DECLARATION

I declare that this thesis is my original work and has not been presented for a degree in any other university.

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Ministry of Public Health and Sanitation
DEDICATION

This work is dedicated with love to my son, Quincy Rowen Musembi. May you live to achieve even more.
ACKNOWLEDGEMENT

First and foremost, my sincere gratitude to God for His Grace and providence that saw me through this work.

I would like to express my profound gratitude and appreciation to my supervisors Dr. Davies Kimanga (NASCOP-Ministry of Public Health and Sanitation) and Dr. George Orinda (Department of Biochemistry-Kenyatta University) for their guidance and support during my study. To the National Commission for Science, Technology and Innovation (NACOSTI) for awarding me the 2012/2013 research grant to carry out this project. A big thank you to Dr. Isaac Mwanzo chairman Community Health department for his constant support and valuable advice. The medical superintendent Dr. Martin Chabi, matron in charge and all staff of Machakos level IV hospital comprehensive care center (CCC) for the exceptional cooperation.

Thanks also go to my dear Mum Alice Mutheu for inculcating in me the value of discipline and hard work.

Finally, special thank you to my best friend and my love Alikah Musembi for being the one person who truly understands me best.

May God bless you all
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OPERATIONAL DEFINITION OF TERMS

Acquired Immunodeficiency Syndrome (AIDS): AIDS is a disease caused by infection with the human immunodeficiency virus (HIV). AIDS results in severe damage to the immune system, leaving the body vulnerable to life-threatening conditions such as infections and tumors; resulting in the progressive immune deficiency caused by infection of CD4+ T cells with the human retrovirus HIV.

Adherence: The extent to which a person’s behavior such as taking medication, following a diet and/or executing lifestyle changes corresponds with agreed recommendations from a health care provider.

Co-trimoxazole (CTX): An antibiotic used in the treatment of a variety of bacterial infections. Kenya’s national guideline recommends that co-trimoxazole be given as prevention to all people with HIV to prevent some opportunistic infections.

Co-infection: Refers to simultaneous infection by separate pathogens.

Side effects: A side effect, also known as an adverse effect, adverse event, or undesirable secondary effect is when a treatment goes beyond the desired effect and causes a problem; the treatment, which may be a medication, surgical procedure or some kind of therapy has an undesirable secondary effect which occurs in addition to the desired therapeutic effect.

Human Immunodeficiency Virus (HIV): HIV is the virus that causes AIDS. The virus is passed from person to person through blood, semen, vaginal fluids and breast milk. HIV attacks CD4+ T-cells in the body, leaving the infected person vulnerable to illnesses that would have otherwise been eliminated by a healthy immune system.
Opportunistic Infections: An opportunistic infection is an infection caused by pathogens, particularly opportunistic pathogens—those that take advantage of certain situations—such as bacterial, viral, fungal or protozoan infections that usually do not cause disease in a healthy host, one with a healthy immune system. A compromised immune system, however, presents an "opportunity" for the pathogen to infect.

Mother to child transmission: The transmission of HIV from an HIV-positive mother to her child during pregnancy, labor, delivery or breastfeeding is called mother-to-child transmission.

Prevention of Mother-to Child Transmission: Prevention of mother-to-child transmission (PMTCT; also known as prevention of vertical transmission) refers to interventions to prevent transmission of HIV from a mother living with HIV to her infant during pregnancy, labor and delivery, or during breastfeeding.

Youth: According to WHO, youth refers to those aged 10-24 (including the range from adolescents, teenagers and young adults)

Prevalence: This refers to the number of affected persons present in the population at a specific time divided by the number of persons in the population at that time

AIDS: AIDS is a disease caused by infection with the human immunodeficiency virus (HIV). AIDS results in severe damage to the immune system, leaving the body vulnerable to life-threatening conditions such as infections and tumors; resulting in the progressive immune deficiency caused by infection of CD4+ T cells with the human retrovirus HIV
CD4: This refers to antigen marker of helper /inducer T cell that recognizes antigens bound in class II MHC protein, and which is used in the classification or disease staging and initiating ART

Directly Observed Therapy: Direct observation of patients taking their medication

Age: This refers to the number of years an individual has lived since birth

Incidence: The incidence of a disease is defined as the number of new cases that occur during a specified period of time in a population at risk for developing the disease

Co-treatment: Treatment of two or more infections simultaneously

Viral load: Levels of virus found in the blood per 10 milliliters (10mls)
ABBREVIATIONS AND ACRONYMS:

AIDS : Acquired Immune Deficiency Syndrome
ANC : Ante-natal clinic
ART : Antiretroviral Therapy
ARV : Antiretroviral
CCC : Comprehensive care center
CDC : US Centers for Disease Control and Prevention
CI : Confidence interval
CPT : Cotrimoxazole Preventive Therapy
CTX : Cotrimoxazole
DOT : Directly Observed Therapy
FGD : Focus Group Discussion
HAART : Highly active antiretroviral therapy
HCP : Health Care Provider
HCT : HIV testing and counseling
HIV : Human Immunodeficiency Virus
KAIS : Kenya Aids Indicator Survey
KAP : Knowledge, Attitude and Practice
KDHS : Kenya Demographic and Health Survey
KII : Key informant interview
MOH : Ministry of Health
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>NASCOP</td>
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<td>OI</td>
<td>Opportunistic Infections</td>
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<td>OR</td>
<td>Odds ratio</td>
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<td>PCP</td>
<td>Pneumocystis Pneumonia</td>
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<td>PITC</td>
<td>Provider initiated testing and counseling</td>
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<td>PLWHA</td>
<td>People living with HIV and AIDS</td>
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<td>PMTCT</td>
<td>Prevention of mother to child transmission</td>
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<tr>
<td>SES</td>
<td>Social Economic Status</td>
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<tr>
<td>SMX-TMP</td>
<td>Sulfamethoxazole Trimethoprim</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub Saharan Africa</td>
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<tr>
<td>STI</td>
<td>Sexually Transmitted Infections</td>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>UNAIDS</td>
<td>United Nations joint program on AIDS</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>YFS</td>
<td>Youth Friendly Service</td>
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<tr>
<td>IRIS</td>
<td>Immune Reconstitution Inflammatory Syndrome</td>
</tr>
<tr>
<td>OPC</td>
<td>Oropharyngeal Candidiasis (Infection)</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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ABSTRACT

