RELATIONSHIP OF TRAINING AND TREATMENT PRACTICES IN TUBERCULOSIS MANAGEMENT IN SELECTED COUNTIES IN KENYA

BY

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DECLARATION

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ABSTRACT

Background: Tuberculosis is an infectious and preventable disease that causes high morbidity and mortality not only in Kenya but globally. Poor adherence to medication leads to worsening of this preventable disease and emergence of drug resistance, a situation which is likely to be attributed to poor patient management by healthcare workers. This study focused on tuberculosis patients in urban and rural areas in Kenya.
Objectives: The objectives of the study were: to review the training curricula for nurses and clinical officers used in the training institutions to prepare this cadre of healthcare workers, to examine health care delivery factors that influence non-adherence to TB treatment, to identify healthcare givers' factors that contribute to non-adherence to medication and to identify training interventions to enhance treatment among tuberculosis patients.
Methods: The study adopted a qualitative research design in purposely selecting a sample consisting of retrospective cohort of non-adherent tuberculosis patients. Target population was smear positive tuberculosis patients registered in the tuberculosis registers in the two counties, within the past six months (June-December 2015) at the commencement date of the study. Data was collected using developed interview schedules and questionnaires administered to patients and healthcare workers together with focus group discussions for tuberculosis managers. Respondents were traced non-adherent smear positive tuberculosis patients (defaulters), health care workers and tuberculosis managers. Age, gender, educational level, ignorance on need for treatment adherence, stigma, alcoholism, social and economic factors such as low income, lack of social support, low education, financial problems, and drug side effects were analyzed using Statistical Packages for Social Sciences (SPSS) platform that generated graphs and tables. Current institutional training curricula for healthcare workers and tuberculosis managers were reviewed for content.
Results: 1) Training curricula for both nurses and clinical officers were found to be deficient in content except in the cadre dealing with Lung and Skin, which was shallow and did not touch on hard and soft skills development. 2) Tuberculosis drugs including pyridoxine were inadequate among other factors. 3) Healthcare workers were inadequately prepared (>40%) to offer Tb treatment, were never briefed (>90%) on tuberculosis management prior to posting to tuberculosis clinics and were rarely given Tb updates (>30%) in their routine work. 4) Medical intervention gaps noted included inappropriate training curricula, few poorly trained healthcare workers deficient in counselling skills and poorly prepared in soft skills application when handling patients and irregular and unscheduled tuberculosis updates and continuing medical education updates(CMEs). 5) From focus group discussions, it was apparent that tuberculosis education is essential not only for people with tuberculosis but also for the general public regarding importance of adherence to medication.
Conclusion:1) Training curricula for nurses and clinical officers were inadequate. 2) Shortage of Tb drugs including pyridoxine essential for counteracting drug side effects among other factors contributed to medication non-adherence. 3) There was no evidence of regular CMEs. 4) Tuberculosis education is essential for both patients and the general public.
Recommendations: Existing training curricula in training institutions need to be revised and updated to include competency development on hard and soft skills acquisition. Tuberculosis drugs including pyridoxine should regularly be availed in adequate amounts. A deliberate and sustained emphasis on tuberculosis education is essential not only for people with tuberculosis but also for the general public regarding importance of adherence to medication. Staffs' updates on tuberculosis treatment should be regularly enhanced through continuing medical education forums.

Table of Contents

ABBREVIATIONS AND ACRONYMS

AIDS Acquired Immune Deficiency Syndrome

ART Antiretroviral therapy

CMEs Continuing Medical Education updates

CTLC County Tb and Leprosy Coordinator

DOTS Directly Observed Treatment Short course

FGDs Focus Group Discussions

HBC High Burden TB/HIV Countries

HIV Human Immunodeficiency Virus

KMTC Kenya Medical Training College

MDG Millennium Development Goals

MDR-TB Multi-Drug Resistant Tuberculosis

NTLD-P Kenya National Tuberculosis, Leprosy and Lung Disease Program

SCTLC Sub County Tb and Leprosy Coordinator

SES Socio-Economic Status

SPSS Statistical Packages for Social Sciences

TB Tuberculosis

TIBU Tuberculosis Information from Basic Units

WHO World Health Organization

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May GOD bless you all abundantly.

DEDICATION

I wish to dedicate this thesis to my family members and friends for all their continued support to carry out the study who were always ready to give encouragement during those difficult times of proposal development that finally culminated in this thesis.

List of Tables

List of Figures

Definition of Terms

Adherence: ***Adherence*** means "sticking to" or "being faithful to," such as your **adherence** to your diet even when chocolate cake is around, or students' **adherence** to school rules they do not use cell phones or music players in class. The noun **adherence** is related to the *verb **adhere**, **meaning** "*to stick." (https://www.vocabulary.com/dictionary/**adherence).** Cambridge Advanced Learner's Dictionary defines adherence as *"the fact of someone behaving exactly according to rules, beliefs, etc.* "In this study, **adherence** refers to the degree to which a patient correctly follows **medical** advice with respect to taking prescribed medicine in correct dosage consistently at the correct time and for he recommended period.

Non-adherence: Medication **non-adherence** is most simply defined as the number of doses not taken or taken incorrectly that jeopardizes the patient's therapeutic outcome. (www.medscape.com/viewarticle/406691_2). According to Tomas Philipson, an economist with University of Chicago, "*Non-adherence in health care results when a patient does not initiate or continue care that a provider has recommended."* In this study, **non-adherence** refers to a situation in which a patient does not medicine at prescribed times, does not take medicine as scheduled and at the right dosage for the prescribed period of time leading to jeopardizing the patient's therapeutic outcome.

County : *A **county** is a geographical region of a country used for administrative or other purposes, in certain modern nations.* (https://en.wikipedia.org/wiki/**County).** *Macmillan Dictionary defines a county as a a region that has its own local government in some countries such as the UK and US.* In this study, a **county** refers to the largest territorial

division for local or devolved Government within Kenya and is now considered as what used to be an administrative district.

Health Education: Herein refers to any combination of planned learning experiences based on sound theories that provide individuals, groups, and communities the opportunity to acquire information and the skills needed to make quality health decisions (Joint Committee on Terminology, 2001).

Health promotion: Herein refers to the process of enabling people to increase control over their health and its determinants, and thereby improve their health (World Health Organization, 2005).

Rural area: In general, a ***rural area*** or countryside is a geographic *area* that is located outside towns and cities. *(*https://en.wikipedia.org/wiki/**Rural_area).** According to the - National Geographic Society a rural area is an open swath of land that has few homes or other buildings, and not very many people. A **rural area** in this context refers to a geographic **area** that is located outside the main county town.

Urban Area: An ***urban area*** is a location characterized by high human population density and many built environment features in comparison to the *areas* surrounding it. *Urban areas* may be cities, towns or conurbations, but the term is not commonly extended to rural *areas* such as villages and hamlets. *(*https://en.wikipedia.org/wiki/**Urban_area).** National Geographic Society defines an urban area as the region surrounding a city. Most inhabitants of urban areas have non-agricultural jobs. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. In this study**, urban area** refers to a location in a town characterized by high

human density and vast human-built features and non-agricultural activities in comparison to the areas surrounding it.

Multi-drug resistant (MDR) tuberculosis: Multi-drug-resistant tuberculosis (MDR-TB, also known as Vank's Disease) is defined as a form of TB infection caused by bacteria that are resistant to treatment with at least two of the most powerful first-line anti-TB drugs, isoniazid (INH) and rifampicin (RMP). According to WHO, Multidrug-resistant TB (MDR-TB) is TB that does not respond to at least isoniazid and rifampicin, the two most powerful anti-TB drugs. In this study, **Multi-drug resistant tuberculosis** is Tuberculosis caused by a bacterium, Mycobacterium tuberculosis which is resistant in vitro to the effects of isoniazid and rifampicin, with or without resistance to any other drugs**.**

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter discusses the study background, epidemiology, statement of the problem, justification of the study, study objectives, research questions, significance of the study, scope and limitation of the study and finally definition of terms as used in this context.

1.2 Background

Tuberculosis (TB) is one of the world's life-threatening communicable diseases and remains a global public health problem with significant morbidity and mortality (World Health Organization, 2012, Raviglione, et.al 2012). In 2013, an estimated 9.0 million people developed TB and 1.5 million died from the disease, 360 000 of whom were HIV-positive. Globally, the tuberculosis (TB) mortality rate has fallen by 41 % since 1990, and the world is on track to reach the global target of a 50 % reduction during 2015 (World Health Organization, 2013). However, global TB control has faced many challenges, with an estimated 8.7 million incident cases in 2011 and 1.4 million deaths from TB since 2011.

Tuberculosis remains a major cause of morbidity and mortality in Kenya. It affects all age groups, but has its greatest toll in the most productive age group of 15 to 44 years. The major factor responsible for the large TB disease burden in Kenya is the concurrent HIV epidemic. Other factors that have contributed to this large TB disease burden include poverty and social deprivation that has led to a mushrooming of peri-urban slums, congestion in prisons and limited access to general health care services (NTLP, 2017).

Globally, TB is slowly declining each year and it is estimated that 37 million lives were saved between 2000 and 2013 through effective diagnosis and treatment 2013 (WHO Global tuberculosis report 2014). Given that most deaths from TB are preventable, the death toll from the disease is still unacceptably high and efforts to combat it must be accelerated if the 2015 global targets, set within the context of the Millennium Development Goals (MDGs), are to be met. *The MDG 6, Target 6.c: was to halt and begin to reverse the incidence of TB by 2015 and reduce prevalence of TB and deaths due to TB by 50% compared with a baseline of 1990* (WHO Global Tuberculosis Report 2014).

The Kenya National Tuberculosis, Leprosy and Lung Disease Program (NTLD-P) has been implementing initiatives towards achieving internationally agreed TB control targets whose immediate short-term goal was to achieve 70/85 targets – that is, to detect 70 % of infectious TB and cure 85% of the detected cases and then sustain this effort over a long time. The TB MDG to have halted and begin to reverse the incidence and mortality due to TB by 2015 has been met in Kenya and the NTLD-P has begun to implement the post 2015 Global TB Strategy that consists of 3 major areas, namely: **integrated, patient-centred care and prevention; bold policies and supportive systems** and **intensified research and innovation** (National Tuberculosis, Leprosy and Lung Disease Program – 2016).

Specifically, the Post-2015 TB Strategy, aimed at:

Integrated, patient-centred TB Care and Prevention, which included:

- Early diagnosis of TB including universal drug-susceptibility testing; systematic screening of contacts and high-risk groups.
- Treatment of all people with TB including drug -resistant TB; and patient support.

- Collaborative TB/HIV activities and management of co-morbidities.
- Preventive treatment for persons at high-risk; and vaccination against tuberculosis.

Bold policies and supportive systems, which included:

- Political commitment with adequate resources for TB care and prevention.
- Engagement of communities, civil society organizations, and all public and private care providers.
- Universal health coverage policy; and regulatory framework for case notification, vital registration, quality and rational use of medicines, and infection control.
- Social protection, poverty alleviation, and actions on other determinants of TB.

Intensified Research and Innovation, which included:

- Discovery, development and rapid uptake of new tools, interventions and strategies.
- Research to optimize implementation and impact, and promote innovations.

To affirm this goal during the commemoration of the World TB day on March 24, 2016, the Principal Secretary, Ministry of Health, Dr Nicholas Muraguri, recounted that, *"Over the last 10 years, a total of 1.2 million Kenyans have been diagnosed with TB and one million TB patients treated successfully, averting an estimated half a million TB deaths. Moreover, free TB services have been accessible to Kenyans across 4,500 health facilities and 1,800 testing sites, and that Kenya remains the first country in sub-Saharan Africa to reach World Health Organisation targets for TB case detection and treatment success."*

The mainstay of Tb control worldwide is through use of effective chemotherapy, which greatly depends on both the efficacy of a medication and patients' adherence/compliance to the therapeutic regimen in use. Effectiveness of a chemotherapy on the other hand is dependent largely on a conducive healthcare worker-patient communication environment that can then lead to proper patients' instruction and counselling by well-trained healthcare workers. This patients' instruction and counselling requires that patients are asked to participate in the decision-making process in taking medication, which can then facilitate an understanding on the benefits of adherence to medication intake as well as the risks of not taking them.

Adherence to TB treatment has been shown to be one of the interventions that can lead to increase in cure rate, reduction in morbidity and mortality, decrease in emergence of Multi drug resistant tuberculosis (MDR) and risk of treatment failure (WHO, 2013); (Abubakar, et.al 2013; Jia, et.al 2012). However, it has been noted that patients are unable to adhere to their treatment because of poor communication (Hansel, et.al, 2004) between them and healthcare workers, drug side effects coupled with pill burden (Gelmanova, et.al, 2007; NLTP, 2007; Dodor, et.al, 2005) and inappropriate patients' counselling by healthcare workers on medication adherence. In addition, most health facility clinics where TB patients go to seek treatment for their ailments are generally overcrowded and run by few staff who must ensure that the queues must be cleared from the clinics at the end of the day. This makes it quite difficult for the staff to have quality time for effective interaction with their patients concerning emphasis on medication adherence and counselling.

Though the therapeutic regimens recommended by WHO have been shown to be highly effective in both preventing and treating TB, in Kenya, Tb is still a major cause of high

morbidity and mortality in Kenya as shown by the fact that in 2008, Kenya was ranked 15th among the twenty two (22) high TB burden countries globally and the 5th highest country with TB burden in Africa (Global Tuberculosis Report 2013) that contributes 80% of global TB burden. Although the drugs for Tb treatment are given free of charge in Kenya, many patients are still unable to adhere to their treatment because of poor communication between them and healthcare workers, a situation probably attributed to inappropriately trained healthcare workers and inadequate community awareness about TB.

TB education is therefore necessary not only for people with TB but also for the general public who need to know how to take their Tb drugs properly, how to make sure that they do not pass TB on to other people and also know the basic information about TB for a number of reasons including reducing the stigma still associated with TB. There is therefore a need to look at new approaches to the management of TB in the country.

1.3 Epidemiology

Tuberculosis is an infectious bacterial disease caused by Mycobacterium tuberculosis, which most commonly affects the lungs and is transmitted from person to person via droplets from the throat and lungs of people with the active respiratory disease during coughing, sneezing, speaking, laughing, or singing. In healthy people, infection with Mycobacterium tuberculosis often causes no symptoms, since the person's immune system acts as a barrier to the bacterial infection. The symptoms of active TB of the lung are cough, sometimes with blood stained sputum, chest pains, weakness, weight loss, fever and night sweats (World TB Day, 24 March 2014 WHO). TB is treatable with a six-month course of rifampicin-based antibiotics. Approximately 5%–10% of those infected will develop active disease, and most will be capable of infecting others (Jensen, P. A. et al. 2005).

Tuberculosis as an infectious bacterial disease caused by Mycobacterium tuberculosis continues to be a major cause of high morbidity and mortality in Kenya. Kenya is among the 22 countries (**Table 1:1** and **Figure 1:1)** contributing 80% of global TB burden. The country has improved from number 13th to 15th among the 22 countries with a high burden of TB in the world, and the 5th highest country with TB burden in Africa (WHO Tuberculosis Report 2013).

Global Tb High Burden Countries – 2013

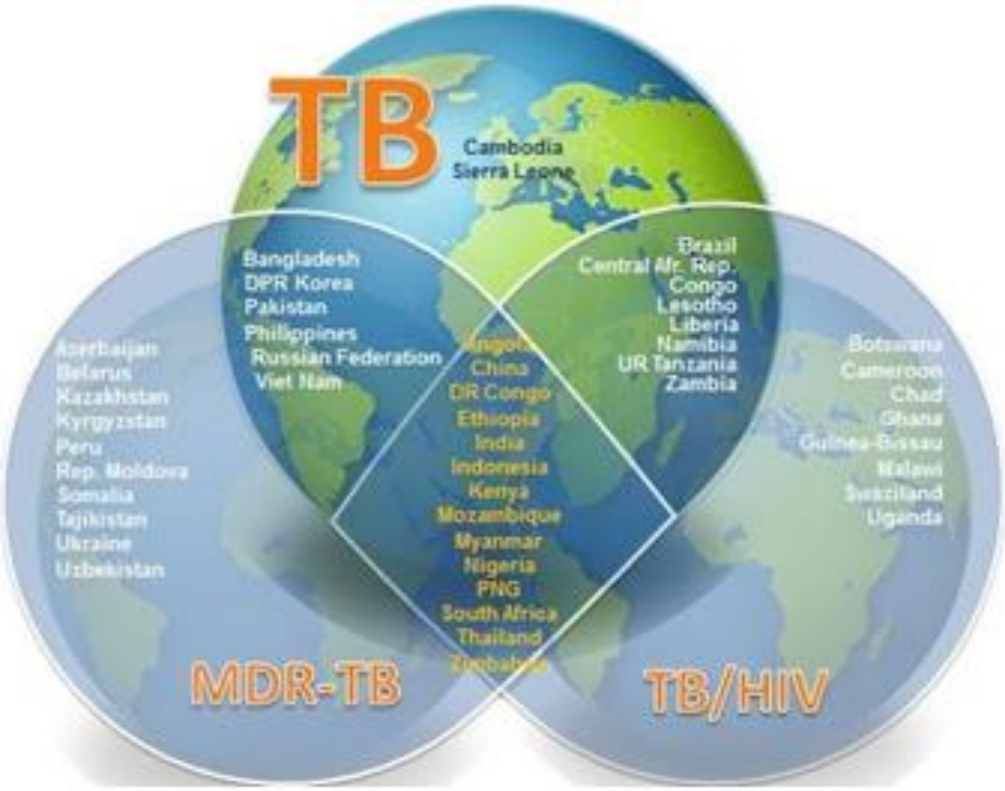
Table 1:1 Global Tb High Burden Countries (HBCs) – 2013

S/No	Country	Cases
1.	India	2,200,000
2.	China	1,000,000
3.	South Africa	530,000
4.	Indonesia	460,000
5.	Pakistan	410,000
6.	Bangladesh	350,000
7.	Philippines	260,000
8.	Ethiopia	230,000
9.	Congo (Democratic Republic of)	210,000
10.	Myanmar	200,000
11.	Nigeria	180,000
12.	Mozambique	140,000
13.	Vietnam	130,000
14.	Russian Federation	130,000
15	Kenya	120,000
16	Brazil	92,000
17.	Thailand	80,000
18.	Tanzania (United Republic of)	79,000
19.	Zimbabwe	77,000
20.	Uganda	65,000
21.	Cambodia	61,000
22.	Afghanistan	56,000
	Total	7,000,000

SOURCE: **Kaiser Family Foundation**, www.GlobalHealthFacts.org, **based on WHO, Global Tuberculosis Report; 2013**

Tuberculosis in Kenya affects all age groups with its greatest toll in the most productive age group of 15 to 44 years. The major factor responsible for the large TB disease burden in Kenya is the concurrent HIV epidemic. Other factors that have contributed to this large TB disease burden include poverty and social deprivation that has led to a mushrooming of peri-urban slums, congestion in prisons and limited access to general health care services (NTLP, 2017). In the last decade TB case notification had been increasing at an average of 16% annually; however, there has been a decline in TB cases from 2005 following a decline in TB/HIV cases that began in 2004 (National Tuberculosis, Leprosy and Lung Disease Program, 2016). According to Kenya NTLD-P Annual Report 2013, 1846 patients were non-adherent to TB treatment out of which 6% were from the two counties of Kericho and Nakuru alone.

Lists of WHO 30 High Burden TB/HIV Countries (HBC) 2016-2020



Source: World Health Organization, (2015)

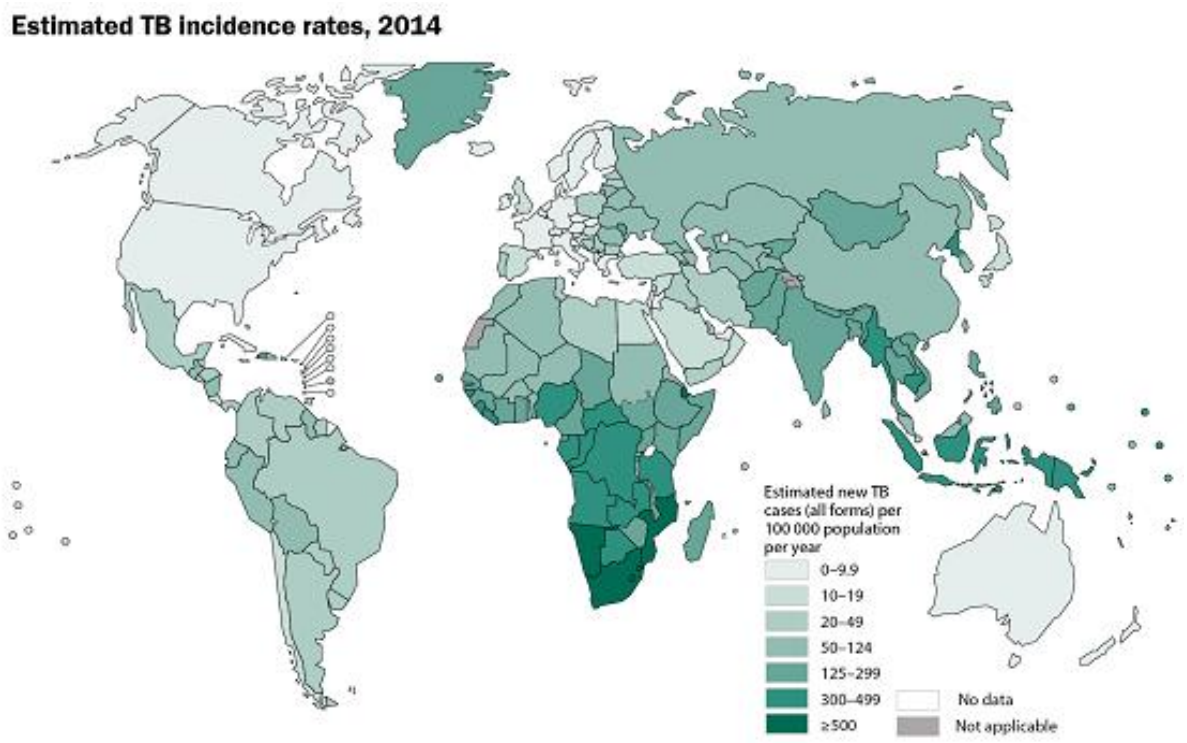
Figure 1:1 Lists of WHO 30 High Burden TB/HIV Countries (HBC) 2016-2020

The 30 TB HBCs (those in all 3 lists in bold) are: **Angola,** Bangladesh, Brazil, Cambodia, **China,** Congo, Central African Republic, DPR Korea, **DR Congo, Ethiopia, India, Indonesia, Kenya,** Lesotho, Liberia, **Mozambique, Myanmar,** Namibia, **Nigeria,** Pakistan, **Papua New Guinea,** Philippines, Russian Federation, Sierra Leone, **South Africa, Thailand,** the United Republic of Tanzania, Uganda, Viet Nam, Zambia and **Zimbabwe.**

According to the WHO's Global TB control report 2013, Kenya had approximately 120,000 new TB cases in 2013. Children formed about 3 % of the new cases of smear

positive pulmonary tuberculosis in Kenya for the same year. Of the 7 million people who developed TB in 2013, more than half (56%) were in the South-East Asia and Western Pacific Regions. A further one quarter was in the African Region, which also had the highest rates of cases and deaths relative to population. India and China alone accounted for 24% and 11% of total cases, respectively (WHO Global tuberculosis report 2014**) (Figure 1:2).**

Estimated Global TB Incidence rates, 2014



Source: Global Tuberculosis Report 2015, WHO, 2015.

Figure 1:2 Estimated Global TB Incidence rates, 2014

About 60% of TB cases and deaths occur among men, but the burden of disease among women is also high. In 2013, an estimated 510 000 women died as a result of TB, more than one third of whom were HIV-positive. There were 80 000 deaths from TB among HIV-negative children in the same year. An estimated 1.1 million (13%) of the 7 million people

who developed TB in 2013 were HIV-positive. The number of people dying from HIV-associated TB has been falling for almost a decade. The African Region accounts for about four out of every five HIV-positive TB cases and TB deaths among people who were HIV positive (WHO Global tuberculosis report 2014).

From a historical perspective, Tuberculosis control in Kenya started in 1956 (DLTLD, 2011) with the initiation of the National Tuberculosis control Programme (NTP). TB was treated with long term regimens lasting a year or over until 1993 when short course chemotherapy was introduced which reduced the TB treatment period from 12 months to 8 months with the introduction of Rifampicin in the intensive phase of treatment (WHO, 2008).

Successful treatment of tuberculosis involves taking anti-tuberculosis drugs for at least six months. Kenya subscribes to the internationally accepted World Health Organization (WHO) strategy for TB control. In addition, the country has adopted the WHO recommended tuberculosis treatment regimes. Although treatment duration for new TB patients in Kenya was previously 8 months in total, a shorter 6-months regime was started in 2007 in Nairobi province and later expanded to cover the whole country by 2009. Consequently, duration of treatment then was either six or eight months. In the first two months of treatment (intensive phase), a combination dose of rifampicin (R), isoniazid (H), pyrazinamide (Z) and ethambutol (E) (2RHZE) was used daily for two (2) months, followed by either 6 months of ethambutol and isoniazid (6EH) for the 8 months regime; or 4 months of rifampicin and isoniazid (4RH) for the 6 months regime. During the intensive phase of treatment, patients collect drugs from facilities weekly while monthly collections are done during the continuation phase. The treatment regime for retreatment

patients is 8 months and includes Streptomycin (S) in the first 2 months. Emphasis is made on Direct Observation of Treatment (DOT) by a health worker or other responsible persons, including household members or others with whom the patient has a close relationship, at least during the intensive phase of treatment.

The therapeutic regimens recommended by WHO have been shown to be highly effective in both preventing and treating TB, but poor adherence to anti-TB medication is a major barrier to its global goal which is to cure patients once they start treatment (WHO, 2003). The Kenya TB treatment defaulter rate is 15% (World Health Organization, 2013). Although the drugs for Tb treatment are given free of charge, many patients are still unable to adhere to their treatment because of poor communication between them and healthcare workers, ignorance about medication adherence and drug side effects coupled with pill burden. Against this backdrop Tb is still a major problem in Kenya as shown by the fact that in 2008, Kenya was ranked 13th among the twenty two (22) high TB burden countries globally and now ranked 15th and the 5th highest country with TB burden in Africa (Global Tuberculosis Report 2013).

In Kenya, nurses and clinical officers are involved in Tb patients' treatment and are expected to effectively communicate and educate patients on importance of medication adherence. This assumes that during training, these healthcare workers (nurses and clinical officers) are appropriately trained and prepared to manage the patients in an environment that is conducive both for them and the patients. Effectiveness of a treatment depends on both the efficacy of a medication and patient adherence to the therapeutic regimen. For effective compliance, a conducive environment is essential for healthcare worker-patient effective communication and is actually a pre-requisite for patients' medication

compliance/adherence. However, it appears that the healthcare workers' training is itself inadequate to meet the expectations as it seems that the curricula used in the training are inappropriate in preparing this cadre for the task.

Adherence/compliance to TB treatment is one of the factors that lead to increase in cure rate and reduction in morbidity and mortality and also decreased emergence of multi drug resistant tuberculosis (MDR TB). However, non-adherence/non-compliance to TB treatment leads to high increase in morbidity and mortality, prolonged TB infectiousness, multi-drug resistance, relapse and death and high cost of TB treatment which translates to increased burden not only to the nation but to the community TB control interventions.

Poor adherence by tuberculosis patients to their medication contributes not only to the worsening of their TB situation but also paves way for incidence of drug resistance. The growing resistance to available drugs means the disease is becoming more deadly and difficult to treat yet ironically, the disease is preventable and treatable. This study intents to bring out the alternative approach to the management of TB by addressing identified training gaps in the training curricula, competency training of healthcare workers on proper treatment and effective patients' counselling together with effective awareness creation regarding TB disease and control in the community.

1.4 Statement of the Problem

As noted in the background information, TB continues to be a major cause of high morbidity and mortality in Kenya, and that poor adherence by tuberculosis patients to their medication contributes to the worsening of their TB situation that paves way for incidence of drug resistance. Many patients are unable to adhere to their treatment because of poor

communication between them and healthcare workers, ignorance about medication adherence, drug side effects coupled with pill burden and inappropriate counselling on medication adherence. The training curricula currently in use in training institutions appear not to adequately prepare healthcare workers for appropriate patients' education on medication adherence. In Kenya, currently, there is inadequate data arising from any studies to support what has been found elsewhere regarding actual associated factors to treatment default.

1.5 Justification of the Study

As noted earlier, non-adherence to TB treatment leads to high increase in morbidity and mortality, prolonged infectiousness, multi-drug resistance, relapse and death (Mohamed, Abdul & Adel, 2013) with a corresponding high cost of TB treatment leading to increased burden to the nation and community TB control interventions. Growing resistance to available drugs means this preventable and treatable disease is becoming more deadly and difficult to treat yet ironically, the drugs for Tb treatment are available and given free of charge to patients. If no efforts are put to determine the actual factors locally influencing non-adherence, the TB programs will continue using strategies that might not be yielding effective results in tuberculosis control. This study formed a basis of training curricula review aiming at incorporating identified shortcomings and thereafter institute appropriate interventions essential in the healthcare worker training.

1.6 Purpose of the study

In order to address issues related to the relationship of training and treatment practices in Tuberculosis management in selected counties in Kenya, the following objectives were considered.

1.6.1 Objectives of the study

To review the relationship of training and treatment practices in Tuberculosis management in selected counties in Kenya.

1.6.2 Specific Objectives These were:

i. To review the training curricula for nurses and clinical officers used in the training institutions to prepare this cadre of healthcare workers.
ii. To examine health care delivery factors that influence non-adherence to TB treatment.
iii. To identify healthcare givers' factors that contribute to non-adherence to medication.
iv. To identify training interventions to enhance treatment among tuberculosis patients.

1.7 Research Questions

i. What deficiencies are inherent in the curricula used in the training of nurses and clinical officers regarding TB treatment and management?
ii. What are the health care delivery factors that influence non-adherence to TB treatment and management?

iii. What are the healthcare givers' factors that contribute to non-adherence to TB medication?

iv. What are the training interventions that can enhance treatment and management among Tb patients?

1.8 Significance of the Study

The findings and conclusions of this study will be useful to policy makers, healthcare givers, training institutions, medical educators, civil societies and other stakeholders in making recommendations for appropriate future interventions in TB disease control.

1.9 Scope of the Study

The study was conducted in urban and rural areas of Kericho and Nakuru Counties in Rift Valley Region ***(Appendix F)*** which accounts for over 26% of the country's total population ***(Appendix G)***. Non-adherent patients (defaulters) purposely selected from DTLCs' "TIBU" records in the two urban and rural health facilities in the two counties were enrolled for the study and interviewed using interview schedules ***(Appendix A)***, while healthcare workers were interviewed using structured questionnaires and semi-structured interview schedules ***(Appendix B)***. Key informant/focus group discussions (FGD) interviews were conducted among TB Programme managers ***(Appendix C).*** Study period commenced on January 2016 covering all smear positive non-adherent TB patients within the past six months (June-December 2015) at the commencement date of the study. A total of 112 smear positive Tb patients (tuberculosis defaulters) from the two counties (62 from Kericho County and 50 from Nakuru County) of Nakuru and Kericho and 46 healthcare workers drawn from 34 health facilities (24 from Kericho County and 10 from Nakuru

County) where TB patients had registered and received their medication were identified using purposive sampling method and enrolled in the study. Key informant interviews/focus group discussions (FGD) were held with 15 (7 from Kericho and 8 from Nakuru) County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs), who are actually Tb managers, from the two counties.

1.10 Limitation of Study

Here only 2 out of 47 counties are considered and findings may not be representative for the whole country, though the two (2) counties alone account for over 26% of the country's total population with TB prevalence of 6%. Secondly, the Ministry of Health was not able to ensure constant supply of TB drugs in all the facilities involved in TB treatment hence some patients defaulted because of lack of Tb drugs in the health facilities.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews studies that have been done in relation to: the mode of training in the Medical Institutions and training curricula used in such institutions to prepare a cadre of healthcare workers (nurses and clinical officers); health care delivery factors that influence non-adherence to TB treatment and Management; healthcare givers' factors that contribute to non-adherence to TB medication and training interventions that can be used to enhance treatment and management among tuberculosis patients, the gap in TB treatment and management that exists which highlights: Expected Medical Compliance and interplay of factors that can affect adherence and Theoretical as well as Conceptual frameworks of the study.

2.2 Mode of Training in the Medical Institutions

The ultimate aim of appropriate training of clinicians is to produce all round clinicians who can adapt quickly to new modes of patient management and who should have appropriate skills to interact with their patients and colleagues in the continuum of patient care with respect to health education and health promotion. This is with respect to the teaching of the community and the public in the awareness of curative, disease prevention, health promotion and rehabilitative endeavors regarding TB disease in their day-to-day survival. This emphasises the efforts geared to sustaining good health and maximizing good health. Thus, good health goes beyond just existing/ surviving to thriving.

In the mid -1970's, many countries around the world had developed centres in faculties of health and medical schools with the growing recognition that a body of education and science needed to be understood and applied by teachers in medical and allied health professions. Strategy in this training was envisaged to be training on Medical Education as it was increasingly noted that by training teachers of medical and allied health professionals in educational methodology, curriculum planning and student assessment, the overall results would be satisfying and rewarding to both the students and teachers. Medical education here refers to appropriate application of educational methodologies in the teaching of doctors and all health care professionals to guarantee desired outcomes. Medical education and training varies considerably across the world. Various teaching methodologies have been utilized in medical education, which is an active area of educational research (Mutema, Kangethe & Naweya, 1999).

Specifically, it was noted that modern medical education calls for teaching and testing beyond rote memorization of facts and that training should be done for understanding of knowledge, application of knowledge and individual performance in realistic situations.

Teaching methodologies that enable students to develop competencies required for successful, professional life, promote life – long learning, develop self – directed learning skills and problem solving skills have become more valuable than traditional methodologies.

(Harden et al. 1984:1) noted that "through years at an authoritarian medical school, idealistic young doctors are moulded into rigid doctors who have lost much of their original ability…" Medical and allied health professionals have also identified the deficiencies of the traditional methods of training which have been characterized mainly by lectures, and

large group demonstrations. They have developed new approaches and methodologies to address the deficiencies of the traditional methods. These new methodologies have generated new ideologies and concepts such as self-directed learning, problem-based-learning and community-based-learning among others. All of these ideologies and concepts are generally referred to as "Innovative Medical Education." As noted in Sudan Medical School, the problem that faces innovative curricula is that most of the teachers are trained in the old traditional schools and have difficulties in understanding the concepts related to innovative curricula (Al Mirghani, 2007).

Innovative medical education has evolved rapidly due to several major reasons, which include some of the following:

i. Rapid technological changes have further complicated learning. The technology which is taught, crammed and practiced today has been noted to be obsolete before the student graduates. Therefore, teaching methodologies that promote life-long-learning skills have become more valuable because they enable graduates to keep on learning and stay up-to-date even after leaving school (Mutema, Kangethe & Naweya, 1999).
ii. Professional life in modern times calls for adaptability, participation in change and interaction with different specialists in problem-solving teams. Therefore, teaching methodologies that enable students to develop competencies required for successful professional life have become increasingly preferable to the straight-lectures and the rote-learning traditional methods (Innovative Techniques in "The Training of Health Professionals: The Case of Moi University, Faculty of Heath Sciences, Kenya" (Kangethe, Muyia, & Mutema,2009).

The training of healthcare workers should be anchored on curricula that emphasize hard and soft skills, strict adherence/compliance to medication, risks of non-adherence to medication, drugs side effects, stigma reduction and general avoidance of default from

health care. Emphasis in the curricula must therefore be accompanied by teaching strict medication adherence in Medical Schools and Colleges as well as giving Health Education to the community. Failure to do this results in shortcomings in the healthcare worker preparedness in disease treatment and management, which will be glaringly apparent in the treatment clinics.

In healthcare, compliance has been defined as the extent to which a patient's behaviour (in terms of taking medication, following diets, or executing life style changes) coincides with healthcare providers' recommendations for health and medical advice (Sackett, 1976). Therapeutic non-compliance occurs when an individual's health seeking or maintenance behaviour lacks congruence with the recommendations as prescribed by a healthcare provider. Adherence has often been used interchangeably with compliance, where adherence has been defined as the ability and willingness to abide by a prescribed therapeutic regimen (Inkster, *et al.,* 2006).

Therapeutic adherence/compliance not only includes patient compliance with medication but also with diet, exercise, or life style changes. In order to evaluate the possible impact of therapeutic non-adherence on clinical outcomes, numerous studies using various methods have been conducted in the United States (USA), United Kingdom (UK), Australia, Canada and other countries to evaluate the rate of therapeutic adherence/compliance in different diseases and different patient populations. Generally, it is estimated that the adherence/compliance rate of long-term medication therapies is between 40% and 50%. The rate of adherence/compliance for short-term therapy is much higher at between 70% and 80%, while the compliance with lifestyle changes is the lowest at 20%–30% (DiMatteo, 1995). Furthermore, the rates of non- adherence/compliance with

different types of treatment also differ greatly. Sadly and inevitably, if the patients do not follow or adhere to the treatment plan faithfully, the intended beneficial effects of even the most carefully and scientifically based treatment plan will not be realized.

Adherence to long-term therapies was noted to be a multidimensional phenomenon determined by interplay of five sets of factors (dimensions) namely: social and economic factors, health care team and system-related factors, condition-related factors, therapy-related and patient-related factors (Culqui, et.al,2012).

