2 Methods of acquiring SMWA

The households that were practicing SMWA were acquiring medicine by either describing the symptoms of their illness or by mentioning the name of the medicine or by mentioning the group to which the drug belongs (e.g., antimalarials) or by presenting a piece of paper on which the name of the drug is written or by showing an old sample or package of the drug. This is similar to the report given by a study on Patterns of self-medication with antibiotics in Maputo City: a qualitative study in Mozambique in which Non-prescribed antibiotics (NPA)

were obtained through five different patterns including; using the generic name, describing the physical appearance and using empty package, describing symptoms or health problem to pharmacists, using old prescriptions and sharing antibiotics with family, friends, and neighbors (Torres, Solomon, & Middleton, 2019). Both family members and often the salespersons in pharmacies have inadequate knowledge about antibiotics (Bi, Tong, & Parton, 2000; Togoobaatar *et al.*, 2010) and the latter make their profits out of the recommendations they make on certain medicines, despite these recommendations not being appropriate in many circumstances (Bi *et al.*, 2000). The group practicing SMWA is at greater risk of adverse reactions, drug resistance, and treatment failure, because the majority either decided the type of antibiotics and dosage by themselves or poorly understood the instruction in the package insert (Hughes *et al.*, 2001). Due to in adequate knowledge before the intervention antimicrobials are used without proper indication, or wrong dosages administered and or incorrect treatment duration. Late or absent downscaling of treatment, poor adherence to treatment, and use of poor quality or substandard antimicrobials is also expected therefore no positive outcome is expected.

5.2.1.3 Sources of SMWA Information

The common households' sources of SMWA information were knowledge of the drug (self-initiative) and health professionals, pharmaceutical personnel inclusive. Another study among households in Kisumu City, Western Kenya reports that self-medication with antimalarial drugs is also initiated by family or friend (Kimoloi *et al.,* 2013) .These findings are similar to findings in Northern Uganda in which drug use among respondents was mainly initiated by self-prescription and drug shop attendants and among students University

Students in Southern China in which majority of the students were at risk by making decision to use antibiotics by themselves (asking for the antibiotic they want) or by relying on salespersons in pharmacies and family members (Pan *et al*., 2012). Community mobilization empowers individuals and communities with tools that gives them the ability to respond responsibly to self-medication with antimicrobial information.

5.2.1.4 Symptoms or illnesses managed by SMWA

This study indicated that most common illnesses that were managed by SMWA were respiratory tract infections and gastrointestinal diseases. This is similar to a report give from a systematic review of observational studies that aimed at estimating the burden, risk factors and effects of antimicrobial self-medication in communities of low- and middle-income countries in which the common disease symptoms managed were, respiratory, fever and gastrointestinal diseases (Ocan *et al*., 2015). This is slightly different from a study done in Northern Uganda in which the indications for SMWA were fever, headache, lack of appetite and body weakness (Ocan *et al*., 2014).Infectious diseases are a major cause of outpatient morbidity especially respiratory tract and gastrointestinal infections in Nyalenda informal settlement. Infectious diseases therefore are risk factors for SMWA use.

5.3 Evaluation of the association of Participatory Learning and Action and community empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement, Kisumu County

In this study participatory learning and action on self-medication with antimicrobials increased the community's self-esteem and self-confidence (power within), improved their

communication techniques and social capital (power with) and improved their knowledge on SMWA and ability to negotiate their inclusion in the health system (power over). PLA proved to be a useful tool for strengthening all domains of empowerment. This is similar to a pilot study in Kisumu City in Kenya that explored the utility and effectiveness of participatory action research as an approach for youth-led peace building in marginalized communities (Amambia *et al.*, 2018) and proved it as a valuable methodological approach. Studies in Little Karoo, South Africa; Odibo, Namibia, various communities in Zambia, and Northern Cape Province, South Africa on PLA initiatives based on strengthening self-reliance and sustainability proved to be appropriate strategy for development (Wetmore & Theron, 1998). Participatory Learning and Action approach and methodology enabled community health volunteers and the households to engage meaningfully and contribute to the identification of self-medication with antimicrobials' root causes and control measures. In the process, they were also empowered with the tools for exercising personal control over their health habits (Bandura, 1994). It enabled quick learning of skills, direct uptake of systematic challenges and use of minimum resources on implementation (Amambia *et al.,* 2018).

The key finding regarding self-medication empowerment is that a PLA methodology enabled increment of all domains of empowerment on the part of CHVs and the community throughout the process of the research activities. All domains of PLA were achieved at very high level and this is also true for empowerment except for power-over, which was achieved, but at comparatively lower level. The association between PLA domains and all empowerment domains is very strong but the strength of association between all the PLA

domains and power over is relatively lower as compared to other domains of empowerment. A study on the Impact of Participatory Learning and Action Women's Groups Alone or Combined with Cash and Food Transfers on Maternal Agency in Rural Nepal (Lu Gram *et al.*, 2018) ruled out larger impacts for PLA alone, comparable in size to the impact observed in the PLA and cash arm on improvement of maternal agency (power-over). It has also been recognized that community mobilization strategies must be complemented by structural interventions to bring about comprehensive changes in the social, economic, legal and political structures that led to disempowerment in the first place (Asthana & Oostvogels, 1996; Kerrigan *et al.*, 2003). This is supported by the previous theoretical views (Kabeer, 2003; Sen, 1999) which emphasize moving beyond empowerment for the individual, to welfare enhancement for achieving lasting social transformation. PLA enabled flexible learning and listening, interaction and evaluation of the training outcome by the participants.