Cotrimoxazole Preventive Therapy (CPT) also known as Sulfamethoxazole-Trimethoprim (SMX-TMP) is a broad-spectrum antibiotic that is active against both gram-positive and gram-negative microorganisms and protozoa. Further, it has been shown to reduce HIV related opportunistic infections and mortality risk by 25-46 percent as well as malaria, diarrhea, pneumonia and hospitalization rates. Yet, opportunistic infections continue to be among the leading causes of mortality and morbidity in HIV/AIDS. Almost half of the deaths from AIDS-related illnesses in 2010 occurred in Africa, with the pandemic claiming at least one million lives annually in sub-Saharan Africa. Despite the ready availability and low cost of cotrimoxazole preventive therapy and its documented benefits in reducing morbidity and mortality associated with HIV/AIDS, opportunistic infections continue to pose a major challenge in HIV/AIDS management, accounting for 47% of AIDS related deaths. Kenya is home to one of the world’s harshest HIV and AIDS epidemics. An estimated 1.5 million people are living with HIV; with an estimated 1.2 million children orphaned by AIDS. In 2009 over 80,000 died from AIDS related illnesses. This research involved a descriptive cross-sectional survey with a broad objective of establishing the determinants of adherence to the uptake of cotrimoxazole preventive therapy among HIV infected persons in Machakos district hospital, Machakos County. Data collection was carried out using pre-tested interviewer administered semi-structured interview schedule and key informant interview schedules to randomly selected respondents. Two (2) focus group discussions were conducted with patients during their weekly support group meetings and their views on the factors influencing CPT uptake recorded. Five (5) key informant interviews were conducted with health workers from selected key departments within the facility. A total number of one hundred and seventy six questionnaires were administered. Quantitative data was analyzed using the Statistical Package for Social Scientists (SPSS) version 17 software. Hypothesis testing was done using chi-square test and significance established at p<0.05. Binary logistic regression was then used to identify the independent predictors adherence to CPT. Permission to carry out the research was sought from Kenyatta University Bioethical Committee and the Ministry of Education Science and Technology. Informed consent was sought from the respondents and confidentiality maintained. The study findings show a low level of knowledge on CPT (54.5%) among the respondents. The main determinants of adherence to CPT were substance use among the respondents ($X^2=31.818$, df=1, p<0.001), patients knowledge on CPT as a preventive therapy for OIs (P<0.001), and admission to hospital ($X^2=31.073$, df=1, p<0.001). Other determinants of adherence to CPT were level of education ($X^2=33.238$, df=1, p<0.001), religion (P<0.001) and facility support groups (P<0.001). The study recommends renewed community awareness on the importance of adherence to regimen among HIV/AIDS patients through social mobilization and education, as well as the development of a more robust defaulter-tracing mechanism for follow up. It further highlights the need to not only continuously screen and treat patients for substance abuse as part of routine HIV care, but also policy formulation that would enhance adherence to CPT and other related antibiotics.
CHAPTER ONE: INTRODUCTION

1.1 Background to the study

People living with HIV infection are at risk for certain infections, often called "opportunistic infections" and cancers, many of which can be treated or even prevented (WHO, 2006). Cotrimoxazole (CTX), which is also referred to as Sulfamethoxazole-Trimethoprim (SMX-TMP), is a broad-spectrum antibiotic which is active against a number of Gram-positive and Gram-negative microbes, including protozoa. Even in poor resource settings, the drug is widely available both in syrup and solid formulations at relatively affordable prices.

Since the early 1990's, CTX has been offered either as a primary or secondary prophylaxis for the prevention of *pneumocystis jiroveci pneumonia* (formerly *Pneumocystis carinii pneumonia*-PCP) and toxoplasmosis as part of the standard care in the management of HIV infected individuals in developed countries. In the recent past, more and more data has been availed from resource-limited settings with regard to the potential benefits of CTX in both adults and children infected with HIV with regard to morbidity and mortality. According to WHO (2006), Cotrimoxazole preventive therapy (CPT) has been shown to have tremendous benefits in the prevention of malaria and bacterial infections although the drug has also been documented to have considerable levels of resistance.
The Ministry of Health recommends that everyone diagnosed with HIV take cotrimoxazole (commonly referred to as Septrin), for reduction of early mortality as well as rate of hospitalization, malaria, diarrhea and pneumonia. The antibiotic is also used in the treatment of a variety of bacterial infections. Kenya policy further recommends that cotrimoxazole be given as prevention to all people diagnosed with HIV to help avoid HIV-related opportunistic infections and therefore extend the length of a person’s life.