Improving treatment outcomes and designing effective interventions require understanding of the factors that prevent people from adhering and those that help in treatment completion. In Sub-Saharan Africa, several social and economic factors such as low income, lack of social support, low education, financial problems and inability to afford services (Sathiakumar, et.al 2010 & Gelmanova, et.al, 2007) have been linked to TB treatment non-adherence. Older age, the male sex, inadequate knowledge, ignorance on need for treatment compliance and stigma (Gelmanova, *et al*, 2007 & Muture, et.al, 2011); (World Health Organization, 2003 & 2008; NLTP, 2007), are among reported patient-related factors that influence default in the region. Reported health care system-related factors for default include poor service provider attitudes, negative attitude by tuberculosis patients towards the treatment centre, running out of drugs, poor access to health services and living near to treatment centre (Gelmanova, *et al*, 2007 &7 NLTP, 2007; World Health Organization, 2003). Drugs side effects, drugs too strong, and feeling better soon after initiation of treatment, (Gelmanova, *et al*, 2007; NLTP, 2007; Dodor & Afenyandu, 2005)

are among therapy related factors that influence TB treatment default while HIV co-morbidity is among the condition-related factor reported (Muture, et.al, 2011).

Some studies have shown that patient-prescriber relationship is another strong factor which affects patients' compliance (Buck *et.al,* 1997; Roter *et.al,* 1998; Stromberg *et.al,* 1999; Moore *et.al,* 2004; & Gonzalez *et.al,* 2005). A healthy patient-prescriber relationship is based on patients' trust and empathy from the prescribers. Other studies have also found that compliance is good when doctors are emotionally supportive, giving reassurance or respect, and treating patients as equal partners (Moore *et.al,* 2004 & Lawson *et.al,* 2005). However, it was also found that for physicians who asked few questions or seldom made eye contact with patients, or where patients found it difficult to understand the physician's language or writing, compliance was poor. More importantly, it was also found that too little time spent with patients by physicians was likely to threaten patient's motivation for maintaining therapy (Moore *et.al,* 2004 & Lawson *et.al,* 2005).

In addition, it was also found that patients' poor communication with healthcare providers was also likely to cause a negative effect on patient's compliance (Apter, *et.al.* 1998).

The above observations emphasize the need for cooperation between patients and healthcare providers and the importance of good communication. Good communication is also very important in helping patients understand their condition and therapy (Lorenc & Braithwaite, 1993). Additionally, it was also noted that patients' medication compliance requires that patients should be literate or have good health literacy. Health literacy means patients are able to read, understand, remember medication instructions, and act on health information (Vlasnik et al 2005). In some studies, it was found that patients with low health literacy were reported to be less compliant with their therapy (Nicholas & Poirier 2000).

On the contrary, patients who could read and understand written instructions and pictograms and drug labels were found to be more likely to have good compliance (Lorenc & Braithwaite, 1993). Thus, using written instructions and pictograms on medicine labels proved to be effective in improving patient's compliance (Dowse & Ehlers 2005).

Kenya Medical Training College (KMTC) training curricula (2013; 2014, 2014b), used in the training of clinicians (nurses and clinical officers) in Kenya, are based on traditional mode of health worker training, i.e. the lecture method which has been the main instructional method in traditional education. This method has always adopted the subject-centred curriculum for many years and was built upon certain subjects that are considered essential and for which specific time is allocated to each in form of lectures. In this mode, the students are taught in large groups first the basic sciences and then the clinical sciences. This method of teaching assumes that extensive factual knowledge is essential for the practice of health professionals including medicine, and that this knowledge should precede the stimulus situation (the health problem or situation). In this large groups and lectures method approach, it becomes evident that medical students are not receiving the kind of one-to-one attention (which can impart skills acquisition) that was once the hallmark of medical education, neither during the teaching laboratories of the basic science years nor during the clerkships in the clinical years. This in itself does not offer appropriate skills acquisition, let alone effective mentorship. There is therefore a dire need to train and equip healthcare providers with appropriate skills to treat, counsel and manage TB patients. Needless to say, the trainers themselves who were trained using traditional method, need re-training on skills acquisition using appropriate curricula, they can then produce competent healthcare workers to man the healthcare facilities. Training emphasis must

include not only the hard skills but most critical and dismally lacking the soft skills. In all health facilities, healthcare workers in the Tb clinics always *applied* hard skills and rarely soft skills when treating and managing Tb patients probably because of their training orientation and also that of their trainers whose training mode was that of traditional method which emphasizes rote learning and not skills acquisition. Consequently, soft skills such as effective healthcare worker-patient communication, human touch skills, a positive flexible attitude and common sense which are very critical in patient management and which do not depend on acquired knowledge and which are not in the training curricula are rarely applied.

Thus, emphasis must be laid on interventions promoting better health care provider-patient communication about adherence; developing or improving existing adherence support services that are offered by a multidisciplinary team (nurse, clinical officer, physician/medical officer, pharmacy, patient et cetera) that expectedly become the single most important area of focus when we consider the training of clinicians. The training of clinicians as noted earlier has by and large been based on traditional mode of health worker training i.e. the lecture method which has been the main instructional method in traditional education. The teaching of medical education as previously indicated has utilized the subject-centred curriculum for many years and is built upon certain subjects that are considered essential for which specific time is allocated to each so that the student first studies the basic sciences and then the clinical sciences later. This is a situation that erroneously assumes that extensive factual knowledge is essential for the practice of health professionals including medicine, and that this knowledge should precede the stimulus situation (the health problem or situation).

The fragmentation thus of education into separate disciplines negatively contrasts the new paradigm of health and medicine and of course other health professions with their "holistic approach" (Ferguson, 1980). The concept of integration can be misunderstood and the so-called integrated curriculum can simply be segmented differently based on organ/systems, pathophysiological processes or other similar classifications. This obviously calls for enactment of a good and relevant curriculum. Therefore, to design a relevant and effective integrated curriculum one has to consider some of the factors as highlighted by Hilliard (Jason, 1972) in a paper on "Integration in Medical Curriculum: Advantages and Disadvantages." This integration proposes combinations such the basic sciences with each other, the clinical sciences with each other, the basic sciences with the clinical sciences, and the medical school with the community. As at now, medical students are not receiving the kind of one-to-one attention that was once the hallmark of medical education, neither during the teaching laboratories of the basic science years nor during the clerkships in the clinical years. Rather than a change in the curriculum, what is needed right now is a change on those who govern and participate in undergraduate medical education (Abrahamson, 1996). In essence, this presupposes that the trainers themselves need to be retrained. This change must emphasize skills acquisition in patient treatment and management. It is a fact that knowledge gained during undergraduate medical curriculum almost becomes outdated by the time the student graduates.

Practicing primary care clinicians need to keep themselves updated with this expansion in knowledge and skills. There is therefore a dire need to train and equip healthcare providers with appropriate skills to treat and manage TB patients. This calls for a paradigm shift in the entire continuum of current patient care as opposed to assumed competence by health

care workers that has proven to be a mirage. This calls for re-training of trainers of healthcare professionals with emphasis on skills acquisition who must then produce competent healthcare workers to operate the health care facilities.

2.3 Health Care Delivery Factors that influence non-adherence

The WHO recommended Directly Observed Treatment Short Course (**DOTS**) strategy was introduced in Kenya in 1993 reaching 100% geographic coverage by 1997. Diverse factors have been associated with non-adherence to TB treatment such as patient characteristics, the relationship between healthcare provider and the patient, the treatment regimen, healthcare workers' preparedness and the health care setting (WHO, 2003). Reported health care system-related factors for default include poor service provider attitudes, negative attitude by tuberculosis patients towards the treatment centre, running out of drugs, access to health services and living near to treatment centre (Gelmanova, *et al.* 2007; NLTP, 2007; & WHO, 2003). Side effects, drugs too strong, and feeling better soon after medication initiation (Dodor & Afenyandu, 2005) are among therapy related factors that influence TB treatment default while HIV co-morbidity is among the condition-related factor reported (Muture *et al.,* 2011).

The DOTS strategy is best illustrated by reviewing the experience of United Republic of Tanzania as highlighted below. The "**DOTS strategy for tuberculosis control"** has been cited as a good example of a case management approach as pioneered in the United Republic of Tanzania in the 1970s that integrated the diagnosis and treatment of tuberculosis into the existing health services infrastructure at district level which was further developed by the WHO Global Tuberculosis Programme in the early 1990s and

which became known under the brand-name **"directly observed treatment, short-course" (DOTS).** Its key features are political commitment; case detection among self-reporting patients with symptoms using sputum-smear microscopy; a shorter course of treatment than that of traditional regimens, under proper management; assurance of a regular drug supply; a strong surveillance and monitoring system; and the fact that a health worker or trained layperson watches the patient swallow the anti-tubercular drugs. DOTS is now the WHO-recommended strategy for tuberculosis control, but the need for directly observed treatment as a universal requirement is highly controversial, because four carefully conducted trials in Pakistan, Thailand and South Africa showed little or no advantage, in relation to cure, of direct observation over self-treatment at home (Garner & Volmink, 2003)**.** Because of the increase of therapeutic failures in areas with a high prevalence of drug resistance, the development of new ways to improve adherence and avoid resistance is a priority area for research in tuberculosis control. An analysis of the technical complexity of DOTS is presented in **Table 2:1** under **"Priority-setting in Health"** (*Bulletin of the World Health Organization* | April 2005, 83 (4), Christian, et al.).

Table 2:1. Application of the conceptual framework to the DOTS strategy for tuberculosis control

Priority-setting in health

Category	Criteria	Intervention
Intervention characteristics		
Basic product design	Stability Standardizability Safety profile Ease of storage Ease of transport	Anti-tubercular drugs, in particular rifampicin, can be easily damaged by high temperatures and humidity. This particularly applies to blister-packaged drugs (Singh & Mohan (2003). Because of the relatively large number of different drug combinations, different fixed-drug combinations, and local manufacturers, product standardization is demanding. Anti-tubercular drugs are generally well tolerated. Serious liver toxicity may occur in 5–10% of patients. Other less common but serious side-effects are sensory neuropathy, optic neuritis, hypersensitivity reactions, thrombocytopenia and anaemia (Chaisson & Nachega, 2003). Storage and transport have to take into account the increased susceptibility to damage in conditions of high temperature and humidity.
Supplies	Need for regular supplies	Regular supplies of diagnostic material and drugs are

		of crucial importance to programme success
Equipment	High-technology equipment and infrastructure needed. Several different types of equipment needed. Maintenance needed.	Laboratory equipment for sputum microscopy, cultures and susceptibility testing needed. X-ray facilities for smear-negative and extra pulmonary cases
Delivery characteristics		
Facilities	Retail sector Outreach services First-level care Hospital care	First-level health-care services for diagnosis and treatment management. Network of smear microscopy laboratories with regular quality control. Hospital services for severe cases and treatment failures, further investigations.
Human resources	Skill level required for service provision. Skill level required for staff supervision. Intensity of professional services in term of frequency or duration.	Community volunteers or paramedical staff for treatment supervision. Doctors or medical practitioners for diagnosis and management of care. Laboratory personnel for smear microscopy, resistance testing and X-ray examinations. Hospital staff for complicated cases, e.g. further Investigations. Professional tuberculosis staff for supervision and Training. Management and planning of regular drug supply and quality assurance and surveillance activities.

	Management and planning requirements.	
Communication and transport	Dependence of delivery on communication and transport infrastructure	Regular drug supply requires functional transport infrastructure. Communication between different levels of services required for timely referrals, communication of test results and surveillance reporting
Government capacity requirements		
Regulation/legislation	Need for regulation Need for monitoring of regulatory measure. Need for enforcement of regulations.	Need for a national TB control strategy Need to regulate licensing of antitubercular drugs, standard-setting and quality monitoring.
Management systems	Need for sophisticated management systems	Need for government financing and stewardship of a national TB programme providing training, drugs, supplies, epidemiological surveillance activities and quality assurance.
Collaborative action	Need for intersectoral action within government.	Collaborative action required between national and local government, between different tiers of the health sector, and between the formal health

	Need for partnership between government and civil society	sector and private providers, NGOs and volunteer treatment supervisors.
Usage characteristics		
Ease of usage	Need for information and education. Need for supervision	Great need for information/education of the public to increase consultation rates and of identified patients to increase compliance with therapy. High level of supervision of treatment supervisors, primary health care staff, and overall TB programme required.
Pre-existing demand	Need for promotion	Currently, it is estimated that less than half of all new TB cases (44%) are detected by DOTS and non-DOTS programmes together (World Health Organization (2004). However, once patients are diagnosed, the demand for treatment is high.
Black-market risk	Need to prevent resale/counterfeiting	Limited risk of resale of antitubercular drugs. Compared to other antibiotics, there is a lower risk of drug counterfeiting, in particular if a national drug supply chain exists.

Source: Bulletin of the World Health Organization | April 2005, 83 (4) Christian, et al. **289**

The therapeutic regimens recommended by WHO have been shown to be highly effective for both preventing and treating TB, but poor adherence to anti-TB medication is a major barrier to its global goal; which is to cure patients once they start treatment (WHO,2003). Diverse factors (**Table 2:2**) have been associated with adherence to TB treatment such as patient characteristics, the relationship between healthcare provider and the patient, the treatment regimen and the health care setting.

Table 2:2: Categories of factors associated with adherence to TB treatment

Category	Factors
Patient-centered factors	Demographic Factors: *Age, Ethnicity, Gender, Education, Marriage Status* Psychosocial factors: *Beliefs, Motivation, Attitude* Patient-prescriber relationship Health literacy Patient knowledge Physical difficulties Tobacco Smoking or alcohol intake Forgetfulness History of good compliance
Therapy-related factors	Route of administration Treatment complexity Duration of the treatment period Medication side effects Degree of behavioural change required Taste of the medication Requirements for drug storage
Healthcare system factors	Lack of accessibility Long waiting time Difficulty in getting prescriptions filled Unhappy clinic visits
Social and economic factors	Inability to take time off work Cost and Income Social support
Disease factors	Disease symptoms Severity of the disease

Source: **Ther Clin Risk Manag. (2008) Feb; 4(1): 269–286.**

Factors that constitute barriers to adherence to TB treatment can further be classified as economic factors, patient related factors (Paixao & Gontijo, 2007) as seen in the state of Parana, Brazil; regimen complexity, supportive relationship between the healthcare provider and the patient, and the pattern of healthcare delivery (WHO, 2003). The ultimate aim of any prescribed medical therapy is to achieve certain positive desired outcomes in the patients concerned. These desired outcomes are part and parcel of the objectives in the management of the diseases or conditions. However, despite all the best intention and efforts on the part of the healthcare professionals, those outcomes might not be achievable if the patients are non-compliant. This shortfall may also have serious and detrimental effects from the perspective of disease management. Hence, therapeutic compliance has been a topic of clinical concern since the 1970s due to the widespread nature of non-compliance with therapy.

Other factors (**Figure 2:5** on interplay of factors that can affect adherence to Medication**)** contributing to persistent patient confusion regarding medication at healthcare facility include underlying health care anxiety; ethnic, cultural and language barriers which to a large extent may be associated with stigma; and information provided in an incomprehensive manner to patients with limited educational backgrounds. These problems are not limited to only low- and middle-income countries, as similar patient misconceptions and barriers between effective patient-health provider communication commonly are encountered within Europe, Canada and the U.S (Hansel, et.al, 2004). Within busy hospital or outpatient clinic practices, health providers often will not have adequate time for more detailed discussions with their patients about TB. This particular problem is notably compounded among many TB clinics within low- and middle-income

countries, where the incidence of TB is generally much higher compared to the U.S. Indeed, many TB clinics within the two counties are typically very busy, and actual provider face-time spent with patients can be quite limited.

2.4 Healthcare givers' factors that contribute to non-adherence to medication

Diverse factors have been associated with non-adherence to TB treatment such as patient characteristics, the relationship between healthcare provider and the patient, the treatment regimen, healthcare workers' preparedness and the health care setting (WHO, 2003). Thus though TB does not discriminate on age, sex or education these factors are thought to influence its spread. Face-to-face discussions with patients about Tb are vital towards achieving an adequate fundamental understanding of TB and removal of confusion about community perceived stigma related to the disease.

Some studies such as those by (Mohamed, et al. 2013) found that existence of human resource gaps and TB staff inadequately prepared to deal with complex issues of TB patients influence the non-adherence. They concluded that reducing travelling and waiting times for TB patients may improve compliance rates. (Bagoes, et al. 2009) also found that more patients take TB treatment according to prescription if they are clearly informed and costs for treatment are reduced. They concluded that non-adherence is a result of developed negative image towards the health care staff, treatment, and quality of medication. It was shown that patients and providers' personal character, abuse of substance, and religion, influence treatment adherence. Female patients adhered most despite cultural practice of seeking permission for treatment from their spouses (Salla, et al., 2007).

Patients' education about medication adherence is crucial. (Sathiakumar *et al.* 2010) reported that non-adherence issues besides smoking (McNagny, et.al 1997; & Shea, et.al 1992) and travel-related concerns were: long treatment period, relieve of symptoms soon after medication initiation, alcohol consumption and lack of adequate drugs were some of other factors that contributed to non-adherence to treatment as patients were not effectively counselled by healthcare workers. (Bagchi, et. al 2010) in their study found that smoking during treatment and travel-related cost factors were significantly associated with non-adherence in the newly-diagnosed patients, while alcohol consumption and short-age of drugs were significant in the residual groups. (Tola, et.al, 2015) study on Tuberculosis Treatment Non-Adherence and Lost to Follow Up among TB Patients found that fear of stigma was another main behavioural factor that was associated with TB treatment non-adherence and lost to follow up.

A study by (Thiam, et.al, 2007) in Senegal showed that intensive strategy in education among healthcare workers can lead to improved patient adherence to medications resulting in improved treatment outcomes. Interventions promoting better health care provider-patient communication about adherence by healthcare workers (Charles P. F 2005) influence positively on patient adherence to medication and are all-important in ensuring treatment compliance and hence reduction in default to medication. A study in Java (Bagoes, et.al, 2009) found that more patients take TB treatment according to prescription if they are clearly informed by the healthcare workers. Unfortunately, staff in very busy clinics cannot effectively educate patients as they have no quality time with them.

It was observed that healthcare workers in the Tb clinics always *applied* hard skills and rarely soft skills when managing Tb patients probably because of their training orientation

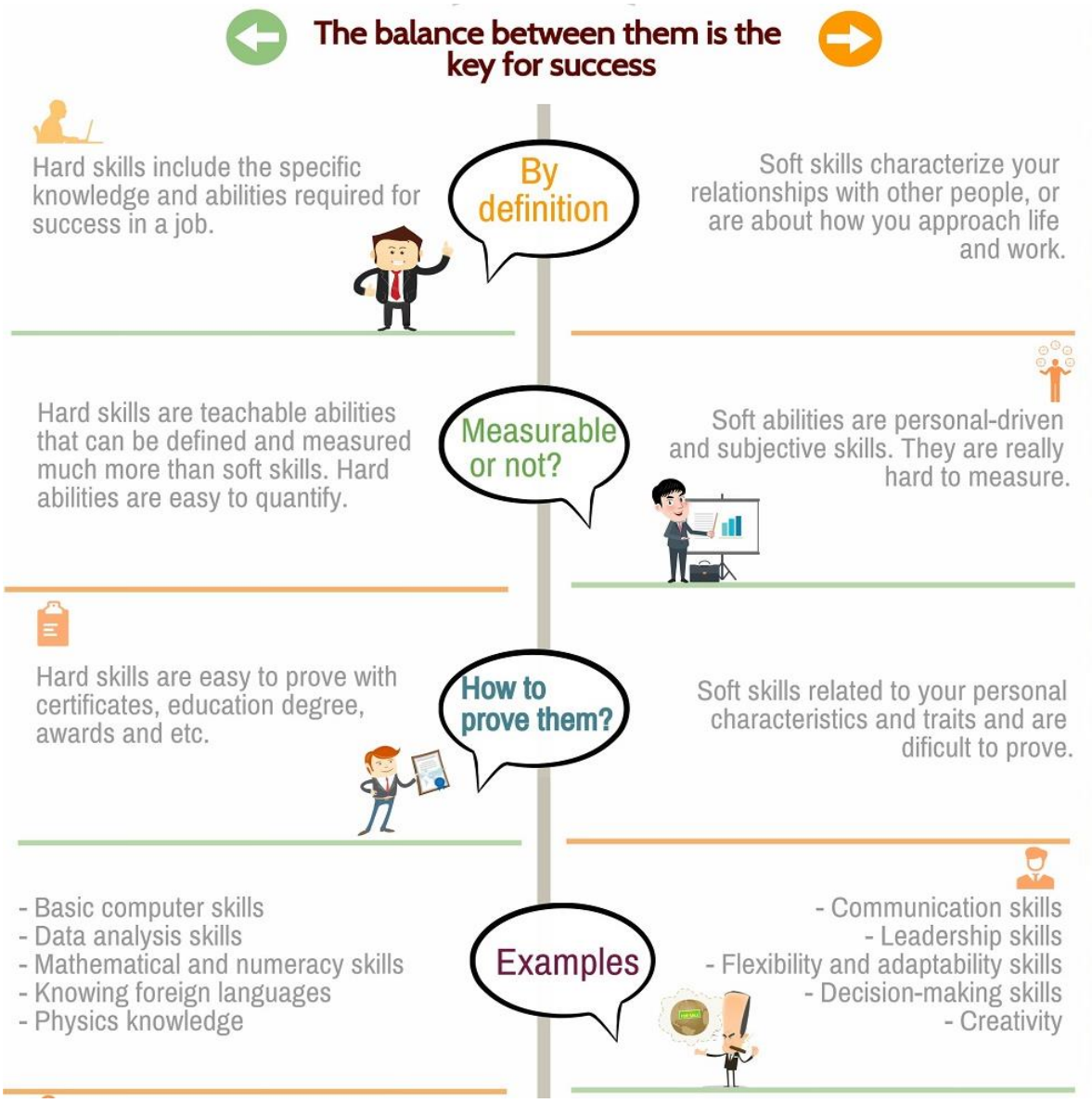
compounded with that of their trainers whose training mode themselves was that of traditional method which emphasizes rote learning and not skills acquisition. Consequently, soft skills such as effective healthcare worker-patient communication, human touch skills, a positive flexible attitude and common sense which are very critical in patient treatment and management and which do not depend on acquired knowledge and which are not in the training curricula were rarely applied. See **Figure 2:1** on summary of comparison between hard and soft skills.

2.4.1 Comparison between Hard & Soft Skills

Because of their training orientation and the trainers' inclination on traditional method of training, healthcare workers always *focus on* hard skills, or skills directly related to acquisition of knowledge and a professional certificate at the expense of soft skills, which do not depend on acquired knowledge.

Because they are not in the curricula "Soft skills," such as common sense, effective healthcare worker-patient communication, human touch skills and a positive flexible attitude and which are very critical in patient management and which do not depend on acquired knowledge are never taught in the training institutions.

2.4.1.1 Hard Skills vs Soft Skills



Source: http://www.businessphrases.net/ **2018**

Figure 2:1: Comparison between Hard & Soft Skills

2.5 Training Interventions of Healthcare Workers

It was generally noted that trained healthcare workers manning health facilities were inadequate in numbers**,** which led to lack of staff quality time with their patients, thus causing staff burn out due to few staff against a large number of patients attending Tb clinics. Nurses and clinical officers Training Curricula were found to be deficient in adequate **content** on Tb disease, had no emphasis on patient education regarding medication adherence and no emphasis on soft skills on patient treatment and management. It was also noted that there were **no scheduled** Continuing Professional Development/Medical Education (**CMEs**) sessions leading to irregular and unscheduled **Tb updates** for health facility staff. A study by (Hansel, et. Al, 2004) observed that within busy hospital or outpatient clinic practices, health providers often will not have adequate quality time for more detailed discussions with their patients about TB treatment and care. In many training institutions, students are not receiving the kind of one-to-one attention, as used to be in the past; what is needed right now is a change on those who teach (Abrahamson, 1996) who must emphasize on skills acquisition in patient management during and after undergraduate training, since knowledge earlier gained maybe outdated by the time the student graduates. This calls for update conferences and workshops to re-train and update healthcare professionals, at the same time should have regularly revised, and updated curricula in line with the changing medical healthcare landscape. The revision of the curriculum is needed to address the gaps in the management of TB patients.

2.6 The gap in the management of TB

There is a discrepancy between present management of the TB success rates and the expected achievement. This gap has been attributed partly to barriers that healthcare providers face in implementing best practices and the attitudes of the patients. But first, a look at the variables of the study.

2.6.1 Variables of the Study

In this study, the variables under consideration are as indicated in **Figure 2:2** below. In simple terms, a variable represents a measurable attribute that changes or varies across the study whether comparing results between multiple groups, multiple people or even when using a single person in a study conducted over time. These variables can be dependent, independent or intervening. The dependent variables are the factors that this study seeks to explore particularly on reasons why patients default from taking medication. The independent variables are those believed to affect the dependent variables, such as gender, age, marital status, occupation, educational level and distance from health facilities. Intervening variables link the independent and dependent variables, but may not directly be observable during the study such as patients' habits, socio-economic status and cultural factors.

2.6.1.1 Relationship of the variables of the Study

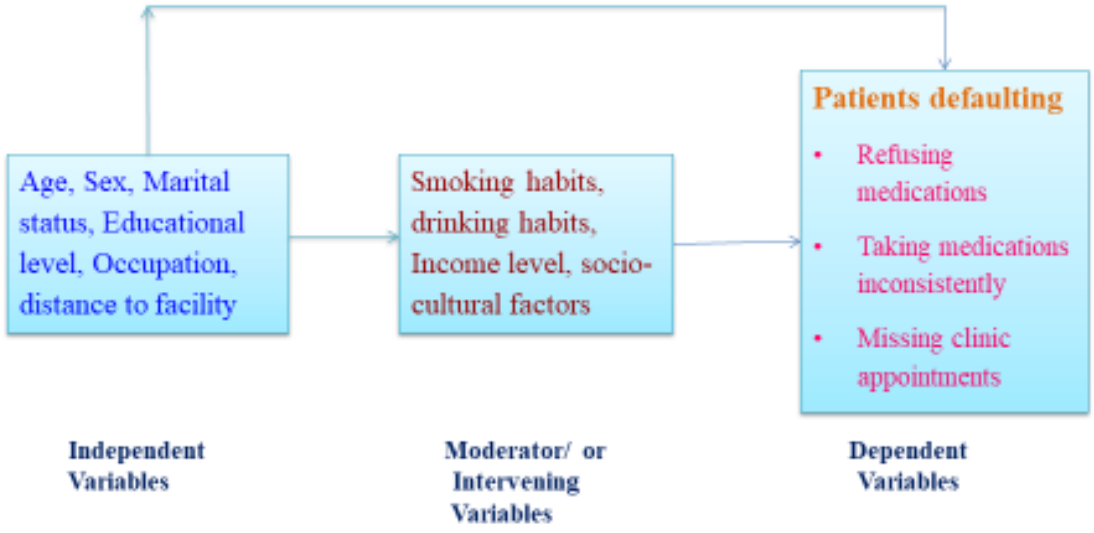


Figure 2.2: Variables of the Study

In the study, data were collected from respondents using interviewer-administered interview schedules, structured questionnaires and semi-structured interview schedules and key informant interviews/focus group discussions (FGD).

Data on variables such as, gender, age, marital status, educational level, occupation, socio-economic status, alcohol intake, smoking, knowledge about TB, association of length of treatment and non-adherence, distance to health facility, means of transport to health facility, drug side effects, and awareness that Tb is curable among others was collected from Tb defaulters.

From healthcare workers, data on the cadre, whether the staff get any TB updates on tuberculosis disease management, and if so, the last time it happened, whether the staff had always performed tuberculosis work after qualification and posting to TB clinic.

From programme managers data were obtained following key informant interviews/focus group discussions (FGD) regarding their views on what they thought were possible reasons for default by patients from medication and their suggested interventions.

2.6.2 Expected Medical Compliance Flow

Figure 2.3 depicts an ideal situation of what should be but from the study findings, there were noted gaps which need to be addressed in order to meet these expectations. These gaps will be highlighted in the recommendations. Patients' poor adherence to treatment provides an additional explanation for the incongruity between recommended treatment and actual treatment outcomes (See **Figure 2:3** below on expected Medical Compliance Flow and **Figure 2:4** on interplay of factors that can affect adherence to Medication).

2.6.2.1 Expected Medical Compliance Flow

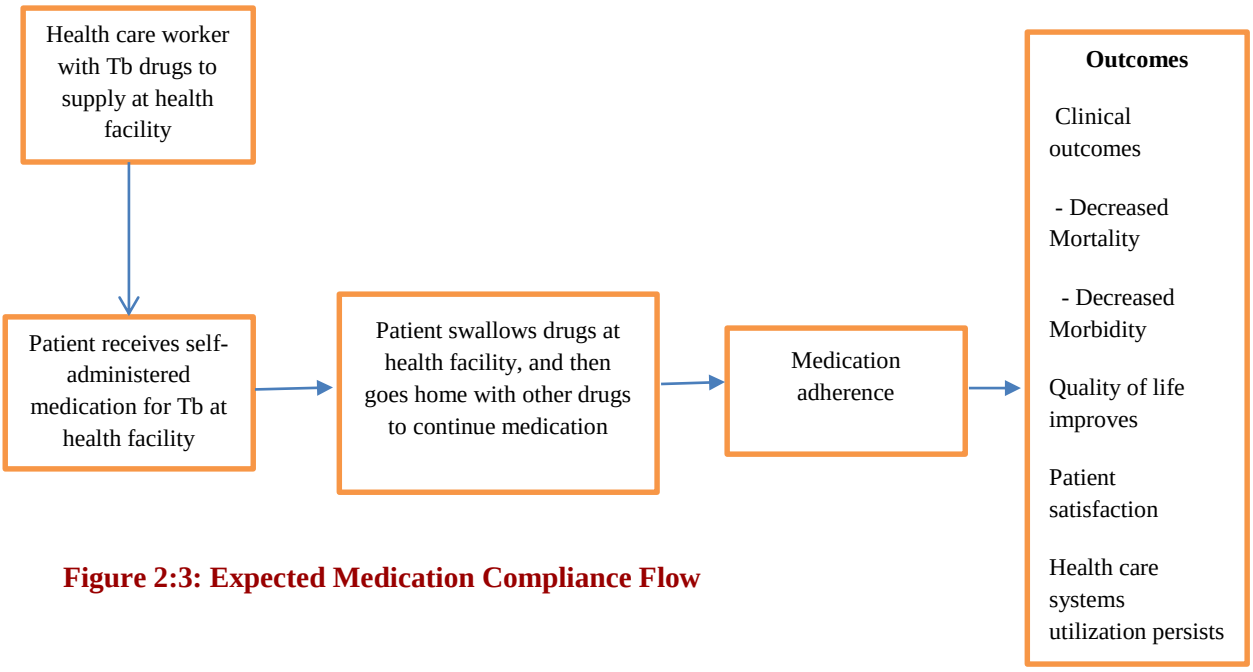


Figure 2:3: Expected Medication Compliance Flow

Poor medication adherence is relatively common. There is a gap in what is expected from the patient and what actually takes place (outcome i.e. defaulting). A **gap analysis** is a technique used to assess the differences between the expected drug intake and actual medication compliance. A variety of factors, more so quality of care, may impact on patient adherence to medication, and thus efforts to improve medication adherence in general are more effective when they address multiple dimensions of adherence behaviours rather than single-target interventions (Roter, et.al, 1998); Charles P. F (2005).

Quality of care plays an important role in tuberculosis control. This is because it helps in influencing timely diagnosis, treatment adherence, and treatment completion so much so that it is expected that at all TB clinics patients are supposed to be given specific information about TB symptoms, diagnosis, treatment, and follow up. However, in most government health facility clinics, it is not unusual to find that patients do not receive adequate information about TB from the healthcare workers as evidenced by the apparent

number who appeared not informed about the possibility of transmitting TB to others, how to stop transmitting TB, the side effects of TB drugs, and signs of side effects making them prone to abandoning medication and thus becoming non-adherent. This limited information among the patients could explain the poor outcomes such as the high default rates as found in the study. Despite good intention by healthcare workers to inform their patients and also to try to motivate them on the importance of behavioural change in order to improve their health, there is evidence that, in practice and because of their own individual inadequate behavioural skills, health care workers are constrained by time and patients' long queues to have adequate time during clinic days, thus making them give limited information. This is clearly not acceptable. As a consequence therefore, education or counselling interventions may not be realized leading to a gap in patient care. This gap leads to poor quality of service provision and improper management of the patients for which the public may interpret to mean lack of healthcare workers' competence on patients' Tb care. This state of affairs makes it easy for patients to become non-adherent to medication. Non-adherence to tuberculosis therapy can lead to drug resistance, prolonged infectiousness, and death; therefore, understanding what causes treatment default is important. This study aimed at understand why patients with drug-susceptible tuberculosis default from treatment the purpose of which is to narrow or eliminate the gap noted regarding expected medication adherence.

Several strategies promoting TB medication adherence have been investigated. These include interventions promoting better health care provider-patient communication about adherence; developing or improving existing adherence support services that are offered by a multidisciplinary team (nurse, clinical officer, physician, pharmacy, patient et cetera)

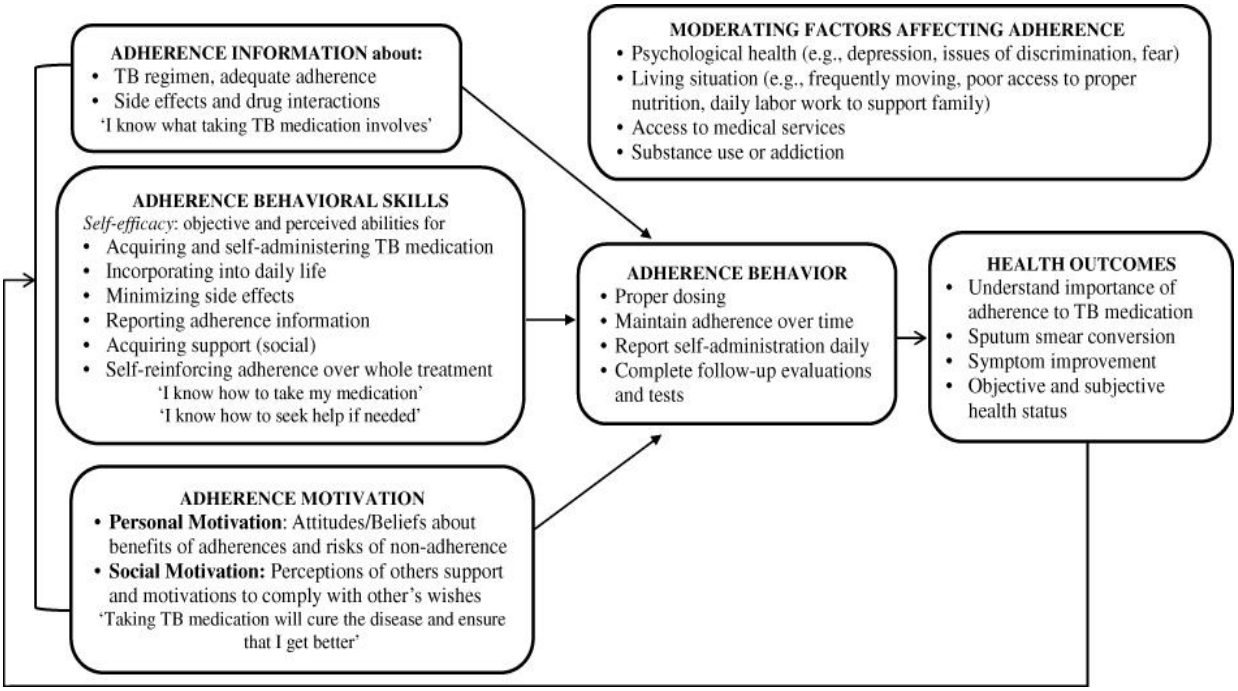
(Charles P. F 2005); directly observed therapy (involving a health care worker, community care worker or family member directly monitoring patients as they swallow their TB medication) (Lutge, *et al.*, 2012); staff motivation and supervision (Lutge, *et al.*,2012); education and counselling (M'Imunya, et.al, 2012); reminder systems and late patient appointment tracers to help patients keep appointments (Liu, et.al, 2008); incentives and enablers (Lutge, et al., 2012); contracts or written or verbal agreements to return for an appointment or course of treatment; social support provided by community health care workers (Bosch-Capblanch, et.al, 2007); social support offered to family members to assist the patient in being adherent, and social support provided by other patients and support groups (M'Imunya, et.al, 2012). These interventions or complex combinations of the interventions may need to be considered for the purpose of promoting TB medication adherence.

2.6.3 Interplay of Factors that can affect adherence to Medication

From literature it was found that on an individual level, interplay of factors **(Figure 2:4)** is involved in the decision-making about medication intake.

Factors that tend to influence adherence to TB treatment positively were beliefs in the curability of TB, and support from families and health professionals.

2.6.3.1 Interplay of Factors affecting adherence to Medication



Source: (Adapted and Based from Social Psychological Foundations of Health and Illness (p. 86), by W. A. Fisher, J. D. Fisher, and J. Harman, 2003).

Figure 2:4: Interplay of factors that can affect adherence to Medication

Barriers to treatment adherence were experiencing side effects, pill burden, economic constraints, lack of food, stigma with lack of disclosure, and lack of adequate/poor communication with health professionals.

2.7 Theoretical Framework /Conceptual Frameworks of the study

The terms theoretical framework and conceptual framework are often generally used interchangeably to mean the same thing. Although they are both used to understand a research problem and guide the development, collection, and analysis of research data, it is important to understand the difference between the two.

Research studies rely upon a theoretical or conceptual framework to guide the researcher in several ways throughout the study, from determining if there is satisfactory demonstration of the relevance and need for the research to establishing a persuasive line of reasoning and academic rigor in the development of the design and analysis.

2.7.1 Theoretical framework

Theoretical framework provides a general or broader set of ideas within which a study belongs and is based on existing theory/theories in the literature, which has been tested and validated by other scholars. It is in the form of a model that pivots a study, with its exponents and the results of their studies. It is well developed, designed and accepted. It offers a focal point for approaching the unknown research in a specific field of inquiry. It consists of theories that seem interrelated with their propositions deduced.