5.4 The effect of community empowerment on self-medication with antimicrobials among households in Nyalenda informal settlement in Kisumu County

In this study community empowerment, which is a community mobilization strategy and implemented through PLA laid a strong emphasis on changing social norms regarding risk behaviors and increasing the social acceptability of risk avoidance and use of trained community peer volunteers to deliver the SMWA messages as a primary means of influencing social norms, building acceptance and support for the study. The trained community peer life circumstances and characteristics closely resembled those of the target population therefore giving them a higher opportunity of influencing acceptance of SMWA messages. The communities and subgroups targeted were relatively small and more

homogenous thus, getting identifiable social groups to change specific behaviors with discrete levels of individual risk, which was more achievable. This strategy was complemented by structural interventions that filled in the gap for inadequacies in the local government health facilities by making prescription medicine timely, friendly favorable and affordable through health outreach services. The study took a period of 7 months and realized a significant effect in the proportion of SMWA. This is similar to a study conducted in the Republic of Ireland which aimed at including migrants in primary healthcare participation used Participatory Learning & Action research to access and engage with 'hard to reach' migrants in primary healthcare research and worked with peer researchers and reported meaningful access and engagement of the migrants in primary health care after qualitative evaluation using emic and etic criteria (O'Reilly-de Brún, 2016), except for the effect size which was not given.

It is also similar to a report given from a systematic review of 55 intervention studies on irrational use of antibacterial studies of which about 10.9% were from Africa and 7.3% were community based. These studies revealed that community-based education interventions experienced a mean reduction of 30.5% on antibacterial use except for the effect size of these interventions which was never determined. The goal of the education measures was to inform the communities through trainings, printed materials and media based approaches (Bbosa *et al*., 2014). It is in contrary to the results of a research   that reviewed characteristics and outcomes of 22 National and 6 Regional campaigns which aimed at improving the use of antibiotics in high income countries between 1990 and 2007 and stated that the interventions were quite expensive, the duration was quite long and the outcome for majority of the

intervention was not evaluated (Huttner *et al*., 2010). Most campaigns that were formally evaluated seemed to reduce antibiotic use. Establishing a cause effect relation between the campaigns and a reduction in the use of antibiotics was further complicated by methodological limitations. Most campaigns did not have a control population and pre-intervention trends were rarely assessed. There was no evaluation of different indicators for measuring the effect of public awareness campaigns on the use of antibiotics in outpatients. In the event that PLA is effectively conducted up to the point of mitigating for barriers and empowerment achieved, realizing a significant effect size is possible.

From the results off the association of socio-demographics self-medication with antimicrobials and SMWA among households in the intervention group.

The health insurance schemes had no effect on SMWA, age and information leading to the SMWA were risk factors but illness or symptoms of illness was associated with SMWA in the intervention group. The relationship of Universal Health Care with SMWA findings   is similar to the findings in Limmu Genet's town households, Jimma Zone, Southwest Ethiopia in which self-medication practice is common among community members regardless of being community based health insurance members (Begashaw Bekele, Tesema Berkesa, Tefera, & Kumalo, 2018). The current study can be compared with an Indonesia study which reported that participants with health insurance still preferred to self-medication rather than visit health facilities, even though they had to pay out of pocket (Widayati *et al.*, 2011). It in contrary to the Pagan report which stated that lack of government-sponsored health insurance coverage increases the propensity to self-medicate (Pagán *et al.,* 2006). Increasing health

insurance coverage could reduce the demand for self-medication by making healthcare more affordable. This makes it clear that SMWA is more of accessibility than affordability.

5.5 Limitations of the Study

1. Structural modification especially improvement on access at the health facility level was not possible. The health facility management representatives did not take the community report positively and never turned up for any further meetings. The study could not have incurred cost of outreach health services.

2. The study could not establish antimicrobial resistance, non-effective treatment, adverse reactions, drug dependence, misdiagnosis, missed diagnosis. It is not possible accessing such conditions by random sampling and at appoint in time.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The chapter's content is presented in such an order that the first part deals with the main findings of the study while the second part uses the findings as a basis for proposed policy interventions. The last part is suggestions for further research.

6.2. Summary of the Findings

1. The intervention and the control group showed similarities in their reasons for SMWA from both the baseline and end line surveys. The intervention group was empowerment on SMWA and especially acquisition of knowledge of associated risks with SMWA, self-medication with antimicrobial drugs in management of disease symptoms is a common practice. The intervention group was therefore practicing SMWA with an informed knowledge. Increased number of the respondents from the intervention group is reported not repurchasing self-medication for another try or for enhanced response meaning overuse of antimicrobials as reduced with the intervention.

2. The odds that each and every PLA domain may have strengthened each and every empowerment domain are more than 2 (the range is 2.2- 8.6) and at a P-value of less than 0.0001. The study rejected the null hypothesis and accepted the alternative hypothesis.

3. Community empowerment significantly reduces the proportion of self-medication with antimicrobials among the households in Nyalenda informal settlement in

Kisumu County by 52.6%. Therefore, the study rejected the null hypothesis and accepted the alternative hypothesis. The health insurance schemes had no effect on SMWA, age and information leading to the SMWA are risk factors while illness or symptoms of illness may significantly influence SMWA in the intervention group.

6.3. Conclusion

1. The reasons for SMWA use remained constant in all the four surveys but the intervention group made informed decision on SMWA except for in increased number of the respondents from the intervention group that reported not repurchasing self-medication for another try or for enhanced response. The study concludes that empowerment on SMWA is an important strategy for increasing public knowledge and understanding of antimicrobial resistance and appropriate use of antimicrobials,

2. The study achieved household empowerment on SMWA through PLA. PLA is an effective tool for achieving empowerment at a low cost and in a wider region especially when the research team was expanded to include peer researchers.

3. Community empowerment significantly reduced the proportion of self-medication with antimicrobials among the households in Nyalenda informal settlement in Kisumu County illness or symptoms of illness, information leading to SMWA and age were associated with SMA in the intervention group. PLA was used as a tool for empowerment and the last step in PLA is mitigation of barriers to success or structural modification. Therefore, the study concludes that SMWA empowerment needs structural modification to achieve its goal. Therefore, in close collaboration with this intervention, there should be an improvement in the quality of healthcare

facilities with easy access, multisectoral and sectoral participation in SMWA management should be strengthened.