Despite the existence of the WHO/UNAIDS guidelines for CPT from as early as 2000, majority of countries are yet to implement the intervention widely enough to achieve full benefits of the therapy. Part of the concerns that have occasioned the slow implementation of the CPT guidelines mainly revolve around the differences in the burden of opportunistic infections particularly in developing countries, the potential of developing resistance to the drug, pill burden and in some cases lack of guidelines for the duration of the therapy. Thus far, a lot more effort has been geared towards the provision of antiretroviral therapy while overlooking the equally important aspect of scaling up the implementation of CTX prophylaxis guidelines. After an experts’ consultation meeting in Geneva in February 2005, WHO identified four priority areas for research into cotrimoxazole prophylaxis. These were the role of cotrimoxazole prophylaxis in the context of concomitant antiretroviral treatment in Africa, defining the optimal timing of cotrimoxazole prophylaxis among HIV positive people with tuberculosis, defining the determinants that influence the efficacy of cotrimoxazole prophylaxis, and determining the best delivery strategies to improve the uptake of cotrimoxazole prophylaxis. Further, evidence has emerged that cotrimoxazole prophylaxis can be introduced into routine HIV clinic activities and is associated with a reduction in overall mortality and malaria
morbidity, even in an area with high bacterial resistance. These results reinforce the need for large-scale provision of cotrimoxazole prophylaxis for all HIV-positive patients in developing countries (Mwaungulu et al., 2004).

In addition to the general guidelines for managing HIV infected persons, the World Health Organization has recommended the use of cotrimoxazole for all HIV infected persons with a CD4 count of less than 350 regardless of the stage of the disease (WHO, 2006).

1.2 Statement of the Problem

Despite the ready availability and low cost of cotrimoxazole preventive therapy (CPT) and its demonstrated ability to reduce opportunistic infections as well as rates of hospitalization, diarrhea and malaria by 25-46% (WHO, 2006), the uptake of this important drug has been low and opportunistic infections continue to be the major cause of mortality and morbidity in HIV, accounting for 47% of AIDS related deaths (Bonnet et al., 2005). The increased cost of health care that HIV/AIDS is causing is primarily as a result of prolonged disease process and multiple opportunistic infections (Bonnet et al., 2005). At the end of 2010 for instance, an estimated 1.8 million people died of AIDS related illnesses (UNAIDS, 2011). In Kenya, only 12.1% (representing 172,000) of HIV infected adults were taking CPT daily to prevent opportunistic infections compared to an estimated 1.25 million HIV infected people in need of CPT (KAIS, 2007). Not taking cotrimoxazole therefore represents a missed opportunity to reduce the rates of morbidity and mortality among HIV infected persons.
1.3 Justification of the study

People with HIV who take cotrimoxazole every day have decreased risk of malaria, pneumonia, diarrhea and death and results in fewer hospitalizations. Cotrimoxazole is inexpensive (less than Ksh 500 per year) and relatively safe—only 3% of patients stop therapy due to toxic reactions, and for many of these patients an alternate daily antibiotic can be prescribed. Since cotrimoxazole is recommended for all people with HIV infection, it does not require testing for CD4 cell count or WHO staging (KAIS, 2007). Whereas the value of cotrimoxazole in reducing the morbidity and mortality associated with HIV infection has been well established through clinical trials conducted in industrialized and developing countries, its uptake still remains low.

Prevention and early treatment of infections is the mainstay of the medical management of majority of people with HIV infection especially in low-income countries. The main causes of mortality and morbidity in HIV remain tuberculosis, bacterial and parasitic infections particularly pneumococcal, non-typhus salmonella and parasitic enteritis. (LUCOT 2005)

Even in regions with acute limitation of resources, the drug is widely available at relatively fair prices both in liquid and solid formulations (WHO, 2006). An understanding of the determinants of adherence to uptake of this therapy is therefore key to promoting its usage among those in need of the drug and to the reduction of opportunistic infections in HIV/AIDS.
In addition, the 2007 Kenya Aids Indicator Survey (KAIS) shows a large unmet need for cotrimoxazole. Eighty four percent of the respondents need cotrimoxazole but do not know their status while a further 12% already know their status and need cotrimoxazole. According to this report, the great majority of unmet need can be attributed to low level of awareness of HIV status among those infected with HIV. However, HIV testing uptake has tripled among women aged 15-49 since 2007 and nearly doubled among men.

The 2007 KAIS study did not capture reasons for not taking daily cotrimoxazole or ARV’s (if eligible) among those aware of their HIV status. This study therefore seeks to establish whether the concerted efforts by government and stakeholders in the health sector to scale up HIV testing and awareness has resulted in a parallel increase in the uptake of Cotrimoxazole preventive therapy, a key element in reducing HIV/AIDS related mortality and morbidity.

1.4 Research Questions:

   a) What socio-economic and demographic factors influence the uptake of CPT among HIV/AIDS patients?

   b) What behavioral factors influence the uptake of CPT among HIV/AIDS patients?

   c) What is the knowledge and practice on CTX as a preventive therapy for opportunistic infection among HIV/AIDS patients?

   d) What facility factors influence CPT uptake among HIV/AIDS patients?
1.5 Hypothesis

1.5.1 The null hypothesis of the study will be

a) Socio-economic and demographic factors do not influence the uptake of CPT among HIV/AIDS patients.

b) Behavioral factors do not influence the uptake of CPT among HIV/AIDS patients.

c) Knowledge and practices on CPT as a preventive therapy has no relationship with its uptake among HIV/AIDS patients.

d) Facility factors have no influence on CPT uptake among HIV/AIDS patients.

1.6 Objectives

1.6.1 Broad objective

The broad objective of this study was to identify determinants of adherence to the uptake of cotrimoxazole preventive therapy among HIV/AIDS patients on treatment in Machakos district hospital, Machakos County.