2.7.2 Conceptual Framework

Conceptual Framework refers to specific or narrower ideas a researcher utilizes in his/her study and is based on the concepts that are the main variables in a study. It is a researcher's own constructed model that s/he uses to explain the relationship that exists between the main variables in his/her study. It can also be an adaptation of a model in an existing theory that a researcher adapts to suit his/her research purpose. Its design is not accepted, but it is a proposal of the researcher's answer to the research problem s/he has defined. It is the framework that shows logically how the research inquiry is to be undertaken. It consists of concepts interconnected to explain the relationships between them and how the researcher attempts to answer the research problem defined.

2.7.2.1 Theoretical Framework of the study

In this study, the theoretical framework used is that of tuberculosis management based on Health Policy and Planning model (**Figure 2:4**) on the work of (Pawson & Tilley 1997) based on the presentation in their book, *Realistic Evaluation.*

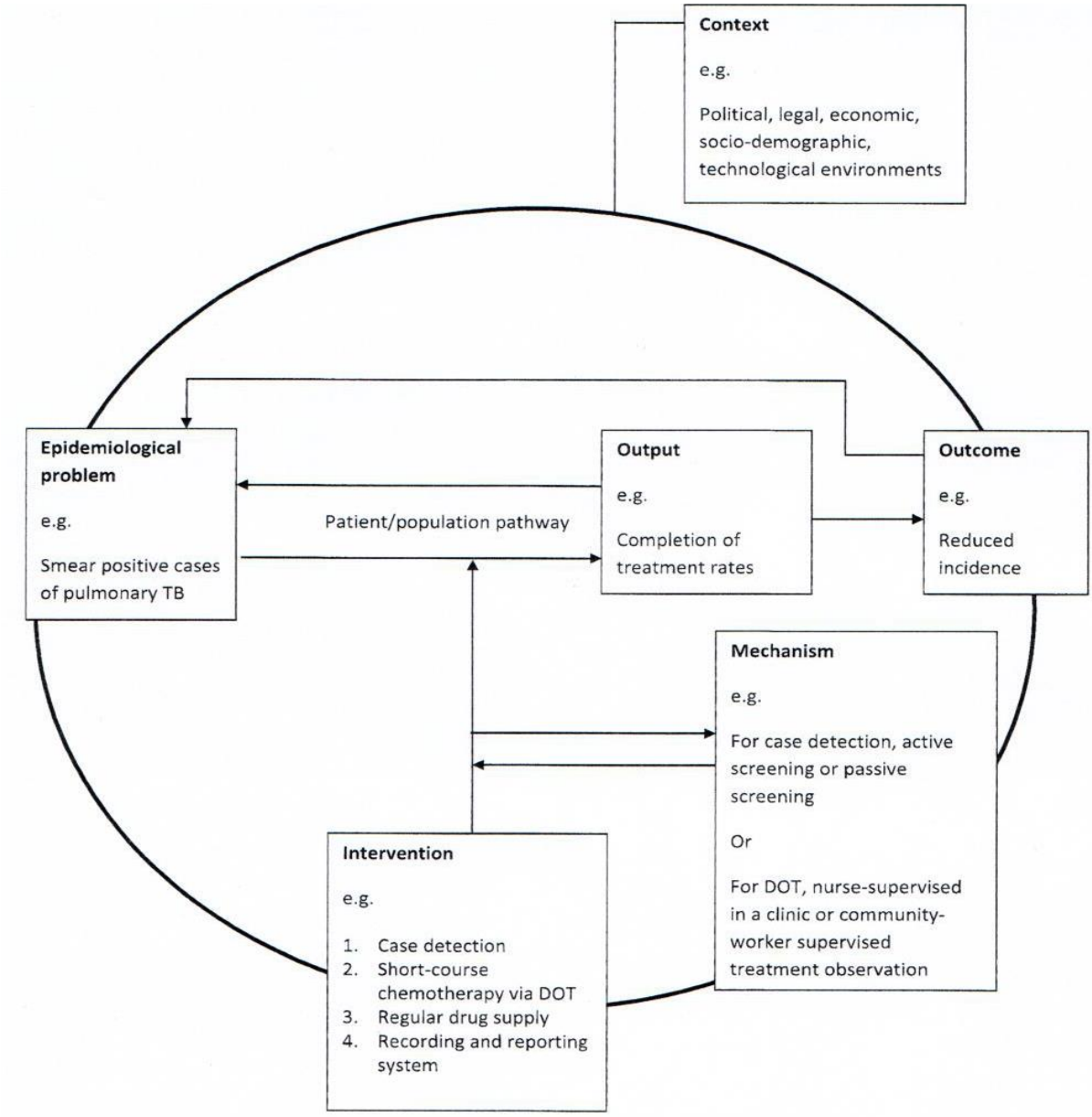
On the basis of this model and, during the study, an interview schedule was used based on further review of literature on adherence which indicated the importance of factors such as regimen and health service related factors (Claxton, Cramer, & Pierce, 2001) from the patients (TB defaulters). For health workers, a structured questionnaire and a semi-structured interview schedule were used which explored their experiences with adherence to TB with a focus on barriers and facilitators to adherence. Other questions were also posed, to the healthcare workers such as their current cadre, any special training on TB management, latest TB management updates, whether the TB clinic is integrated with other clinics and what they would do to try and assist patients with adherence, and finally what they would recommend as possible interventions that would promote adherence to anti TB treatment. However, whilst the theoretical framework outlined above and illustrated in **Figure 2:4** addresses many of the more obvious factors that inform the delivery of services in programmes, it does not explicitly address two issues of interest that are important in a comparative analysis of communicable disease control programmes and health systems, namely health system functions and integration.

While adopting the (Pawson & Tilley 1997) model, the use of the data collection instruments was based on a theoretical framework for health related behaviours, in which the following six major categories were thought to be essential: *accessibility of health care; evaluation of health care; perception of symptoms and threat of disease; social network*

characteristics; knowledge about disease; demographic characteristics (Ingersoll & Cohen, 2008).

This theoretical framework as stated earlier, builds upon: (a) the work Pawson and Tilley (1997) presented in their book, *Realistic Evaluation*; (b) other earlier work extending Pawson and Tilley's work to encompass communicable disease control programmes and health systems through the Systemic Rapid Assessment (SYSRA) of health interventions (Atun et al. 2004; & Coker et al. 2004); and (c) other further development of an analytical framework to conduct case studies on the integration of HIV/AIDS and TB control programmes and general health systems. (Pawson & Tilley 1997) attempted to go beyond the traditional research question often asked of programmes; that of asking simply whether a programme works or not, and instead attempted to develop a theoretical framework that provided an understanding of whether a programme can work, for whom and in what circumstances.

2.7.2.1.1 Pawson and Tilley (1997) Theoretical Model.



Source: Pawson and Tilley (1997) model based on their book - *Realistic Evaluation*

Figure 2:5: Theoretical Framework for TB management

Pawson and Tilley suggested several elements to evaluate a programme whilst acknowledging its complexity and the environment within which it sits, including:

(i) *context*; (ii) *epidemiological problem*; (iii) *intervention*; (iv) *mechanism*; (v) *outputs*; and (vi) *outcomes*.

First, **context** denotes the political, legislative, social, economic and technological environments within which communicable disease control programmes sit. This environment may be global, regional, national or local. These contextual elements may also be drivers, i.e., forces that operate to provide the initiative, resources and energy for the control of communicable diseases, in this case, Tb as the main disease. Together, these components are part of the enabling or constraining environments, the foundation upon which a programme's success or failure ultimately depends.

Secondly, the **epidemiological problem** refers to infection levels and various disease characteristics e.g., this might relate to upstream risk factors such as the emergence of Drug-resistant strains of TB or HIV, or clusters of diseases in congregate settings such as prisons and other institutions.

The third component is the **intervention** intended to serve public health. For example, in TB control this could be the DOTS strategy and its respective components. For HIV, this might be the prevention of mother-to-child transmission (PMTCT) through the four-pronged approach, including the use of antiretroviral therapy (ART). Many interventions are recommended through clinical and policy guidelines and are evidence-based, thus lending themselves to scrutiny against gold standards.

The fourth element is the **mechanism** by which interventions are delivered. It is the mechanisms within a programme, required to function effectively, that are of critical interest in this comparative analysis for they make interventions operational. Interventions are often the focus of much evidence, through randomized controlled trials (RCTs) for example, yet the mechanisms by which these interventions are provided usually rest on a weaker evidence base. For example, a regular supply of quality-assured anti-TB drugs (the

intervention) is a prerequisite for an effective control programme, yet questions remain regarding how this can best be achieved (the mechanism).

The fifth element of the theoretical framework relates to **outputs**. Outputs are public health concepts that can be measured or determined and include equity, acceptability, efficiency and effectiveness of the control programmes as a result of interventions. For Tb, this would imply successful completion of treatment. In a successful and sustainable programme, these outputs ideally result in **outcomes**, such as reduced incidence of disease (Tb) or decreased mortality.

The model described above has helped the study to bring out gaps that need to be addressed in order to minimize factors associated with non-adherence to medication in TB treatment and management.

2.7.3 Conceptual Framework of the Study

In this study the variables that are thought to be considered in addressing the lack of congruence noted with respect to healthcare workers poor practices regarding inadequate observed poor treatment and management of TB cases and their training in the training institutions. In this respect, four critical areas of concern and their relationship are addressed, namely: Training Curricula, Comprehensive Training, Tb Treatment Practice and Evaluation of Practice.

The ultimate aim of appropriate training of healthcare workers /clinicians, as noted earlier, is to produce all round workers who can adapt quickly to new modes of patient management and who should have appropriate skills to interact with their patients and colleagues in the continuum of patient care with respect to disease treatment, management,

health education and health promotion. This is with respect also to the teaching of the community and the public in the awareness of curative, management, disease prevention, health promotion and rehabilitative endeavors regarding TB disease in their day-to-day survival. This emphasises the efforts geared to sustaining good health and maximizing good health. Thus, good health goes beyond just existing/ surviving to thriving.

The training of healthcare workers should be anchored on curricula that emphasize hard and soft skills, strict adherence/compliance to medication, risks of non-adherence to medication, drugs side effects, stigma reduction and general avoidance of default from health care. Emphasis in the curricula must therefore be accompanied by teaching strict medication adherence in Medical Schools and Colleges as well as giving Health Education to the community. Failure to do this results in shortcomings in the healthcare worker preparedness in disease treatment and management, which will be glaringly apparent in the treatment clinics.

Kenya Medical Training College (KMTC) training curricula (2013; 2014, 2014b), used in the training of clinicians (nurses and clinical officers) in Kenya, are based on traditional mode of health worker training, i.e. the lecture method which has been the main instructional method in traditional education. This method has always adopted the subject-centred curriculum for many years and was built upon certain subjects that are considered essential and for which specific time is allocated to each in form of lectures. In this mode, the students are taught in large groups first the basic sciences and then the clinical sciences. This method of teaching assumes that extensive factual knowledge is essential for the practice of health professionals including medicine, and that this knowledge should precede the stimulus situation (the health problem or situation). In this large groups and

lectures method approach, it becomes evident that medical students are not receiving the kind of one-to-one attention (which can impart skills acquisition) that was once the hallmark of medical education, neither during the teaching laboratories of the basic science years nor during the clerkships in the clinical years. This in itself does not offer appropriate skills acquisition, let alone effective mentorship. There is therefore a dire need to train and equip healthcare providers with appropriate skills to treat, counsel and manage TB patients. Needless to say, the trainers themselves who were trained using traditional method, need re-training on skills acquisition using appropriate curricula, they can then produce competent healthcare workers to man the healthcare facilities. Training emphasis must include not only the hard skills but most critical and dismally lacking the soft skills. In all health facilities, healthcare workers in the Tb clinics always *applied* hard skills and rarely soft skills when treating and managing Tb patients probably because of their training orientation and also that of their trainers whose training mode was that of traditional method which emphasizes rote learning and not skills acquisition. Consequently, soft skills such as effective healthcare worker-patient communication, human touch skills, a positive flexible attitude and common sense which are very critical in patient management and which do not depend on acquired knowledge and which are not in the training curricula are rarely applied.

The conceptual framework adopted here lays emphasis on the four critical areas of concern and their relationship as alluded to earlier, namely: Training Curricula, Comprehensive Training, Tb Treatment Practice and Evaluation of Practice. In this framework, (**Figure 2:5)**, the different variables for detailed consideration included: the **training curricula** for nurses and clinical officers which are expected to capture in detail: *Comprehensive Tb*

Treatment, Phase 1 and 2 of treatment, detailed content on Tb disease in terms of causation, diagnosis, management and control, competency on soft skills application, skills on effective healthcare worker-patient communication and holistic health education and health promotion not only on Tb but also on other aspects of patient care. Curricula should also address medication adherence, stigma and MDR-Tb. In the actual training, the process must emphasize: Comprehensive Treatment phase 1and 2, emphasis on medication adherence, stigma reduction, consequences of medication non-adherence, MDR-Tb and Implications, emphasis on health education and health promotion and time management during patient care; on Tb treatment practices emphasis again must include Comprehensive Treatment phase 1 and 2, emphasis on medication adherence, stigma reduction, case definition of multi-drug resistance and how to avoid it and emphasis on healthcare worker-patient effective communication and quality time for interaction together with emphasis on aspects of relevant health education and health promotion. In whatever area of focus, there must be feedback on evaluation of practice to implementers of the curricula for further necessary adjustments in the training, such as justification for Seminars, updates on Continuing Professional Development/Continuing Medical Education (CMEs) and Conferences.

It is believed that if there is proper and respectful interaction between healthcare giver and the patient and if good health education and health promotion are emphasized, patients would not default in their treatment and thus would adhere until the duration of treatment is over.

The relationship between the different variables in this context and as highlighted above are as depicted below (**Figure 2:5).**

2.7.3.1 Conceptual Framework Study variables

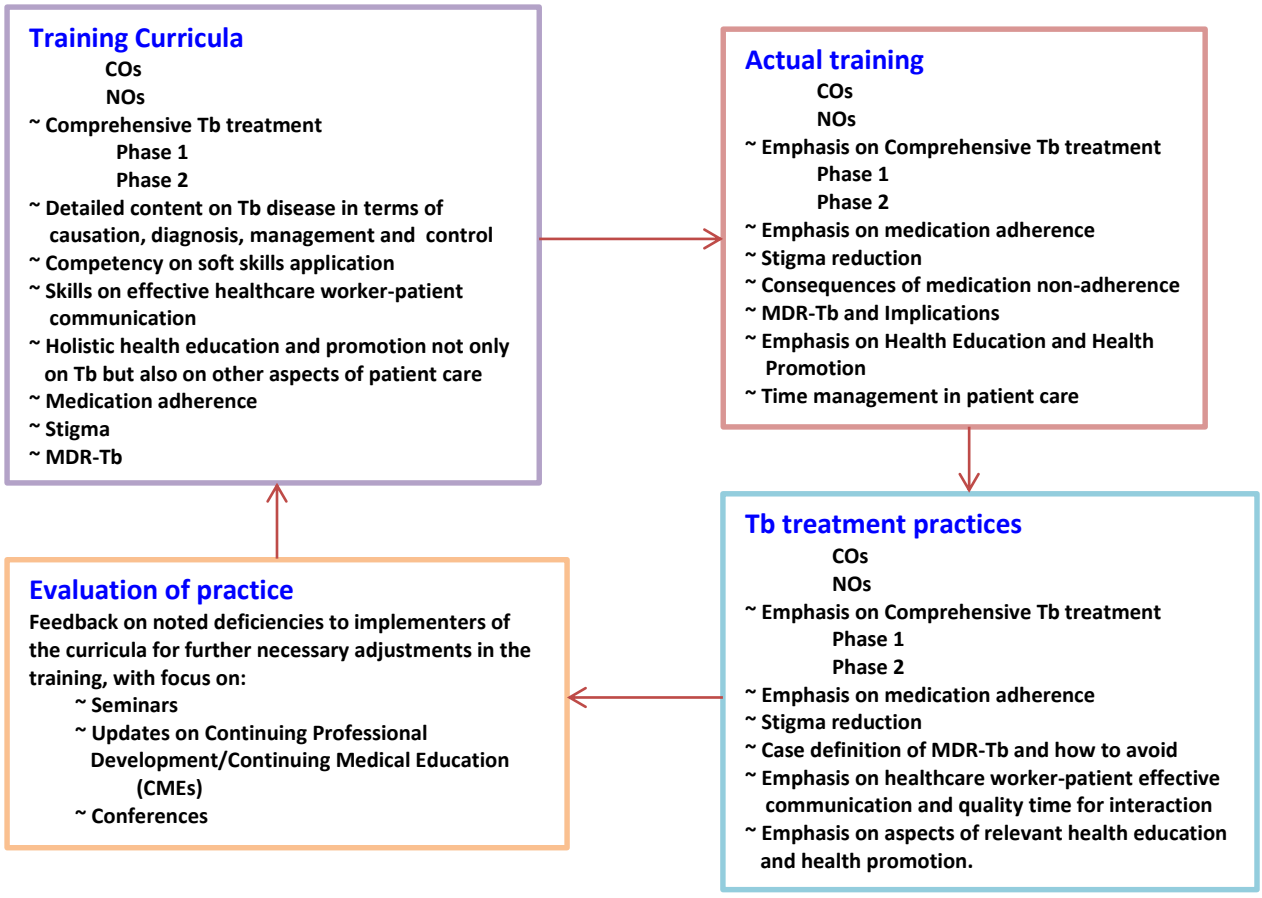


Figure 2:6: Conceptual framework on proposed areas of focus in the training of healthcare workers.

Therefore, in order to treat Tb effectively and resolve the problem of non-adherence, which may have arisen from insufficient education on medication adherence due to poor healthcare worker-patient ineffective communication, a lot of emphasis must be placed on health education and health promotion. Thus to reduce the chances of developing Tb

treatment resistant bacteria, curricula have to have comprehensive treatment and management of disease taught. This will ensure that Multi-Drug Resistant (MDR) Tb will not arise as issues of medication adherence will have been tackled long before they arise. Emphasis in the curricula should therefore be accompanied by constant teaching of adherence in health institutions (Medical Schools and Colleges) as well as giving Health Education and Health Promotion to the community.

Thus, to avoid MDR Tb resurgence, comprehensive training in Medical Schools and Colleges is a must and if necessary the training should be prolonged with emphasis on: medication adherence, drugs' side effects, stigma reduction and persistent health education and health promotion the purpose of which is to mitigate against emergence multi-drug resistant TB.

As noted earlier, TB is a global disease, found in every country in the world and is the leading infectious cause of death worldwide. It is responsible for poor socio-economic status and rampant poverty and illness that affects families and communities in almost every country in the world. There is an emerging and disturbing issue about TB disease and infection which is the growing resistance of TB to available drugs meaning the disease is becoming more deadly and difficult to treat yet ironically, this disease is preventable and treatable. TB is treatable and preventable with effective chemotherapy. In fact with proper TB treatment, someone with TB will very quickly not be infectious and so can no longer spread the disease to others. TB drug treatment for the prevention of TB can reduce the risk of a first episode of active TB occurring in people either exposed to infection, or with latent TB. It can also reduce the risk of a recurrent TB episode. However, most people may be ignorant about this and therefore need to be educated.

TB prevention consists of two main parts. The first part of TB prevention is to stop the transmission of TB from one adult to another which can be done firstly through identifying people with active TB, and then getting them cured through the provision of effective drug treatment. With effective treatment, someone with TB will very quickly not be infectious and so can no longer spread the disease to others. The second main part of TB prevention is to prevent people with latent TB from developing active and infectious TB disease. Anything which increases the number of infectious people, such as the presence of TB and HIV infection together, or which increases the number of people infected by each infectious person, such as ineffective treatment because of drug resistant TB which can arise from non-adherence to treatment, can reduce the overall effect of the main TB prevention efforts. Consequently, it is then more likely that globally the number of people developing active TB will increase rather than decrease.

Tb prevention and reduction at household level in our setting can present a big challenge because there is a wide variation in types of houses patients live in, considering the WHO's recommendations which proposes certain actions that should be taken such as:

- Houses should be adequately ventilated;
- Anyone who coughs should be educated on cough etiquette and respiratory hygiene, and should follow such practice at all times; and
- While smear positive, TB patients should:
    - Spend as much time as possible outdoors;
    - If possible, sleep alone in a separate, adequately ventilated room;
    - Spend as little time as possible on public transport;

- Spend as little time as possible in places where large numbers of people congregate or gather together.

Cough etiquette and respiratory hygiene means covering one's nose and mouth when coughing or sneezing. This can be done with a tissue, or if the person does not have a tissue he/she can cough or sneeze into their upper sleeve or elbow, but they should not cough or sneeze into their hands. The tissue should then be safely disposed of.

TB education is necessary not only for people with TB but also the general public who need to know basic information about TB for a number of reasons, among them the reduction of stigma that is still associated with TB. People also need to have adequate knowledge on how to take their TB drugs properly and also how to make sure that they do not pass TB on to other people. Educating people about TB is also an important part of TB prevention, as well as ensuring that people who need TB treatment receive it as soon as possible.

Healthcare workers' emphasis on TB education is anchored on the fact that the major component of the prevention of TB is to stop the spread of the bacteria from one adult to another. This is done by firstly finding the adults who have TB, then providing them with effective treatment so that they are no longer infectious and consequently recover from being sick. Sometimes it is generally believed that education about TB only needs to involve people who already have TB. But nothing is further from the truth. As a matter of fact, there is a need to educate not only the general public about TB but also all the healthcare workers. This is firstly to ensure that people know how TB is transmitted and

indeed not transmitted, and to reduce the stigma surrounding TB. It can also help to ensure that people with TB come forward for testing and treatment as soon as possible.

It should be noted that drug treatment quickly makes a TB patient un-infectious, and most household contacts who do become infected, will have already become infected before the diagnosis of TB has been made hence no need to advocate for patient isolation. In any case, people may still need to go into a health care facility because there are complications arising from their condition, or their treatment. What is important is that healthcare workers, who provide care for patients with TB, must follow infection control procedures to ensure that TB infection is not passed from one person to another and must therefore as a matter of policy insist that infection control guidance must not only be written but also implemented.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section addresses the location of study, study population, research design, research variables, inclusion and exclusion criteria, sampling procedures, research instruments, validity and reliability of research instruments, data collection procedures, data analysis and ethical issues and their considerations.

3.2 Location of the study

The study was conducted in urban and rural areas of Kericho and Nakuru Counties ***(Appendix I)*** in Rift Valley Region ***(Appendix E)***. Rift Valley Region is one of Kenya's eight (8) regions, covering an area of 182,505.1 square kilometres (45,098,000 acres; 70,465.6 sq. mi) and according to the 2009 Census had a population of 10,006,805, with Kericho County having 752,396 people and Nakuru County with 1,603,325. The combined population of the two counties out of 14 counties in the region gives a population of 2,355,721, which translates to 24% (almost a quarter, **25%**, of the region's population in the 2 counties alone) of the region's population. The total population of the region, **10,006,805** people, makes it the largest and most populous region in the country, which accounts for over 26% of the country's total population ***(Appendix F)***. In addition, according to 2009 census the two counties had a higher Tuberculosis prevalence that exceeded the National average **Tb prevalence** of **223 per 100,000** population, with Kericho having **248** and Nakuru **237** per 100,000 population (Kenya Ministry of Health**:** Kenya Tuberculosis prevalence per county November 24, 2015). The Kenya NTLD-P Annual Report 2013 showed that 1846 patients were non-adherent to TB treatment out of

which 6% were from the two counties alone, and this raises some concern in terms of a relatively high prevalence, compared to other counties, thus necessitating this study.

The two counties of Kericho and Nakuru out of the 14 counties in Rift Valley region as noted earlier, together host about a quarter, 25%, of the region's population with the society having people of different cultures from many different counties of the country, mostly living in congregate settings especially in large commercial farms, but who co-exist amicably together. The relatively high Tuberculosis prevalence and the cosmopolitan nature of the counties' populations raises some concern hence necessitating this study.

Kericho County is one of the 47 counties in Kenya with a population of 752,396 ***(Appendix F)*** and an area of 2,111 km². It borders Uasin Gishu County to the North, Baringo County to North East, Nandi County to the North West, Nakuru County to the East, and Bomet County to the South. It also borders Nyamira to the South West, Kisii County to the South and south West and Nyando District to the West ***(Appendix G)***. According to 2009 census, Kericho County had a population of 752,396 people and Tb prevalence of **248 per 100,000** compared with the National average **Tb prevalence** of **223 per 100,000** population (Kenya Ministry of Health**:** Kenya Tuberculosis prevalence per county November 24, 2015). The population is cosmopolitan with largest tea plantation in the country that has large congregate setting with people of low socio-economic status around the tea estates living in overcrowded environments, hence the intention to understand the various factors associated with TB treatment default.

Nakuru County is one of the largest counties in Kenya with a population of 1,603,325 people ***(Appendix F)***, living on some 7,495 square kilometres in the central part of the country. It is located in the South Eastern part of the former Rift Valley Province, bordering

seven counties with Baringo to the north, Laikipia to the north east, Nyandarua to the east, Kajiado to the south, Narok to the south west with Bomet and Kericho to the west***(Appendix H)***. According to 2009 census, Nakuru County had Tb prevalence of **237 per 100,000** compared with the National average **Tb prevalence** of **223 per 100,000** population (Kenya Ministry of Health**:** Kenya Tuberculosis prevalence per county November 24, 2015). The county's population is also cosmopolitan with very diverse population of residents of low socio-economic status living in large congregate settings around Kwa Ronda estates in Nakuru West near urban area and around the flower farms in Naivasha who live in overcrowded environments, and has two lakes-Nakuru and Naivasha-both Tourist attractions hence again the intention to understand the various factors associated with TB treatment default.

3.3 Study Population

The target population were TB patients registered in the TB registers in the two counties for the period July – December, 2015 who totalled 2641 (849 from Kericho and 1792 from Nakuru). Study period was within the past six months at the commencement date of the study in January 2016. Identified smear positive non-adherent TB patients (112) within the last six months of study were purposely sampled and included in the study with consideration of characteristics such as age, sex, marital status, level of education, financial status and occupation. Healthcare workers (46) from 34 purposely identified health facilities from where Tb defaulters were traced together with a total of 15 (7 from Kericho and 8 from Nakuru) County Tuberculosis and Leprosy Coordinators (CTLCs) and sub

County Tuberculosis and Leprosy Coordinators (SCTLCs) from the two counties of Kericho and Nakuru were included in the study.

3.4 Research Design

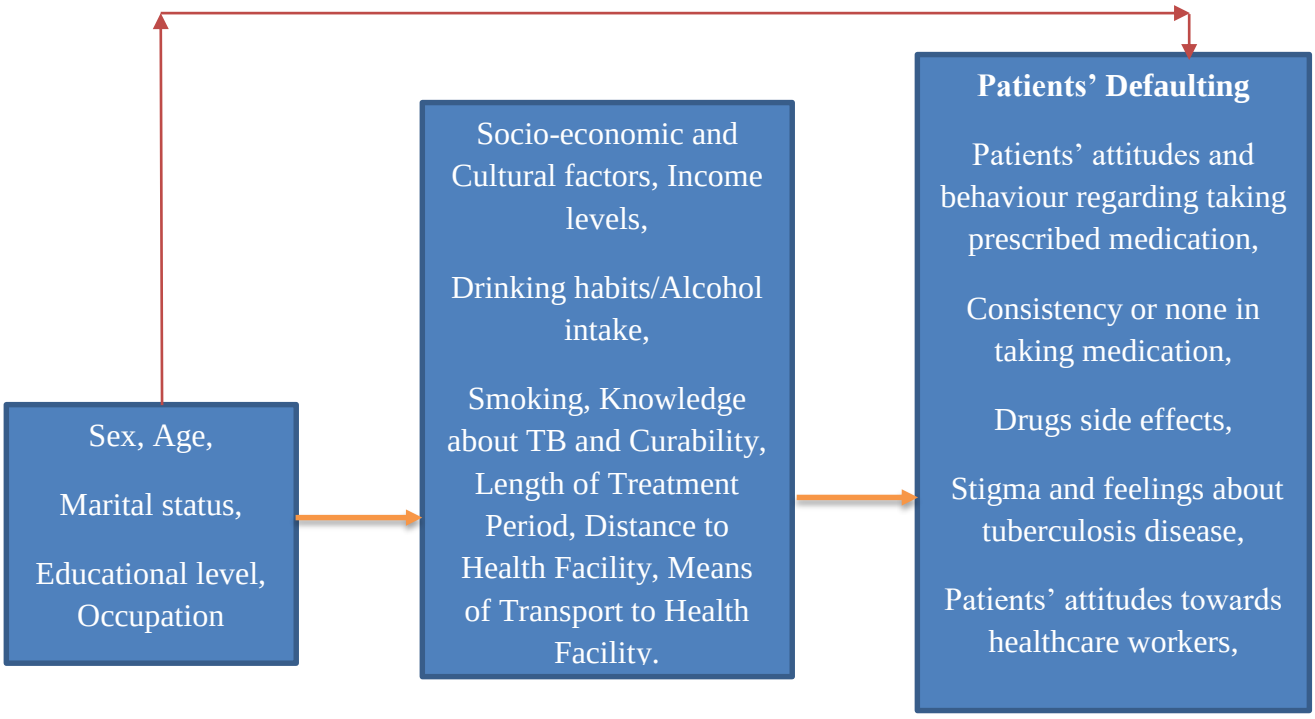
A qualitative research design was adopted in this study, with a combination of descriptive statistics and qualitative methods employed in the data analysis. In this study, closed-ended (descriptive statistics) and open-ended (qualitative) questions were posed to non-adherent smear positive tuberculosis patients enrolled on tuberculosis treatment in the two counties of Kericho and Nakuru. The design utilized interview schedules for Tb defaulters, questionnaires and semi-structured interview schedules for healthcare workers and semi-structured interview schedules for key informant interviews/focus group discussions (FGD) for County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs) all of whom are actually regarded as tuberculosis managers.

3.5 Research Variables

In this study, various variables were considered and data collected from respondents using interviewer-administered interview schedules, structured questionnaires and semi-structured interview schedules and key informant interviews/focus group discussions (FGD). Such variables included but not limited to **independent variables** such as gender, age, marital status, educational level, and occupation; **dependent variables** such as patients' attitudes and behaviour regarding taking prescribed medication, consistency or none in taking medication, drugs side effects, stigma and feelings about tuberculosis disease, patients' attitudes towards healthcare workers, attending or missing clinic

appointments and **intervening/moderating variables** such as socio-economic and cultural factors, income levels, drinking habits/alcohol intake, smoking, knowledge about TB disease and its curability, association of length of treatment and non-adherence, distance to health facility, and means of transport to health facility.

3.5.1 Relationship of Research Variables



Independent Variables **Intervening/Moderating Variables** **Dependent Variables**

As seen from the above, the variables can be dependent, independent or intervening.

The dependent variables are the factors that this study seeks to explore particularly on reasons why patients default from taking medication. In this situation, factors to be considered include: patients' attitudes and behaviour regarding taking prescribed medication, consistency or none in taking medication, drugs side effects, stigma and

feelings about tuberculosis disease, patients' attitudes towards healthcare workers, and attending or missing clinic appointments.

The independent variables are those believed to affect the dependent variables, such as gender, age, marital status, occupation, and educational level.

Intervening variables link the independent and dependent variables, but may not directly be observable during the study such as: socio-economic and cultural factors, income levels, drinking habits/alcohol intake, smoking, knowledge about TB disease and its curability, length of treatment period, distance to health facility, and means of transport to health facility.

From healthcare workers, data on the cadre, whether the staff get any TB updates on tuberculosis disease management, and if so, the last time it happened, whether the staff had always performed tuberculosis work after qualification and posting to TB clinic.

From programme managers data were obtained following key informant interviews/focus group discussions (FGD) regarding their views on what they thought were possible reasons for default by patients from medication and their suggested interventions. Discussions were held with regard to major areas of concern as follows:

i. **Patient-centred factors** such as : Demographic Factors: *Age, Ethnicity, Gender, Education, Marriage Status;* Psychosocial factors: *Beliefs, Motivation, Attitude;* Patient-prescriber relationship; Health literacy; Patient knowledge; Physical difficulties; Tobacco Smoking or alcohol intake; Forgetfulness; History of good compliance.

ii. **Therapy-related factors** such as: Route of administration; Treatment complexity; Duration of the treatment period; Medication side effects; Degree of behavioural change required; Taste of the medication; Requirements for drug storage.

iii. **Healthcare system factors** such as: Lack of accessibility; Long waiting time; Difficulty in getting prescriptions filled; Unhappy clinic visits.

iv. **Social and economic factors** such as: Inability to take time off work; Cost and Income; Social support.

v. **Disease factors** such as: Disease symptoms; Severity of the disease; HIV co-morbidity.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion criteria

All registered smear positive non-adherent TB patients within the past six (6) months of the study period were recruited for the study.

3.6.2 Exclusion criteria

Transfer-ins and transfer-outs and patients with other disease conditions were not included in the study.

3.7 Sampling Procedures

3.7.1 Sampling Frame

From registered Tb patients in the DTLCs' "TIBU" registers from the two counties, who totalled 2641 (849 from Kericho and 1792 from Nakuru) in the period July – December, 2015, a total of 112 tuberculosis defaulters within the past six months at the commencement

date of the study in January 2016, were purposely identified and enrolled for the study. They were interviewed using interview schedules ***(Appendix A)***. Healthcare workers (46) from 34 purposely identified health facilities from where Tb defaulters were traced were also interviewed using questionnaires and semi-structured interview schedules ***(Appendix B)*** regarding: their cadre, knowledge of TB, duration of treatment, briefing prior to posting to Tb clinics, and the last update training if any on TB management while key informant interviews/focus group discussions (FGD) ***(Appendix C)*** were held with 15 (7 from Kericho and 8 from Nakuru) County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs) from the two counties.

3.7.2 Sample size

A total of 112 smear positive Tb patients (tuberculosis defaulters) from the two counties (62 from Kericho County and 50 from Nakuru County) of Nakuru and Kericho and 46 healthcare workers drawn from 34 health facilities (24 from Kericho County and 10 from Nakuru County) where TB patients had registered and received their medication were identified using purposive sampling method and enrolled in the study. Key informant interviews/focus group discussions (FGD) were held with 15 (7 from Kericho and 8 from Nakuru) County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs) from the two counties.

3.8 Research Instruments

The data collection tools/instruments used in this study included: interview schedules, structured questionnaires and semi-structured interview schedules and key informant

interviews/focus group discussions (FGD) ***(Appendices A, B & C --Data Collection Tools)***.

3.9 Validity and Reliability of Research Instruments

For the reliability and validity of data in this study, and in order to ensure that the study utilized good quality data, the data collection tools (interview schedules, structured questionnaires and semi-structured interview schedules and key informant interviews/focus group discussions (FGD)) were piloted in Emining location of Baringo County, a neighbouring county North – East of Nakuru County, so as to identify challenges that might be faced during data collection and address them before the study was carried out. After the piloting, the tools were found to be workable and were adopted and were actually used later in a similar successful study carried out in Baringo County: "(Obwoge *R*.O, et al. 2016) on *Factors associated to non-adherence in Tuberculosis treatment, Baringo County, Kenya."* The interview schedules were administered by a trained research assistant, who was well-versed with the geography of the two counties and fluent in the local language, but who had not worked in any of the TB health facilities in the two counties. The structured questionnaires and semi-structured interview schedules ***(Appendix B)*** for health care workers and key informant interviews/focus group discussions ***(Appendix C)*** were administered by the researcher himself. The interview schedules, structured questionnaires and semi-structured interview schedules, and key informant interviews/focus group discussions (FGD) interviews were prepared in English.

3.10 Data Collection Procedures

Study period commenced on January 2016 focusing on the past six months of treatment initiation (July-December, 2015). Data were collected using interviewer-administered interview schedules, structured questionnaires and semi-structured interview schedules and key informant interviews/focus group discussions (FGD). Respondents were traced non-adherent TB patients (defaulters), health care workers and Tb programme managers (County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs)) all of whom in this context were actually regarded as tuberculosis managers. Primary data was obtained from sampled cases (n = 112) who were interviewed using interview schedules. In this study, a defaulter was a patient who had missed 2 or more clinic visits consecutively (WHO Guidelines 2010) as per the patients' scheduled attendance for drugs' collection. Data on variables such as, gender, age, marital status, educational level, occupation, socio-economic status, alcohol intake, smoking, knowledge about TB, association of length of treatment and non-adherence, distance to health facility, means of transport to health facility, drug side effects, and awareness that Tb is curable among others was collected from Tb defaulters.

From healthcare workers, data on the cadre, whether the staff get any TB updates on tuberculosis disease management, and if so, the last time it happened, whether the staff had always performed tuberculosis work after qualification and posting to TB clinic.

From programme managers data was obtained following key informant interviews/focus group discussions (FGD) regarding their views on what they thought were possible reasons for default by patients from medication and their suggested interventions. The discussions followed the following major areas of concern, namely:

i. Patient-centered factors such as :

- Demographic Factors: *Age, Ethnicity, Gender, Education, Marriage Status*
- Psychosocial factors: *Beliefs, Motivation, Attitude*
- Patient-prescriber relationship
- Health literacy
- Patient knowledge
- Physical difficulties
- Tobacco Smoking or alcohol intake
- Forgetfulness
- History of good compliance

i. Therapy-related factors such as:

- Route of administration
- Treatment complexity
- Duration of the treatment period
- Medication side effects
- Degree of behavioural change required
- Taste of the medication
- Requirements for drug storage

ii. Healthcare system factors such as:

- Lack of accessibility
- Long waiting time
- Difficulty in getting prescriptions filled
- Unhappy clinic visits

iii. Social and economic factors such as:

- Inability to take time off work Cost and Income
- Cost and Income
- Social support

iv. Disease factors such as:

- Disease symptoms
- Severity of the disease
- HIV co-morbidity

The interview schedule was divided into nine sections covering demographic information, patient-related factors, socio-economic variables, healthcare system-related

factors, default factors, stigma, and disease and medicine-related factors. There were 62 items, responses to each of which were coded. The interview schedule was administered by a trained research assistant, who was well-versed with the geography of the two counties and fluent in the local language, but who had not worked in any of the TB health facilities in the two counties.