6.4. Recommendations from the current study

1. Self-medication with antimicrobials is a serious problem in Nyalenda informal settlement and such intervention should be prolonged and continuous building more of power over domain to offer changes in the reason for SMWA.

2. Participatory Learning and Action training is not limited to use in a single research project; once trained, peer researchers can continue with the intervention and also apply PLA to any other primary healthcare program in this region.

3. In close collaboration with this intervention, there should be an improvement in the quality of healthcare facilities with easy access, law enforcement, and control regulations regarding the inappropriate use of antibiotics. Pharmaceutical personnel should also be morally encouraged to educate patients and rationalize antimicrobial use.

6.5 Recommendations for Further Research

1. Strict legislation/laws over inappropriate management of antimicrobials should be reinforced to ensure nonexistence of unlicensed pharmaceutical premises and nonexistence of salespersons with inadequate knowledge.

2. Continued and further facilitation of PLA by peer researchers should be closely monitored to ensure that PLA standards are not compromised.

3. Possible barriers to empowerment should be explored and mitigation procedures established and incorporated in the intervention plan and budget.

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APPENDICES

Appendix I: **Map of Kisumu City showing the distributions of Obunga, Nyalenda A and Nyalenda B households.**
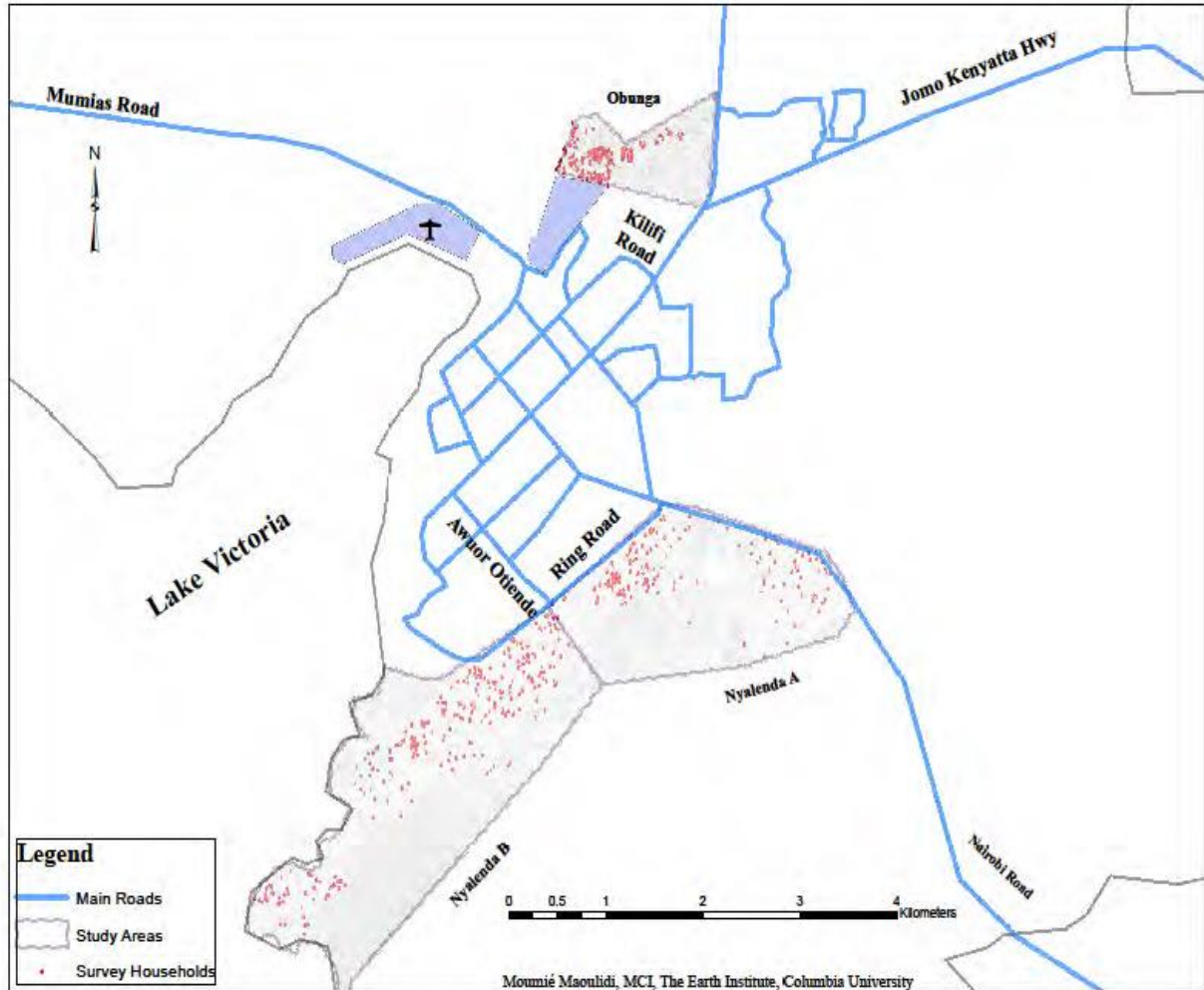
Appendix II: The Intervention Design

This involved development of the problem statement, identification and prioritization of the causes of the problem and solution finding through participatory learning action together with the application of health education theories and adoption of Fawcett SB *et al.* (2000) stages that brings people together to address community issues.

Stage 1: Preparing the ground. It involved making contact with relevant community groups and leaders (both formal and informal), and identifying available resources and a community management structure e.g. community health volunteers to explore community issues. This includes setting priorities during initial planning,

Stage 2: Developing capacity of the CHVs and social group leaders: building capacity for strategic planning, interpersonal communication, and group processes. Program participants develop evaluation skills and learn to critically appraise their progress continually through the evaluator's supervision and training (Fetterman, 1996). Thus, philosophically, self-determination is intended to be a fundamental outcome keystone of this approach(Fetterman & Wandersman, 2007) Develop an action plan for the team's activities.