1.6.2 Specific objectives

The specific objectives of the study were to:

a) To determine the socio-economic and demographic factors influencing the uptake of CPT among HIV/AIDS patients.

b) To determine the behavioral factors influencing uptake of CPT among HIV/AIDS patients.
c) To determine the knowledge and practices on CTX use as a preventive therapy for opportunistic infections among HIV/AIDS patients.

d) To identify facility factors that influence adherence to uptake of CPT among HIV/AIDS patients.

1.7 Significance and anticipated output

The findings of this study will offer significant contribution particularly in the design of programmatic interventions aimed at addressing barriers to, and scaling up CPT uptake; with the larger goal of reducing mortality and morbidity from opportunistic infections in HIV/AIDS. This research will elaborate on the limiting as well as promoting factors to the uptake of CPT faced by HIV-infected persons on treatment.

1.8 Assumptions of the study

The research assumed that all the participants gave consent to participate in this study and that the information they provide to the researcher was correct.

1.9 Delimitation of the study

The study involved HIV infected persons of reproductive age (15-49 years) residing within the larger Machakos County and attending to the Machakos Level IV hospital for HIV related care and treatment.
1.10 Limitation of the study

Owing to limitation of resources to conduct the research in several comprehensive care centres (CCC) for comparative analysis purposes, the study was conducted in one CCC at the Machakos level IV hospital. This facility serves as the referral centre for the larger Machakos County.

The study largely depended on patient’s ability to recall specific events relating to their infection with HIV and particularly their drug taking habits. Fear of self-incrimination may have hindered some respondents from volunteering information, or even providing inaccurate information. The study further confined its research to persons of reproductive age between 15-49 years and its findings may not thus be generalizable to populations outside this age bracket.
1.11 Conceptual framework for determinants

**Conceptual framework**

- **Facility service delivery**
  - Waiting time
  - Availability of drugs
  - Staff attitude
  - Availability of CPT guidelines
  - Facility management
  - Integration of CPT into HIV care & treatment
  - Staff support
  - Facility accessibility
  - Lab testing

- **Socioeconomic & cultural**
  - Age, Sex, Education level, Employment status of patient, Religion

- **Behavioral**
  - Drug abuse
  - Fear and stigma
  - Moral support from friends and relatives
  - Depression

**Adherence to CPT**

- Knowledge and awareness on CPT benefits
- Patient attitude towards care & treatment
- Drug-taking practices
- Knowledge, Attitude, Practice


**Figure 1.1: Conceptual Framework**
CHAPTER TWO: LITERATURE REVIEW

2.1 Global perspective on HIV related opportunistic infection

Across the world, several millions of people who are infected with the HIV and who need antiretroviral drugs especially those living in resource-poor and resource-limited settings have very limited or no access to such life prolonging antiretroviral. Even in situations where such drugs are available, there still remains the critical aspect of prevention and treatment of opportunistic infections. There is paramount importance attached to the right and timely intervention in treating such infections. It has, however, been observed that in certain circumstances it might be prudent to delay initiating treatment for HIV and instead offer treatment for the opportunistic infections when there are fears of unintended drug interactions and drug toxicities (Date et al., 2010).

All individuals infected with HIV are prone to infection with a myriad of opportunistic infections that would still be pathogenic to host individuals even in the absence of HIV infection. However, these opportunistic infections tend to be more common and severe in persons already infected with HIV (CDC, 2010).

Cotrimoxazole, which is also variously referred to as septra or bactrim has been shown to be effective in preventing a number of these opportunistic infections including tuberculosis, bacterial pneumonia, malaria and PCP. In addition, the drug has also been shown to significantly reduce HIV related mortality among individuals being initiated into ARV. Despite the affordability of this drug, many countries are yet to implement
relevant policies and put in place framework to nationwide adoption of such policies (Hutchinson et al., 2008).

Although some opportunistic infections are easier to treat than others, effective management of such infections remains a function of several health related factors such as facility’s ability to procure, store and administer such treatment in a manner that guarantees desired treatment outcome. In other circumstances, home-based care where diagnosis is made by observing symptoms can be employed in the management of such opportunistic infections as herpes zoster, thrush and candidiasis of the mouth (Zachariah et al., 2007).

2.2 Individual Opportunistic Infections

Key among opportunistic infections that affect individuals living with HIV includes:

2.2.1 Bacterial pneumonia

Various bacteria have been known to cause pneumonia but in all the cases, the symptoms of the disease are similar whether or not the individual is living with HIV and include chest pains, chills and pus in the sputum. Accurate diagnosis is important since people living with HIV are prone to many other forms of respiratory infections. Such diagnosis may include a chest radiograph, blood cultures and white blood cell count aimed at eliminating other infections with treatment targeting the identified bacteria.
2.2.2 Candidiasis

The two main types of candidiasis include localised disease (of the mouth and throat or of the vagina) and systemic disease (of the oesophagus, and disseminated disease). HIV-positive women have been show to acquire the mouth and throat strain which is usually known as thrush or OPC and which is believed to occur at least once in the lifetime of all HIV-infected individuals. Treatment of localised disease may be initiated with drugs such as nystatin, miconazole or clotrimazole while antifungal agents such as fluconazole, ketoconazole or amphotericin are used for the systemic candidiasis.

2.2.3 Cryptococcosis

This is caused by a fungus that majorly affects the brain, often appearing as meningitis and occasionally as a pulmonary disease. While the diagnosis is relatively easy, cryptococcal meningitis is fatal if left untreated. Those diagnosed with cryptococcal disease should be initiated into ART. However, the development of immune reconstitution inflammatory syndrome (IRIS) in cryptococcal meningitis should be weighed when treating the disease.

2.2.4 Herpes simplex and herpes zoster

Although not life threatening, the symptoms of herpes simplex infection—which causes sores around the mouth and genitals, and herpes zoster infection which causes chickenpox can be extremely painful. However, the two viruses are capable of causing retinitis as well as encephalitis—which can be life-threatening. While herpes Zoster is
usually transmitted through the respiratory route, herpes simplex is transmitted through contact with secretions from an infected area.