The structured questionnaires and semi-structured interview schedules for health care workers and key informant interviews/focus group discussions were administered by the researcher himself.

3.11 Data Analysis and Ethical Issues and their Considerations

3.11.1 Data Analysis

All collected data which included data from interview schedules from health facilities (which were units of analysis), structured questionnaires and semi-structured interview schedules together with key informant interviews/focus group discussions (FGD) were reviewed, checked for completeness and thereafter appropriate data cleaning was performed. Data was then entered on spreadsheets using MS Excel and later transported to Statistical Packages for Social Sciences (SPSS) version 20 as it allowed for descriptive analysis of the data. Descriptive statistics and graphical summaries in charts (bar and cross-tabulations) are presented. The focus groups were analysed qualitatively. This qualitative analysis enabled the researcher to capture the actual voice of the subjects that gave the real meaning to the data collected.

3.11.2 Ethical Issues

Ethical Approval was obtained from IREC, Moi University. This Institutional Review Board approved the oral informed consent since it was anticipated that this being a researcher-administered questionnaires, interview schedules and key informant interviews/focus group discussions (FGD), the defaulters did not have to read or write on the interview schedules. In addition to this, the Institutional Review Board approved all ethical procedures, based on the awareness about the type of study (that it was harmless to study subjects) and the education level of study subjects. An official permission was obtained from the CTLCs of the two counties of Nakuru and Kericho and each SCTLC of the sub counties visited, together with approval from each head of each health facility visited prior to the interviews.

During data collection, oral informed consent was obtained from all participants after they were introduced to the purpose of the study and informed about their rights to interrupt the interview at any time. To ensure confidentiality, as much as possible, names were avoided in the questionnaire and reporting the results of the study. In addition, the collected information was locked with a key (hard copies) and by passwords (soft copies). Informed oral consent was also obtained from parents or guardians for subjects under 18 years old.

3.11.3 Ethical Considerations

The study was retrospective and did not involve any experimental procedures on patients. Respondents were informed: that they were going to participate in a non-invasive research study; what the study was about and why it was important; that they were expected to

respond to a prepared interview schedule; and that they were free to decide not to participate in the study or could freely withdraw from the study at any stage if they felt uncomfortable about the study. After briefing, respondents were requested to sign a written informed consent indicating that they had understood the nature of the study and that the results would be treated confidentially. Addresses of defaulters ***(Appendix A)***, and names of the healthcare workers ***(Appendix B),*** CTLCs and sCTLCs ***(Appendix C)*** and in the Consent Form/Certificate ***(Appendix D)*** were collected only for the purposes of follow-up. Incentives in the form of transport re-imbursement and lunch were given to respondents as compensation for waiting time and inconveniences caused.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1: Introduction

This chapter presents findings that reveal that: the socio-demographic/economic information of the study population is that of a relatively young population of low socio-economic status and low educational level; the curricula in use for training of nurses and clinical officers were inadequate and inappropriate; shortage of Tb drugs including pyridoxine essential for counteracting drug side effects among other factors contributed to medication non-adherence; healthcare workers/givers were poorly prepared to manage TB patients; there was no evidence of regular continuing professional development/continuing medical education (CMEs) updates for healthcare workers which could have assisted in boosting up their preparedness in managing TB patients and that in addition, it became clear that effective Tuberculosis education is essential not only for the healthcare workers but also for the people with tuberculosis and also the general public regarding importance of medication adherence.

In this study, a qualitative research design was adopted, with a combination of descriptive statistics and qualitative methods employed in the data analysis. Collected data were entered on spreadsheets using MS Excel and later transported to Statistical Packages for Social Sciences (SPSS) version 20, which allowed for descriptive analysis of the data. Descriptive statistics and graphical summaries in charts (bar and cross-tabulations) are presented, while data on the focus groups were analysed qualitatively, which enabled the

researcher to capture the actual voice of the subjects that gave the real meaning to the data collected.

4.2: Socio-Demographic and Economic factors of respondents

The study analysed the socio-demographic and economic characteristics of 112 respondents (50 from Nakuru and 62 from Kericho) from the two counties of Nakuru and Kericho, which included gender, marital status, age, level of formal education, occupation and level of income.

Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation. Several studies report that non-adherence is associated with low SES (Kumareson, *et al.,* & 2002; Bhatia, *et al.,* 2002).

4.2.1 Gender of respondents

The result of gender of respondents is presented in table 4:1.

Table 4:1 Gender of Respondents

Sex	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Male	29 (58)	33 (53)
Female	21 (42)	29 (47)
Total	50 (100)	62 (100)

The result in table 4:1 indicates that of the 50 defaulters interviewed from Nakuru County 58% were males while 42% were female while out of 62 defaulters interviewed from

Kericho County 53% were males and 47% were females. From the two counties therefore more than 50% were males.

The implication of this is that the mere fact that men´s breadwinner status as head of households and as workers may have trouble in leaving their duties for a health facility visit leading to their fewer adherences to treatment. This is because travelling time for an employed patient represents a time absence from work, coupled with the fact that some employers may not take kindly to the frequent long periods during which TB patients need to attend health facilities for treatment, hence patients may opt not to leave their work stations in order to secure their jobs and as a result become non-adherent to treatment.

4.2.2 Marital status of the respondents

During the interview, marital status of the respondents was established and the result is presented in table 4:2.

Table 4:2 Marital Status of the respondents

Patients' Marital status:	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Single	26 (52)	34 (55)
Married	24 (48)	28 (45)
Total	50 (100)	62 (100)

The result in table 4:2 shows that in Nakuru County, 52% of the defaulters were single and 48% were married, while in Kericho County, 55% were single and 45% were married. From the results more than 50% of the respondents in the two counties were single.

The findings are supported by a study in Kenya (Muture et al., 2011) and in China (Chee & James, 2000), where patients who were singles were found to have a higher risk of defaulting compared to patients who were married.

4.2.3 Age of the respondents

The ages of the respondents were established during the interview and their age distribution is as shown in table 4:3.

Table 4:3 Age Distribution of the respondents

Status	**Nakuru County**		**Kericho County**	
Age group(Yrs.)	**n**	**%**	**n**	**%**
20 and below	5	10	12	19
21-29	15	30	25	40
30-39	20	40	17	27
40-49	6	12	6	10
50-59	2	4	1	2
60 and above	2	4	1	2
Total	50	100	62	100

The result in table 4:3 shows that majority of the patients in the two counties were found in the age group 21-39 years with Kericho county having 67% while Nakuru had 70%. This age group which has more than 65% of the respondents is also the most economically active age group generally.

Some studies have reported a rapid rise in TB morbidity and mortality among this young adult population mostly between 15 – 44 years of age (WHO Global Tuberculosis Report 2013; Warker & Edward, 2004; (MOH/NLTP), 2005). People in this age group tend to be unstable in their environments and will move to set-ups like townships in search for employment opportunities and in such situations may be forced to live alone or without family; they get minimal social support and tend to live in overcrowded and unhygienic environments.

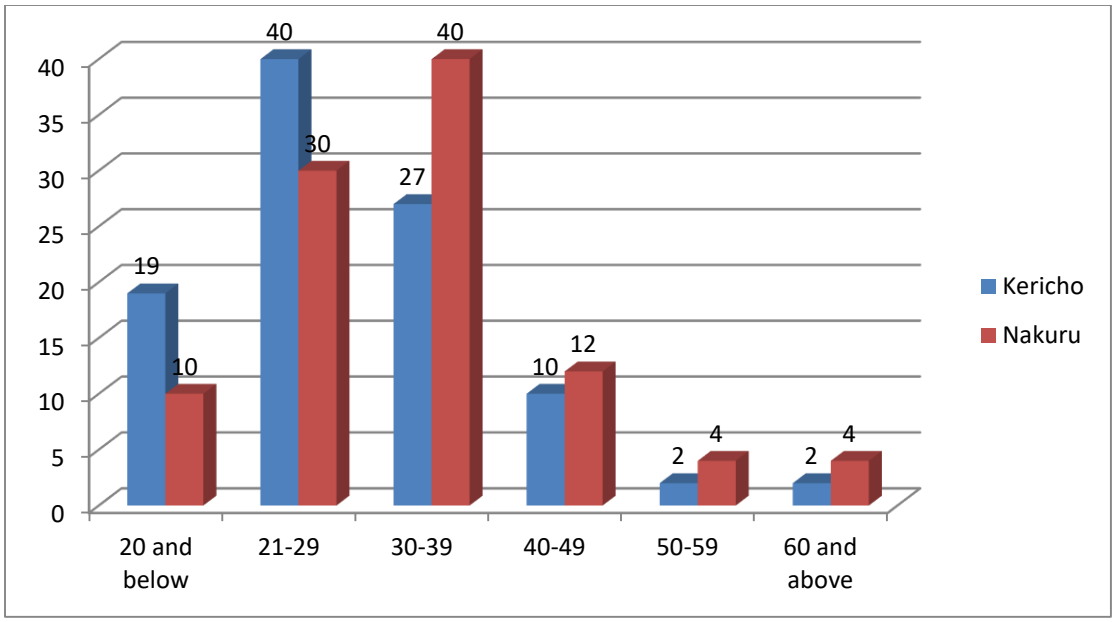


Figure 4:1 Age Distribution of the respondents

4.2.4 Level of formal education of the defaulters

The level of education among the defaulters was also assessed and the results are as presented in table 4:4.

Table 4:4 Level of formal education of the defaulters

Education level:	**Nakuru n (%)**	**Kericho n (%)**
None	15 (30)	2 (3)
Primary	20 (40)	32 (52)
Secondary	12 (24)	22 (35)
Tertiary	3 (6)	6 (10)
Total	50 (100)	62 (100)

On level of formal education, 30% and 3% had no education in Nakuru and Kericho respectively while 40% and 52% had Primary education in the two counties respectively. 24% had Secondary education in Nakuru while 35% were found in Kericho. 6% had

Tertiary education in Nakuru while 10% were found in Kericho County. These findings indicate that in Kericho County, 97% of the defaulters had at least primary level of education and above while in Nakuru County, 30% of the defaulters had no formal education at all.

Studies indicate that education overall increases knowledge and health awareness and treatment seeking behaviour of the individual (Geetakrishnan, 1990). Literate individuals are more likely to complete the treatment (Kumareson *et al*., 2002). Studies have revealed that patients who have completed at least high school education were strictly treatment adherent with noted decrease in trend of non-adherence as level of education increased. Medication adherence requires that patients should be literate or have good literacy. Health literacy means patients are able to read, understand, remember medication instructions, and act on health information (Vlasnik, et al, 2005). In some studies, it was found that patients with low health literacy were reported to be less compliant with their therapy (Nichols-English & Poirier 2000).

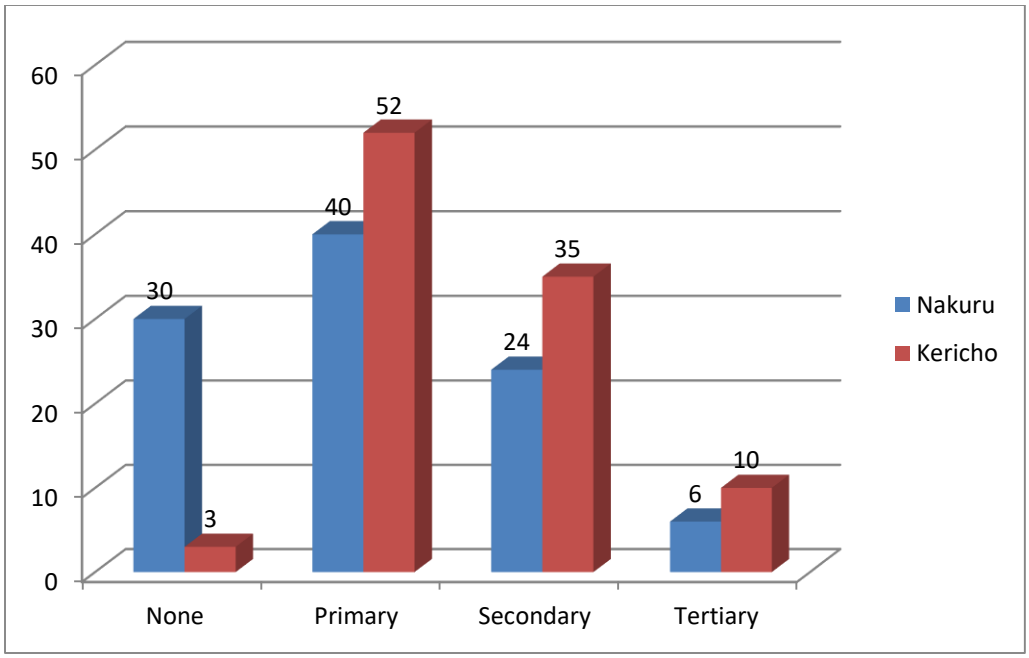


Figure 4:2 Level of formal education of the defaulters

4.3: General factors thought to affect Tb treatment

The respondents were asked questions that were thought to be associated with non-adherence to medication such as their occupation**,** level of income, knowledge regarding Tb, whether they thought Tb was curable with the current drugs in use, whether they thought Tb disease was a curse, distance to health facility and means of travel to health facility. They were also asked whether their defaulting was associated with the responses they gave on the questions asked. The responses to the questions asked are shown in tables 4:5 to 4:11.

4.3.1: Occupation and association with non-adherence

The defaulters were asked about their occupation and their responses are presented in Table 4:5.

Table 4:5 Occupation of the defaulters

What is your Occupation?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Employed	3 (6)	12(19)
Self employed	12 (24)	17 (27)
Not employed	32 (64)	19 (31)
Student	3 (6)	14 (23)
Total	50 (100)	62 (100)

The result in table 4:5 indicates that 6% and 19% of the defaulters were employed, 24% and 27% self-employed, 64% and 31% not employed while 6% and 23% were students in Nakuru and Kericho counties respectively. The findings indicate that more than 60% of the defaulters in Nakuru County were not employed, while in Kericho County, more than 50% of the defaulters were both students and unemployed.

Some studies (Maher, 2002; & Rajeswari, et al., 2002), seem to suggest that the TB epidemic may have changed the population's economic needs, resulting in forcing more young men and women to be exposed to situations that place them at higher risk for TB transmission, for instance, sharing overcrowded rooms even when the situation does exacerbate the risk of TB transmission. This exposure to inevitable risk is due to attempts to secure jobs for livelihoods for the concerned. Other studies reported that there is an association between unemployment and non-adherence (Bhatia, et al., 2002).

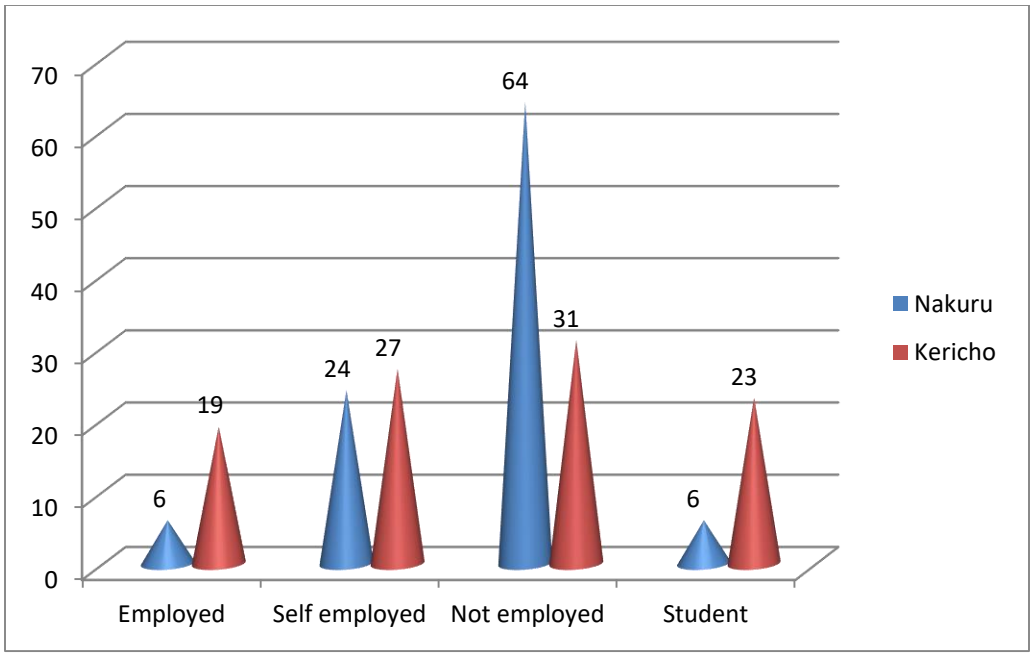


Figure 4:3 Occupation of the defaulters

4.3.2: Association of Occupation with Non-adherence

When asked whether their defaulting was associated with their occupation the responses given by the defaulters are shown in table 4:6.

Table 4:6 Association of Occupation with Non-adherence

Do you associate your occupation with non-adherence?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	35 (70)	27(44)
No	15 (30)	35 (57)
Total	50 (100)	62 (100)

The result in table 4:6 indicates that 70% and 44% of the defaulters in Nakuru and Kericho counties respectively associated their defaulting with their occupation while 30% and 56% respectively did not associate their non-adherence with occupation in Nakuru and Kericho counties. The findings indicate that 70% of the defaulters in Nakuru County associated their non-adherence with their occupation, while 56% in Kericho County did not.

4.3.3: Level of Income of the respondents and Association with Non-adherence

The defaulters were also asked to indicate their level of income per month and their responses are shown in table 4:7.

Table 4:7 Level of income of the defaulters

What is your income level (Ksh)?	Nakuru n (%)	Kericho n (%)
LESS than 3400	42 (84)	42(68)
3500-4900	7 (14)	8 (13)
5000-10000	N/A	7 (11)
Above10000	1 (2)	5 (8)
Total	14 (100)	62 (100)

The results in Table 4.7 indicates that in Nakuru, 84% of patients earned less than 3400/= per month, while in Kericho the proportion who earned the same was 68%. Those who earned between 3500/= and 4900/= in Nakuru were 14%, and those in Kericho 13%. There was no defaulter who earned between 5000/= and 10000/= in Nakuru County, while in Kericho 11% earned this amount. Those who earned above 10000 were 2% and 8% in Nakuru and Kericho counties respectively. The findings here indicate that in Nakuru county, more than 80% of the defaulters earned less than 3400/= while more than 60% in Kericho county earned the same. Combined, 98% of the defaulters earned less than 5000/= in Nakuru County compared with 81% in Kericho County.

Bhatia, et al, 2002, while reviewing Tuberculosis infection among Tibetan refugees in India asserted that non-adherence is associated with low socio-economic status and that as social class becomes higher, treatment adherence increases. Kumareson, *et al.,* 2002, in his study also reports the same that non-adherence is associated with socio-economic status.

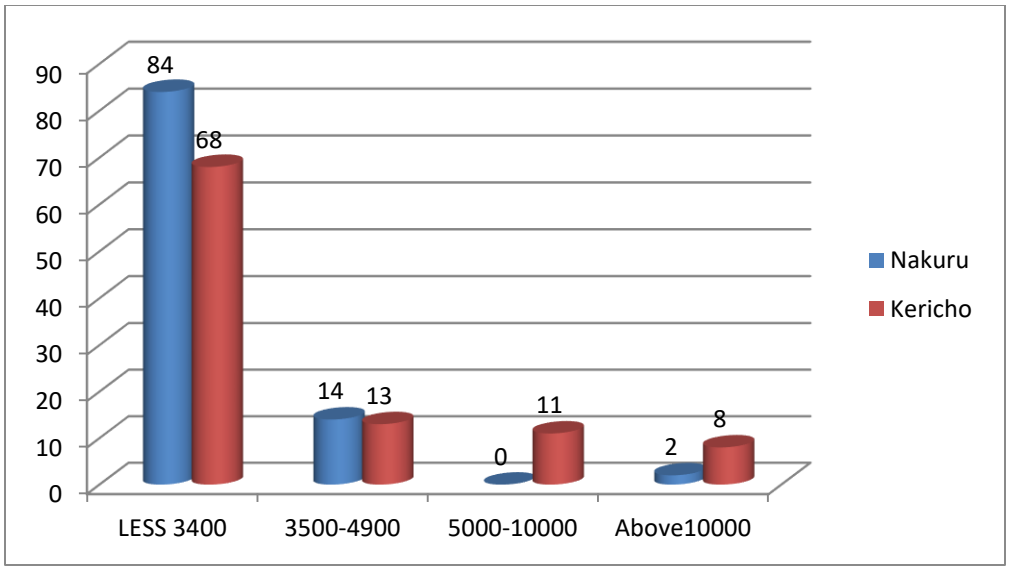


Figure 4:4 Level of income of the defaulters

4.3.4: Association of Income of the defaulters with Non-adherence

When asked whether their non-adherence was associated with their level of income and hence their financial challenges, the responses from the defaulters are shown in table 4:8.

Table 4:8 Association of income with non-adherence

Do you associate your financial challenges with non-adherence?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	42 (84)	53(86)
No	8 (16)	9 (14)
Total	50 (100)	62 (100)

The responses in table 4:8 indicate that 84% and 86% of the respondents agreed that their non-adherence was due to financial challenges in Nakuru and Kericho counties respectively while 16% and 14% did not associate their non-adherence with their financial challenges. These findings indicate that more than 80% of the defaulters in the two counties defaulted because of their financial challenges.

4.3.5: Patients' Knowledge Regarding Tb

In order to assess their knowledge about Tb, the defaulters were asked questions about their understanding about the disease TB they were suffering from, whether the disease was curable with the current drugs in use, whether Tb was a curse, whether they associated their non-adherence with discomfort or drug side effects during treatment, whether they associated their non-adherence with the length of treatment period, whether Tb patients can share their items with others and whether they had had any other treatment earlier which they never finished. The responses to these questions are shown in the tables 4:9 to 4:11.

4.3.6: Understanding TB Disease

The defaulters were asked whether they understood the Tb disease they were suffering from and their responses are shown in table 4:9.

Table 4:9 Understanding TB Disease

Do understand the disease TB you are suffering from?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	47 (94)	59 (95)
No	3 (6)	3 (5)
Total	50 (100)	62 (100)

Table 4:9 results indicate that 94% and 95% of the patients knew the disease they were suffering from while 6% and 5% did not understand the disease in Nakuru and Kericho counties respectively. These findings indicate that more than 90% of the defaulters knew the disease they were suffering from.

These findings are consistent with those found by Makwila, et.al (2016), which found that 98% of patients interviewed said that Tb is transmitted through the air (coughing or sneezing) and **92**% said Tb is not transmitted by handshake.

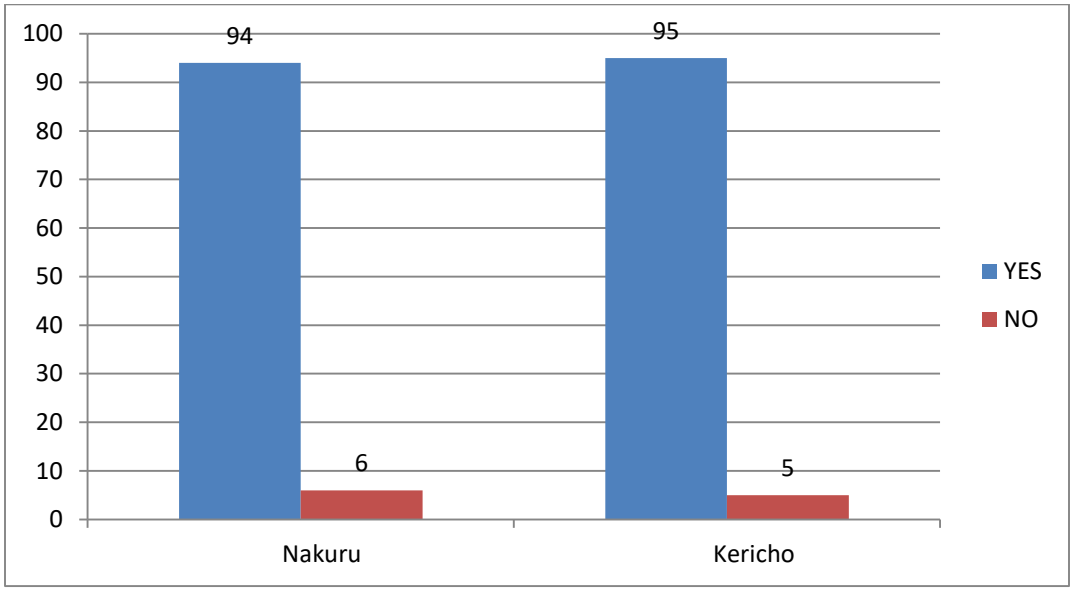


Figure 4:5 Understanding TB Disease

4.3.7: Whether the Disease was Curable with the Current Drugs in use

When the respondents were asked if the disease was curable with the drugs in current use, their responses are shown in table 4:10.

Table 4:10 Disease Curability with the Current Drugs in use

Is TB curable?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	50 (100)	62 (100)

Does TB treatment cure TB disease?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	50 (100)	62 (100)

The results in table 4:10 indicate that the respondents in the two counties of Nakuru and Kericho were unanimous that TB disease is curable with the drugs in current use.

This is similar to what was found by Omenge, et al, (2016), while reviewing factors associated with TB treatment default by patients in a study carried out in Baringo County. In this study, it was found out that 94% of patients interviewed stated that they knew Tuberculosis disease was curable.

4.3.8: Whether Tb Disease is a Curse

The defaulters were also asked whether they thought Tb disease was a curse. Their response is shown in table 4:11.

Table 4:11 Tb Disease a Curse?

Is TB Disease a Curse?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	4 (8)	1 (2)
No	46 (92)	61 (98)
Total	50 (100)	62 (100)

The response in table 4:11 indicates that 8% and 2% of the respondents in Nakuru and Kericho counties respectively thought that TB disease is a curse, while 92% and 98% respectively in the two counties did not believe Tb disease is a curse. This response indicates that more than 90% of the defaulters did not think that Tb disease is a curse.

This finding is also similar to what was found in a study by Omenge, et al., 2016 which showed that more than 90% of the defaulters did not think that Tb disease is a curse.

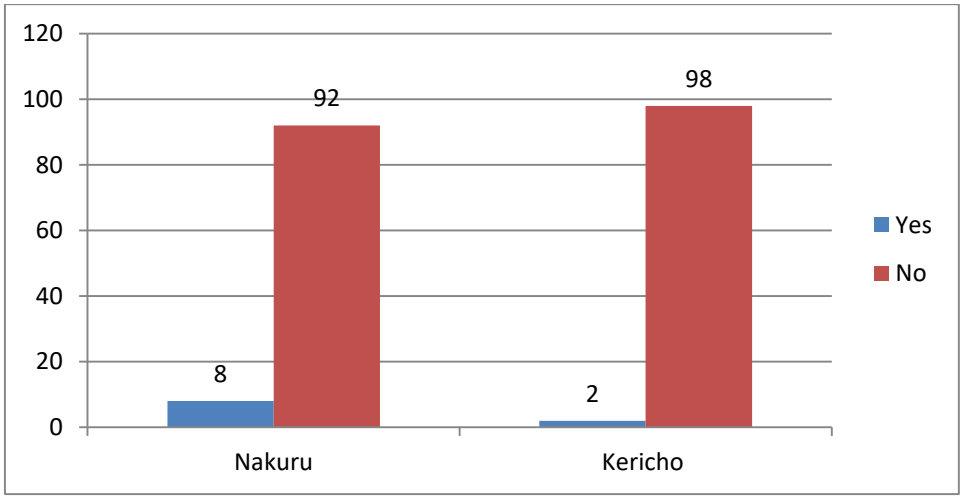


Figure 4:6 Tb disease a curse?

The above information from the data collected is summarized in table 4:12 below.

Table 4:12 Summary of Socio-Demographic/Economic Information

Item	Nakuru	Kericho
Gender - Male	29 (58%)	33 (53%)
Marital Status - Single	26 (52%)	34 (55%)
Age Distribution - 21-39 Yrs.	35 (70%)	42 (67%)
Level of formal education – Primary & below	35 (70%)	34 (55%)
Occupation of the defaulters – Unemployed + student	35 (70%)	33 (54%)
Association of Occupation with Non-adherence? Yes	35 (70%)	27 (44%)
Level of income – Earning <5,000/=	49 (98%)	50 (81%)
Association of income with non-adherence? Yes	42 (84%)	53 (86%)

From **Table 4:12**, it is clear that the socio-demographic/economic information of the study population is that of a relatively young population of low socio-economic status and low educational level.

The study findings as highlighted above indicate that the study population is that of a relatively young population of low socio-economic status and low educational level. Majority of the patients in the two counties of Kericho and Nakuru were found in the age group 21-39 years with Kericho County having 67% while Nakuru had 70%. This age group which has more than 65% of the respondents is also the most economically active age group generally. Studies in other situations have found a related rapid rise in TB morbidity and mortality among a similar young adult population mostly between 15 – 44 years of age (WHO Global Tuberculosis Report 2013; Warker & Edward, 2004; (MOH/NLTP), 2005). People in this age group tend to be unstable in their environments and will move to set-ups like townships in search for employment opportunities and in such situations may be forced to live alone or without family; they get minimal social support and tend to live in overcrowded and unhygienic environments. In developing countries, low socioeconomic status may put patients in the position of having to choose between competing priorities. Such priorities frequently include demands to direct the limited resources available to meet the basic needs. Low financial strains may force more young men and women to be exposed to situations that place them at higher risk for TB transmission, for instance, sharing overcrowded rooms especially in tea plantations and flower farms in the two counties of Kericho and Nakuru, thus exacerbating the risk of TB transmission.

On gender, this study this study reveals that more than 50% of respondents were males (58% Nakuru County and 53% Kericho County). The implication of this is that the mere fact that men´s breadwinner status as head of households and as workers in the expansive tea plantations in Kericho County and flower farms in Njoro, Rongai, and Naivasha sub counties in Nakuru County, may have trouble in leaving their duties for a health facility visit leading to their fewer adherences to treatment. This is because travelling time for an employed patient represents a time absence from work, coupled with the fact that some employers may not take kindly to the frequent long periods during which TB patients need to attend health facilities for treatment, hence patients may opt not to leave their work stations in order to secure their jobs and as a result become non-adherent to treatment.

It is important to note that education overall increases knowledge and health awareness and treatment seeking behaviour of the individual (Geetakrishnan, 1990). Literate individuals are more likely to complete the treatment (Kumareson *et al*., 2002). Low educational level has been found to hamper effective understanding of Tb treatment. It is also a fact that, soon after initiation of TB treatment and due to ignorance, a TB patient may begin to feel better after few weeks of treatment initiation, and may leave the treatment as he/she assumes he/she may be cured of TB. Besides, understanding on correct duration of treatment is usually found to be lower among non-adherent TB patients. (Bhatia, et al, 2002) on “Tuberculosis among Tibetan refugees in India” reported that non-adherence is associated with low socio-economic status and that as social class becomes higher, treatment adherence increases.

In Kenya, the government supports treatment of tuberculosis by availing free diagnostic services and drugs, but other hidden costs such as transport and opportunities lost during

treatment exist. The health budget is usually overstretched and resources for social support are scarce or unavailable. Similar to findings in some Sub-Saharan African countries (Dodor, *et al.,* 2005; Demissie & Kebede, 1994) indicate that socioeconomic factors such as low income and low education were linked to TB treatment default. In this study, the socio-economic status of the respondents was low as it revealed that more than **80%** (98% in Nakuru and 81% in Kericho) of the respondents earned less than 5000/= and that more than **80%** (84% in Nakuru and 86% in Kericho)of the respondents in the two counties associated their non-adherence with their financial challenges.

4.4: Findings related to review of the training curricula for nurses and clinical officers used in the training institutions

The curricula for both nurses and clinical officers were found to be deficient in adequate content on Tb disease in terms of causation, diagnosis, treatment, management and control (Kenya Medical Training College curricula, 2013; 2014; 2014b). There was no mention on soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and healthcare worker-patient communication skills application that are appropriate for competent patient care. Neither was there any mention on health education as an important component of holistic patient care. The curriculum for higher diploma in clinical medicine, however, has attempted to give a course description/content including side effects of treatment though in a shallow way.

4.4.1: Training Curriculum for the Diploma in Registered Community Health Nursing

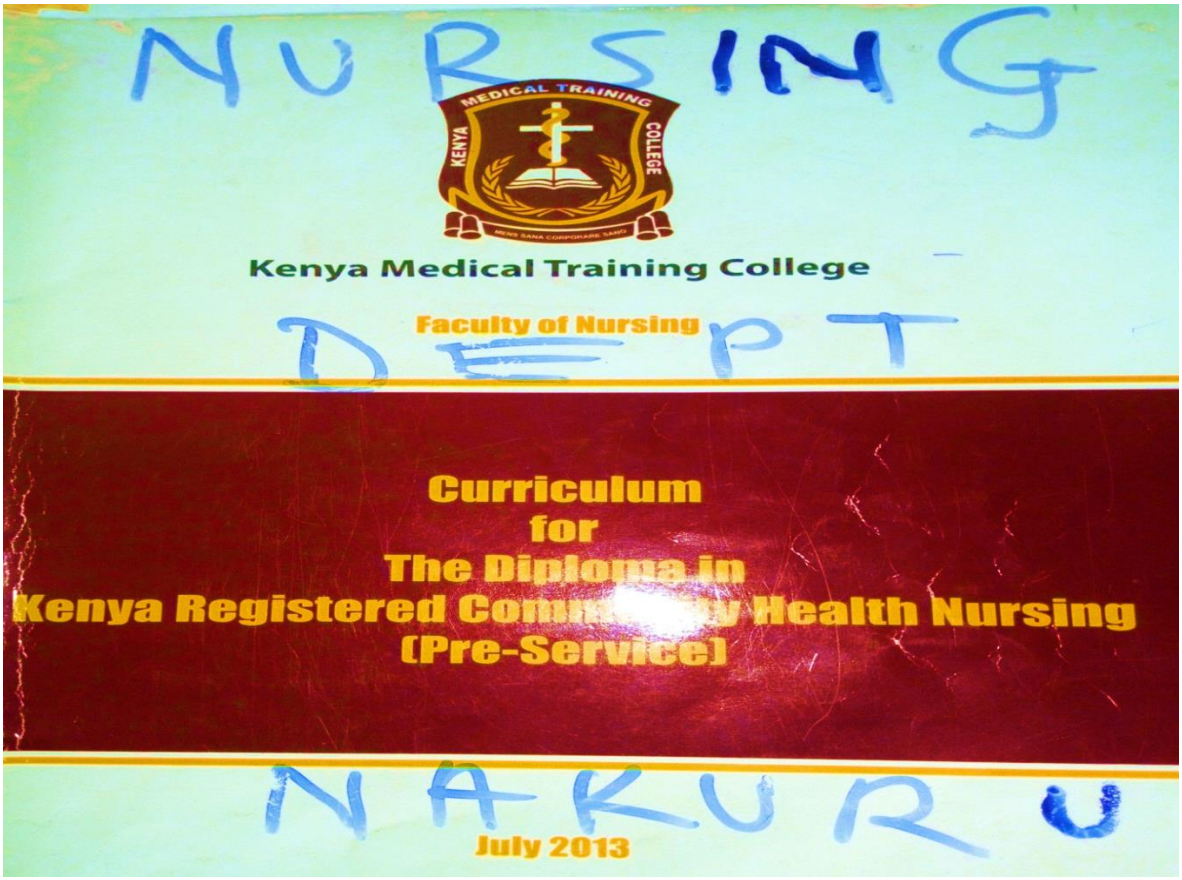
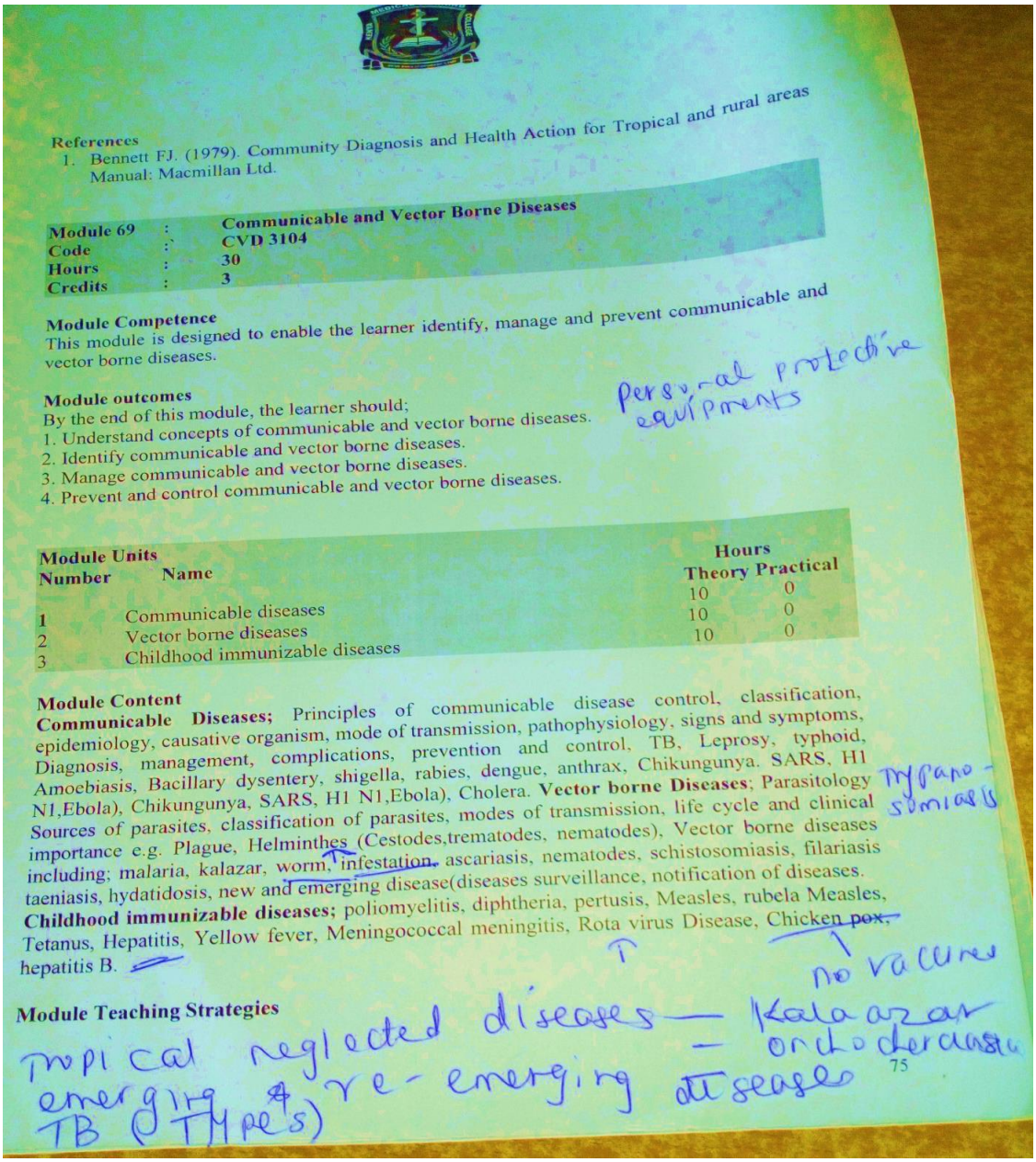


Figure 4:7 **Training Curriculum for the Diploma in Registered Community Health Nursing**

The Nursing curriculum (**Figure 4:7**) mentions in a shallow way: TB under communicable diseases among other diseases like bacillary dysentery, shigella, anthrax, SARS, etc. regarding among others diagnosis, management, complications, prevention and control but gives no course description/content, see excerpt on **figure 4:8** below.