Action Plan for the Teams Activities

#	Activities	Person Responsible	Date to be completed	Resources needed
1	Developing problem statement			
2	The team identifies the important causes leading to self-medication with antimicrobials using a problem tree			
2	Identification of the potential objectives for an intervention to address			
3	Identification of potential strategies to address root causes			
4	Ranking potential strategies to address root causes (important and changeable) of the practice			
5	Drafting an action plan for the proposed solutions			
6	Compiling a report of the input and the outcome			
7	Each team member is then assigned a group of 50 members to carry a PLA program as they have learnt, to monitor the progress of the members and to give feedback			
8	Developing an action plan for the teams' activities within the community			
9	Evaluation of both the teams and the community's activities and compiling a report			

Stage 3: Implementation of the action plan through Participatory Rapid Assessment. It consists of assessing the community needs with the CHVs and issues most important to the community.

Stage 4: CHVs implementing the action plan for the team's activities within the community.

Stage 5: Evaluation; It focused on documenting the progress, identifying barriers to progress, and redirecting efforts to activities that may be more effective.

The Intervention Procedure

A: Problem analysis using the problem tree

The team identifies the important causes leading to self-medication with antimicrobials using a problem tree as a graphic representation of a problem at the center with major branches reflecting main causes leading to the problem. This activity stimulates and broadens thinking about potential or actual causes and helps to further examine causes until a chain of causes leading to root causes are identified. This activity will help the team address root causes of problems in action plans rather than superficial symptoms.

Materials needed: Index cards, pens and notebook, stones, pebbles, beans, chart paper or newsprint.

Step 1: Developing the Problem Statement. The facilitator begins by placing an index card with the problem (self-medication with antimicrobials) written on the card. The problem card should include words to describe an existing negative state (The risks of the practice) then have participants place a symbol such as a rock or branch on top of the card to represent the problem. The symbol has the function of keeping the index card from blowing away in the wind, and allows participants to use their own symbol to represent the problem, increasing understanding of what is being discussed.

Step 2: Identification of major causes. Ask participants, using group consensus, to identify the major causes/events leading to self-medication with antimicrobials. Instruct participants to place symbols (a rock or stick) representing each cause in a line to one side (usually below) of the index card/symbol representing the problem. The facilitator then writes the name of each cause on an index card and places the index card underneath the symbol

representing that cause. The facilitator asks about each cause, "How does this (cause) lead to the issue/problem?" and records explanations given by informants.

Step 3: Identification of root causes. The facilitator asks participants to indicate the chain of events leading to each of the major causes/events leading to the problem. The rule of thumb is to ask, "What leads to ____?" five times for each major cause/event that leads to the problem or until the participants cannot think of anything further. For example, for each major cause (X) ask, "What are the things (Y) that lead to X?" and then "What leads to Y that then leads to X?" and then "What leads to that?" etc. Continue this line of questioning for each major cause/event leading to the problem. Have participants, using consensus, graphically show the chain of events leading to the problem, by placing a symbol on the ground and drawing lines between symbols in a way that links the events in the order mentioned. We ask these questions to look in-depth at a problem to try and understand its underlying root causes. This is so that we can address problems by developing solutions that address root causes rather than superficial symptoms.

Step 4: Identification of most important root causes: Once the problem tree is completed, the group then selects, from among all the root causes identified, the ones they consider to be the major sources of the problem. Encourage participants to rank among those causes farthest down the 'branches' of the problem tree. Ask about and record explanations of why some root causes are ranked highly important.

Step 5: Identification of root causes that are both important and changeable. Ensure that there is a card or symbol for the root causes identified as most important in the exercise above. Ask participants to re-arrange the symbols for the most important root causes in order of "changeability" from most changeable to least changeable. Divide the ordered root causes

in half and into two groups: most changeable and least changeable. Suggest that the most changeable group of root causes be the focus of intervention.

B: Objective analysis using an objective tree

The team identifies potential objectives for an intervention to address.

Materials needed: List of the most important root causes for self-medication, index cards, pens and notebook, chart paper or newsprint.

Assist team members to transform the problem statement and root causes of the Problem Tree, by rewording the negative 'cause-effect' description of the root causes into positive 'means-ends' objective statements. Develop the Objectives Tree using symbols and index cards first. Later, transfer the information to paper for sharing with other members and stakeholders. These positive statements can serve as potential objectives describing possible means for solving key problems and the effects of any solutions that would be implemented. Objective analysis, therefore, describes desirable conditions after a problem is solved and provides the basis for program management and evaluation. The potential objectives of a program would be the reformulation of those root causes ranked as priority for intervention.

C: Ranking potential strategies to address root causes (important and changeable) of self-medication.

Materials needed: chart paper or newsprint, open area on the ground, easel or chalkboard for working on matrix, stones, pebbles or beans for scoring/ranking (or chalk for chalkboard) and list of potential objectives from objectives tree.

Step1: Development of a matrix for ranking potential solutions in order of preference on a large sheet of paper, on the ground or on a chalkboard where the group discussion will take place. Make a column for the following items:

1. Potential solution/strategy is a column for listing all the potential strategies to achieve an objective (to be selected).

2. Sustainability refers to the chance that a potential strategy can be carried out with existing resources and will continue as long as needed.

3. Equitability refers to the chance that a potential strategy is "fair" and will be accessible to those most affected by the problem.

4. Productivity refers to the chance that a potential strategy can fully address the problem.

5. Overall ranking is used to rank potential solutions in order of preference.

- Collect sufficient numbers of locally available counters (stones, seeds,) to fill every box in the matrix (about 100 counters).

- Facilitator introduces the topic and reads the group verbal consent form and signs the form if participants give consent (participants who do not consent are allowed to leave).

- Facilitator shows the objectives analysis tree to the group and asks the group to select one of the objectives from the objectives tree to address first (select one from among those at the bottom/end of the tree).