2.2.5 Leishmaniasis

The transmission of Leishmaniasis is through the bite of sand flies and possibly through the sharing of needles. Leishmania has four forms with the most serious of the four being visceral leishmaniasis (also known as kala azar). Usually, visceral leishmaniasis is fatal if left untreated. Symptoms of the disease include irregular bouts of fever, weight loss, swelling of the spleen (splenomegaly) and liver and anemia. In the case of visceral leishmaniasis, amphotericin B and pentavalent antimony are recommended whereas sodium stibogluconate is used for cutaneous leishmaniasis.

2.2.6 Pneumocystis Jirovecii Pneumonia

Originally referred to as pneumocystis carinii but now renamed pneumocystis jirovecii, Pneumocystis Carinii Pneumonia (PCP) is a common opportunistic infection associated with HIV occurring in 70%-80% of patients. Symptoms of PCP include fever, chest pain and difficulty in breathing and its diagnosis requires body tissue/fluids microscopy. The treatment for PCP includes clindamycin and oral primaquine for severe cases and clindamycin alone for mild cases. Particular emphasis is usually recommended for the prevention of PCP among HIV patients especially in areas where it is known to be of great public health concern.
2.2.7 Tuberculosis

Tuberculosis (TB) has remained the greatest opportunistic infection associated with HIV particularly in developing countries with the risk of developing active TB for those with HIV/TB co-infection being 30-50% higher than those infected with TB alone. This poses a serious public health challenge with regard to increased transmission of the TB pathogen, which in turn results in more TB carriers and consequently increases cases of TB in the population. While TB diagnosis is harder in HIV-infected persons, accurate TB diagnosis is important especially given that the disease progresses faster in HIV infected persons and it also more fatal if left undiagnosed or untreated. In addition, TB has been shown to infect HIV individuals much earlier than many other opportunistic infections.

Proper combination for TB treatment has both curative and preventive benefits, which makes the individual non-contagious and thereby preventing further spread of the germ. This can largely be attributed to the successful implementation of the WHO recommended directly observed short course (DOTS). The recommended 6-8 weeks successful treatment not only cures the individual but also prevents further spread of the disease to others, underscoring the importance attached to the prevention of infectious diseases at community level. Isoniazid has been recommended as a preventive therapy not only for HIV-infected persons at risk of TB, but also for those known to have latent TB infection.
2.3 Cotrimoxazole uptake and the Africa situation

Over the last decade, the burden of HIV and AIDS has been documented as being greater in the sub-Saharan Africa than in any other region of the world. Approximately two thirds of the global total number of people living with HIV and AIDS are found within the Sub-Saharan Africa, with an estimated 22.9 million people are living with HIV in the region. In 2010 for instance, around 1.2 million people died from AIDS in sub-Saharan Africa with another 1.9 million people acquiring the infection. The situation has been further compounded by the number of orphans left behind as a result of the pandemic, with a total of 14.8 million children losing one or both parents to HIV/AIDS since the beginning of the epidemic.

The social and economic consequences of the AIDS epidemic are widely felt, not only in the health sector but also in education, industry, agriculture, transport, human resources and the economy in general. The AIDS epidemic in sub-Saharan Africa continues to devastate communities, rolling back decades of development progress.

Over the past few years, a number of papers in leading medical journals have in several occasions raised pertinent question of why cotrimoxazole preventive therapy for opportunistic infections in patients living with the human immunodeficiency virus (HIV) has not been more widely scaled up in low-income countries. Published in The Lancet Infectious Diseases, the BMJ and the Bulletin of the World Health Organization, these papers have all expressed the authors' frustration at knowing that an intervention known to be highly efficacious, cost-effective, amply researched and urgently needed has not
become widely available, especially in Africa. In the most recent article Date et al., 2007 combined analyses of the development of policy on cotrimoxazole prophylaxis and on isoniazid preventive therapy to raise concerns about the uptake of both interventions. While operationally the need to rule out active disease before initiating treatment creates problems that make isoniazid preventive therapy especially challenging, Date et al., 2007 highlights similarities in the frustration generated by the slow scale-up of both cotrimoxazole prophylaxis and isoniazid preventive therapy. They point out that at the national level both the development of cotrimoxazole prophylaxis and the development and implementation of policy on isoniazid preventive therapy have been sluggish, and they argue "strong advocacy and dissemination of evidence-based information regarding the benefits of cotrimoxazole prophylaxis and isoniazid preventive therapy are urgently required at the national and international level".

Njozing et al., 2007 conducted a study to assess the accessibility of HIV care and treatment packages among TB patients in the Northwest Region of Cameroon. This study assessed the uptake of provider initiated testing and counselling (PITC), ART and CPT services and factors that influenced their uptake among TB patients in selected treatment facilities within the Northwest Region. The study period was between January 2006 and December 2007, when TB/HIV collaborative activities became operational. The study demonstrated a low uptake of CPT (47.0%) among co-infected patients with 24% (359/1473) of CPT records missing. Since all HIV-positive patients are eligible for CPT, then only 36% (524/1473) of the TB patients were on CPT. Also noted was a higher uptake in faith-based hospitals (65.8%) compared to the public hospital (35.2%), which is however lower than results from studies in Malawi with uptakes above 90%. Considering
the fact that CPT is a simple intervention with less stringent eligibility criteria compared to ART, a higher uptake compared to ART could have reasonably been expected. Incidences of inadequate supplies and rupture of CPT stocks have been reported and patients have been required to procure treatment personally and this might be another explanation for the low enrolment. The study recommends further research to explore the reasons for the above finding and address the operational challenges contributing to among others, the low CPT uptake.