Excerpt from the curriculum



References
1. Bennett FJ. (1979). Community Diagnosis and Health Action for Tropical and rural areas Manual: Macmillan Ltd.

Module 69 : Communicable and Vector Borne Diseases
Code : CVD 3104
Hours : 30
Credits : 3

Module Competence
This module is designed to enable the learner identify, manage and prevent communicable and vector borne diseases.

Module outcomes
By the end of this module, the learner should;
1. Understand concepts of communicable and vector borne diseases.
2. Identify communicable and vector borne diseases.
3. Manage communicable and vector borne diseases.
4. Prevent and control communicable and vector borne diseases.

Module Units Number	Name	Hours Theory	Hours Practical
1	Communicable diseases	10	0
2	Vector borne diseases	10	0
3	Childhood immunizable diseases	10	0

Module Content
Communicable Diseases; Principles of communicable disease control, classification, epidemiology, causative organism, mode of transmission, pathophysiology, signs and symptoms, Diagnosis, management, complications, prevention and control, TB, Leprosy, typhoid, Amoebiasis, Bacillary dysentery, shigella, rabies, dengue, anthrax, Chikungunya. SARS, H1 N1,Ebola), Chikungunya, SARS, H1 N1,Ebola), Cholera. **Vector borne Diseases**; Parasitology Sources of parasites, classification of parasites, modes of transmission, life cycle and clinical importance e.g. Plague, Helminthes (Cestodes,trematodes, nematodes), Vector borne diseases including; malaria, kalazar, worm, infestation, ascariasis, nematodes, schistosomiasis, filariasis taeniasis, hydatidosis, new and emerging disease(diseases surveillance, notification of diseases. **Childhood immunizable diseases;** poliomyelitis, diphtheria, pertusis, Measles, rubela Measles, Tetanus, Hepatitis, Yellow fever, Meningococcal meningitis, Rota virus Disease, Chicken pox, hepatitis B.

Module Teaching Strategies

Figure 4:8 **Excerpt from the curriculum**

Of note is that there is no mention (**Figure 4:8**) on soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and healthcare worker-patient communication skills application which are appropriate for competent

patient care. Neither is there any mention of health education as an important component of holistic patient care.

4.4.2: Training Curriculum for Basic Diploma in Clinical Medicine

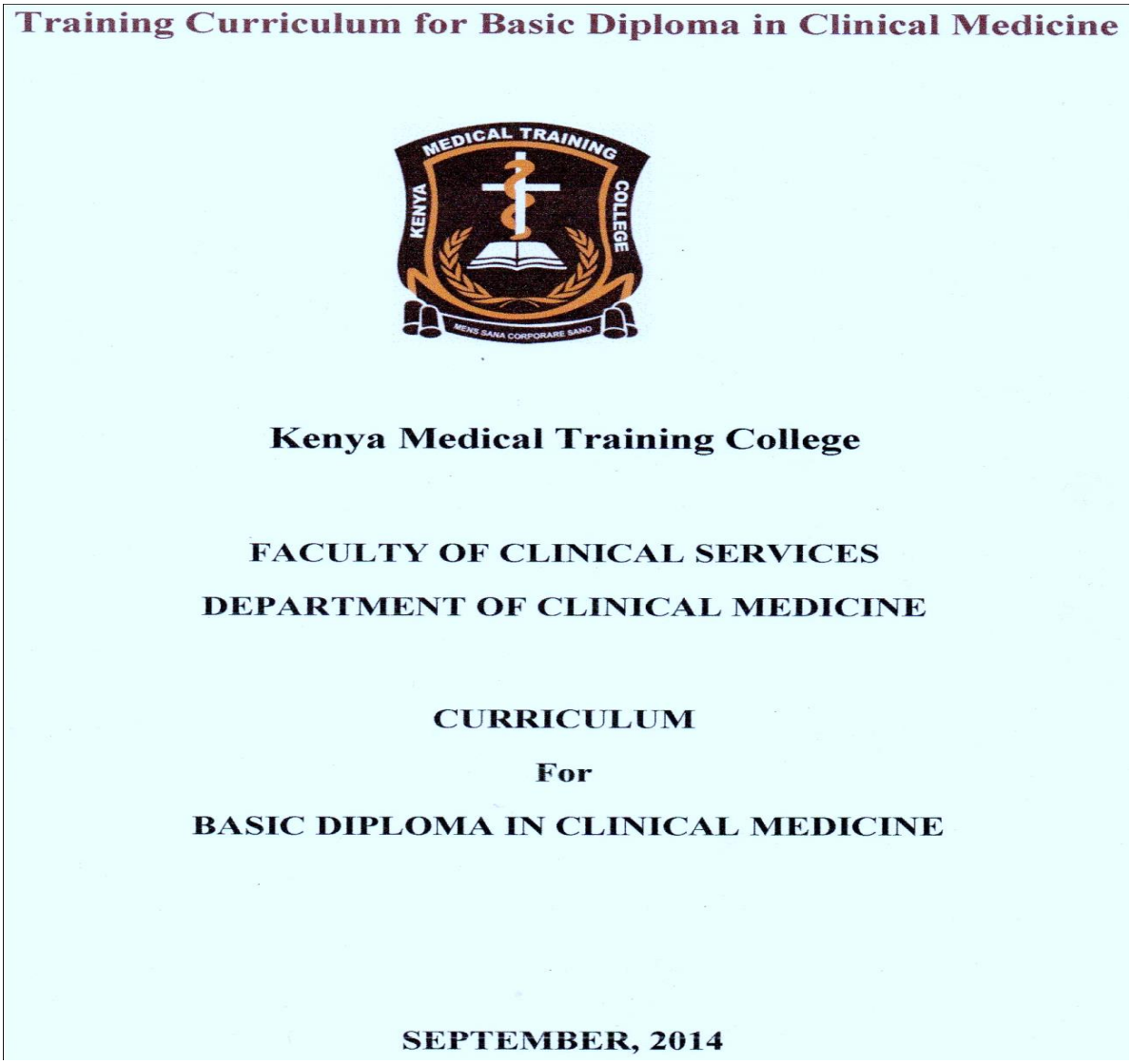


Figure 4:9 **Training Curriculum for Basic Diploma in Clinical Medicine**

In this curriculum (**Figure 4:9**) there is no specific mention of TB other than a shallow mention on **Respiratory System -** Common signs and symptoms: Examination Technique should be followed; inspection, palpation percussion and auscultation. Chest x ray and endoscopy, sputum examination haematological tests.

Under **MODULE 7: CLINICAL METHODS I**, which emphasizes communication skills, it is stated that the learner is expected to be able to communicate, take appropriate history and perform physical examination. The learning outcome states that by the end of this module, the learner shall be able to: Communicate professionally and take relevant history. Like in the case of Nursing Curriculum, there is no mention on soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and healthcare worker-patient communication skills application, which are appropriate for competent patient care. Neither is there any mention of health education as an important component of holistic patient care.

What has been mentioned above is in theory and paper, what appears but practically, this has not been actualized, so a lot needs to be done on this front.

4.4.3: Training Curriculum for Higher Diploma in Clinical Medicine and Surgery

(Lung and Skin Diseases)

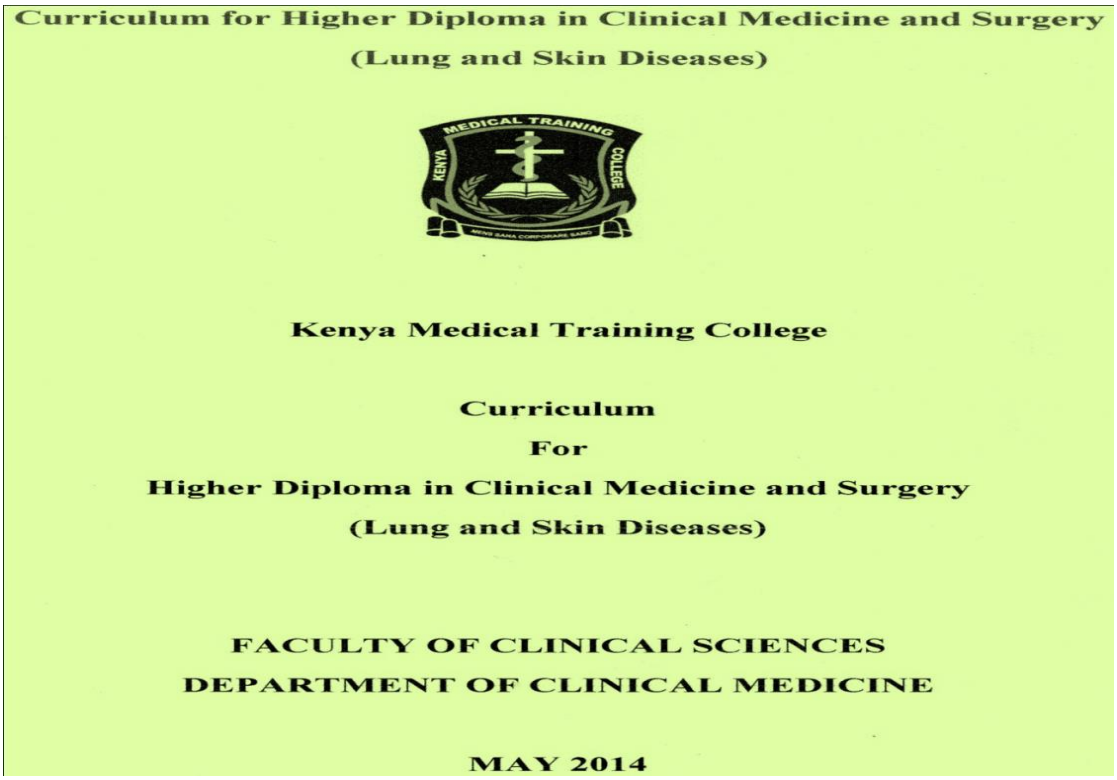


Figure 4:10: **Training Curriculum for Higher Diploma in Clinical Medicine and Surgery**

Under Curriculum for Higher Diploma (**Figure 4:10**) in Clinical Medicine and Surgery (Lung and Skin Diseases), the aim is to train a special cadre of clinicians with specific emphasis on Tuberculosis management. As stated in the curriculum: *"This cadre was therefore charged with the responsibility to supervise and participate in control activities of TB, Leprosy and STIs in all levels of health care services."* In this curriculum, Tuberculosis is covered under **MODULE 4: CHRONIC LUNG DISEASES** whose aim is to equip the learner with knowledge, skills and attitudes in making diagnosis and managing chronic lung conditions. The expected **learning outcomes** state: ***"****By the end of this module*

the learner should be able to manage patients with Tuberculosis." The course content states: "**Tuberculosis:** Definition of terms , Epidemiology, pathogenesis, aetiology/predisposing factors, clinical types, Investigations, management , complications of TB, differential diagnosis, MDR TB/WHO recommended treatment. Side effects of treatment. Again, this is good on paper, but the emphasis during the training still remains the bone of contention.

Like in the case of Nursing and Basic Diploma in Clinical Medicine curricula, there is no mention on soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and healthcare worker-patient communication skills application that are appropriate for competent patient care. Neither is there any mention of health education as an important component of holistic patient care. In this curriculum though, there has been an attempt to give a course description/content on Tb including side effects of treatment though in a shallow way.

As seen above, the training curricula (Kenya Medical Training College curricula, 2013; 2014; 2014b) currently in use in training institutions do not even mention such important areas as medication adherence, health education and basic concepts of soft skills in patients management. In this regard therefore, the curricula do not adequately prepare healthcare workers for appropriate patients' education on medication adherence (M'Imunya et.al 2012). The training per se of healthcare workers (nurses and clinical officers) which is supposed to address this training need is in itself inadequate to meet the expectations due to inappropriate training curricula structure (Mutema, Kangethe, Naweya 1999);

(Abrahamson, 1996 & Al Mirghani, 2007)) that in most cases are poor in content and appropriate competency skills.

The ultimate aim of appropriate training of healthcare workers is to produce all round workers who can adapt quickly to new modes of patient management and who should have appropriate skills to interact with their patients and colleagues in the continuum of patient care with respect to disease treatment, management, health education and health promotion. This is with respect also to the teaching of the community and the public in the awareness of curative, management, disease prevention, health promotion and rehabilitative endeavors regarding TB disease in their day-to-day survival. The emphasis is on the efforts that are geared to sustaining good health and maximizing good health as good health goes beyond just existing/ surviving to thriving.

The training of healthcare workers must therefore be solidly anchored on curricula that emphasize training on hard and soft skills, strict adherence/compliance to medication, risks of non-adherence to medication, drugs side effects, stigma reduction and general avoidance of default from health care. Failure to observe strict application of the aforementioned will result in shortcomings in the healthcare worker preparedness in disease treatment and management, which will be glaringly apparent in the treatment clinics.

Emphasis on TB education is necessary for people with TB to take adherence seriously. People with TB also need to know how to take their TB drugs properly and need to know how to make sure that they do not pass TB on to other people. Emphasis on TB education is also necessary through health education for the public. Unfortunately, as noted earlier, health education per see does not feature in the training curricula. The public needs to know

basic information about TB for a number of reasons including reducing the stigma still associated with TB.

In Kenya, and indeed worldwide, the hallmark of Tb treatment is geared to full participation and corporation of medically trained healthcare workers. The success of Tb treatment depends not only on healthcare workers' competencies on hard skills but also on soft skills. However, healthcare workers training curricula lays emphasis on hard skills on Tb treatment such as acquisition of knowledge and a professional certificate in their professional areas so as to get employed and secure job duties at the expense of soft skills such as effective healthcare worker-patient communication, common sense, empathy, the ability to effectively deal with people, and a positive flexible attitude. Unfortunately, as noted earlier, soft skills are never taught in training institutions, as they are not in the curricula and so receive no emphasis or attention.

Quality of care plays an important role in Tb control and training should therefore emphasize timely diagnosis, treatment adherence, and treatment completion. This quality care cannot be guaranteed if the healthcare workers are not properly prepared during training which should lay emphasis on medication adherence, adherence counselling, soft skills application during patient care and general health education.

4.5: Findings on Health care delivery factors

Questions as to the distance the patients had to travel to reach the health facility and the means of transport they used to reach the facilities were posed. The responses from the defaulters are presented in tables 4:13 to 4:14.

4.5.1: Distance to the nearest health Facility

The respondents were asked how far they had to travel from their homes to the health facilities in order to access their medication. Their responses are shown in table 4:13.

Table 4:13 Frequency of travel to the nearest health Facility

Distance to Health facility in kilometres (km)	**Nakuru**	**Kericho**
	n (%)	**n (%)**
1	34 (68)	13 (21)
2	11 (22)	4 (6)
3	3 (6)	6 (10)
4	1 (2)	5 (8)
5 and more	1 (2)	34 (55)
Total	50 (100)	62 (100)

The responses in table 4:13 and Figure 4:11 revealed that 68% and 21% of the defaulters in Nakuru and Kericho counties respectively had to travel at least 1 km to reach the nearest health facility, 22% and 6% 2km, 6% and 10% 3 km, 2% and 8% 4 km and 2% and 55% 5 and more km, respectively. These findings indicate that 68% of the defaulters in Nakuru County had to travel at least 1 km to reach the nearest health facility while in Kericho County, 55% of the defaulters had to travel more than 5 km to reach the nearest health facility.

Clearly, there was a wide diversity of distance covered by the defaulters in order to reach their health facilities. This is supported by other studies such as those by Mohamed et al. (2013) who found that existence of human resource gaps and TB staff inadequately prepared to deal with complex issues of TB patients treatment and management, particularly prolonged waiting time in the health facility prior to treatment, tend to

influence non-adherence to medication. They concluded that reducing travelling and waiting times for TB patients might improve compliance rates. (Bagchi, et al. 2010) in their study found that travel-related cost factors were significantly associated with non-adherence in the newly diagnosed patients.

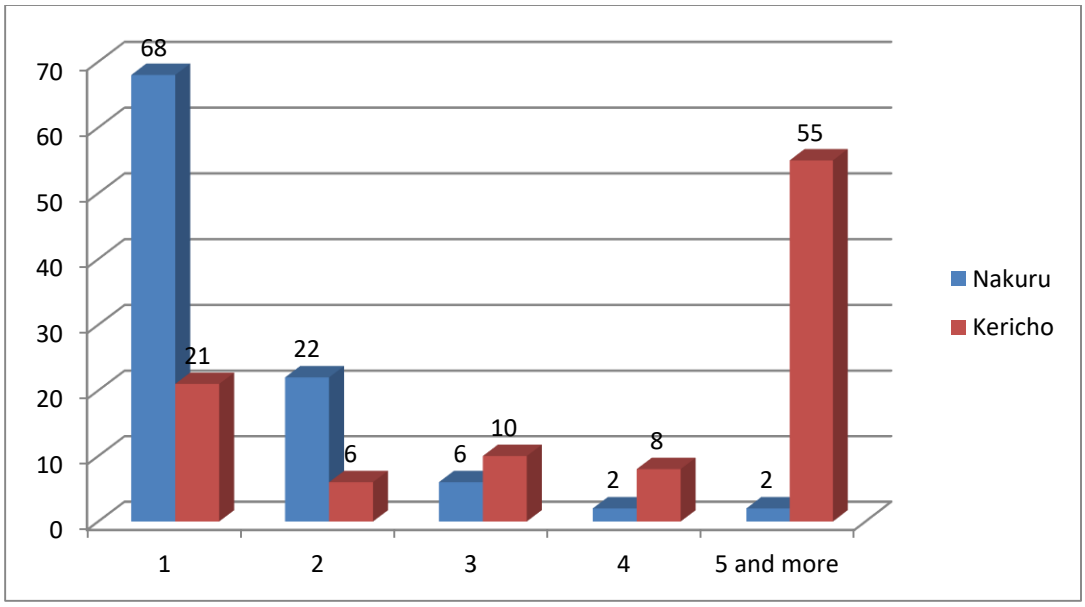


Figure 4:11 Frequency of travel to the nearest health Facility

4.5.2: Means of Transport to Health Facility

When asked the means of transport to reach the nearest health facility for their medication, the respondents answered as shown in table 4:14 and figure 4:12.

Table 4:13 Means of Transport to the nearest Health Facility

What is your Means of transport to the nearest health facility?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Walk	14 (28)	6 (10)
Vehicle	18 (36)	46 (74)
Motorbike	18 (36)	10 (16)
Total	50 (100)	62 (100)

The result in table 4:14 and Figure 4:12 revealed that, 28% and 10% of the defaulters walked to the nearest health facility in Nakuru and Kericho counties respectively, while 36% and 74% used vehicles and the rest, 36% and 16% used motorbikes. These responses indicate that in Nakuru County in both occasions, 36% of the defaulters used vehicles and motorbikes respectively while in Kericho County, majority (74%) of the patients used vehicles.

(Bagchi, et al 2010) in their study found that travel-related cost factors were significantly associated with non-adherence.

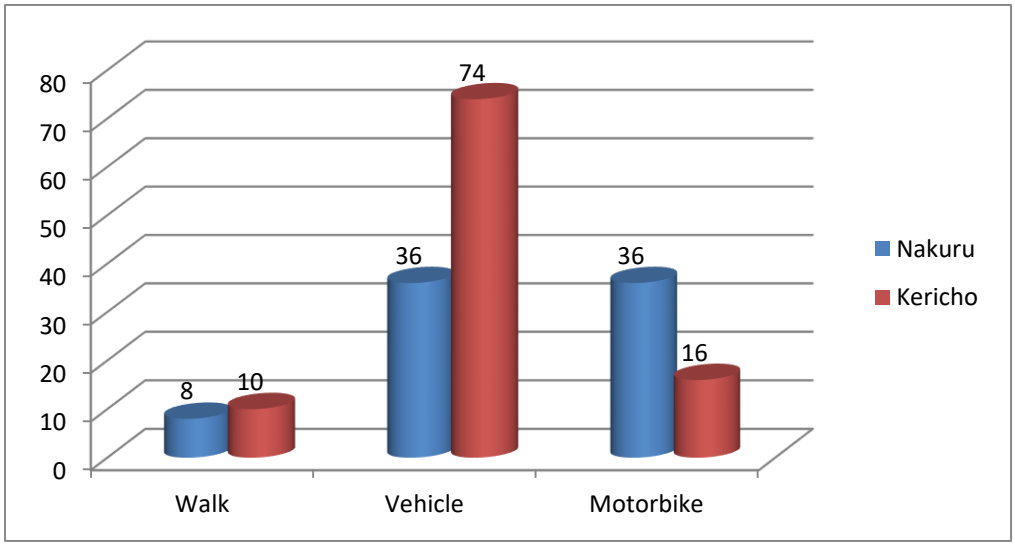


Figure 4:12 Means of Transport to the nearest Health Facility

4.5.3: Association of Discomfort or Drug side effects with Non-adherence during Treatment

The defaulters were asked if they associated their non-adherence with discomfort or drug side effects they felt during treatment. The response is indicated in table 4:15.

Table 4:15 Association of Non-adherence with Discomfort or Drug side effects during Treatment

Did you associate your non-adherence with discomfort or drug side effects during treatment?	Nakuru	Kericho
	n (%)	n (%)
Yes	38 (76)	16 (26)
No	12 (24)	46 (74)
Total	50 (100)	62 (100)

The response in table 4:15 and Figure 4:13 indicates that 76% and 26% of the respondents in Nakuru and Kericho counties respectively associated their non-adherence to discomfort or drug side effects they felt during treatment, while 24% and 74% respectively did not. The responses indicate that in Nakuru County, 76% of the defaulters associated their non-adherence with discomfort or side effects while 74% of Kericho County defaulters did not. These findings are supported by other studies which showed that side effects, drugs too strong, and feeling better soon after initiation of drugs intake (Gelmanova, *et al.,* 2007; Ministry of Health, Kenya, 2007; Dodor & Afenyandu, 2005) are among therapy related factors that have been found to influence TB treatment default.

In Nakuru County, one defaulter, a 54 year-old male who discontinued both his anti-TB and ART treatment after experiencing severe side effects explained:

……."I continued the drugs but the nightmares and the hunger became too much. And then, I don't really even know how, my mind was also disturbed, so I took the drugs for some time, and stopped all drugs. You know the nightmare! And since I had no one beside me, and since the medications were disturbing me at night, and since it was pushing me to run away, I got scared and stopped the drugs."……. (54 year-old male Tb defaulter).

Another defaulter, a 36 year old female in Kericho County said she had to default when she noticed change in colour of her urine and had this to say "…..*My urine turned red; I thought it was blood caused by the medication. I thought it was safer to stop the medication……"*

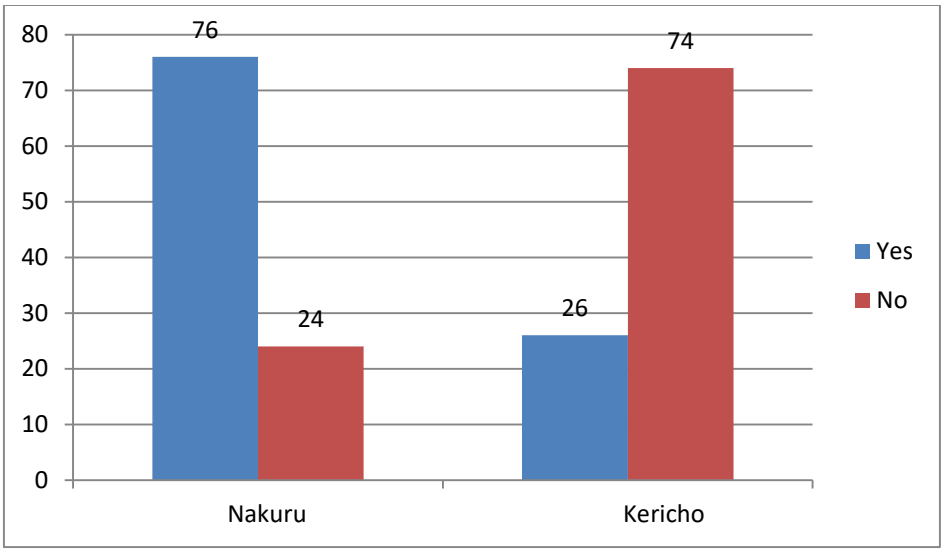


Figure 4:13 Association of Non-adherence with Discomfort or Drug side effects during Treatment

4.5.4: Length of Treatment Period and Non-adherence

When asked whether their non-adherence was associated with the length of treatment period, the response by the defaulters was as shown in table 4:16 and figure 4:14.

Table 4:16 Association of Length of Treatment Period with Non-adherence

Do you associate the length of treatment period with your non-adherence?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	45 (90)	21(34)
No	5 (10)	41 (66)
Total	50 (100)	62 (100)

The result in table 4:16 and figure 4:14 indicates that 90% and 34% of the respondents attributed their non-adherence with the length of treatment period in Nakuru and Kericho counties respectively, while 10% and 66% did not, respectively. This indicates that 90% of

the defaulters in Nakuru County attributed their non-adherence with length of treatment period while 66% did not in Kericho County.

These findings are similar to what (Culqui, et al. 2012) in a study "Factors associated with the non-completion of conventional anti-tuberculosis treatment in Peru" while studying the length of treatment period who found that adherence to long-term therapies is a multidimensional phenomenon determined by the interplay of five sets of factors (dimensions) namely; social and economic factors, health care team and system-related factors, condition-related factors, therapy-related and patient-related factors.

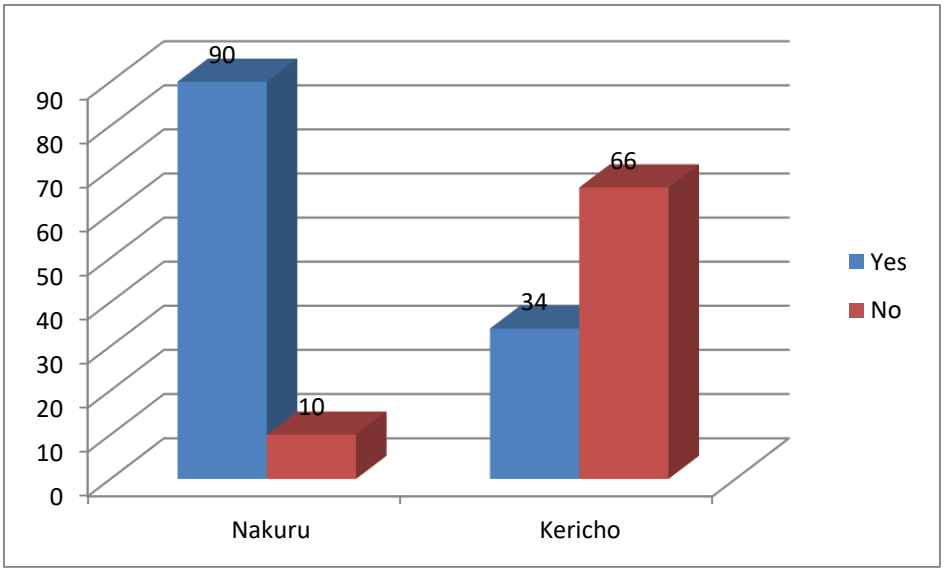


Figure 4:14 Association of Length of Treatment Period with Non-adherence

4.6: Findings on Healthcare Givers' (Workers') Factors

A total of 46 health care workers (11 from Nakuru County and 35 from Kericho County) from 34 (24 from Kericho and 10 from Nakuru) purposely identified health facilities in the two counties were interviewed by the researcher who administered a structured questionnaire to each of those who were found to administer tuberculosis treatment in various health facilities, in particular about their cadre, whether they get any tuberculosis updates on tuberculosis disease management, if so, the last time it happened, whether they have always performed tuberculosis work after qualification and posting to TB clinic. The findings from the healthcare workers regarding the questions posed are presented in tables 4:17 to 4:20.

4.6.1: Cadre dealing with Tb patients' Treatment

An interview schedule was administered to the healthcare workers who were dealing with Tb patients' treatment in order to establish their cadre. The findings are shown in table 4:17.

Table 4:17 Cadre that currently deals with Tb patients' Treatment

What is your current Cadre now that you are dealing with Tb patients' Treatment?

Cadre	Nakuru n (%)	Kericho n (%)
Nurse	7 (50)	19 (54)
RCO*	7 (50)	13 (37)
Others	N/A	3 (9)
Total	14 (100)	35 (100)

*** RCO – Registered Clinical Officer**

The results from the interview schedule revealed that Nurses, RCOs and others are involved in Tb patients' treatment. Table 4:17 and Figure 4:15 revealed that among those

involved in Tb patients' treatment, 50% and 54% were nurses in Nakuru and Kericho counties respectively, while 50% and 37% were RCOs. 9% of those who were also involved in Tb patients' treatment and were listed as others, included Tb ambassadors (cough monitors) and peer educators and were found only in Kericho County. These findings indicate that in Nakuru County, nurses and RCOs share Tb work equally (50% each) while in Kericho County, most (54%) of the Tb work is performed by nurses.

Although in Kenya mainly nurses and clinical officers are the ones mainly dealing with treating and managing TB patients, historically, public health officers were involved in patients' Tb management and were in fact empowered under public health Act Cap 232 to follow up (contact trace) such patients in the community and give notification to relevant authorities for those who defaulted from treatment. Sadly this is no longer strictly adhered to in all health facilities due to inadequate staff and change in roles.

The training of the healthcare workers in the Ministry of Health is based on traditional mode of health worker training i.e. the lecture method, which is the main instructional method in traditional education using subject-centred curriculum. This method of training as mentioned earlier, and as per the current curricula, is not appropriate in preparing this cadre in TB management of the patients. The curricula as is do not emphasize and explicitly focus on medication adherence, adherence counselling, soft skills application and health education. There is inadequate and inappropriate emphasis on effective healthcare worker-patient communication skills and patients' personal disease prevention strategies. This makes provision of health services poor and inadequate, thus falling short of the service provision expectations.

Success of good health service provision often depends on “soft skills,” which are skills related to emotional intelligence, interpersonal communication, social skills, and general positive attitudes on health care. Consequently and inevitably healthcare workers are seen to be incompetent in counselling as they lack appropriate skills on medication adherence. In addition, most busy healthcare workers do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, they must clear the queue of patients before the day ends. A study in Senegal showed that intensive strategy of treatment monitoring and education, which is lacking in this case, can lead to improved adherence to medications and improved outcomes among TB patients (Thiam, et.al 2007)).

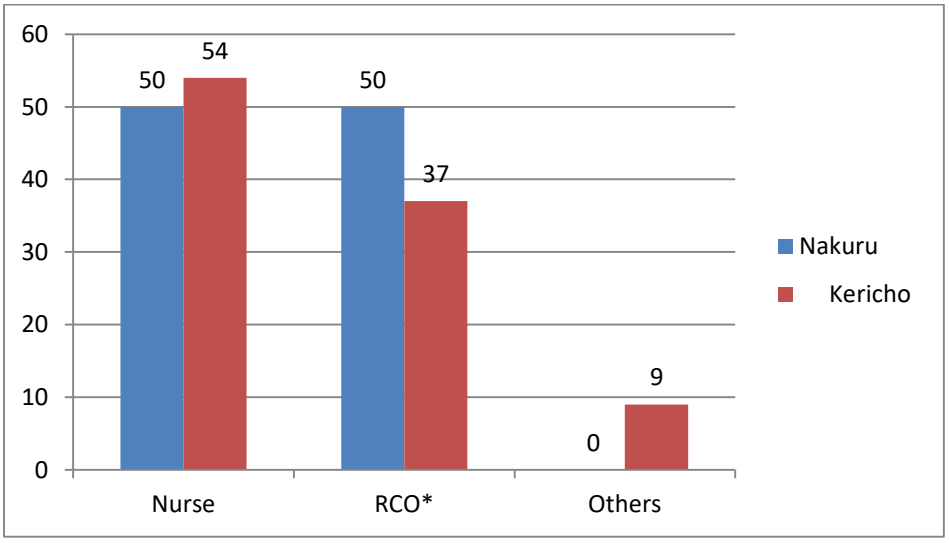


Figure 4:15 Cadre that currently deals with Tb patients’ Treatment

4.6.2: Tb update workshops attended

When asked if they had attended any Tb update workshop the healthcare workers’ responses are shown in table 4:18.

Table 4:18 Tb update workshops attended

Any Tb update workshop attended?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	8 (57)	23 (66)
No	6 (43)	12 (34)
Total	14 (100)	35 (100)

The results in table 4:18 and Figure 4:16 from responses of the healthcare workers revealed that 57% and 66% of the healthcare workers had attended Tb update workshops in Nakuru and Kericho counties respectively, while 43% and 34% had not. The findings indicate that in Kericho County, 66% of the healthcare workers had attended Tb update workshops while 43% in Nakuru County had not, compared to 34% in Kericho County.

In an ideal situation, everybody running a Tb clinic must get regular and timely update. Noting that the training of the healthcare workers in the Ministry of Health is based on traditional mode of health worker training i.e. the lecture method which is the main instructional method in traditional education using subject-centred curriculum, it should be recalled that knowledge gained during undergraduate medical training almost becomes outdated by the time the student graduates, yet the general public still assumes that the knowledge acquired is still there. This therefore justifies the need for regular and timely update, which can be achieved through continuing professional development/continuing medical education (**CMEs**) for all clinic staff. Again as we borrow a leaf from Senegal study (Thiam, et.al (2007)), intensive strategy of treatment monitoring and education, which is lacking in this case, can lead to improved adherence to medications and improved outcomes among TB patients. It is therefore clear that the factor that compromises

healthcare worker competence is the lack of update workshops, which is meant to boost their knowledge on patient care.

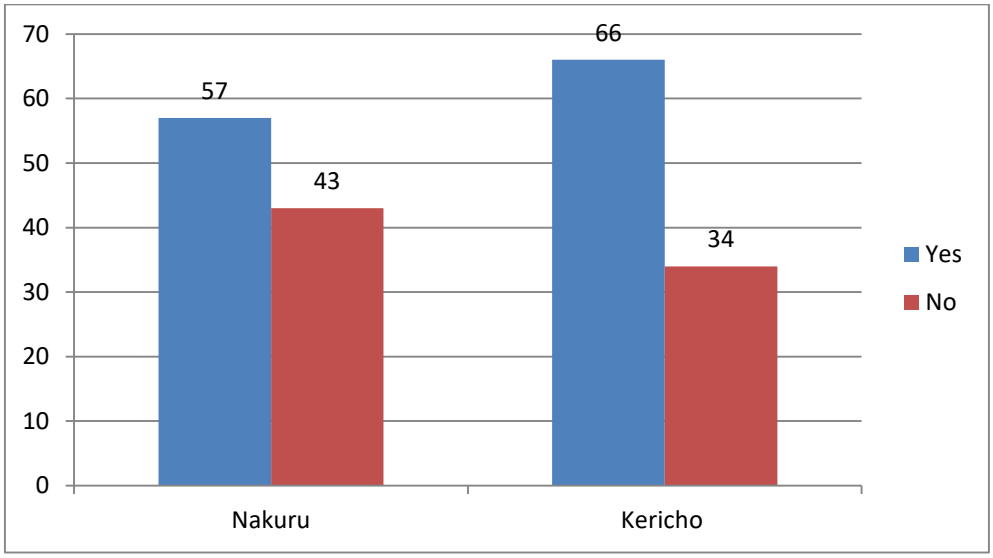


Figure 4:16 Tb update workshops attended

4.6.3: Time of attendance of last Tb update workshop.

When asked about the last time they had attended Tb update workshop, the healthcare workers' responses are shown in table 4:19.

Table 4:19 Time when last Tb update workshop was attended

When was the last time you attended a Tb update workshop?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Less Than A Year Ago	1 (7)	4 (12)
Within A Year But Less Than 2 Years	3 (21)	7 (20)
More Than 2 Years Ago	4 (29)	12 (34)
Never	6 (43)	12 (34)
Total	14 (100)	35 (100)

The results in table 4:19 and Figure 4:17 from the interview schedule revealed that the period of Tb update workshop attendance varied, with 7% having attended less than a year

ago in Nakuru County, 21% within a year but less than 2 years, 29% more than 2 years ago and 43% having never attended at all. The situation was a little different in Kericho County which showed 12% of attendance within less than a year, 20% within a year but less than 2 years, and an equal number- 34% each for those who had attended more than 2 years ago and those who had never attended at all.

For TB updates, it was generally noted that, in almost all health facilities, educational materials such as informational pamphlets on what TB is, how it is transmitted, how it is diagnosed, how TB can be treated, the type of drugs for treatment, expected behaviours at individual and community levels to prevent Tb transmission, and medical alerts on emerging drug-resistant tuberculosis were scanty, or not available at all not only for healthcare workers, but also to the general public. Availability of these educational materials is critical if we have to increase TB awareness at individual and community levels for the purpose of TB disease control.