- Facilitator presents the matrix by indicating the meaning of each column and checks understanding of the meaning of each column. A group process will be used to elicit a list of potential solutions–these are written in the "potential solution" column. Each group is encouraged to SCORE each potential solution using a scale of 1 to 3 beans or pebbles by the relevant criteria. The strategy with the highest score is ranked 1st. For the overall ranking ask, "What would be your overall first choice for a strategy? "Second choice"? "Third"? and so on until preferences for the top three strategies (or whatever number of strategies seems manageable to implement) have been identified.

The groups are to give explanation for their strategy preferential and record made (exact quotes of important statements are excellent to record)."Sustainability" and "Equitability" are suggested as key criteria to encourage selection of strategies.

Ranking of Potential Strategies

Potential Strategy	Sustainability	Equitability	Productivity	Overall Ranking
A	3	3	3	1
B	1	2	2	
C	1	1	1	
D	1	1	1	
E	2	1	3	2
F	2	1	2	

D: The team drafting an action plan for the implementation of community activities

Materials needed: Chart paper or newsprint, easel or chalkboard for working on action plan, markers for working on paper, chalk for working on chalkboard,

Develop the planning matrix on a large sheet of paper or on a chalkboard where the group discussion will take place (It is to be a replica of the action plan for the team) and Facilitator presents the meaning of each column on the horizontal axis, checking understanding of each objective symbol and criteria symbol, correcting misunderstandings.

Draft Action Plan for Proposed Solutions

Objectives	Activities (How)	Person Responsible (Who)	Date to be completed (When)	Resources needed
1				
2				
2				
3				

E: Identify outcomes and develop performance indicators

The study used outcome measurement, which is a systematic way to assess the extent to which a program has achieved its intended results(Reisman, Gienapp, & Stachowiak, 2007). The main questions addressed in outcome measurement are:

What has changed in the lives of individuals, families, organizations, or the community as a result of this program? Has this program made a difference? How are the lives of program participants better as a result of the program?

This phase established a shared understanding of what the program or project is and how it is supposed to work by completing a logic model including inputs, activities, outputs, and outcomes. It also created a set of measures that corresponded to the logic model and was used to assess the accomplishments of staff and project partners.

Objective: To empower the community and individuals to reduce level of and develop an understanding of progress and consequences on self-medication with antimicrobials.

Example of a Program Logic Model

Input	Activities	Output	Outcome	Indicators
Resources available to the program that allow and support provision of technical assistance, including money, staff, volunteers, clients, materials or equipment	PLA activities	1The number of trainings facilitated 2. the number of team members trained	The team's knowledge in empowerment strategy developed	Management of programs

Empowerment Outcome Indicators

CATERGORIES	OUTCOME	INDICATORS
Power from Within: increased individual consciousness	Increased awareness and desire for change	% of the CWVs reporting increased knowledge of risks of self-medication rights, roles and responsibilities confidence in seeking treatment from the Health Facility, confidence of insisting to be served at a registered premise, compliance with prescribed activities improved motivation and self-confidence, improved individual resilience to adversity, improved capacity to work independently on knowledge, Improved attitude towards taking action taking action to claim their right
Power With: increased power from collective action	Increased solidarity to challenge underlying assumptions	Strengthening existing CU and Identifying with them No. of Operational CUs % of members of CU members participating in the program Improved knowledge of self-medication, rights, roles and responsibility towards their health Improved life skills Group building alliances and taking collective action with other actors Community taking action to claim their rights
Power Over: ability to influence and coerce	Changes in underlying resources and power to challenge constraints Laws and policies are in place and implemented which support community to access rights, opportunities and services	Strengthened Community Health supports access to rights/opportunities/services with a verifiable contribution from program activity Sufficient resources are allocated to improve services at the local health facilities (Amount and % of total national and local government spending allocated to supporting the program) Policies and laws are monitored and enforced community have improved access to rights, services and opportunities Legal framework in place that defends the health rights of the community Power holders/law enforcers and CM are aware of the rights of and laws protecting the community Overall level of community participation in decision making is improved. Improved opportunities for engagement between CM and power holders Improved quality of engagement between CM and power holders CM are effectively represented on health management Board

Appendix III: Questionnaire for Data Collection (Nyalenda A and Nyalenda B baseline and end Line Survey)

NOTE. The questionnaire is conducted in English but translated to the language best understood by the respondent, if need be.