Various other studies in Africa have demonstrated that CPT reduces morbidity and mortality in HIV co-infection underscoring the importance of providing this simple but important CPT intervention to HIV-infected patients and to vigorously monitor and report programme activities.

Most recent works on CPT uptake and opportunistic infections involve a research conducted by the United States Centres for Disease Control (CDC) in eastern Uganda, where malaria is endemic, and published in March 2012 by the Oxford Journal of Clinical Infectious Diseases. The research found out that 72% of the 315 cases of fever reported by the study participants occurred among those who had stopped taking cotrimoxazole prophylaxis, and they were also nearly twice more likely to report diarrhoea. The direct implication of this study is that HIV-infected persons, while on cotrimoxazole, have a lower rate of these infections and stopping the drug increases the rate.
2.4 Cotrimoxazole Preventive Therapy Guidelines

Despite the existence of the World Health Organization (WHO) and the joint United Nation Program on HIV and AIDS (UNAIDS) guidelines for CPT from as early as 2000, majority of countries are yet to implement the intervention widely enough to achieve full benefits of the therapy. Part of the concerns that have occasioned the slow implementation of the CPT guidelines mainly revolve around the differences in the burden of opportunistic infections particularly in developing countries, the potential of developing resistance to the drug, pill burden and in some cases lack of guidelines for the duration of the therapy. Thus far, a lot more effort has been geared towards the provision of antiretroviral therapy while overlooking the equally important aspect of scaling up the implementation of CTX prophylaxis.

The World Health Organization (WHO) recommends that, in resource-limited settings, the following groups of people should begin taking co-trimoxazole:

- HIV-exposed infants and children, starting at 4-6 weeks after birth, or at first contact with health care, and continued until HIV infection is excluded,
- HIV-positive children less than 1 year old,
- HIV-positive children aged 1-4 years who have mild, advanced or severe symptoms of HIV disease, or a CD4 count below 25%,
- HIV-positive adults and adolescents who have mild, advanced or severe symptoms of HIV disease, or a CD4 count below 350 cells per ml,
- HIV-positive people with a history of treated PCP.
According to the WHO guidelines, treatment of HIV-positive children should continue until at least age five. In general treatment of adults and children should continue indefinitely, though it may sometimes be stopped following successful antiretroviral treatment.

The World Health Organization (WHO) and the joint United Nation Program on HIV and AIDS (UNAIDS) now recommend that all children of HIV positive mothers receive prophylaxis cotrimoxazole against opportunistic infections such as *Pneumocystis jiroveci* pneumonia from 6 weeks of age and continue this therapy until exposure through breast milk ceases and the infant is confirmed HIV negative. Yet, *Pnuemoncystis jiroveci* accounts for about 20% of cases of severe pneumonia in HIV infected children and over one third of all HIV related deaths in infancy (WHO, 2006). Despite this recommendation, benefits and low cost of Cotrimoxazole Preventive Therapy (CPT), there continues to be barriers to its use. According to WHO/UNICEF (2008) status report, only 4% of the estimated 4 million children who need CPT are currently receiving it.

### 2.5 Cotrimoxazole and opportunistic infections

People living with HIV infection are at risk for certain infections, often called “opportunistic infections” (OIs) and cancers, many of which can be treated or even prevented (Kais 2007). According to the journal of e-medicine on general prophylaxis, prevention of opportunistic infections in patients with HIV is important because in all HIV-infected individuals, the risk of infections, both opportunistic and non-opportunistic increases as the absolute CD4 T-lymphocyte count falls, especially to below 200 cells/μL.
Therefore, the CD4 count must be current to within 4 months to determine the risk of infection in a specific patient.

Cotrimoxazole (CTX), also known as Sulfamethoxazole-Trimethoprim (SMX-TMP), is a broad-spectrum antimicrobial agent that targets a variety of aerobic Gram-positive and Gram-negative organisms and protozoa and has been shown to reduce the risk of early mortality from opportunistic infections in HIV/AIDS by 25-46 percent as well as rate of hospitalization, malaria, diarrhea and pneumonia. Provision of Cotrimoxazole (CTX) as primary or secondary prophylaxis for prevention of pneumocystis jiroveci pneumonia-formerly Pneumocystis carnii pneumonia (PCP) and toxoplasmosis has been part of the standard care in the management of HIV infected individuals in developed countries since the early 1990's. The antibiotic is also used in the treatment of a variety of bacterial infections. The drug is widely available in both syrup and solid formulations at low cost in most places, including resource–limited settings (WHO, 2006).

Over the past few years, more data from resource–limited settings have become available on the feasibility and the positive impact of CPT prophylaxis on the morbidity and mortality among adults and children infected with HIV. CPT has been shown to be effective in preventing bacterial infections and malaria, despite the existence of variable levels of resistance to CPT (WHO, 2006).

2.6 Determinants of adherence to cotrimoxazole preventive therapy

The consequences of poor or non-adherence to treatment regimen is not only limited to poor treatment outcome with respect to the individual patient, but most importantly has been associated with the emergence of multi-drug resistant strains and subsequent
transmission of such strains to the general population which is raising a serious public health concern (Edlin et al., 2006).

Coons et al. (2005) describes adherence as the extent to which an individual sticks to the prescribed drug regimen. Conversely, compliance has been defined as the overall evaluation of how well an individual sticks to the prescribed regimen, i.e. evaluation of adherence.