There is a great need for health professionals to be attending conferences, seminars and workshops on Tb for updates. Here, time of workshops attendance is of essence, noting that the more frequent the update the better since as pointed out earlier, knowledge gained during undergraduate medical training almost becomes outdated by the time the student graduates. Here again there is need to borrow a leaf from Senegal study (Thiam, et.al 2007), which showed that intensive strategy of treatment monitoring and education, which is lacking in our situation, can lead to improved adherence to medications and improved outcomes among TB patients. It is therefore clear that the factor that compromises healthcare worker competence is the lack of update workshops that is meant to boost their knowledge on patient care.

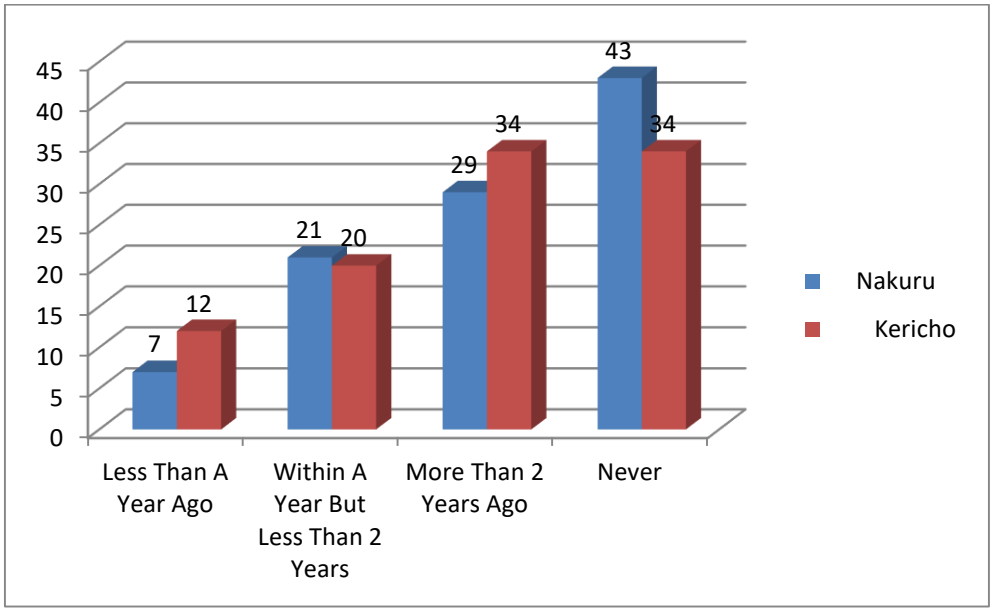


Figure 4:17 Time when last Tb update workshop was attended

4.6.4: Performance of Tb work since posting to the Tb Clinic

The healthcare workers were also asked whether they had always performed Tb work after qualification and posting to Tb clinic. Their responses are shown in table 4:19.

Table 4:20 Performance of Tb work since posting to Tb Clinic.

Have you always performed Tb work since posting to Tb Clinic?	**Nakuru**	**Kericho**
	n (%)	**n (%)**
Yes	1 (7)	3 (9)
No	13 (93)	32 (91)
Total	14 (100)	35 (100)

The result in Table 4:20 and Figure 4:18 revealed that 93% and 91% of the healthcare workers in Nakuru and Kericho counties respectively had never performed any Tb work prior to the current engagement with Tb activities while 7% and 9% respectively admitted

they had always performed Tb work. The findings reveal that more than 90% of the healthcare workers had never performed any Tb work prior to their posting to the Tb clinic.

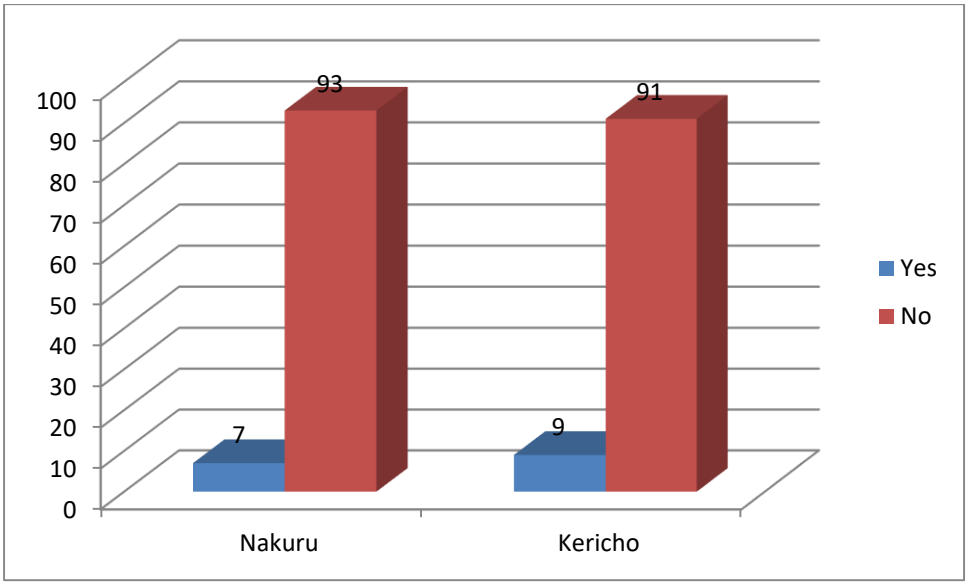


Figure 4:18 Performance of Tb work since posting to Tb Clinic

As noted earlier, the factor that compromises healthcare worker competence is the lack of update workshops, which is meant to boost their knowledge on patient care. Lack of update makes the healthcare workers appear incompetent in counselling and communication as they lack appropriate patient management skills. This has a negative relationship with the degree of healthcare worker preparedness in dealing with newly diagnosed Tb patients especially regarding effective healthcare provider-patient communication and lack of emphasis on medication adherence. Patients, health care workers, and health care systems, all have a role in improving medication adherence and that healthcare workers should be aware that patients are more likely to adhere to medication regimens when they are convinced that the medication they are taking is clearly linked to their future health and wellness and that they must be made active participants in the decision-making process

regarding the medications. It is therefore essential that healthcare workers need to effectively interact and bond with their patients so that they can gain mutual trust of their patients so as to promote medication adherence. This healthcare worker-patients mutual trust can happen if the healthcare workers are appropriately prepared prior to posting to a TB clinic. Failure to do this can only make the staff poor service providers and in the eyes of the public will appear incompetent. As pointed out by (Thiam, et.al 2007), a proper healthcare worker preparedness in terms of health education can lead to positive improvement on patients' treatment adherence.

4.7: Findings on Healthcare workers' and TB Programme managers' views regarding TB patients' default from treatment.

Through structured questionnaires and semi-structured interview schedules ***(Appendix B &C)***, healthcare workers and TB programme managers were asked to give their views as to what they thought were the reasons patients defaulted from their medication and asked to suggest possible interventions to curb the observed trends on default from medication.

For the healthcare workers, the questions posed were:

i. What in your opinion could be the reason/s why patients default from TB Treatment?
ii. What interventions, immediate, short term and long term can be used to promote adherence to TB Treatment?

For the programme managers (CTLCs and sCTLCs), the questions posed were more elaborate as they centred on focus group discussions and were as follows:

Focus Group Discussions (FGD)

As health managers regarding patients' TB treatment (Diagnosis, Treatment and follow-up, please give us your views about what possibly causes patients to default from treatment:

What in your opinion could be the reason/s why patients default from TB Treatment? Identify possible reasons from the attached suggestions:

Categories of factors associated with adherence to TB treatment

Category	**Factors**
Patient-centered factors	Demographic Factors: *Age, Ethnicity, Gender, Education, Marriage Status* Psychosocial factors: *Beliefs, Motivation, Attitude* Patient-prescriber relationship Health literacy Patient knowledge Physical difficulties Tobacco Smoking or alcohol intake Forgetfulness History of good compliance
Therapy-related factors	Route of administration Treatment complexity Duration of the treatment period Medication side effects Degree of behavioural change required

	Taste of the medication Requirements for drug storage
Healthcare system factors	Lack of accessibility Long waiting time Difficulty in getting prescriptions filled Unhappy clinic visits
Social and economic factors	Inability to take time off work Cost and Income Social support
Disease factors	Disease symptoms Severity of the disease HIV co-morbidity

Figure 4:1 Categories of factors associated with adherence to TB treatment

On interventions, the managers were asked to suggest immediate, short term and long term possible interventions that can promote adherence to anti TB Treatment.

4.7.1 Health workers' views on patients' defaulting and suggested interventions

Of the 46 healthcare workers (11 from Nakuru County and 35 from Kericho County) interviewed by the researcher and who were administering tuberculosis treatment in various health facilities at the time of study, some of their responses when asked about their views on possible reasons for default from tuberculosis treatment by patients, are as follows:

4.7.1.1 Alcohol intake

On how alcoholism contributes to non-adherence to tuberculosis medication, 24 out of 35 (69%) healthcare workers in Kericho County had this to say from their experience *"……majority of those who are alcoholic forget to take their medication when under the influence of alcohol, and fear to come to health facility since instructions given when starting treatment is that they should not take alcohol while under medication, and since they have breached this instructions they fear to face the* ***daktari*** *(doctor – referring to health worker)….."*

4.7.1.2 Feeling well soon after medication intake

Soon after taking medication many patients begin to feel well and thus do not feel any obligation to continue taking medication and hence default from medication. On this, 21 out of 35 (60%) and 8 out of 11 (73%) healthcare workers interviewed in Kericho and Nakuru counties respectively said that *"…..once patients feel better after a few days of taking medication, they imagine that they are now cured and see no reason to take medication anymore thus defaulting from medication…"*

4.7.1.3 Stigma

Regarding stigma and its relationship to non-adherence to treatment, 51% (18 out of 35) of the healthcare workers interviewed in Kericho county had this to say on how stigma contributes to medication non-adherence *"…..most of the patients go into denial due to possible association of their disease with HIV as they feel that they are culturally or socially unacceptable or inferior so they become withdrawn, fearful, silent, and secretive and this prevents them from talking about their condition even to those who are close to them and love them….."*

4.7.1.4 Pill burden and drugs side effects

On drug fatigue – i.e. too many drugs and prolonged period of intake –pill burden, 55% (6 out of 11) and 29%(10 out of 35) of the healthcare workers interviewed in Nakuru and Kericho counties respectively stated that from the perspective of some patients, a high number of pills was associated with potential damage to the body and a higher risk of not tolerating the drugs, thus, summing up what one patient stated: *"Swallowing so many drugs, was very difficult. I was scared that it would harm my body. Drugs can harm you if they are too many." (36-year-old male defaulter in Kericho County).* This belief was reinforced by some 55% of healthcare workers in Nakuru County who also narrated: …."*When they think about pill burden, they say, can I tolerate this, won't this kill me? Taking many pills is perceived as lethal by some. Patients worry a lot about whether their body will be able to handle so many pills every day."*

Regarding drug side effects, according to 45% (5 out of 11) of healthcare workers interviewed in Nakuru County, some defaulters abandon taking medication citing side effects as reason for non-adherence stating that patients tend to experience side effects mainly at the beginning of anti-TB treatment or upon initiation of concomitant treatment, with some side effects mentioned being: generalized body weakness, “burning of the stomach,” "turning of the head", headache, bad dreams, rash and vomiting.

The views on possible reasons for default from Tb Treatment and suggested interventions as gathered from the interviewed healthcare workers of the two counties of Nakuru and Kericho are summarized in **table 4:21** and **table 4:22** below.

Table 4:2 Frequency on Responses of Health care workers' views on possible reasons for defaulting- Nakuru & Kericho counties (Top 15 reasons)

What are your views as to why patients default from Treatment?	Nakuru (N= 11)	Kericho (N= 35)
	%	%
Stigma	(4)36	(18)51
Feeling well	(8)73	(21)60
Lack of fare to Health Facility	(2)18	(13)37
Cross border transfer- and travelling out of station	(2)18	(2)6
Social problems like unstable family setup and disputes	N/A	(4)11
Poverty	(4)36	(8)23
Drug side effects	(5)45	(3)9
Alcoholism	(5)45	(24)69
Denial due to possible association with HIV	N/A	(6)17
Drug fatigue – too many drugs and prolonged period of intake –pill burden	(6)55	(10)29
Not appreciating seriousness of Disease	(1)9	(4)11
Migrant population, no fixed abode	(1)9	(4)11
Giving up in Life	N/A	(5)14
No food, cannot take drugs on an empty stomach	(3)27	(3)9
Distance to Facility	(4)36	(9)26

Table 4:22 Health workers' suggested interventions (Top 16 suggestions)

Suggested Interventions	Nakuru (N= 11)	Kericho (N= 35)
	%	%
Involve CHVs/Tb Supporter/ Tb ambassadors in drug supply and defaulter tracing	(6)55	(21)60
Have sensitization during chiefs' Barazas	(4)36	(9)26
Involve PHOs in defaulter tracing	(1)9	(4)11
Increase number of trained staff in health facilities to minimize burn out	(2)18	(6)17
Open up more treatment centres near patients' residences	(2)18	(3)9
Give financial support to existing CHVs	(2)18	(12)34
Ensure constant supply of pyridoxine in clinics	(3)27	(3)9
Avail and distribute food supplements to Tb patients	(1)9	(7)20
Financial support to patients for transport	(2)18	(4)11
Intensify Health Education by Clinic staff	(5)45	(18)51
Ministry of Health to work on availing fewer FDC therapies and reduce duration of treatment i.e. reduce pill burden	(2)18	(5)14
Have in place Alcohol Reduction Strategies in communities – involve Alcohol & Drug Abuse Group	N/A	(4)11
Constant supply of Tb drugs	(3)27	(4)11
Home visits by health workers- patients' homes	(3)27	(5)14
Increase and regularize staff updates on Tb	(2)18	(4)11
Financial support to staff for reminders(airtime) to patients about clinic attendance	(2)18	(4)11
Staff to intensify adherence counselling	(6)55	(16)46

4.7.2: Key informant interviews/focus group discussions (FGD) views on patient factors that lead to defaulting

Views from CTLCs and SCTLCs who are the managers and implementers of Tb programme in their respective counties were taken as they responded to questions of what they thought were the possible reasons patients defaulted from Tb medication and what they could suggest as the possible interventions to curb the observed anomaly.

4.7.2.1: Stigma

Stigma related issues frequently confront the programme managers. According to them fear of stigma not only lead patients not disclosing their illnesses but also makes seeking TB treatment in their catchments areas difficult for fear of being identified by neighbours. Many patients believed that they were predisposed to stigma because of TB. For many of these patients, that was mainly due to the fact that people associated TB with HIV. Many had seen other HIV patients suffering from stigma and discrimination in their communities, and feared that the same might happen to them. Some shared their experiences, such as being pointed at in their neighbourhoods, neighbours gossiping about their illness behind their backs and exclusion from social events. Some patients said the stigma was directly related to the TB because they were believed to be infectious. These actual experiences and anticipations of stigma resulted in many patients hiding their diagnosis of TB or only disclosing it to selected people, mostly close families.

This fear was confirmed by many of the programme managers from the two counties of Nakuru and Kericho who explained during the focus group discussion that they have faced

difficulties with patients who do not want to receive treatment in the health facilities located in their vicinity, for fear of being identified by neighbours.

4.7.2.2: Medication side effects

The programme managers were unanimous that frequently some patients experience medication side effects and present with nausea/vomiting, features of hepatotoxicity, peripheral neuropathy, red coloration of urine etc. all leading to a patient abandoning medication and hence becoming non-adherent.

4.7.2.3: Level of Education

The level of education also has a role to play in non-adherence since: *"…..clients with low level of education default more due to lack of understanding on importance of treatment….."*

4.7.2.4: Feeling Well

According to the programme managers they have noticed that patients tend to abandon Tb medication after a short while *"….because of the impression of being cured once medicines begin to take effect and the patient feeling better……."*

4.7.2.5: Alcohol intake

The Kenya NLTP TB guidelines recommend that patients taking TB treatment should not smoke or drink alcohol , though doing so are not contraindications to treatment. The implications of patients taking alcohol while on treatment are twofold. Firstly, patients may forget to take their medicines when drunk, and secondly there may be more side effects to TB medicines, particularly when patients are taking other medicines, which may result in their being non-compliant. Smoking when concomitantly combined with TB medication may result in delayed healing from treatment, which in turn gives the

patients false impression that the TB medicines are not working thereby causing them not to be compliant.

The association of alcohol intake and defaulting was summed up by the managers thus: *"……Alcohol and tobacco smoking contributes to defaulting as most patients – forget treatment not willingly for one or 2 doses……"*

4.7.2.6: Age and Gender

On age as a factor that contributes to non-adherence to medication, the managers had this to say: *"……the very young and the very old or disabled e.g. blind who are dependent on guardians have no one to collect drugs for them and so become defaulters….."* and on gender: *"....males more than females default more because of nature of occupation – women not given permission to go to clinics to collect drugs, while men who mostly work outside home, forget to refill drugs e.g. long distance truck drivers…."*

4.7.2.7: Duration of Treatment

The duration of Tb medication/drug intake was felt to be too long by the health professionals and in addition they felt that the drugs to be taken were too many causing pill burden with associated side effects. Patients, especially those with co-morbidity (Tb & HIV) confide to them that pill burden is one of the major challenges of concomitant treatment, and they use expressions such as "becoming a drug bag", and "becoming a pharmacy". From the perspective of some patients, a high number of pills was associated with potential damage to the body and a higher risk of not tolerating the drugs as one defaulter narrated thus:

"Swallowing so many drugs was very difficult. I was scared that it would harm my body. Drugs can harm you if they are too many." (36-year-old male participant)

This belief was reinforced by some health professionals, including programme managers who stated about patients that:

"……When patients think about pill burden, they say, can I tolerate this, won't this kill me? Taking many pills is perceived as lethal by some. Patients worry a lot about whether their body will be able to handle so many pills every day…….."

The programme managers were unanimous in their plea that concerted research be done with the aim of reducing the duration patients have to take Tb medication because: *"…..Prolonged treatment contributes to defaulting……"*

Summary of key informant interviews/focus group discussions (FGD) views regarding possible factors that lead to defaulting and suggested interventions are shown in **tables 4:23** and **4:24**. See also ***Appendix J*** showing the researcher with one of the county's FGD in session.

Table 4:3 Summary of key informant interviews/focus group discussions (FGD) views of Programme Managers' suggested possible patients' factors that lead to defaulting in Kericho and Nakuru counties.

Kericho County	Nakuru County
2. Alcoholism and tobacco smoking. 3. Stigma associated with HIV. 4. Lack of knowledge about Tb disease due to low level of education. 5. Patient attitude toward medication – improvement in signs/symptoms (Relief), make patients assume they are cured prematurely. 6. Pill burden – too many drugs to swallow which is a challenge especially if one is poor and cannot eat well. One gets discomfort if one swallows drugs on an empty stomach. 7. Duration of treatment is long, making patients get drug fatigue. 8. HIV co-morbidity resulting in pill burden since one has to take multiple drugs both for Tb and for HIV.	*1. Age:* - The very young who are dependent on guardians have no one to collect drugs for them - Also very old or disabled e.g. blind *2. Gender*: - Males more than females because of nature of occupation - not given permission. - Men work outside home, forget to refill drugs e.g. long distance truck drivers. *3. Level of education:* – clients with low level of education default more due to lack of understanding on importance of treatment. 4. *Singles:* - Tend to default, lack psychosocial support. - No one to send for collection of drugs. *5. Beliefs:* - Others believe in divine healing e.g. Wakorinos. *6. Motivation* – e.g. MDR patients are motivated by the money they are given and food support. *7. Attitude:* - Harsh approach to patients scares them away. - Alcohol and tobacco smoking contributes to defaulting as most patients – forget treatment not willingly for one or 2 doses. *8. Route of Administration:* Those on injectable tend to be compliant because of DOTS Prolonged treatment contributes for defaulting. *9. Medication side effects* contribute to defaulting e.g. nausea/vomiting, hepatotoxicity, peripheral neuropathy, red coloration of urine. *10. Severity of Disease* Patients who have severity of the disease tend to default. *11. Disease co-morbidity* Patients with Tb and HIV co-morbidity tend to default because of stigma, pill burden/or other co-morbidities. *12. Imprisonment* Imprisonment where Clients are released without proper contacts/address (transfers out)

Summary of the combined focus groups' views regarding suggested interventions in the two counties of Nakuru and Kericho are presented in **table 4:24.**

Table 4:4 Summary of key informant interviews/focus group discussions (FGD) suggested interventions to reduce Patients' default from Tb Medication in Kericho and Nakuru counties.

Kericho County	Nakuru County
Immediate 1. Proper counselling and health education 2. Equipping health care workers with proper knowledge on TB management 3. Strengthening DOT strategy. **Short-term** 1. Accessibility Decentralization – all health facilities to be equipped as TB treatment sites 2. Involve psychosocial Health facility counsellors 3. Continuous mobilization and sensitization in the community though CHVs. **Long-term** 1. Reduce duration of treatment through research 2. Strengthen DOTs 3. Establish linkages with rehabilitation centres to deal with alcoholics.	**Immediate** 1. Intensify adherence counselling during initiation of treatment and during clinic visits. 2. Ensure availability of food support. 3. Create positive environment for the clients in health facilities and also with health care workers. **Short term** 1. Empower community health volunteers (CHVs) to assist in terms of counselling and defaulter tracing. 2. Training of Health care workers on attitude change. 3. Training of private practitioners on management of clients and also chemists who dispense drugs and reagents. 4. Ensure laboratory services are decentralized. **Long Term Interventions** 1. Continuous counselling and TB updates of healthcare workers. 2. Infrastructure – building additional new health facilities to decentralize patients. 3. To employ more personnel to assist in TB clinic management to reduce burn out of clinic staff. 4. In future use ID numbers to register TB patients.

4.8: DISCUSSION AND INTERPRETATION OF THE STUDY FINDINGS

4.8.1: Socio-demographic factors of respondents

The study analysed the socio-demographic characteristics of 112 respondents (50 from Nakuru and 62 from Kericho) drawn from 34 health facilities of the two counties of Nakuru and Kericho which included age, gender, marital status, level of formal education, income levels and occupation. In addition there were 46 healthcare workers who participated in the interviews as respondents on interview schedules and 15 Programme managers (County Tuberculosis and Leprosy Coordinators (CTLCs) and sub County Tuberculosis and Leprosy Coordinators (SCTLCs) all of whom in this context are actually regarded as tuberculosis managers and who formed key informant interviews/focus group discussions interview group.

4.8.1.1: Age

The defaulters' mean age in Nakuru County was 33 years with range 66 years (10 to 76) while in Kericho County the mean age was 29 years with range 46 years (15 to 61). Majority of the patients in the two counties were found in the age group 21-39 years with Kericho County having 67% while Nakuru had 70%. This age group which has more than 65% of the respondents is also the most economically active age group generally. Other studies have reported a rapid rise in TB morbidity and mortality among this young adult population mostly between 15 – 44 years of age (WHO Global Tuberculosis Report 2013; Warker & Edward, 2004; & MOH/NLTP), 2005)) which is in line with the study findings. Other studies mention that patients in extreme age groups (older than 54 and younger than 15) presented a greater tendency towards non-adherence (Burman, et al., 1997) as they are more dependent on those who are more able, energetic and young. People in this age group, 21-39 years as is noted above generally, also tend to be unstable in their environments and

will move to set-ups like townships in search for employment opportunities and in such situations may be forced to live alone or without family; they get minimal social support and tend to live in overcrowded and unhygienic environments.

4.8.1.2: Gender

Among the defaulters in Nakuru county, there were 29 (58%) males and 21 (42%) females while in Kericho county, among the defaulters interviewed 33(53%) were males and 29(47%) were females. This indicates that slightly more than half (58% and 53% in Nakuru and Kericho counties respectively) of the defaulters interviewed were males showing that males were more likely to have TB than females [World Health Organization Global Tuberculosis Report 2013, Ministry of Health: National Leprosy and Tuberculosis Guideline (MOH/NLTP, 2005.), meaning that men are at a higher risk of treatment non-adherence than women. Studies that analyzed the relationship between sex/gender and non-adherence showed that men´s breadwinner status as heads of households explained their tendency to be less adherent to treatment. (Balasubramanian, et al. 2000), in a study conducted in India found that being male and being employed implied twice the risk of abandoning treatment, mainly because workers have trouble in leaving their duties for a health care centre visit. Other studies (Burman, et al., 1997; Jha, et al., 2010; & Horna-Campos, et al., 2010) showed that the male sex was identified as a risk factor for non-adherence to treatment. In another study such as that found in Peru, the issue of non-adherence was compounded in a situation where men are more actively engaged in employment, albeit their precarious working conditions which often entailed lack of formalized work, lack of unemployment benefits, contracts without vacation time and lack of subsidies for illness, it became difficult for them to be adherent to treatment as they did

not have free time. However (Salla et al., 2007) found that female patients were more adherent to treatment despite cultural practice of seeking permission for treatment from their spouses.

In this study, more than 50% of respondents were males (58% Nakuru County and 53% Kericho County). The implication of this is that, as noted earlier in other studies, the mere fact that men´s breadwinner status as head of households and as workers may have trouble in leaving their duties for a health facility visit leading to their fewer adherences to treatment. This is because travelling time for an employed patient represents a time absence from work, coupled with the fact that some employers may not take kindly to the frequent long periods during which TB patients need to attend health facilities for treatment, hence patients may opt not to leave their work stations in order to secure their jobs for financial gains and as a result become non-adherent to treatment.

4.8.1.3: Marital Status

The defaulters' marital status in Nakuru County was; Single 26 (52%), Married 24(48%) while in Kericho county Singles were 34 (55%) and Married 28 (45%). These findings indicate that more than 50% of the defaulters were single which is supported by a study in Kenya (Muture, et al., 2011), on "Factors Associated with Default among Tuberculosis Patients in Nairobi Province, Kenya: A Case Control Study. BMC Public Health.(2011); 11,696)" and in China (Chee & James, (2000), on "Patient and disease characteristics and outcome of treatment defaulters from the Singapore tuberculosis control unit: a one-year retrospective survey, *International Journal of Tuberculosis and Lung Disease*.(2000); 4:496–503)" where patients who were singles had higher risk of defaulting compared to patients who were married, probably because the singles were busy looking for jobs. This

is contrary to a study in Bangalore, India (Vijay, et.al 2003) and in Benin city, Nigeria, (Xu, et.al 2009), which showed that patients who were married had a higher risk of lost to follow up compared to those who were single. A possible explanation could be that family responsibility and associated lack of money and time may have reduced their attention to health care, hence becoming non-adherent to treatment. On the other hand, the singles who probably unemployed and not engaged, had more free time to go for treatment and were therefore more adherent.

4.8.1.4: Occupation

Analysis of the occupation of the defaulters revealed that in Nakuru county those who were employed were 3 (6%), self-employed 12 (24%), not employed 32 (64%), students (6%) while in Kericho county the occupations of the defaulters were: employed 12 (19%), self-employed 17 (27%), not employed 19 (31%), students 14 (23%). From the study, majority (64%) of the defaulters were unemployed in Nakuru County compared with 31% in Kericho County.

It has been demonstrated in other studies (Maher, (2002); Rajeswari, et al., (2002), that the TB epidemic may have changed the population's economic needs, resulting in forcing more young men and women to be exposed to situations that place them at higher risk for TB transmission, for instance, sharing overcrowded rooms even when the situation does exacerbate the risk of TB transmission. Because of expected low economic empowerment, the young men and women needed time to eke a living rather than go for medication, and thus inevitably be forced to be non-adherent. This seems to be in support the findings of our study. Some studies reported that there is an association between unemployment and non-adherence (Bhatia, et al., 2002) while others suggested that unemployed patients were

more treatment adherent, reason being that the patients had more time available to go to treatment centres to take doses at the proper time. Also, females contributed majority of unemployed group and as discussed earlier females are more treatment adherent. It may reflect role of social and family support when on anti-Tb treatment.

4.8.1.5: Level of Formal Education

The education levels of the defaulters in Nakuru County were: None 15 (30%), Primary 20 (40%), Secondary 12 (24%) and Tertiary 3 (6%) while in Kericho County those with no education were 2 (3%), Primary 32 (52%), Secondary 22 (35%) and Tertiary 6 (10%). These findings indicate that in Kericho County, 97% of the defaulters had at least primary level of education and above while in Nakuru County, 30% of the defaulters had no formal education at all.

High literacy level has been reported to positively impact on slowing rapid development of DR-TB because a great degree of literacy has been positively associated with good health perception (Pronyk, et al., 2001). Education overall increases knowledge and health awareness and treatment seeking behaviour of the individual (Geetakrishnan, 1990). Literate individuals are more likely to complete the treatment (Kumareson, et al., 2002). It was observed that patients who have completed at least high school education were strictly treatment adherent with noted decrease in trend of non-adherence as level of education increased. A study done in Zambia, by (Needham, et al. 1998) on "Barriers to tuberculosis Control in urban Zambia: the economic impact and burden on patients prior to diagnosis. (*Int J Tuberc Lung Dis*. 1998), 2: 811-817" contradicts this finding as the study revealed that though most patients had attended primary level of education, with more male patients

in the majority, there was no relationship between the individuals' level of education and TB infection rates.

Medication compliance/adherence requires that patients should be literate or have good literacy. Health literacy means patients are able to read, understand, remember medication instructions, and act on health information (Vlasnik, et al., 2005). In some studies, it was found that patients with low health literacy were reported to be less compliant with their therapy (Nichols-English & Poirier 2000).

TB education is necessary for people with TB. People with TB need to know how to take drugs for TB treatment properly. They also need to know how to make sure that they do not pass TB on to other people. Education on TB is also necessary for the public who need to know basic information about TB for a number of reasons including reducing the stigma still associated with TB. Stigma related issues frequently confronted the programme managers and according to them, fear of stigma not only lead patients into not disclosing their illnesses but also makes them afraid of seeking TB treatment in their catchments areas for fear of being identified by neighbours since people have a tendency to associate TB with HIV. Many such patients had seen other HIV patients suffering from stigma and discrimination in their communities, and feared that the same might happen to them. Some even shared their experiences, such as being pointed at in their neighbourhoods or neighbours gossiping about their illness behind their backs and exclusion from social events. Some patients said the stigma was directly related to their TB because they were believed to be infectious. These actual experiences and anticipations of stigma resulted in many patients hiding their diagnosis of TB or only disclosing it to selected people, mostly close families.

One undeniable fact is that, regrettably, many patients are unable to adhere to their treatment because of poor communication (Hansel, et.al, 2004), between them and healthcare workers, drug side effects coupled with pill burden (Gelmanova, et.al, 2007; NLTP, 2007; Dodor & Afenyandu 2005) and inappropriate counselling on medication adherence. Long patients' queues however, do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya et.al 2012)) with their patients concerning emphasis on medication adherence and counselling. Sometimes it is believed that education about TB only needs to involve people who already have TB. Nothing can be further from the truth. The truth of the matter is that there is dire need to educate the public as well about TB. This is firstly to ensure that people know how TB is transmitted and indeed not transmitted, and to reduce the stigma surrounding TB. It can also help to ensure that people with TB come forward for testing and treatment as soon as possible. It was also unfortunate and generally noted that concerning TB updates in almost all health facilities, educational materials such as informational pamphlets on what TB is; how it is transmitted; how it is diagnosed; how TB can be treated; the type of drugs for treatment; expected behaviours at individual and community levels to prevent Tb transmission; and medical alerts on emerging drug-resistant tuberculosis; were scanty, or not available at all not only for healthcare workers, but also to the general public. Availability of these educational materials is critical if we have to increase TB awareness at individual and community levels for the purpose of TB disease control.

In this study, more than 50% of the respondents **(**70% in Nakuru and 55% in Kericho) had primary level and below of education. This implies low educational level. Low educational level hampers effective understanding of Tb treatment. This scenario seems to hold true in

our case in this study. Healthcare workers should therefore spend adequate time to inform and educate TB patient regarding importance of regular treatment and correct duration of the treatment. Understanding on correct duration of treatment was found to be lower among non-adherent group. It should be noted that as a TB patient begins to feel better after few weeks of treatment initiation he/she may leave the treatment as he assumes that TB is cured. Poor patient-healthcare worker communication can lead to treatment default and poor health services utilization. Face-to-face discussions with patients about Tb are vital towards achieving an adequate fundamental understanding of TB and removal of confusion about community perceived stigma related to the disease. Many factors contributing to persistent patient confusion include underlying health care anxiety; ethnic, cultural and language barriers; and information provided in an incomprehensive manner to patients with limited educational backgrounds. Unfortunately, within busy hospital or outpatient clinic practices, healthcare workers often will not have adequate and quality time for more detailed discussions with their patients about TB. This is a problem commonly encountered among many TB clinics within low- and middle-income countries, where the incidence of TB is generally much higher. Indeed, many TB clinics within the two counties are typically very busy and thus actual healthcare worker face to face-time spent with patients can be quite limited.

4.8.1.6: Income Levels

The defaulters' monthly income levels in Nakuru county were: less than KSH 3400/= 42 (84%), 3500/= to 4900/= 7 (14%), 5000/= to 10000/= None (0%), and above 10,000/= 1(2%) while in Kericho county their earnings were: less than KSH 3400/= 42 (68%),

3500/= to 4900/= 8 (13%), 5000/= to 10000/= 7(11%), and above 10,000/= 5(8%). The study revealed that majority (84%) of the defaulters in Nakuru County earned less than Ksh. 3400/= compared with 68% in Kericho County.

(Bhatia, et al., 2002), on a study among Tibetan refugees in India, concluded that from the study findings it became apparent that non-adherence is associated with low socio-economic status and that as social class becomes higher, treatment adherence increases. Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.(Kumareson, et al., 2002) from their study also came to the same conclusion that non-adherence is associated with low SES.

In developing countries, low socioeconomic status may put patients in the position of having to choose between competing priorities. Such priorities frequently include demands to direct the limited resources available to meet the household's basic needs. In Kenya, the government supports treatment of tuberculosis by availing free diagnostic services and drugs, but other hidden costs such as transport and opportunities lost during treatment exist. The health budget is usually overstretched and resources for social support are scarce or unavailable. Similar to findings in studies in some Sub-Saharan African countries (Dodor, et al., 2005;Demissie & Kebede, 1994) cited that socioeconomic factors such as low income and low education were linked to TB treatment default. In this study, the socio-economic status of the respondents was low as it revealed that more than **80%** (98% in Nakuru and 81% in Kericho) of the respondents earned less than 5000/= and that more than

80% (84% in Nakuru and 86% in Kericho)of the respondents in the two counties associated their non-adherence with their financial challenges.

4.8.1.7: Knowledge regarding Tb

The study revealed that 94% and 95% of the patients knew the disease they were suffering from while 6% and 5% did not understand the disease in Nakuru and Kericho counties respectively indicating that more than 90% of the defaulters knew the disease they were suffering from. These findings are consistent with those found by (Makwila, et.al 2016) in a study "Infection Control in Heath Care and Community Setting: Knowledge, Attitude and Practices of Tb Suspects in Uasin-Gishu and Nandi Counties, Kenya" in which the study found that 98% of patients interviewed said that they knew that Tb is transmitted through the air (coughing or sneezing) and **92**% were aware that Tb is not transmitted by handshake.

4.8.1.8: Disease Curability

Findings from the study indicate that the respondents in the two counties of Nakuru and Kericho were 100% unanimous that TB disease is curable with the drugs in current use. This is similar to what was found by (Omenge et al, August 2016) in a study **"**Factors associated to non-adherence in Tuberculosis treatment, Baringo County, Kenya where it was found that 94% of patients interviewed stated that they knew Tuberculosis disease was curable.

4.8.1.9: Tb Disease a Curse?

The study findings indicate that 8% and 2% of the respondents in Nakuru and Kericho counties respectively thought that TB disease is a curse, while 92% and 98% respectively

in the two counties did not believe Tb disease is a curse. This response indicates that more than 90% of the defaulters did not think that Tb disease is a curse. The small minority who thought that Tb is a curse is supported by a study in Baringo County (Obwoge, Sang & Wakube, (2016) which found that some defaulters believed that TB is due to witchcraft while others thought that Tb was inherited in some families.

4.8.2: Findings related to review of the training curricula for nurses and clinical officers used in the training institutions

Literature search regarding link between healthcare workers' training curricula and practices is very scanty hence this study becomes the first study done which attempts to make the link.

The training curricula (Kenya Medical Training College curricula, 2013; 2014; 2014b) currently in use in training institutions do not adequately prepare healthcare workers for appropriate patients' education on medication adherence (M'Imunya, et.al 2012). The training per se of healthcare workers (nurses and clinical officers) which is supposed to address this training need is in itself inadequate to meet the expectations due to poor, inadequate and uncomprehensive training curricula structure (Mutema, Kangethe, Naweya 1999; Abrahamson, 1996; & Al Mirghani, 2007)) most of which displayed shallow content and lack of appropriate competency skills.

From focus group discussions, the group unanimously expressed concern about the inappropriateness of the curricula in the current form where it was apparent that there was shallowness in content especially on diagnosis, treatment and management of TB disease, neither were there comprehensive counselling and medication adherence sessions in all the

documents. Unfortunately, also, the curricula did not mention or have a section that deals with soft skills aspect of disease management. In the day-to-day life, soft skills are applied though not consciously. These skills are those personal qualities, habits, empathy, attitudes and social abilities that make someone a well-rounded employee; are not traditionally taught in school, or even on the job; in fact, workers often have to learn them on their own, by either observing and mimicking exceptional professionals who display these traits or practicing them as they would any other skill. The general expectation is that each healthcare worker is supposed to have empathy, which is the single most important thing that keeps healthcare workers grounded and allows them to remember that every case is different and people need to be treated as individuals. Without empathy, a healthcare worker is in danger of falling into the trap of forgetting that everyone reacts in different ways and needs a personalized approach to help them get the most out of their treatment. The focus group also generally felt that the curricula currently in use were inappropriate, more so because the members themselves were beneficiaries of the same, who were taken through the same curricula during their training and were quick to point out the deficiencies they felt.