SECTION1

1. In the last 3 months have any of the members of the household taken any antibiotic or anti-malarial drug? Yes/No

2. How did you get the drugs?

2.1 The doctor prescribed and I bought them from the pharmacy

2.2 I was given from the hospital

2.3 I went to the pharmacy and was given without a prescription.

3. Do you have an NHIF card? Yes/No

4. Have you used the NHIF card for outpatient services? Yes/No

5. Were you happy with the services? Yes/No

6. Have you registered for universal health care services? Yes/No

7. Have you used the universal health care services? Yes/No

8. Were you happy with the universal health care services you received? Yes/No

SECTION 2

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENT

1. Age:

 2. Gender: 2.1 Male 2.2. Female

3. Marital Status:

3.1. Single 3.2. Married 3.3. Divorced

3.4. Widowed 3.5. Separated

4. Family Status:

4.1. Father 4.2. Mother 4.3. Son or Daughter

4.4. Other member of the family 4.5. Others

5. Educational Level:

5.1. Illiterate 5.2. Read and write only 5.3. Primary school

5.4. Secondary school 5.5. College and above

6. Occupation:

6.1. Student 6.2. Government employee 6.3. Self-employed

6.4. Employed by a private business 6.5. Unemployed

7. Average monthly income…………………………

7.1. Less than 5000

7.2. 5000 to10000

7.3. >10000

8. Approximate drug expenditure: ………… the last 3months

9. Religion:

9.1. Christian, Orthodox 9.2. Christian, Protestant 9.3. Muslim

9.4. Christian, Catholic 9.5. Others Please specify………………

10. Condition of the drug consumer:

10.1. Pregnant 10.2. Breastfeeding 10.3. Has a chronic disease such as liver, kidney, cardiac,

etc. 10.4. Child under the age of 12 years

10.5. Geriatric

SECTION 3

SELF-MEDICATION WITH ANTIMICROBIALS USE INDICATORS

1. What illness/symptoms of illness that you would not seek a doctor for?

1.1. Respiratory Tract Infection

(e.g. cough, cold, etc.). Yes /No

1.2. Gastro-intestinal disease (e.g diarrhea, heart burn, etc.). Yes/ No

1.3. Sexually Transmitted Disease. Yes/ No

1.4. Eye disease. Yes/ No

1.5. Headache/ fever. Yes/ No

1.6. Skin disease, injury, etc. Yes/ No

1.7. Maternal/menstrual. Yes /No

2. How long is the duration of illness before seeking this self-medication?

2.1. Within 24 hours 2.2. 1 to 7 days 2.3. 1 to 4 weeks

2.4. 5 to 12 weeks 2.5. Above 12 weeks

3. Why do you resort to self-diagnosis and self-medication now?

3.1. Emergency use. Yes/No

3.2. Disease is not serious. Yes/No

3.3. For prevention of known/unknown disease(s). Yes/No

3.4. Prior experience about the drug (own and/or friends, read about it, etc.). Yes/No

3.5. Less expensive in terms of time/money. Yes/No

4. How did you request for the drug(s) you wanted?

4.1. By mentioning the name of the drug. Yes/No

4.2. By mentioning the group to which the drug belongs, e.g. antacid. Yes/No

4.3. By telling the symptom of your illness. Yes/No

4.4. By showing an old sample/package of the drug. Yes/No

4.5. By presenting piece of paper on which the name of the drug is written. Yes/No

4.6. By describing the shape/shape or any other physical characteristics. Yes/No

5. What are your sources of information/advice for self-medication?

5.1. Received no advice (respondent knows about it). Yes/No

5.2. Read label or leaflet or promotional material of the drug. Yes/No

5.3. Advised by neighbors, friends or relatives. Yes/No

5.4. Suggested by traditional healers. Yes/No

5.5. Advised by Doctors, Nurses, and Health workers but without prescription. Yes/No

5.6. Recommended by Pharmacists or those working in the pharmacy. Yes/No

6. Have you used other sources of care before coming for this self-medication? Yes/ No

7. If yes, which sources of care?

7.1. Public health facility. Yes/No

7.2. Private clinic. Yes/No

7.3. Self-medication. Yes/No

7.4. Holy water. Yes/No

7.5. Traditional medical practitioner. Yes/No

8. If yes to self-medication, what was the outcome of the treatment?

8.1. Cured the illness. Yes/No

8.2. Prevented the illness. Yes/No

8.3. Improved the illness. Yes/No

8.4. Has not cured or prevented or improved. Yes/No

9. When you buy medicine and it made you feel better do you re purchase it so as to improve your condition further? Yes/No

10. In case you don't respond to medication do you repurchase the same medication to make another try? Yes/No

11. Is there a drug that you know does not treat you when you try using? Yes/No

The respondent is allowed to mention the drug.

12 When given medication and you no longer feel ill yet the drugs are not over.

12.1 I stop taking the medications. Yes/No

12.1 I continue with the medications. Yes/No

12.3 I keep it to use it the next time I get the same illness. Yes/No

13. Do you know of any medicine that makes you mores sick when you take? Yes/No.

The respondent can mention the drug.

14. Have you ever fallen so sick after taking medications that you had to be taken to the hospital for treatment? Yes/No

GUIDELINES ON HOW TO COMPLETE THIS QUESTIONNAIRE

Politely greet the respondent.

Introduce yourself and the study title to the respondent. But do not ask his/her name.

Make sure that you are there not to evaluate the patient but to collect information on self-medication, the objective of which is mentioned below.

INTERVIEWER

Please make clear the objectives of this questionnaire from the outset.

This interview is conducted to establish the pattern of self-medication with antimicrobials use among households in Nyalenda Informal Settlement in Kisumu County. The rationale of the study is developed in response to unsolved issues in self-medication with antimicrobials. The findings of this study will be used to develop an empowerment strategy for reducing the level of self-medication with antimicrobials and enhancing rationale use of antimicrobials therefore minimizing risk. Your collaboration in answering these questions will be helpful to the whole community of Kenya.

INTERVIEWER

Please ask for the willingness of the patient to be interviewed. Thank the respondent for giving his/her valuable time to participate in this research of high public health importance.

INTERVIEWER

Please select proper place that can maintain privacy of the respondent to conduct the interview.

INTERVIEWER: This interview is confidential research and confined to the data collector and to the researcher only.

NO PERSON INTERVIEWED IS QUOTED BY

NAME. Tell them that they can be confident about this.

If the responded has consented to the interview then he/she should sign.

Signature of the responded……………………………………………………

Appendix IV: Tool for Measuring the Level of PLA and Empowerment (PLAEE Tool)

The tool helped to establish whether the individuals have developed skills linked to empowerment like, confidence, social networks, specialist policy knowledge (power within), whether they have increased their sense of internal political efficacy that is the perception that they can influence their local place and services (power over). It also established if the mechanism has led to any improvements in a community's level of political efficacy, social capital and social cohesiveness (Power with). Finally, it assessed whether individuals and the groups are now able to exercise more influence on decision making and if a sustained shift in power has taken place. The tool also assessed if PLA was effectively conducted.

Questionnaire for Assessment of Household/CHV Empowerment and Participatory Learning and Action on Self-Medication with Antimicrobials.

NOTE. The questionnaire is conducted in English but translated to the language best understood by the respondent, if need be.