2.6.1 Demographic characteristics

A number of studies have shown a close association between certain demographic characteristics and adherence to drug regimen particularly in the African context. However, few data is available on the influence of such factors among people suffering from HIV. In general, demographic factors have been associated with decreased adherence to medication (Graham et al., 2004).

2.6.1.1 Age

Several studies have been conducted with regard to drug adherence and age. Majority of these studies within the African context have shown a general tendency of an increase in adherence, except in the most elderly, according to a study conducted by Meyers et al., 2006. However, in one similar study by Singh et al. (2004) age was found not to be associated with adherence.

2.6.1.2 Gender

In a study conducted by Walsten et al. (1995), female gender was associated with increased adherence with the male gender being linked to decreased adherence to drug
regimen. However, several other studies have been conducted which do not show any correlation between the male gender and decreased adherence. A related publication by CDC (2009) underscores the urgent need to address barriers to adherence as this would have significant bearing on the treatment outcomes with respect to either gender.

2.6.1.3 Socioeconomic status

In a study conducted by Wallsten et al. (2004), lower socio-economic status was shown as an important factor contributing either to non-adherence or poor adherence to drug regimen. A lower income was particularly cited as major factor hindering individuals from seeking health care or even purchasing medication and immensely contributed to poor health seeking behavior among many patients.

2.6.2 Behavioral and psychosocial characteristics

2.6.2.1 Psychological stress

A number of underlying social and personal issues have been associated with decreased adherence. According to a study by Coons et al. (2004) the presence of such inherent psychosocial issues as resentment, anxiety and guilt was shown to be significantly associated with decreased adherence. These findings were underscored by Kumar et al. (2004) whose study recommended that, among other measures, proper psychiatric care should form an integral part of HIV care and management.

2.6.2.2 Social relationships and activities

Social networking and the social theorem have severally been advanced as key in influencing the behavior of individuals with respect to drug taking habits. Since human
beings are networked, the information flow and subsequent influence through such networks have been cited as key in promoting adherence. As such, poor social relationships have been associated with decreased adherence alongside poor living conditions, lack of family support and social exclusion according to Kissinger et al., 1995. However, the findings of Singh 2004 showed no association between increased adherence and social support among the study participants.

2.6.2.3 Patients attitudes and beliefs

Several study findings have attempted to show the intricate link between how a patient perceives prescribed medication and the level of adherence to such medication. In particular, negative view towards medication has been shown to negatively impact on the patient’s commitment to prescriptions (Youssef et al., 2006). Equally important in sticking to the prescribed regimen was the patients perceived benefits from the medication and the value such regimen would add to their present condition.

2.6.3 Health facility service delivery factors

2.6.3.1 Patient knowledge

One critical aspect closely associated with adherence revolves around the patient knowing the correct dosage of medication to take and the importance of sticking to that dosage especially for chronic conditions such as HIV. According to the findings of Wallsten et al. (2004), precise patient knowledge of the role that the prescribed regimen plays in one’s medical condition was significantly associated with increased adherence. Closely associated to this is the understanding that better progress and change in clinical
response in one's condition is tied to the level of adherence. Given the chronic nature of HIV/AIDS, it is imperative that patients be equipped with necessary knowledge on the benefits of continued medication especially during the asymptomatic period.

2.6.3.2 Health care provider and patient communication

Healthcare providers play a pivotal role with regard to the dissemination of patient information particularly on the correct use of medication. Even with the correct dosage information, several studies have shown that majority of patients often forget the timings of medication which calls for innovative strategies to incorporate reminders such as timed pill dispensers, alarm clocks and friends/relatives (Youssef et al., 2006).

Numerous other studies have also pointed to the need for a more robust approach in providing patients with information regarding the importance of adherence to medication including more hospital visits and facility based support services for HIV patients.
CHAPTER THREE: MATERIALS AND METHODS

3.1 Study design

The study employed descriptive cross-sectional survey design that was conducted in two phases:

i) Phase one involved data collection using interviewer administered semi-structured interview schedule to randomly selected respondents,

ii) Phase two involved focused group discussions in which the respondents were put in groups of 8-12; as well as key informant interviews with health professionals to get their views on factors influencing uptake of cotrimoxazole preventive therapy.

3.2 Variables

3.2.1 Dependent variable

Uptake of cotrimoxazole preventive therapy (CPT) among HIV infected persons.

3.2.2 Independent variables

i) Socio-economic and demographic factors influencing CPT uptake.

ii) Behavioral factors influencing CPT uptake.

iii) Knowledge, Attitude and Practices on CPT uptake.

iv) Facility factors influencing CPT uptake.
3.3 Location of the Study

The study was carried out in Machakos County in Eastern province. The county stretches from latitudes 0° 45' south to 1° 31' North and longitudes 36° 45' east to 37° 45' west. According to the Kenya population and housing census 2009, Machakos district has a total population of 1,098,584 with majority of the population falling within the reproductive age bracket of 15-49 years. The district covers an area of 6,281.4km. This area has a documented HIV prevalence of 6.7% (District AOP, 2007). Its proximity to the Nairobi-Mombasa highway and upcoming towns has recently seen the upsurge of long distance truck drivers accompanied by the emergence of commercial sex work. This has attracted many young adults and middle-class Kenyans of varied social, economic and cultural backgrounds giving it great potential as a catchment area for escalation of HIV/AIDS.

3.4 Target population

The Kenya 2009 census documented a total of 219,409 females and 223,521 males of reproductive age of between 15-49 years in the county. The target population included all persons of reproductive age (between 15-49 years) residing within Machakos county. The study population included all persons of reproductive age (between 15-49 years) who were HIV positive and were attending the Machakos level IV hospital for HIV related care and services.