For the trainers in training institutions to see the need for emphasis on deep understanding on TB disease and its management, detailed information should be available for trainers in the curricula, so that they appreciate the need for comprehensive information on TB diagnosis, treatment, appropriate management, counselling and emergence of multi-drug resistant forms of TB.

From a historical perspective, tuberculosis control in Kenya started in 1956 (DLTLD, 2011), with the initiation of the National Tuberculosis Control Programme (NTP). TB was

treated with long term regimens lasting a year or over until 1993 when short course chemotherapy was introduced which reduced the TB treatment period from 12 months to 8 months with the introduction of Rifampicin in the intensive phase of treatment (WHO/HTM/TB/2008.398). Currently, successful treatment of tuberculosis involves taking anti-tuberculosis drugs for at least six months.

The therapeutic regimens recommended by WHO for treating Tb have been shown to be highly effective in both preventing and treating the disease but poor adherence to anti-TB medication becomes a major barrier to its global goal which is to cure patients once they start treatment (WHO, 2003). Effectiveness of a treatment depends on both the efficacy of a medication and patient adherence to the therapeutic regimen. For effective compliance, a conducive healthcare worker-patient communication environment is a pre-requisite for patients' medication compliance/adherence. Poor compliance/adherence (WHO, 2003) by tuberculosis patients to their medication contributes to the worsening of their TB situation that paves way for incidence of drug resistance. Adherence to TB treatment is one of the interventions that can lead to increase in cure rate and reduction in mortality and decrease in emergence of Multi drug resistant tuberculosis (MDR) and high cost of treatment (World Health Organization, 2013; Abubakar, et.al 2013 &; Jia, et.al 2012)). Non-adherence to tuberculosis therapy can lead to drug resistance, prolonged infectiousness, and death; therefore, healthcare worker full understanding of what causes treatment default is very crucial.

Emphasis on TB education is very necessary for people with TB so as for them to take medication adherence seriously. People with TB also need to know how to take their TB drugs properly and need to know how to make sure that they do not pass TB on to other

people; other people meaning the general public, who should know the basic information about TB for a number of reasons including reducing the stigma still associated with TB. Regrettably, many patients are unable to adhere to their treatment because of poor communication (Hansel, et.al 2004) between them and healthcare workers, drug side effects coupled with pill burden (Gelmanova, et.al 2007; NLTP, 2007; Dodor & Afenyandu, 2005) and inappropriate counselling on medication adherence. Long patients' queues however, do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya et.al 2012) with their patients concerning emphasis on medication adherence and counselling. Sometimes it is believed that education about TB only needs to involve people who already have TB. But there is a need to educate the general public about TB. This is firstly to ensure that people know how TB is transmitted and indeed not transmitted, and to reduce the stigma surrounding TB. It can also help to ensure that people with TB come forward for testing and treatment as soon as possible. Once the healthcare workers are fully appraised on the above, then it is expected that they would be well prepared to manage TB patients and issues to do with patients defaulting would not arise.

In Kenya, and indeed worldwide, the hallmark of successful Tb treatment is based on full participation and corporation of competent medically trained healthcare workers who are well equipped with both hard and soft skills, which are essential components of any disease management. However, as noted earlier, healthcare workers' training curricula lay emphasis on hard skills on Tb treatment for the purpose of acquisition of knowledge and a professional certificate in their professional areas that can make them get employed and secure job duties. These hard skills (technical skills) are teachable abilities or skill sets that

are easy to quantify and can be learned in the classroom, through books or other training materials, or on the job (Alison Doyle, 2017). These skills are essential when treating patients or prescribing medications, and in healthcare, emphasis is rightly put on the "hard skills," because before a patient puts his/her life or health in someone's hands, he/she needs to have assurance they have the necessary training and track record of past successful patient treatment.

As noted earlier, in TB treatment, healthcare workers inevitably apply hard skills in patient care as opposed to incorporating these hard skills with soft skills in patient care in disease management, making it difficult for the healthcare worker to immediately accommodate immediate patients' concerns during such patients' encounter. Again, and as noted earlier, it is unfortunate that soft skills are never taught in training institutions as they are not in the curricula and so receive no emphasis or attention.

Quality of care plays an important role in Tb control and training should therefore emphasize timely diagnosis, treatment adherence, and treatment completion. This quality care cannot be guaranteed if the healthcare workers are not properly prepared during training which should lay emphasis on medication adherence, adherence counselling, soft skills application during patient care and general health education. Generally it is expected that at all Tb clinics, patients are supposed to be given specific information about TB symptoms, diagnosis, treatment, and follow up. Regrettably, in most government health facility clinics it is not unusual to find that the patients do not receive adequate information about TB from the healthcare workers because of their own individual inadequate behavioural skills or are constrained by time and patients' long queues during clinic days, thus making them give limited information (Waitzkin, & Stoeckle, 1976). In this regard

therefore, inevitably, education or counselling interventions may not be realized leading to a gap in patient care (M'Imunya, et.al 2012). This gap leads to poor quality of service provision and improper management of the patients which the public may interpret to mean poor healthcare worker attitudes and lack of healthcare workers' competence on Tb patients' care. All this is hinged on the way healthcare workers have been trained using the inappropriate structure of the current curricula.

As noted above, the training of the healthcare workers (providers) in the Ministry of Health in Kenya is based on traditional mode of health worker training i.e. the lecture method, which is the main instructional method in traditional education using subject-centred curricula which do not emphasize and explicitly focus on medication adherence, adherence counselling, soft skills application and health education. There is no adequate and appropriate mechanism for healthcare workers that suitably prepares them to put emphasis on prevention strategies necessary for effective healthcare worker-patient communication skills required for appropriate care and management of patients.

Reviewing the training curricula (Kenya Medical Training College curricula, 2013; 2014; 2014b) currently in use in training institutions, it was evident that the curricula were inappropriate as training tools as they do not adequately prepare healthcare workers for appropriate patients' counselling and education on medication adherence (M'Imunya, et.al 2012). This inappropriateness was because the curricula were found to be deficient in adequate content on Tb disease in terms of causation, diagnosis, treatment, management and control. Neither was there any mention on competence training essential for soft skills application, adherence counselling, medication adherence, risk of non-adherence to

medication and healthcare worker-patient communication skills application which are appropriate for competent patient care. Neither is there any mention on health education as an important component of holistic patient care. From focus group discussions, all the members unanimously expressed concern that the curricula in the current form were inappropriate as it was abundantly apparent that the curricula had shallowness in content especially on diagnosis, treatment and management of TB disease, neither were there comprehensive counselling and medication adherence sessions in all the documents. These deficiencies were quickly pointed out by the members who themselves were beneficiaries of the same curricula and who confessed the inappropriateness as they had been taken through the same training tool in the training institutions in their formative years.

As mentioned earlier, the training per se of healthcare workers (nurses and clinical officers) which is supposed to address this training need is in itself inadequate to meet the expectations due to poor, inadequate and uncomprehensive training curricula structure (Mutema, Kangethe, & Naweya 1999; Abrahamson, 1996 & Al Mirghani, 2007)) most of which displayed shallow content and lack of appropriate competency skills. Unfortunately, also, as mentioned earlier, the curricula did not mention or have a section that deals with soft skills application in the context of patients care as an important component in disease management. Normally, in the day-to-day life, soft skills are applied though not consciously. These skills are: those personal qualities, habits, empathy, attitudes and social abilities that make someone a well-rounded employee; are not traditionally taught in school, or even on the job; in fact, workers often have to learn them on their own, by either observing and mimicking exceptional professionals who display these traits or practicing them as they would any other skill. The general expectation is that each healthcare worker

is supposed to have empathy, which is the single most important thing that keeps healthcare workers grounded and allows them to remember that every case is different and people need to be treated as individuals. Without empathy, a healthcare worker is in danger of falling into the trap of forgetting that when people are sick, they react individually in different ways and need a personalized approach to help them get the most out of their treatment.

Thus to conclude, and in order to accommodate address to the deficiencies noted above, existing training curricula in training institutions need to be revised and updated to include practical components that touch on healthcare workers' competency improvement on skills acquisition on patients' management reinforced with mandatory hands on soft skills applications for all trainees.

4.8.3: Findings on Health care delivery factors

4.8.3.1: Distance to the nearest health Facility

Beyond education factors, other factors include the distance to the health facilities which varied greatly amongst the defaulters. The study revealed that 68% and 21% of the defaulters in Nakuru and Kericho counties respectively had to travel at least 1 km to reach the nearest health facility, 22% and 6% 2km, 6% and 10% 3 km, 2% and 8% 4 km and 2% and 55% 5 and more km, respectively. Clearly, there was a wide diversity of distance covered by the defaulters in order to reach their health facilities. The diversity in distance covered by the patients also gave varied responses as for some, the farther the distance, the more the time spent in travelling leaving them missing adequate time to attend to personal chores, while for others too much time spent waiting to be attended to by the few staff

available in the clinics, meant wasted time. The feeling of time wasted had a negative influence on medication adherence. According to the patients, any prolonged time spent travelling to seek for medication was a challenge to their better use on their attempts to eke a living as for most, their socio-economic status was low and their priority was looking for food for their survival.

The findings in this study is supported by other studies such as those by (Mohamed, et al. 2013) who also in addition to the long distance to be covered, found that existence of human resource gaps and TB staff inadequately prepared to deal with complex issues of TB patients treatment and management, particularly prolonged waiting time in the health facility prior to treatment, tended to worsen the situation, which led to non-adherence to medication. They concluded that reducing travelling and waiting times for TB patients might improve compliance rates. (Bagchi, et al. 2010) in their study found that travel-related cost factors were significantly associated with non-adherence to medication among the newly diagnosed patients.

4.8.3.2: Means of Transport to Health Facility

Defaulters used various means of transport to access health facilities. In this study it was found that 28% and 10% of the defaulters walked to the nearest health facility in Nakuru and Kericho counties respectively, while 36% and 74% used vehicles and the rest, 36% and 16% used motorbikes. These responses indicate that in Nakuru County in both occasions, 36% of the defaulters used vehicles and motorbikes respectively while in Kericho County, majority (74%) of the patients used vehicles. Use of vehicles implies that patients can afford fares for travel, a situation which may not be tenable due to low socio-

economic status. These findings are supported by other studies such as those by (Bagchi, et al 2010) who found that travel-related cost factors were significantly associated with non-adherence to medication.

4.8.3.3: Discomfort or Drug side effects

Another key finding beyond distance to the health facility, means of travel to the health facility and educational factors is the drugs regimens used. The study revealed that 76% of the defaulters in Nakuru County associated their non-adherence to discomfort or drug side effects they felt during treatment, compared with 25% of the respondents in Kericho County.

Experiencing drugs side effects, or feeling that drugs are too strong, or feeling better soon after initiation of drugs intake (Gelmanova, *et al.,* 2007; Ministry of Health, Kenya, 2007; Dodor & Afenyandu, 2005) are among therapy related factors that have been found in other studies to influence TB treatment default. When asked whether they received information regarding potential side effects, patients often replied that they did not get information. Patients' fears and concerns about adverse drug reactions can be alleviated by health care professionals in advance when educating patients regarding common side effects of the drugs which they are taking, how to prevent an adverse drug reaction, if possible, and also convincing the patient of the need for continued treatment even if there was mild discomfort. This education is however not feasible because long patients' queues do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya, et.al 2012) with their patients concerning medication adherence counselling.

From focus group discussions, it was revealed that patients' fears and concerns about adverse drug reactions were real as they confessed that healthcare workers did not explain to them in advance prior to initiation of treatment the possible drug reactions. During these discussions, also, the healthcare workers echoed the patients' fears that the drugs were too many and treatment period was too long such that in their opinion, too many drugs can harm the body, especially when taken on an empty stomach for too long. It was also clear that the healthcare workers because of the long queues of patients, which they had to clear before the day ends, did not have quality time with their patients so as to explain to them the importance of consistency on drug intake despite the long period as required by the treatment schedule.

One of the greatest impediments to medication adherence is the inconsistency of Tb drugs supply. Tb drugs are not always in adequate supplies and when available, some patients tend to get side effects, which fortunately can be counteracted by taking pyridoxine at the same time when taking TB drugs. The unfortunate thing is that this drug is frequently unavailable. It is therefore imperative that constant supply and availability of this drug must be assured because when this drug is not available and patients do get drugs side effects, they tend to be non-compliant leading to defaulting from treatment. Almost always, presentation of side effects tend to demotivate the patients. Side effects, drugs too strong, and feeling better soon after initiation of treatment are among the factors that have been cited elsewhere as contributing to patients' default from treatment.

Not all patients get drugs side effects once TB treatment starts. Nevertheless, prior to commencement of treatment, patients need to be psychologically prepared about possibility of possible side effects as they embark on given medication. When patients were

engaged in a discussion during the study, they expressed fears and concerns about adverse drug reactions, and it was clear that their fears were real as they confessed that healthcare workers did not explain to them in advance prior to initiation of treatment the possible drug reactions. These fears and concerns about adverse drug reactions can be alleviated by health care professionals in advance when educating patients regarding common side effects of the drugs which they are taking, how to prevent an adverse drug reaction, if possible, and also convincing the patient of the need for strict adherence to treatment even as they make arrangements to report such developments while at home. This education is however not feasible because long patients' queues do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya et.al (2012)) with their patients concerning medication adherence counselling.

Other than drugs side effects contributing to possibility of default from treatment, the drugs to be taken were thought to be too many and in fact from focus group discussions, the healthcare workers expressed the patients' fears that the drugs were too many and treatment period was too long such that in their opinion, too many drugs can harm the body, especially when taken on an empty stomach.

Stock-outs and poor forecasting on adequate supply of Tb drugs was noted in almost all government health facilities leading to deficient and unsteady supply of pyridoxine, which is essential in counteracting Tb drugs side effects. Consequently, non-availability of TB drugs became an issue, where patients would turn up in the health facilities on scheduled appointments only to be turned away because the drugs had not been supplied to the facilities, and therefore there was nothing to be dispensed. In-charges of health facilities must therefore ensure timely procurement and availability of adequate supplies of Tb drugs

to avoid the current noted scenario of stock-outs and poor forecasting so as to ensure adequate and steady supply of Tb drugs which must include pyridoxine which is essential in counteracting Tb drugs side effects. In this way, patients would therefore have no reason to default from attending heath facilities during scheduled clinic appointments.

4.8.3.4: Length of Treatment Period

This study showed that 90% of the respondents in Nakuru County attributed their non-adherence to medication with the length of treatment period compared to 34% in Kericho County.

These findings are similar to what (Culqui, et al. 2012) in a study "Factors associated with the non-completion of conventional anti-tuberculosis treatment in Peru" while studying the length of treatment period who found that adherence to long-term therapies is a multidimensional phenomenon determined by the interplay of five sets of factors (dimensions) namely; social and economic factors, health care team and system-related factors, condition-related factors, therapy-related and patient-related factors.

> The views from focus group discussions intimated that the duration of Tb medication/drug intake was too long and in addition they felt that the drugs to be taken were too many causing pill burden with associated side effects. Patients, especially those with co-morbidity (Tb & HIV) had confided in them that they were very uncomfortable with the many drugs they had to swallow (pill burden), and to them this gave them quite a challenge, especially if one was on concomitant drugs intake if they had co-morbidity. To show their discomfort, such patients used expressions such as "becoming a drug bag", and "becoming a pharmacy". From the perspective of some patients, a high number of

pills were thought to be associated with potential damage to the body and a higher risk of not tolerating the drugs especially if one took them on an empty stomach. The programme managers in their part gave their considered opinion and pleaded that concerted research be done with the aim of reducing the duration patients have to take Tb medication because: *".....Prolonged treatment contributes to defaulting……"*

4.8.4: Findings on Healthcare Givers' (Workers') Factors

4.8.4.1: Cadre dealing with Tb patients

Through interview schedules ***(Appendix B)***, healthcare workers were categorized in terms of cadre such as Nurse, Registered Clinical Officer (RCO), Sub-County TB and Leprosy Coordinator (SCTLC), District TB and Leprosy Coordinator (DTLC), Medical Officer (MO) and Others which could be Tb ambassadors (cough monitors) and peer educators. For each, questions were posed as to: whether they had attended any TB workshop; and if so, for how long, whether less than a year, or within a year but less than 2 years, or more than 2 years; whether they had had any training specifically on TB disease management, and if so, when and where; and whether they had always performed TB work after qualification. In addition, they were also asked what they thought could be the reason/s why patients default from TB Treatment, and what interventions, immediate, short term and long term could be put in place to promote adherence to Anti TB Treatment.

The findings from the interview schedules revealed that Nurses, RCOs and others who included Tb ambassadors (cough monitors) and peer educators and were found only in Kericho County. These findings indicate that in Nakuru County, nurses and RCOs share

Tb work equally (50% each) while in Kericho County, most (54%) of the Tb work is performed by nurses. Historically, public health officers were involved in patients' Tb management and were in fact empowered under public health Act Cap 232 to follow up (contact trace) such patients in the community and give notification to relevant authorities for those who default from treatment. Sadly this is no longer strictly adhered to in all health facilities due to inadequate staff and change in roles.

The training of the healthcare workers in the Ministry of Health as noted earlier, is based on traditional mode of health worker training i.e. the lecture method, which is the main instructional method in traditional education using subject-centred curriculum. This method of training as mentioned earlier, and as per the current curricula, is not appropriate in preparing this cadre in TB disease management of the patients. This has already been fully explained earlier. The curricula as already explained, do not emphasize and explicitly focus on medication adherence, adherence counselling, soft skills application and health education. There is inadequate and inappropriate emphasis on effective healthcare worker-patient communication skills and patients' personal disease prevention strategies. This makes provision of health services poor and inadequate, thus falling short of the service provision expectations.

Success of good health service provision often depends on "soft skills," which are skills related to emotional intelligence, interpersonal communication, social skills, and general positive attitudes on health care. Consequently and inevitably, healthcare workers are seen to be incompetent in counselling as they lack the needed basic soft skills and more importantly the appropriate skills on medication adherence. In addition, most busy healthcare workers do not have time for quality interaction with their patients and,

therefore, often fail to consider adherence issues. It is instrumental to note that the healthcare workers mainly involved in TB disease management are nurses and clinical officers and who are also few in number, making it easy for them to get burn out thus leading to possible inefficiency. As noted, the staffs are few and most often than not, they must clear the queue of patients before the day ends. A study in Senegal, which support the findings in this study, showed that intensive strategy of treatment monitoring and education to the healthcare workers, which is lacking in our case, can lead to improved adherence to medications and improved outcomes among TB patients (Thiam, et.al, 2007).

From the study therefore, it was apparent that the healthcare workers, who were few in number and also because of the long queues of patients, which they had to clear before the day ended, did not have quality time with their patients so as to explain to them the importance of consistency on drug intake despite the long period as required by the treatment schedule, thus making it easy for the patients not to be medication adherent.

4.8.4.2: Tb updates workshop

The study revealed that 57% and 66% of the healthcare workers had attended Tb update workshops in Nakuru and Kericho counties respectively, while 43% and 34% had not. In an ideal situation, everybody running a Tb clinic must and should get regular and timely update. Noting that the training of the healthcare workers in the Ministry of Health is based on traditional mode of health worker training i.e. the lecture method which is the main instructional method in traditional education using subject-centred curriculum, it should be recalled that knowledge gained during undergraduate medical training almost becomes out-dated by the time the student graduates, yet the general public still assumes that the knowledge acquired is still there. Sadly, this is not the case on the ground, for which regular

boosting is indicated. This therefore justifies the need for regular and timely updates, which can be achieved through continuing professional development/continuing medical education (**CMEs**) for all clinic staff, through workshops and/or conferences. Generally, it was noted that, TB updates, in almost all health facilities, educational materials such as informational pamphlets on what TB is, how it is transmitted, how it is diagnosed, how TB can be treated, the type of drugs for treatment, expected behaviours at individual and community levels to prevent Tb transmission, and medical alerts on emerging drug-resistant tuberculosis were scanty, or not available at all not only for healthcare workers, but also to the general public. Availability of these educational materials is critical if we have to increase TB awareness at individual and community levels for the purpose of TB disease control.

To borrow a leaf from Senegal study (Thiam, et.al (2007), intensive strategy of treatment monitoring and education to healthcare workers, which is lacking in this case, can lead to improved adherence to medications and improved outcomes among TB patients, if this strategy can be applied. It is therefore clear that the factor that compromises healthcare worker competence is the lack of update workshops which is meant to boost their knowledge on patient care.

4.8.4.3: Time of attendance of last Tb update workshop

There is a great need for health professionals to be attending conferences, seminars and workshops on Tb for updates. The findings from the interview schedule revealed that the period of Tb update workshop attendance varied, with 7% having attended less than a year ago in Nakuru County, 21% within a year but less than 2 years, 29% more than 2 years ago and 43% having never attended at all. The situation was a little different in Kericho County

which showed 12% of attendance within less than a year, 20% within a year but less than 2 years, and an equal number- 34% each for those who had attended more than 2 years ago and those who had never attended at all. Here, time of workshops attendance is of essence, noting that the more frequent the updates, the better, since as pointed out earlier, knowledge gained during undergraduate medical training almost becomes outdated by the time the student graduates. Here again there is need to borrow a leaf with application from Senegal study (Thiam, et.al (2007), which showed that intensive strategy of treatment monitoring and education, which is lacking in our situation, can lead to improved adherence to medications and improved outcomes among TB patients. It is therefore clear that the factor that compromises healthcare worker competence is the lack of update workshops, which has the potential to boost their knowledge on effective patient care.

4.8.4.4: Performance of Tb work since posting to the Tb Clinic

The study established that 93% and 91% of the healthcare workers in Nakuru and Kericho counties respectively had never performed any Tb work prior to the current engagement with Tb activities. As noted earlier, the factor that compromises healthcare worker competence is the lack of update workshops/conferences, which is meant to boost their knowledge on effective patient care. Lack of update makes the healthcare workers appear incompetent in counselling and communication as they lack appropriate patient management skills. This has a negative relationship with the degree of healthcare worker preparedness in dealing with newly diagnosed Tb patients especially regarding effective healthcare provider-patient communication and lack of emphasis on medication adherence. To avoid this, healthcare workers need to be well prepared through workshops/updates prior to being posted/attached to TB clinics.

Additionally, on medication non-adherence it should be emphasized that the effectiveness of a treatment depends on both the efficacy of a medication and patients' adherence to the therapeutic regimen. Patients, health care workers, and health care systems, all have a role in improving medication adherence and that healthcare workers should be aware that patients are more likely to adhere to medication regimens when they are convinced that the medication they are taking is clearly linked to their future health and wellness and that they must be made active participants in the decision-making process regarding the medications. Most busy healthcare workers however, do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, they must clear the queue of patients before the day ends. From the fore-going, it has become abundantly clear that the healthcare workers because of the long queues of patients, which they had to clear before the day ends, did not have quality time with their patients so as to explain to them the importance of consistency on drug intake despite the long period as required by the treatment schedule.

To promote medication adherence, patients need to be instructed properly, asked to participate in the decision-making process, and helped to understand the benefits of taking their medications consistently as well as the risks of not taking them. Patients must be told in a simple and clear way how to take their medications. The patient must be able to read and understand, as well as comprehend and translate what he/she understands into actions that conform to the healthcare workers' instructions. This can be a challenge in a situation where general level of education is low, and even worsened by staffs' lack of quality time with their patients in busy clinics.

Adherence is a dynamic issue and barriers are also liable to change over time, which necessitates continuation of multi-disciplinary and collaborative inputs and support from not only the healthcare workers (nurses and clinical officers) but with others in the health sector such as medical officers, pharmacists and public health officers. Studies such as the Senegal study (Thiam, et.al 2007) have demonstrated a positive effect of health education to healthcare workers on improving patients' treatment adherence. In fact, the National TB Control Program Implementation Guide in China (2008 Edition) states clearly that carrying out health education for TB patients before chemotherapy was the most important step of DOTS implementation, and the treatment regimen and that emphasis on importance of adherence were the core of health education for the purpose of improving patients' knowledge. A study in Botswana (Ingengo, et.al, 1993), involving a group of patients noted low knowledge in preventive measures despite having attended a Tb treatment clinic. Although these patients could have received the information to improve their knowledge, from the clinic during the time they were collecting drugs, prevention did not seem to have been stressed by health care providers due to the fact that the staff did not have quality time with them.

As has been noted severally earlier, the biggest challenge healthcare workers have with their patients is the availability of adequate time for counselling and medication adherence. Adherence, as earlier noted, is a dynamic issue and barriers are also liable to change over time, which necessitates continuation of multi-disciplinary and collaborative inputs and support from not only the healthcare workers (nurses and clinical officers) but with others in the health sector such as medical officers, pharmacists and public health officers. Studies

such as the Senegal study (Thiam, et.al 2007) have demonstrated a positive effect of health education to healthcare workers on improving patients' treatment adherence. In fact, the National TB Control Program Implementation Guide in China (2008 Edition) states clearly that carrying out health education for TB patients before chemotherapy was the most important step of DOTS implementation, and the treatment regimen and that emphasis on importance of adherence were the core of health education for the purpose of improving patients' knowledge. A study in Botswana (Ingengo, et.al, 1993), involving a group of patients noted low knowledge in preventive measures despite having attended a Tb treatment clinic. Although these patients could have received the information to improve their knowledge, from the clinic during the time they were collecting drugs, prevention did not seem to have been stressed by health care providers due to the fact that the staff did not have quality time with them available to them to be with their patients.

Treatment default is one of the biggest problems in the treatment of tuberculosis today. Experience shows that many people find it difficult to adhere to a 7-day antibiotic treatment regimen in a case such as for a simple pneumonia, yet we expect TB patients to have to go through their treatment several times a week for at least half a year (6-8 months). Compounding this difficulty is the lack of education on the possible consequences of treatment default, which often exists among TB patients in the developing countries, which only serves to worsen the issue, making it the largest driver of drug resistance. Due to the prolonged treatment duration of 6-8 months, patients often decide to abandon treatment mid-way, especially since the symptoms of the disease usually subside after about 2 months, while the side effects of the various antibiotics persist. It is therefore imperative

that patients are fully motivated through education to strictly observe medication adherence.

The duration of drugs intake as mentioned earlier is long, hence patients are supposed to be motivated to continue taking the drugs for such a prolonged period of time, i.e. patients must be compliant to treatment. Generally, adherence/compliance to treatment not only includes patient compliance with medication but also with diet, exercise, or life style changes. In order to evaluate the possible impact of non-compliance on clinical outcomes, numerous studies using various methods have been conducted in the United States (USA), United Kingdom (UK), Australia, Canada and other countries to evaluate the rate of therapeutic adherence/compliance in different diseases and different patient populations. The studies revealed that the adherence/compliance rate of long-term medication therapies (e.g. TB) was between 40% and 50%. The rate of adherence/compliance for short-term therapy was much higher at between 70% and 80%, while the compliance with lifestyle changes was the lowest at 20%–30% (DiMatteo, 1995). Furthermore, the rates of non-adherence/compliance with different types of treatment also differ greatly. This implies that if patients do not follow or adhere to the treatment plan faithfully, the intended beneficial effects of even the most carefully and scientifically based treatment plan will not be realized. It is therefore imperative that a lot of effort is put in order to ensure that patients are fully motivated through education to strictly observe medication adherence.

Patients, health care workers, and health care systems, all have a role in improving medication adherence and that healthcare workers should be aware that patients are more likely to adhere to medication regimens when they are convinced that the medication they

are taking is clearly linked to their future health and wellness and that they must be made active participants in the decision-making process regarding the medications. Most busy healthcare workers however, do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, they must clear the queue of patients before the day ends. From the fore-going, it has become abundantly clear that the healthcare workers because of the long queues of patients, which they had to clear before the day ends, did not have quality time with their patients so as to explain to them the importance of consistency on drug intake despite the long period of drugs intake as required by the treatment schedule.

To promote medication adherence, patients need to be properly instructed on how to take medication, asked to participate in the decision-making process, and helped to understand the benefits of taking their medications consistently as well as the risks of not taking them. It is critical that the healthcare workers endeavour to enlighten the patients that the current fixed drug combinations in use were the best there were internationally for which the Kenya Ministry of Health subscribes to and as such should be taken as per the advice of the healthcare workers. Patients must also be explained in a simple and clear way how to take their medications. For this, it is advisable that the patient should be in a position to read and understand, as well as comprehend and translate what he/she understands into actions that conform to the healthcare workers' instructions and advice. In fact, healthcare workers must deliberately at all times sustain patients' health promotion and prevention strategies with specific emphasis on importance of adherence to medication and possible stigma reduction. The limited contact time between the patients and the healthcare workers

presents a challenge in a situation where general level of education is low, and even worsened by staffs' lack of quality time with their patients in busy clinics.

4.8.5 Identified areas for Training Interventions to enhance Treatment among Tuberculosis Patients

In this section, the areas that need special consideration in an effort to mitigate against witnessed perpetual non-adherence to medication are described. Such critical areas include training curricula, drugs supply, medication adherence and counselling, healthcare workers' preparedness and community sensitization.

4.8.5.1 Training curricula

The training of the healthcare workers (providers) in the Ministry of Health in Kenya is based on traditional mode of health worker training i.e. the lecture method, which is the main instructional method in traditional education using subject-centred curricula which do not emphasize and explicitly focus on medication adherence, adherence counselling, soft skills application and health education. There is no adequate and appropriate mechanism for healthcare workers that suitably prepares them to put emphasis on prevention strategies necessary for effective healthcare worker-patient communication skills required for appropriate care and management of patients.

A review of the training curricula (Kenya Medical Training College curricula, 2013; 2014; 2014b) currently in use in training institutions revealed that the curricula were inappropriate as training tools as they do not adequately prepare healthcare workers for appropriate patients' counselling and education on medication adherence (M'Imunya, et.al

2012). This inappropriateness was because the curricula were found to be deficient in adequate content on Tb disease in terms of causation, diagnosis, treatment, management and control. Neither was there any mention on competence training essential for soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and healthcare worker-patient communication skills application which are appropriate for competent patient care. Neither is there any mention on health education as an important component of holistic patient care. From focus group discussions, all the members unanimously expressed concern that the curricula in the current form were inappropriate as it was abundantly apparent that the curricula had shallowness in content especially on diagnosis, treatment and management of TB disease, neither were there comprehensive counselling and medication adherence sessions in all the documents. These deficiencies were quickly pointed out by the members who themselves were beneficiaries of the same curricula and who confessed the inappropriateness as they had been taken through the same training tool in the training institutions in their formative years.

As mentioned earlier, the training per se of healthcare workers (nurses and clinical officers) which is supposed to address this training need is in itself inadequate to meet the expectations due to poor, inadequate and uncomprehensive training curricula structure (Mutema, Kangethe,& Naweya 1999; Abrahamson, 1996 &Al Mirghani, 2007) most of which displayed shallow content and lack of appropriate competency skills. Unfortunately, also, as mentioned earlier, the curricula did not mention or have a section that deals with soft skills application in the context of patients care as an important component in disease management. Normally, in the day-to-day life, soft skills are applied though not consciously. These skills are: those personal qualities, habits, empathy, attitudes and social

abilities that make someone a well-rounded employee; are not traditionally taught in school, or even on the job; in fact, workers often have to learn them on their own, by either observing and mimicking exceptional professionals who display these traits or practicing them as they would any other skill. The general expectation is that each healthcare worker is supposed to have empathy, which is the single most important thing that keeps healthcare workers grounded and allows them to remember that every case is different and people need to be treated as individuals. Without empathy, a healthcare worker is in danger of falling into the trap of forgetting that when people are sick, they react individually in different ways and need a personalized approach to help them get the most out of their treatment.

Thus to conclude, and in order to accommodate address to the deficiencies noted above, existing training curricula in training institutions need to be revised and updated to include practical components that touch on healthcare workers' competency improvement on skills acquisition on patients' management reinforced with mandatory hands on soft skills applications for all trainees.

4.8.5.2 Drugs supply

One of the greatest impediments to medication adherence is the inconsistency of Tb drugs supply. Tb drugs are not always in adequate supplies and when available, some patients tend to get side effects, which fortunately can be counteracted by taking pyridoxine at the same time when taking TB drugs. The unfortunate thing is that this drug is frequently unavailable. It is therefore imperative that constant supply and availability of this drug must be assured because when this drug is not available and patients do get drugs side effects, they tend to be non-compliant leading to defaulting from treatment. Almost always,

presentation of side effects tend to demotivate the patients. Side effects, drugs too strong, and feeling better soon after initiation of treatment are among the factors that have been cited elsewhere as contributing to patients' default from treatment.

Not all patients get drugs side effects once TB treatment starts. Nevertheless, prior to commencement of treatment, patients need to be psychologically prepared about possibility of possible side effects as they embark on given medication. When patients were engaged in a discussion during the study, they expressed fears and concerns about adverse drug reactions, and it was clear that their fears were real as they confessed that healthcare workers did not explain to them in advance prior to initiation of treatment the possible drug reactions. These fears and concerns about adverse drug reactions can be alleviated by health care professionals in advance when educating patients regarding common side effects of the drugs which they are taking, how to prevent an adverse drug reaction, if possible, and also convincing the patient of the need for strict adherence to treatment even as they make arrangements to report such developments while at home. This education is however not feasible because long patients' queues do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya et.al 2012) with their patients concerning medication adherence counselling.

Other than drugs side effects contributing to possibility of default from treatment, the drugs to be taken were thought to be too many and in fact from focus group discussions, the healthcare workers expressed the patients' fears that the drugs were too many and treatment period was too long such that in their opinion, too many drugs can harm the body, especially when taken on an empty stomach.

Stock-outs and poor forecasting on adequate supply of Tb drugs was noted in almost all government health facilities leading to deficient and unsteady supply of pyridoxine, which is essential in counteracting Tb drugs side effects. Consequently, non-availability of TB drugs became an issue, where patients would turn up in the health facilities on scheduled appointments only to be turned away because the drugs had not been supplied to the facilities, and therefore there was nothing to be dispensed. In-charges of health facilities must therefore ensure timely procurement and availability of adequate supplies of Tb drugs to avoid the current noted scenario of stock-outs and poor forecasting so as to ensure adequate and steady supply of Tb drugs which must include pyridoxine which is essential in counteracting Tb drugs side effects. In this way, patients would therefore have no reason to default from attending heath facilities during scheduled clinic appointments.

4.8.5.3 Medication adherence and counselling

Adherence is a dynamic issue and barriers are also liable to change over time, which necessitates continuation of multi-disciplinary and collaborative inputs and support from not only the healthcare workers (nurses and clinical officers) but with others in the health sector such as medical officers, pharmacists and public health officers. Studies such as the Senegal study (Thiam, et.al 2007) have demonstrated a positive effect of health education to healthcare workers on improving patients' treatment adherence. In fact, the National TB Control Program Implementation Guide in China (2008 Edition) states clearly that carrying out health education for TB patients before chemotherapy was the most important step of DOTS implementation, and the treatment regimen and that emphasis on importance of adherence were the core of health education for the purpose of improving patients' knowledge. A study in Botswana (Ingengo, et.al, 1993), involving a group of patients noted

low knowledge in preventive measures despite having attended a Tb treatment clinic. Although these patients could have received the information to improve their knowledge, from the clinic during the time they were collecting drugs, prevention did not seem to have been stressed by health care providers due to the fact that the staff did not have quality time with them available to them to be with their patients.

Treatment default is one of the biggest problems in the treatment of tuberculosis today. Experience shows that many people find it difficult to adhere to a 7-day antibiotic treatment regimen in a case such as for a simple pneumonia, yet we expect TB patients to have to go through their treatment several times a week for at least half a year (6-8 months). Compounding this difficulty is the lack of education on the possible consequences of treatment default, which often exists among TB patients in the developing countries, which only serves to worsen the issue, making it the largest driver of drug resistance. Due to the prolonged treatment duration of 6-8 months, patients often decide to abandon treatment mid-way, especially since the symptoms of the disease usually subside after about 2 months, while the side effects of the various antibiotics persist. It is therefore imperative that patients are fully motivated through education to strictly observe medication adherence.

The duration of drugs intake as mentioned earlier is long, hence patients are supposed to be motivated to continue taking the drugs for such a prolonged period of time, i.e. patients must be compliant to treatment. Generally, adherence/compliance to treatment not only includes patient compliance with medication but also with diet, exercise, or life style changes. In order to evaluate the possible impact of non-compliance on clinical outcomes,

numerous studies using various methods have been conducted in the United States (USA), United Kingdom (UK), Australia, Canada and other countries to evaluate the rate of therapeutic adherence/compliance in different diseases and different patient populations. The studies revealed that the adherence/compliance rate of long-term medication therapies (e.g. TB) was between 40% and 50%. The rate of adherence/compliance for short-term therapy was much higher at between 70% and 80%, while the compliance with lifestyle changes was the lowest at 20%–30% (DiMatteo, 1995). Furthermore, the rates of non-adherence/compliance with different types of treatment also differ greatly. This implies that if patients do not follow or adhere to the treatment plan faithfully, the intended beneficial effects of even the most carefully and scientifically based treatment plan will not be realized. It is therefore imperative that a lot of effort is put in order to ensure that patients are fully motivated through education to strictly observe medication adherence.

Patients, health care workers, and health care systems, all have a role in improving medication adherence and that healthcare workers should be aware that patients are more likely to adhere to medication regimens when they are convinced that the medication they are taking is clearly linked to their future health and wellness and that they must be made active participants in the decision-making process regarding the medications. Most busy healthcare workers however, do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, they must clear the queue of patients before the day ends. From the fore-going, it has become abundantly clear that the healthcare workers because of the long queues of patients, which they had to clear before the day ends, did not have quality

time with their patients so as to explain to them the importance of consistency on drug intake despite the long period of drugs intake as required by the treatment schedule.