SECTION I: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENT

1. **Age:** 1.1: 15-25 1.2:26-35   1.3:36-50   1.4:above 50

2. **Gender:** 2.1 Male 2.2. Female

3. **Marital Status**:

      3.1. Single 3.2. Married 3.3. Divorced

      3.4. Widowed 3.5. Separated

4. **Family Status:**

      4.1. Father 4.2. Mother 4.3. Son or Daughter

      4.4. Other member of the family 4.5. Others

5. **Education Level:**

    5.1. Illiterate 5.2. Read and write only 5.3. Primary school

    5.4. Secondary school 5.5. College and above

6. **Occupation:**

    6.1. Student 6.2. Government employee 6.3. Self-employed

    6.4. Employed by a private business 6.5. Unemployed

7. **Average monthly income**…………………………

    7.1 Less than 5000

    7.2 5000 to10000

    7.3 >10000

8. **Approximate drug expenditure: ………… the last 3months**

9. **Religion:**

    9.1. Christian, Orthodox 9.2. Christian, Protestant 9.3. Muslim

    9.4. Christian, Catholic 9.5. Others Please specify………………

10. **Condition of the drug consumer:**

    10.1. Pregnant 10.2. Breast feeding 10.3. Has a chronic disease such as high blood

    pressure etc. 10.4. Child under the age of 12 years 10.5.>65 years

    10.6. >12to 65years

SECTION II

A. Questions for empowerment assessment (Rate the listed achievements into very good, good, somehow and no)

Statements on increased awareness and desire to change	Very Good	Good	Somehow	No
Have you increased knowledge of risks of self-medication, rights, roles and responsibilities of your health?				
Do you have the confidence of seeking treatment from the health facility?				
Do you have the confidence of insisting to be served at a registered pharmaceutical premise and by registered personnel?				
Do you think you can comply with the prescription requirements?				
Do you have the motivation of stopping self-medication and seeking a doctor's prescription?				
Have you improved your capacity to work independently on knowledge of risks of self-medication, rights, roles and responsibilities of your health?				
Have you improved your attitude towards taking action on claiming your rights or motivating others to do the same				
Statements on increased solidarity to challenge underlying assumptions	**Very Good**	**Good**	**Somehow**	**No**
Do you have a role and responsibility to play in improving your neighbors' health?				
Does your neighbor have a role and responsibility to play in improving your health?				
Do you think as a group you can build an alliance and take collective action with other actors and claim the community health?				
Statements on Changes in underlying resources and power to challenge constraints	**Very Good**	**Good**	**Somehow**	**No**
Do you have the ability to influence and coerce the health facility to serve you efficiently?				
Are you aware that you are represented at the Health Facility Management Board?				
Do you understand how community health strategy operates?				
Do you know how to access your health rights, opportunities and services?				
Are you positive that you can access your health rights, opportunity and services through the health facility?				

B. Questions on PLA assessment (the interaction between the trainer and the trainee). Rate the listed programs, personalities or characters into very good, good, somehow and no

Questions on Flexible learning and listening	Very Good	Good	Somehow	No
Was the trainer a listener with personal quality of embracing error and showing respect in the process?				
Did the training program cover different knowledge and skills related to self-medication?				
Was the training program useful and attractive?				
Was the trainer supportive of your contribution with]'a right belief and attitude?				
Was the trainer friendly and helpful?				
Was the trainer well organized on both professional and technical competencies?				
Questions on Participatory evaluation				
Did you feel that your own world view and capability of analyzing and solving your problems and acting was given an opportunity?				
Did the trainer use different and effective training methods and techniques?				
Questions on participatory interaction				
Were you given a chance to clarify issues, fill gaps, alter, add and make changes, exchange ideas, discussions, cross checking error and omissions, identify areas of coordination and cooperation?				
Were you given adequate time for the practical component of the training program?				
The training hall was appropriate and comfortable				
Was the training program designed according to your training needs?				
Did the trainees participate well				
Did you have control over the decisions made during the training				

Note:
Very good **and** *good* **is a YES**
Somehow **and** *No* **is a NO**

Household Name and signature...

Household Phone number...

Appendix V: MUERC Letter

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622   Ext: 3050   Private Bag – 40105, Maseno, Kenya
Fax: +254 057 351 221   Email: muerc-secretariate@maseno.ac.ke

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FROM: Secretary - MUERC   **DATE**: 13th September, 2018

TO: Isabel Akoth Owuor   **REF**: MSU/DRPI/MUERC/00567/18
            PG/PHD/PH/00192/2014
            Department of Public Health
            School of Public Health and Community Development
            Maseno University
            P.O. Box Private Bag, Maseno

RE: Effect of Community Mobilization on Self Medication with Antimicrobials among the Households in Nyalenda Informal Settlement, Kisumu County Kenya. Proposal Reference Number MSU/DRPI/MUERC/00567/18.
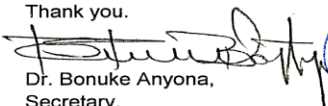

This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 13th day of September, 2018 for a period of one (1) year.

Please note that authorization to conduct this study will automatically expire on 12th September, 2019. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 15th August, 2019.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 15th August, 2019.

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

Thank you.

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

Cc: Chairman,
Maseno University Ethics Review Committee.

MASENO UNIVERSITY IS ISO   9001:2008 CERTIFIED

136

Appendix VI: Nyalenda Chief's Research Approval Letter

THE PRESIDENCY
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT

Telegrams: "DISTRICTER", KISUMU CENTRAL,

Telephone: 0713687490,

E-mail: Jobitalkinak@yahoo.com

When replying please quote

Ref. No. ....
         and date

OFFICE OF THE ASSISTANT CHIEF
NYALENDA 'B' SUB-LOCATION
P.O. Box 1921-40100,
KISUMU.
10th — 11— 2020.

To

MIASENO UNIVERSITY
P.O. BOX
PRIVATE BAG
KISUMU.

RE:- EFFECT ON COMMUNITY MOBILIZATION
        ON SELF MEDICATION WITH ANTI-MICROBIALS
        IN NYALENDA INFORMAL SETTLEMENT.