To promote medication adherence, patients need to be properly instructed on how to take medication, asked to participate in the decision-making process, and helped to understand the benefits of taking their medications consistently as well as the risks of not taking them. It is critical that the healthcare workers endeavour to enlighten the patients that the current fixed drug combinations in use were the best there were internationally for which the Kenya Ministry of Health subscribes to and as such should be taken as per the advice of the healthcare workers. Patients must also be explained in a simple and clear way how to take their medications. For this, it is advisable that the patient should be in a position to read and understand, as well as comprehend and translate what he/she understands into actions that conform to the healthcare workers' instructions and advice. In fact, healthcare workers must deliberately at all times sustain patients' health promotion and prevention strategies with specific emphasis on importance of adherence to medication and possible stigma reduction. The limited contact time between the patients and the healthcare workers presents a challenge in a situation where general level of education is low, and even worsened by staffs' lack of quality time with their patients in busy clinics.

4.8.5.4 Healthcare workers' preparedness

The training of the healthcare providers (workers) in the Ministry of Health in Kenya is based on traditional mode of health worker training i.e. the lecture method which is the main instructional method in traditional education using subject-centred curricula which do not emphasize and explicitly focus on medication adherence, adherence counselling,

soft skills application and health education. There is inadequate and inappropriate emphasis on effective healthcare worker-patient communication skills and patients' personal disease prevention strategies. Because knowledge gained during undergraduate medical training almost becomes outdated by the time the student graduates, there is need for staff to get regular and timely update which can be achieved through Continuing Professional Development/Continuing Medical Education (CMEs) which will improve healthcare worker competence. When updates are irregular, staff become less motivated and this, coupled with inadequate number of staff, will lead them in the end to inevitably get burnout. In addition, most busy healthcare workers do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, the situation demands that they must clear the queue of patients before the day ends. To avoid burn out other cadres of healthcare workers such as public health officers, pharmacist and medical officers should be actively engaged and brought on board to complement the nurses and clinical officers currently involved in treatment of Tb patients. A study in Senegal showed that intensive strategy of treatment monitoring and education, which is lacking in this case, can lead to improved adherence to medications and improved outcomes among TB patients (Thiam, S., et.al 2007).

In Kenya, and indeed worldwide, the hallmark of Tb treatment expects full participation and corporation of medically trained healthcare workers. The success of Tb treatment depends not only on healthcare workers' competencies on hard skills but also on soft skills. Hard skills (technical skills) are teachable abilities or skill sets that are easy to quantify and can be learned in the classroom, through books or other training materials, or on the job (Alison Doyle, 2017). These skills are essential when treating patients or prescribing

medications, and in healthcare, emphasis is rightly put on the "hard skills," because before a patient puts his/her life or health in someone's hands, he/she needs to have assurance that these health professional have the necessary training and track record of past successful patient treatment.

In the day-to-day life, soft skills are applied though not consciously. These skills are those personal qualities, habits, empathy, attitudes and social abilities that make someone a well-rounded employee; are not traditionally taught in school, or even on the job; in fact, workers often have to learn them on their own, by either observing and mimicking exceptional professionals who display these traits or practicing them as they would any other skill. The general expectation is that each healthcare worker is supposed to have empathy, which is the single most important thing that keeps healthcare workers grounded and allows them to remember that every case is different and people need to be treated as individuals. Without empathy, a healthcare worker is in danger of falling into the trap of forgetting that everyone reacts in different ways and needs a personalized approach to help them get the most out of their treatment.

From a practical perspective and sadly so, healthcare workers training curricula lays emphasis mainly on hard skills on Tb treatment such as acquisition of knowledge and a professional certificate in their professional areas, which will enable them to get employed and secure jobs. This is done at the at the expense of soft skills such as effective healthcare worker-patient communication, common sense, empathy, the ability to effectively deal with people, and a positive flexible attitude. As noted earlier, these critical and essential skills are not in the curricula, so they never get taught and therefore consequently and unfortunately receive no emphasis or attention. Therefore existing training curricula in

training institutions need to be revised and updated to include practical components that touch on healthcare workers' competency improvement on skills acquisition on patients' management reinforced with mandatory hands on soft skills applications for all trainees.

Quality of care plays an important role in Tb control, by influencing timely diagnosis, treatment adherence, and treatment completion. This quality care cannot be guaranteed if the healthcare workers are not properly prepared during training which should lay emphasis on medication adherence, adherence counselling, soft skills application during patient care and general health education. Generally, it is expected that at all Tb clinics, patients are supposed to be given specific information about TB symptoms, diagnosis, treatment, and follow up. Regrettably, in most government health facility clinics it is not unusual to find that the patients do not receive adequate information about TB from the healthcare workers because of their own individual inadequate behavioural skills or are constrained by time and patients' long queues during clinic days, thus making them give limited information (Waitzkin, & Stoeckle, 1976). In this regard therefore, education or counselling interventions may not be realized leading to a gap in patient care (M'Imunya, et.al 2012). This gap leads to poor quality of service provision and improper management of the patients, which the public may interpret to mean poor healthcare worker attitudes and lack of healthcare workers' competence on Tb patients' care. All this is hinged on the way healthcare workers have been trained using the structure of the current curricula.

Patients, health care providers, and health care systems, all have a role in improving medication adherence and that healthcare workers should be aware that patients are more likely to adhere to medication regimens when they are convinced that the medication they are taking is clearly linked to their future health and wellness and that they must be made

active participants in the decision-making process regarding the medications. Most busy healthcare workers however, do not have time for quality interaction with their patients and, therefore, often fail to consider adherence issues. This is because the staffs are few and most often than not, they must clear the queue of patients before the day ends.

As noted earlier, the factor that compromises healthcare worker competence is the lack of update workshops/conferences, which is meant to boost their knowledge on effective patient care. Lack of update makes the healthcare workers appear incompetent in counselling and communication as they lack appropriate patient management skills. This has a negative relationship with the degree of healthcare worker preparedness in dealing with newly diagnosed Tb patients especially regarding effective healthcare provider-patient communication and lack of emphasis on medication adherence. To avoid this, healthcare workers need to be well prepared through workshops/updates prior to being posted/attached to TB clinics. It is imperative therefore that staffs' updates on Tb treatment and management must be regularly enhanced through continuing medical education forums.

4.8.5.5 Community sensitization

TB education is necessary for people with TB. People with TB need to know how to take drugs for TB treatment properly. They also need to know how to make sure that they do not pass TB on to other people. Education on TB is also necessary for the general public. The public needs to know basic information about TB for a number of reasons including reducing the stigma still associated with TB. Healthcare workers interviewed in Kericho county had this to say on how stigma contributes to medication non-adherence *"…..most*

of the patients go into denial due to possible association of their disease with HIV as they feel that they are culturally or socially unacceptable or inferior so they become withdrawn, fearful, silent, and secretive and this prevents them from talking about their condition even to those who are close to them and love them…..". Stigma related issues frequently confronted the programme managers and according to them, fear of stigma not only lead patients into not disclosing their illnesses but also makes afraid of seeking TB treatment in their catchments areas for fear of being identified by neighbours since people have a tendency to associate TB with HIV. Many of such patients had seen other HIV patients suffering from stigma and discrimination in their communities, and feared that the same might happen to them. Some even shared their experiences, such as being pointed at in their neighbourhoods or neighbours gossiping about their illness behind their backs and exclusion from social events. Some patients said the stigma was directly related to their TB because they were believed to be infectious. These actual experiences and anticipations of stigma resulted in many patients hiding their diagnosis of TB or only disclosing it to selected people, mostly close families.

One undeniable fact is that, regrettably, many patients are unable to adhere to their treatment because of poor communication (Hansel, et.al, 2004), between them and healthcare workers, drug side effects coupled with pill burden (Gelmanova, et.al, 2007; NLTP, 2007; Dodor & Afenyandu 2005) and inappropriate counselling on medication adherence. Long patients' queues however, do not allow healthcare workers to have the needed quality time for effective interaction (M'Imunya et.al 2012) with their patients concerning emphasis on medication adherence and counselling. Sometimes it is believed that education about TB only needs to involve people who already have TB. Nothing can be further from the truth. The truth of the matter is that there is dire need to educate the

general public as well about TB. This is firstly to ensure that people know how TB is transmitted and indeed not transmitted, and to reduce the stigma surrounding TB. It can also help to ensure that people with TB come forward for testing and treatment as soon as possible. It was unfortunate and generally noted that concerning TB updates in almost all health facilities, educational materials such as informational pamphlets on what TB is; how it is transmitted; how it is diagnosed; how TB can be treated; the type of drugs for treatment; expected behaviours at individual and community levels to prevent Tb transmission; and medical alerts on emerging drug-resistant tuberculosis; were scanty, or not available at all not only for healthcare workers, but also to the general public. Availability of these educational materials is critical if we have to increase TB awareness at individual and community levels for the purpose of TB disease control.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents a summary, conclusion and recommendations from the study findings with regard to review of the nurses and clinical officers' training curricula used in the training institutions to prepare this cadre of healthcare workers, identification of health care delivery factors that influence non-adherence to TB treatment, identification of healthcare givers' factors that contribute to non-adherence to medication and identified training interventions to enhance treatment among tuberculosis patients.

5.1 Summary, Conclusion and Recommendations from the study findings

5.1.1 Summary of findings with regard to review of the nurses and clinical officers training curricula used in the training institutions to prepare this cadre of healthcare workers:

The training curricula in current form:

i. Appeared deficient as they did not explicitly focus and emphasize on Tb disease in terms of detailed content relating to: cause, diagnosis, treatment, management and control.

ii. Do not give emphasis on medication adherence, importance of adherence, and adherence counselling with clear explanation on risks of non-adherence to medication to patients before and after initiation on treatment.

iii. Do not emphasize on soft skills application as part of patient management which are really critical in effective patient care.

iv. Do not emphasize on holistic, appropriate and effective healthcare worker-patient communication skills application touching on patients' personal disease prevention strategies.

5.1.2 Summary of findings on health care delivery factors that influence non-adherence to TB Treatment

Generally,

i. Patients tended to prematurely stop medication intake soon after feeling well, thinking they were cured as they were not properly counseled on persistent and strict medication adherence as indicated on treatment schedule.

ii. Many patients tended to display drug fatigue due to too many drugs (pill burden) to be swallowed for a prolonged period of time.

iii. A number of patients felt unwell or had discomfort following drug intake which were manifestations of drug side effects during medication, making them abandon medication.

iv. There was noted shortage of Tb drugs in health facilities which led to lack of motivation by patients to attend such health facilities.

v. There was also unavailability in most health facilities of pyridoxine drugs which are essential in counteracting Tb drugs side effects.

vi. In some instances, patients experienced challenges in accessing health facilities because of distance.

5.1.3 Summary of findings on healthcare givers' factors that contributed to non-adherence to medication

i. Nurses, RCOs were the main staff charged with the responsibility of Tb patients' treatment and management.

ii. In terms of Tb treatment, many healthcare workers were inadequately prepared to effectively manage Tb patients as they were found to be poor on soft skills application, adherence counselling, gave no emphasis on medication adherence, no caution and risk of non-adherence to medication and generally poor on healthcare worker-patient communication skills.

iii. Because of long patients' queues and few staff, there was a feeling of burn out worsened by lack of quality time supposed to be spent on individual patients to facilitate effective counselling on importance of medication adherence.

iv. In most busy Tb clinics, healthcare workers felt they had to clear the long queue of patients before the day ends and therefore did not have time for quality interaction with their patients and, therefore, often failed to offer effective counselling on medication adherence.

v. More than 90% of the healthcare workers in the two counties of Kericho and Nakuru had never performed any Tb work prior to their posting to the Tb clinics and neither were they given any brief on how to treat and manage Tb patients.

vi. More than 30% of the healthcare workers had never attended any Tb update workshops which incidentally were noted to be few, erratic and unscheduled.

vii. Many (46% and 43%) healthcare workers in Kericho and Nakuru counties respectively felt that they were inadequately prepared to deal with Tb patients as

they felt they were not doing much on adherence counselling to the patients for which they felt it should be intensified.

viii. The feeling of inadequacy to manage Tb patients was also reflected from views collected from their interview schedules and also that from the focus group discussions with Tb programme managers.

5.1.4 Summary of identified interventions for training to enhance treatment among tuberculosis patients.

The proposed training interventions should lay emphasis during training on the following identified shortcomings:

i. Training curricula for nurses and clinical officers were deficient in adequate content on Tb disease in terms of causation, diagnosis, treatment, management and control.

ii. Generally, the curricula did not give emphasis on soft skills application, adherence counselling, medication adherence, risk of non-adherence to medication and generally effective healthcare worker-patient communication skills application which are appropriate for competent patient care.

iii. Health education as a component of holistic patient care was not emphasized at all both in the training institutions' curricula and Tb clinics.

iv. Educational materials such as informational pamphlets on what TB is; how it is transmitted; how it is diagnosed; how TB can be treated; the type of drugs for treatment; expected behaviours at individual and community levels to prevent Tb transmission; and medical alerts on emerging drug-resistant tuberculosis; were

scanty, or not available at all not only for healthcare workers, but also to the general public.

v. There were inadequate numbers of trained healthcare workers running and taking care of health facilities leading to a feeling of burn out by staff.

vi. Most healthcare workers did not have time for quality interaction with their patients and, therefore, often failed to educate patients on importance of medication adherence.

vii. There were no scheduled Continuing Professional Development/Continuing Medical Education (CMEs) sessions leading to few, irregular and unscheduled Tb updates for health facility staff.

viii. Mainly nurses and clinical officers were the main staff charged with the responsibility of Tb patients' treatment leaving out other cadres of staff in the Ministry of health such as medical officers, pharmacists and public health officers.

5.2: CONCLUSION

i. Training curricula for nurses and clinical officers were inadequate in detailed content on Tb disease in terms of causation, diagnosis, treatment, management and control; competency on soft skills application and effective healthcare worker-patient communication skills application.

ii. Shortage of Tb drugs including pyridoxine essential for counteracting drug side effects among other factors contributed to medication non-adherence in most of the health facilities.

iii. There was no evidence of regular Continuing Professional Development/Continuing Medical Education (CMEs).

iv. Tuberculosis education is essential for both patients and the general public.

5.3: RECOMMENDATIONS

i. Existing training curricula in training institutions need to be revised and updated to include detailed content on Tb disease in terms of causation, diagnosis, treatment, management and control; competency skills on soft skills application and effective healthcare worker-patient communication skills application.

ii. Tuberculosis drugs including pyridoxine should regularly be availed in adequate amounts in all the health facilities.

iii. Staffs' updates on tuberculosis treatment should be regularly enhanced through continuing professional development/continuing medical education forums (CMEs).

iv. A deliberate and sustained emphasis on tuberculosis education is essential not only for people with tuberculosis but also for the general public regarding importance of adherence to medication.

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APPENDICES

APPENDIX I: DATA COLLECTION TOOL 1

Factors influencing non adherence to TB treatment, Kericho & Nakuru Counties, Kenya

Interview schedule – To be filled by the Researcher/Research assistant

A. BIO-DATA

- Patients' Marital status ..... Sex..... Age.....
- Education level 1. None 2. Primary 3. Secondary 4. Tertiary
- Sub county .....

B. Patient-related factors that contribute to non adherence to TB treatment

- Treatment interrupted at phase I or II.....
- Occupation .....
- Do you associate your occupation with non adherence? 1. Yes 2. No
- Smoking 1. Yes 2. No
- If yes do you associate smoking with non adherence? 1. Yes 2. No
- Drinking 1. Yes 2. No
- If yes do you associate drinking with non adherence? 1. Yes 2. No
- Means of transport to health facility .....
- Do you associate your financial challenges with non adherence? 1.Yes 2. No
- Do you associate your non adherence with discomfort or drug side effects during treatment? 1. Yes 2. No
- Who supported you during treatment? 1. Family, 2. Patient supporter, 3. Health worker 4. Other Specify .....
- Who do you live with? 1. Alone ..... 2. Parents .... 3. Relatives .... 4. Friend....
- Poverty (your income levels) 1. Less than 3400/= 2. 3500-4900/= 3. 5000-10000/= 4. Above 10000/=

Knowledge

- Do understand the disease TB you are suffering from? 1. Yes 2. No
- Is TB preventable and curable? 1. Yes 2. No
- Does TB treatment cure TB disease? 1. Yes 2.No

Attitudes

- Can a patient with TB safely share their items like utensils with others? 1. Yes 2. No
- Is TB disease a curse? 1. Yes 2. No
- Can TB patient be cured? 1. Yes 2. No
- Any other treatment you never completed? 1. Yes 2. No

C. Patient's perceived Health workers factors during TB treatment

Stress during encounter with health provider at the health facility

- Were you comfortable in asking providers questions? 1. Yes 2. No
- Do you associate your non adherence with forgetfulness or carelessness? 1. Yes 2. No
- Did you experience stress during treatment? 1. Yes 2. No
- If Yes, do you associate your non adherence with stressful life events? 1. Yes 2.No

Patient's perceived Provider mastery of the disease

Did you:

- Understand the health workers' explanation on TB treatment? (Communication skills) 1. Yes 2. No
- Understand all information pertaining TB treatment? (Knowledge of health literacy issues) 1. Yes 2. No
- Feel that the health worker clearly understood your sickness situation? (Lack of empathy) 1. Yes 2. No

If No:

- Do you associate the situation with non adherence? 1. Yes 2. No
- Are you comfortable with taking medication daily? (Number of medications needed per day) 1. Yes 2. No
- If No, do you associate that with non adherence? 1. Yes 2. No

Health care delivery Patterns that influence non adherence of TB treatment

- Distance to TB health facility from home ..... kms (Access to care)
- Did you have patient supporter? 1. Yes 2. No (continuity of care)
- Did you understand the language written (prescription) on your drugs? (Patient education material not written in plain language) 1. Yes 2. No
- If No do you associate it with non adherence? 1. Yes 2. No
- Were drugs always available? 1. Yes 2. No
- If no, do you associate lack of adequate drugs with your non adherence? 1. Yes 2. No
- Do you easily access the pharmacy from TB clinic? (Inability to access or difficulty accessing pharmacy) 1.Yes 2.No

- Any Medication cost experienced during treatment? 1. Yes 2. No
- If yes, do you associate medication costs with your non adherence? 1. Yes 2.No
- If Yes, which costs?
  .....

Condition and therapy

- Do you associate the length of treatment period with your non adherence? 1.Yes 2.No
- Ever changed your drug regimen? (Frequent changes in regimen) 1.Yes 2.No
- If Yes, do you associate it with non adherence? 1.Yes 2.No
- Did you experience unpleasant side effects? 1.Yes 2.No
- Do you associate duration of therapy/treatment with your defaulting? 1.Yes 2.No
- Do you associate lack of immediate benefit of therapy/treatment with your defaulting? 1. Yes 2.No
- Do you think there is social stigma associated with the TB medication? 1.Yes 2.No
- How do you view TB treatment-- Clear or Complicated? (Complexity of medication).....

D. Socio-cultural factors that influence non adherence to TB treatment

Social factors

- Did you lack family or social support during treatment? 1. Yes 2.No
- If Yes, do you associate the lack of family support to your non adherence during course of treatment? 1.Yes 2.No
- During treatment were you experiencing unstable living conditions? 1. Yes 2. No
- If Yes, do you associate your unstable living conditions to non-adherence? 1. Yes 2.No
- Do you have any religious beliefs against western (Conventional) medication? 1. Yes 2.No
- If Yes what alternative medication do you prefer?
  …….
- Did your religious beliefs influence your defaulting? 1. Yes 2.No
- Did you have to seek permission from your spouse to attend clinic? 1.Yes 2.No
- If Yes, do you associate lack of permission to your non adherence? 1.Yes 2.

APPENDIX II: DATA COLLECTION TOOL 2

E. Health Professional Factors (Health Care Provider Factors)

i. Name …… Health Facility ……..
County …….. Sub county ……..

ii. Current cadre: 1. Nurse 2. RCO 3. SCTLC (DTLC) 4. MO 5. Other- Specify ……

iii. Any TB update workshop attended? 1. Yes 2. No

iv. If Yes, indicate: 1. Less than a year ago 2. Within a year ago but less than 2 years 3. > 2years ago

v. Any training specifically on TB disease management? 1. Yes 2.No

vi. If Yes when and where?
……

vii. Have you always performed TB work after qualification? 1. Yes 2. No

F. What in your opinion could be the reason/s why patients default from TB Treatment?

……

……

……

G. Interventions that promote Adherence to Anti TB Treatment

- Immediate
  ……
  ……
  ……
- Short term
  ……
  ……
  ……
- Long term
  ……
  ……
  ……
  ……

APPENDIX III: DATA COLLECTION TOOL 3

H. CTLCs and sCTLCs' Views on Patients' defaulting from Treatment

Focus Group Discussions (FGD)

As health managers regarding Patients TB treatment (Diagnosis, Treatment and follow-up, please give us your views about what possibly causes patients to default from treatment:

Name ……. County ……..

I. What in your opinion could be the reason/s why patients default from TB Treatment? Identify possible reasons from the attached suggestions:

Categories of factors associated with adherence to TB treatment

Category	Factors
Patient-centered factors	Demographic Factors: *Age, Ethnicity, Gender, Education, Marriage Status* Psychosocial factors: *Beliefs, Motivation, Attitude* Patient-prescriber relationship Health literacy Patient knowledge Physical difficulties Tobacco Smoking or alcohol intake Forgetfulness History of good compliance
Therapy-related factors	Route of administration Treatment complexity Duration of the treatment period Medication side effects Degree of behavioural change required Taste of the medication Requirements for drug storage
Healthcare system factors	Lack of accessibility Long waiting time Difficulty in getting prescriptions filled Unhappy clinic visits

Social and economic factors	Inability to take time off work Cost and Income Social support
Disease factors	Disease symptoms Severity of the disease HIV co-morbidity

J. Interventions that promote Adherence to Anti TB Treatment

- Immediate
  ……
  ……
  ……
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- Short term
  ……
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  ……
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- Long term
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APPENDIX IV: CONSENT FORM/CERTIFICATE

(To be retained by the investigator)

I have read/ been explained the information in the participant information sheet. The nature of the study and my involvement has been explained and all my questions have been answered satisfactorily. By signing this consent form I indicate that I understand what will be expected from me and I am willing to participate in this survey. I know I can withdraw at any time.

Read by: Respondent [ ] Interviewer [ ]

Agreed [ ] Refused [ ]

Respondent's Name:_____

Address: ----------

Respondent's Signature/Thumb impression:_____

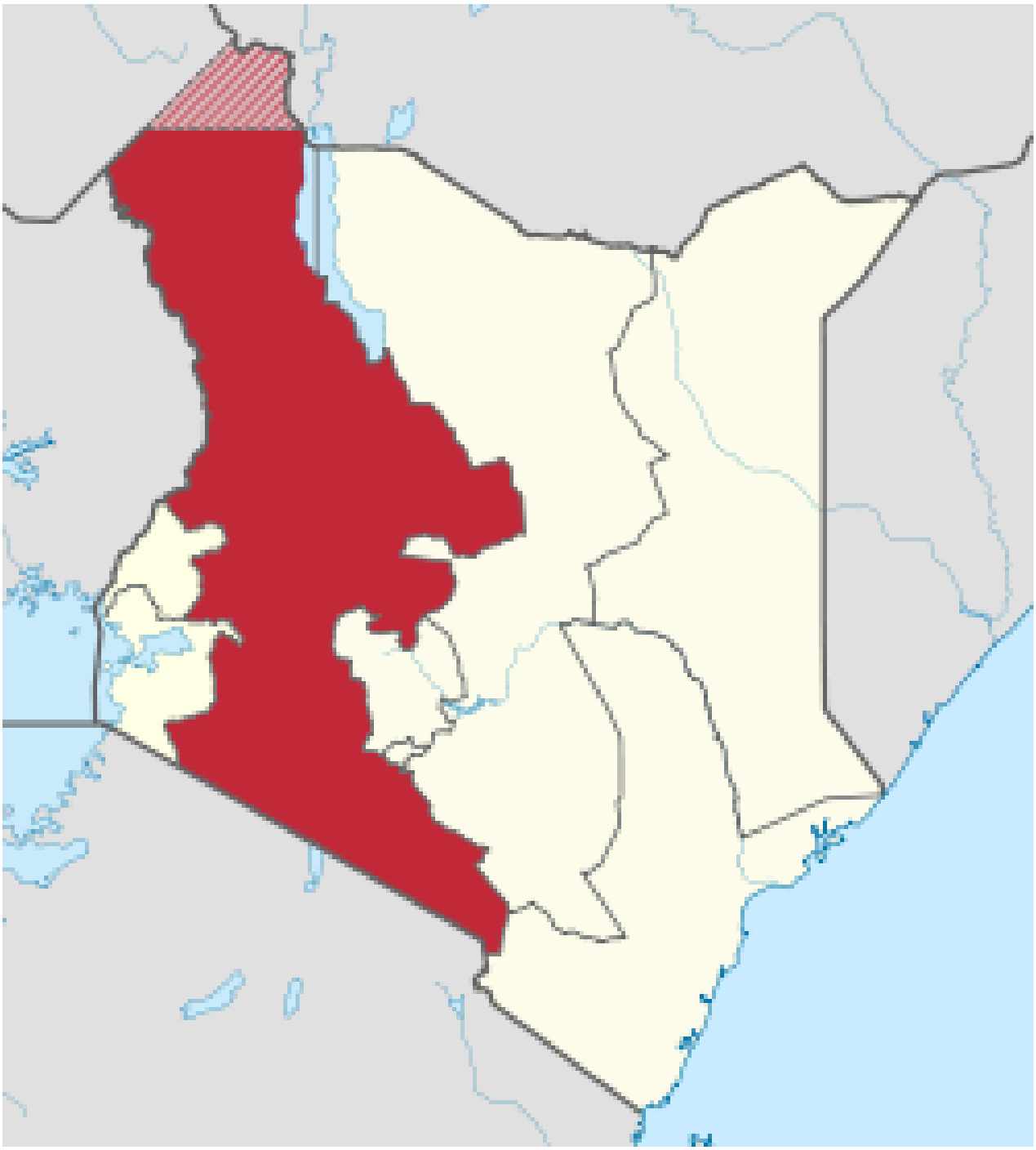
Date:_____

Interviewer\s name:_____

Signature of interviewer:_____

Date:_____

APPENDIX V: MAP OF RIFT VALLEY REGION– LOCATION IN KENYA



APPENDIX VI: RIFT VALLEY PROVINCE CENSUS, 2009

Code	County	Former Province	Area (km^2)	Population Census 2009	Capital
23	Turkana	Rift Valley	71,597.8	855,399	Lodwar
24	West Pokot	Rift Valley	8,418.2	512,690	Kapenguria
25	Samburu	Rift Valley	20,182.5	223,947	Maralal
26	Trans Nzoia	Rift Valley	2,469.9	818,757	Kitale
27	Uasin Gishu	Rift Valley	2,955.3	894,179	Eldoret
28	Elgeyo-Marakwet	Rift Valley	3,049.7	369,998	Iten
29	Nandi	Rift Valley	2,884.5	752,965	Kapsabet
30	Baringo	Rift Valley	11,075.3	555,561	Kabarnet
31	Laikipia	Rift Valley	8,696.1	399,227	Nanyuki
32	Nakuru	Rift Valley	7,509.5	**1,603,325**	Nakuru
33	Narok	Rift Valley	17,921.2	850,920	Narok
34	Kajiado	Rift Valley	21,292.7	687,312	Kajiado
35	Kericho	Rift Valley	2,454.5	**752,396**	Kericho
36	Bomet	Rift Valley	1,997.9	730,129	Bomet
	Totals		182,505.1	**10,006,805**	

APPENDIX VII: LOCATION OF KERICHO COUNTY (GREEN)

APPENDIX VIII: LOCATION OF NAKURU COUNTY (GREEN)

APPENDIX IX: THE STUDY AREAS

Kericho County Map

Nakuru County Map

APPENDIX X: FOCUS GROUP DISCUSSION WITH PROGRAMME MANAGERS – KERICHO COUNTY

CTLC & sCTLCs, Kericho County during Focus Group Discussion (FGD) session, Kericho County Hospital with Researcher at the far Left.

APPENDIX XI: PUBLICATIONS

African Population Studies Vol. 28 no 2 Supplement July 2014
http://aps.journals.ac.za 1046

Determinants of diarrhoea among young children under the age of five in Kenya, evidence from KDHS 2008-09

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Abstract

This paper examines the relative contribution of household, demographic and maternal characteristics to the incidence of diarrhoea in young Kenyan children. Data from the Kenya Demographic and Health Survey 2008-09 was used with a total of 3838 women included in the study. The measure of diarrhoea in children was derived from woman's questionnaire. Logistic regression analysis showed that age of child [AOR, 0.796; 95% CI, 0.559-1.134] and residence of mother [AOR, 0.538; 95% CI, 0.324-0.895] are more likely to influence childhood diarrhoea. Higher education level of mother was associated with lower incidence of childhood diarrhoea [AOR, 0.187; 95% CI, 0.609-0.573]. Household characteristics that had statistically significant influence on childhood diarrhoea included sources of drinking water [AOR, 1.644; 95% CI, 1.040-2.599] and household size [AOR, 1.334; 95% CI, 1.000-1.780]. This paper emphasizes the importance of mothers being literate and access to good quality drinking water sources in reducing childhood diarrhoea.

Keywords: Childhood diarrhoea; Sources

Factors Associated to non-adherence in Tuberculosis Treatment, Baringo County, Kenya

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Jan 2016

ABSTRACT

The study was to determine the factors associated to non-adherence to TB treatment at individual, health care provider, facility and community levels.

A cross sectional descriptive survey study was conducted in Baringo County (urban and rural areas), Kenya.

Data collection was done using developed self-administered questionnaire and interview schedules and checklist. Respondents were be traced through TB patient defaulters registers and health workers.

Convenience sampling was employed. Data was analyzed using SPSS version 20.

The study found that non adherence to treatment was both at treatment phases as; intensive (46%) and continuation (54%). Amongst the smoking patients 45% associate it with non-adherence, 58% associated their drinking habit with non-adherence. 53% of patients who walk, 41% of defaulters associated symptoms relieve during treatment with non-adherence, 52% associated their non-adherence with their forgetfulness or carelessness. Defaulting was associated with both patient, health care delivery patterns and socio-cultural factors.

Keywords: non adherence, treatment interrupters**,** non-adherence factors

Factors Contributing to Patient Default of Tuberculosis Treatment in Health Facilities within Nakuru East and West Sub-Counties-Kenya

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Abstract: Tuberculosis is an infectious disease caused by mycobacterium tuberculosis (MTB) which is transmitted through the air or by ingesting infected milk or meat (bovine Tb). It is major public health problem worldwide. The study sought to determine factors contributing to patient defaulting to tuberculosis treatment in Nakuru East and West Sub-Counties, Nakuru

County. The study adopted a descriptive cross-sectional study design. The target populations were patients who had defaulted

TB treatment in various health facilities of Nakuru East and West Sub-Counties, Nakuru County. They were estimated to be 70 clients according to District Health Information System, 2015. The study utilized convenient sampling method to access the respondents among the traced TB defaulters. Interview schedule was used as data collection tool. Data collected was analyzed by use of Statistical Package for Social Sciences (SPSS) version 21 and presented by use of tables. The study result found that majority of the respondents was male 38 (90.5%) while the minority was female 4 (4%). Counseling services to were; 7

(16.7%) only counseled during the first visit for treatment, 17 (40.5%) on each visit, 13 (31%) once a while 5 (11.9%) were never counseled 26 (61.9%) of the respondents were casual laborers, 3 (7.1%) were self-employed, 3 (7.1%) were employed and 7 (16.7%) were dependants and that 2 (9.5%) of the respondents believed that TB can be cured using traditional medicine while 40 (90.5%) did not belief that. The study recommends that health education should be intensified within the communities, focusing on all the TB patients to be intensified, particularly at the beginning of treatment, with reinforcement at each visit using the local language. This intensification should be comprehensive to include duration of treatment, possible side effects and how to deal with them, consequences of not completing TB treatment and the dangers of using traditional medicines during TB treatment.

Keywords: Tuberculosis Treatment, Defaulting, Compliance, Contributing Factors

Tuberculosis Treatment Outcomes of Patients Co-Infected With Tuberculosis and HIV At Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), Kenya.

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Background: Human Immunodeficiency Virus (HIV) infection and Tuberculosis (TB) increase the rate of disease progression of each other, thereby reducing the survival time of the patients. TB disease is considered a preventable, detectable and curable disease that requires wider public- private partnerships. Causes of mortality include late TB and/or HIV diagnosis, late HAART initiation, overlapping drug toxicities or comorbidities, drug-drug interactions between rifamycin and antiretroviral drugs, and immune reconstitution syndrome of TB after ART initiation etc. The Kenya National TB cohort analysis showed poorer treatment outcomes to be higher among patients with unknown or undocumented HIV status followed by HIV positive TB patients. Nyanza province contributes TB (20%) and HIV (30%) burden of the national burden, with co-infection rate of 70% of TB patients against 53% national rate. Early diagnosis, treatment initiation and monitoring leads to improved survival.

Methods: This was a retrospective study aimed at evaluating socio-demographic characteristics of 350 TB/HIV co-infected patients (adults and children) enrolled in JOOTRH and documented treatment outcomes, risk factors associated with mortality and lost to follow up between January 2012 and July 3013 who were followed up 8 months after completion of treatment.

Conclusion: Early ART initiation in the intensive phase of TB treatment, use of Cotrimoxazole, being WHO stage I & II and CD4> 350cells/mm3 were associated with reduced deaths or loss to follow up while being male gender, initiating or delaying treatment after 2 months of TB treatment, WHO stage III and IV and CD4 <350cells/mm3 were significantly associated with high mortality.

Patient Factors Which Contribute to Non-adherence to TB Treatment in Kericho and Nakuru Counties of Kenya

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Abstract: Tuberculosis (TB) continues to be a major cause of high morbidity and mortality in Kenya. Adherence to TB treatment is one of the interventions that lead to increase in cure rate thus reducing mortality and emergence of Multi drug resistant tuberculosis (MDR) and high cost of treatment. This study focused on TB patients in urban and rural areas of Kericho and Nakuru Counties. The study was to determine the patient factors which contribute to non-adherence to TB treatment. A purposive sampling method was used to carry out a cross sectional descriptive survey with retrospective cohort of non-adherent

TB patients. Target population was smear positive TB patients registered in the TB registers in the two counties, within the past six months at the commencement date of the study. Data was collected using adopted/ developed observation forms/checklists, interview schedules and questionnaires. Respondents were traced non-adherent smear

positive TB patients (defaulters), care supporters and health care workers. Collected data was analyzed using SPSS platform. Age, gender, inadequate knowledge, ignorance on need for treatment adherence, stigma, alcoholism, social and economic factors such as low income, lack of social support, low education, financial problems, drug side effects were analyzed. Feeling well soon after medication initiation, drug side effects, low educational level, poor financial status, unemployment, shortage of Tb drugs including unavailability of pyridoxine which is essential in counteracting drug side effects and were associated with defaulting.

Staff should also intensify adherence counselling targeting effect of personal factor to adherence. The County of Nakuru and Kericho's Ministry of Health to increase awareness on Tb and make the public aware of the importance of TB control.

Keywords: Non-Adherence, TB Treatment, Defaulter, Patient Factor, Tuberculosis

Socio-Cultural Factors Associated with Non-Adherence to Tuberculosis Treatment and Medical Education Interventions in Selected Counties of Kenya

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Abstract

Background: Tuberculosis (TB) continues to be a major cause of high morbidity and mortality in Kenya. Adherence to TB treatment is one of the interventions that lead to increase in cure rate thus reducing mortality and emergence of Multi drug resistant tuberculosis (MDR) and high cost of treatment. This study focused on TB patients in urban and rural areas of Kericho and Nakuru Counties of Kenya.

Objectives: The study set out to identify the socio-cultural factors associated with non-adherence to TB treatment.

Methods: A purposive sampling method was used to carry out a cross sectional descriptive survey with retrospective cohort of non-adherent TB patients. Target population was traced non-adherent smear positive TB patients (defaulters) and health care workers within the past six months (June-December 2015) at the commencement date of the study. Interview schedules and questionnaires were used to collect data. Data analysis was done with aid of SPSS platform that generated graphs and tables.

Results: Some of the factors which contributed to non-adherence to TB treatment were socio-demographic factors and ignorance on need for treatment adherence. Socio-cultural/economic factors which included stigma, alcoholism, poverty, low income, living alone, and poorly prepared healthcare workers on Tb treatment also contributed to non-adherence to treatment.

Conclusion: Socio-demographic and socio-cultural/economic factors associated with non-adherence to treatment included ignorance on need for treatment adherence, stigma, alcoholism, poverty, low income, living alone. Inadequately prepared healthcare workers seem to have also contributed to non-adherence to medication.

Recommendations: A deliberate and sustained plan on patients' health education regarding adherence to medication and stigma reduction must be emphasized. Staffs' updates on Tb treatment must be regularly enhanced through continuing medical education forums.

Keywords: Non-Adherence, TB Treatment, Defaulter, Patient Factor, Tuberculosis

APPENDIX XII: PLAGIARISM REPORT

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RELATIONSHIP OF TRAINING AND TREATMENT PRACTICES IN TUBERCULOSIS MANAGEMENT IN SELECTED COUNTIES IN KENYA CHAPTER ONE INTRODUCTION 1.1 Introduction This chapter discusses the study background, epidemiology, statement of the problem, justification of the study, study objectives, research questions, significance of the study, scope and limitation of the study and finally definition of terms as used in this context. 1.2

Background Tuberculosis (TB) is one of the world's life-threatening communicable diseases and remains a global public health problem with significant morbidity and mortality (World Health Organization, 2012, Raviglione, et.al (2012)). In 2013, an estimated 9.0 million people developed TB and 1.5 million died from the disease, 360 000 of whom were HIV-positive.

Globally, the tuberculosis (TB) mortality rate has fallen by 41 % since 1990, and the world is on track to reach the global target of a 50 % reduction during 2015 (World Health Organization, 2013). However, global TB control has faced many challenges, with an estimated 8.7 million incident cases in 2011 and 1.4 million deaths from TB since 2011. Tuberculosis remains a major cause of morbidity and mortality in Kenya.