ISABEL AKOTH OWUOR of MASENO UNIVERSITY conducted a research on the effect of community mobilisation on self medication with anti-microbials in Nyalenda Informal settlement from 18th MAY - 2018 to 31st - DEC- 2018.

Assist her where possible.

Thank you,

ASST. CHIEF
NYALENDA 'B' SUB-LOC
DATE 10th -11-2020
L. A. JOBITIA.

137

Appendix VII: The Role of Participatory Learning and Action

The Role of Participatory Learning and Action on Strengthening the Different Domains of Empowerment on Self-medication with Antimicrobials in Nyalenda Informal Settlement, Kisumu County, Kenya

Main Article Content

Isabel AkothOwuor

Department of Public Health, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

HarrysoneAtieli

Department of Public Health, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

Collins Ouma

Department of Biomedical Sciences and Technology, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

Abstract

Self-medication with antimicrobials (SMWA) is a common global practice. Studies in Nyalenda B Ward, an informal settlement in western Kenya, found that significant households (76.6%) perceived the practice of SMWA as convenient and appropriate. The rationale of the current study was in response to unsolved self-mediation practice through functional health literacy in such set-ups. This study used Participatory Learning and Action

(PLA) as a tool and assessed its role on strengthening the different domains of empowerment on SMWA. The study adopted a descriptive survey design and data was collected from 1531 PLA trainees through focused group discussions and structured questionnaires. Results revealed that reasons for SMWA are ignorance and easier accessibility. Logistic regression analyses with a statistical significance tested at $p \leq 0.05$ established the association between PLA domains and all empowerment domains revealed that flexible learning and listening increase power within by 5 times (OR=5.361, 95% CI=3.101-9.268, $P<0.0001$), power with by 6 times (OR=6.160, 95% CI=3.437-11.39, $P<0.00010$) and power over by 2 times (OR=2.261, 95% CI=1.293-3.954, $P<0.0001$). Participatory evaluation may increase power within by almost 8 times (OR=7.711, 95% CI=5.184-11.459, $P<0.0001$), power with by 5 times (OR=5.012, 95% CI=3.375-7.443, $P<0.0001$), and power over by more than 3 times (OR=3.618, 95% CI=2,375-5,509, $P<0.0001$). Participatory interaction may increase power within by almost 8 times (OR=7.823, 95% CI=4.798-12.763, $P<0.0001$), power with by over 8 times (OR=8.610, 95% CI=4.987-14.866, $P<0.0001$.), power over by 4 times (OR=4.003, 95%CI=2.325-6.693, $P<0.0001$). PLA proved to be a useful tool for strengthening all domains of empowerment and integrated functions that prompted broader social connections.

Appendix VIII: Self-medication with Antimicrobials Perceptions among the Households

Self-medication with Antimicrobials Perceptions among the Households in Nyalenda Informal Settlement, Kisumu County, Kenya: Post-Community Mobilization Intervention

Main Article Content

Isabel Akoth-Owuor

Department of Public Health, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

Harrysone Atieli

Department of Public Health, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

Collins Ouma

Department of Biomedical Sciences and Technology, School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

Abstract

Self-medication is very common especially in developing countries and is documented to be associated with many health risks including antibiotic resistance. Antibiotic resistance is shrinking the range of effective antibiotics and is currently listed as a global health problem. This study investigated the perceptions of self-medication with antimicrobials (SMWA) after community mobilization intervention among the households in Nyalenda B, an informal

settlement, within Kisumu County, Kenya. This enabled the study to establish the magnitude of SMWA and the perceptions that persist given such intervention within the region. Data was collected through structured questionnaires administered to 380 households. Focus group discussions (FGDs) were also facilitated and targeted purposively-selected 30 CHVs. Descriptive and binary logistic regression analyses were used to determine the association between socio-demographic characteristics and the perceptions influencing SMWA. The study established that 316 households had used antimicrobials of which 20.9% were self-medicating with antimicrobials. Age (OR=0.647, 95% CI=0.431, 0.973, P=0.037) is significantly related to SMWA, use of NHIF for outpatient services (OR=1.772, 95% CI=0.652, 2.887, P=0.133) and use of Universal Healthcare Services (OR=1.165, 95% CI=0.922, 1.472, P=0.201) may have contributed to SMWA reduction but not significantly as compared to other socio-demographic factors. Likewise, sources of information or advice on self-medication (OR=0.732, 95% CI=0.613, 0.873, P=0.001) and illness or symptoms of illness (OR=1.324, 95% CI=1.129, 1.554, P=0.001) may significantly influence SMWA as compared to other SMWA perceptions. Community mobilization using empowerment as a strategy and implemented through participatory learning and action is a successful method for reduction of SMWA level and development of SMWA perceptions with an experiential value especially when strengthened with structural modification. SMWA is a serious problem in developing countries and so such intervention should be prolonged and continuous to offer sustained changes in public perception and attitudes towards the misuse of antimicrobials.

Appendix IX: Proposal Approval Letter

MASENO UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: PHD/SC/00048/017

Private Bag, MASENO, KENYA
Tel:(057)351 22/351008/351011
FAX: 254-057-351153/351221
Email: sgs@maseno.ac.ke

Date: 27th April, 2018

TO WHOM IT MAY CONCERN

**RE: PROPOSAL APPROVAL FOR ISABEL AKOTH OWUOR —
PHD/PH/00192/2014**

The above named is registered in the Doctor of Philosophy Degree Programme in the School of Public Health and Community Development, Maseno University. This is to confirm that her research proposal titled "Effect of Community Mobilization Intervention on Self Medication with Antimicrobials among the Households in Nyalenda Informal Settlement, Kisumu County, Kenya" has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.

Prof. J.O. Agure
DEAN, SCHOOL OF GRADUATE STUDIES

Maseno University   *ISO 9001:2008 Certified*