3.5 Sampling technique and sample Size

The study employed simple random technique to identify respondents using the comprehensive care clinic card (MOH 257) which contains the patient unique identification number. A table of random numbers was then used to select patients
corresponding to the unique identification numbers one at a time until the desired sample size was achieved. Sample size calculation was based on the number of HIV positive individuals of reproductive age (15-49 years) as a proportion of the total population of reproductive age in the county.

The study included 176 respondents aged between 15-49 years randomly selected from the study population. It also included 5 health professionals for key informant interviews from various service delivery areas within the facility chosen on the basis of their strategic placement and interaction with study population i.e. the medical superintendent, health administrative officer, the nursing officer in-charge of comprehensive care center (CCC), the in-charge pharmacy and the hospital matron.

Inclusion criteria:

a) Those who gave informed consent,  
b) Those who fell in the age bracket 15-49 years,  
c) Those who were HIV positive.

Exclusion criteria:

a) Those who did not give informed consent,  
b) Those who did not fall in the age bracket 15-49,  
c) Those who were HIV negative.
3.6 Sample size determination

The minimum sample size was obtained using the formula as described by Fisher et al., (1998) as shown below:

\[ N = Z^2 pqD \]

\[ d^2 \]

Where:

- \( N \) is the desired sample size
- \( Z \) is the normal deviate (1.96) which corresponds to 95% confidence interval
- \( p \) is the proportion of the target population estimated to have the desired characteristic
- \( q \) = \( 1 - p \)
- \( d \) is the degrees of freedom
- \( D \) is design effect = 1

Thus

\[ N = 1.96^2 \times 0.118 \times 0.8822 \times 1 \]

\[ 0.05^2 \]

Approximately 160
3.7 Instruments

The study utilized both qualitative and quantitative data collection tools. The research instruments employed included interviewer administered semi-structured interview schedule, focus group discussions as well as key informant interview schedules. These instruments were developed in line with the specific study objectives to capture the intended information.

3.8 Pre-Test

A pre-test of the research tools was conducted in Kathiani District hospital a public health facility with similar characteristics to the facility of interest within Machakos County.

3.9 Validity

Pre-testing of the data collection instruments was carried out before the actual study was conducted in order to appraise the instruments and ascertain their feasibility. This helped determine whether the questions were clear to the respondents, acceptable and analyzable and assisted in modifying them where necessary.

3.10 Reliability

Reliability of the data collection instruments was established during the pre-test in order to check the consistency of the responses provided by respondents.
3.11 Data Collection Techniques

Data collection was done using semi-structured interview schedules and key informant interviews administered to randomly selected respondents who consented to participate in the study. Focus group discussions in which the respondents were placed in groups of 8-12 were also carried out and their views on the factors influencing CPT uptake recorded.

A total number of one hundred and seventy six questionnaires were administered to the randomly selected respondents. Two (2) focus group discussions were conducted with male and female HIV positive clients during their monthly support group meeting within the facility. The enabled the researcher to gather information from the clients on a set of relevant questions in a group environment.

3.12 Data Analysis

All the data from the study was coded and entered into a computer using the Statistical Package for Social Sciences (SPSS) version 17. Baseline characteristics such as demographics, education level, income level, practices, knowledge and attitude towards CPT uptake as well as facility factors were compared with whether the respondents use CPT using Chi square. Measures of central tendency such as mean, mode and median were then computed. Cross tabulation was done to establish the relationship between the variables and Chi-square used to test for the association at p<0.05. Binary logistic regression was used to predict score on one variable on the basis of their scores on several other variables. The research findings were presented using tables, pie charts and bar graphs.
3.13 Ethical consideration

i. Approval of the study was sought from the graduate school of Kenyatta university. Ethical clearance was obtained from the Kenyatta University Ethics Review Committee P.O Box 43844, Tel. 8710901/12 Fax 8711242, Email kuerc.chairman@ku.ac.ke. Permit to carry out the research was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) of the Ministry of Higher Education, Science and Technology.

ii. All participants gave informed consent.

iii. Numbers were used instead of names and confidentiality was guaranteed to all participants.
CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter details the results of the study as obtained from the various tools that were employed to collect both quantitative and qualitative data. Quantitative data collection was achieved through a semi-structured interview schedule while qualitative data was collected using information obtained from focus group discussion and key informant interview schedules.

4.1 Socio-demographic characteristics of the respondents

4.1.1 Distribution of the respondents based on Gender

A total of 176 clients participated in this study and were drawn from the comprehensive care center of the Machakos level IV hospital. Of these, 85 (48.3%) were male while 91 (51.7%) were female. According to hospital sources, the center attends to an average of eighty (80) patients in a day who visit the facility for various HIV care and treatment related services. Figure 4.1 below shows the distribution of the respondents by gender.

![Figure 4.1: Distribution of respondents by gender](image-url)
4.1.2 Distribution of the participants based on age

The result show that 66 (37.6%) of the respondents were aged between 29-35 years of age while 29 (16.2%) of respondents were between 36-42 years and 43-49 years age groups (Figure 4.2)

![Age Distribution Chart](image)

**Figure 4.2: Distribution of respondents based on age**

4.1.3 Distribution of respondents by education level

The results show that 92 (52.4%) of the respondents had primary school education, 70 (39.6%) secondary school education while 8 (4.8%) had attained tertiary level of education. Some of the respondents 6 (3.2%) had no formal education (Figure 4.3).
4.1.4 Distribution of the respondents by marital status

The results indicated that the 117 (66.5%) of the respondents were married, 38 (21.6%) were single/never married, 21 (11.9%) were separated/divorced/widowed as represented in Figure 4.4.

Figure 4.4: Distribution of respondents based on marital status
4.1.5 Distribution of the respondents by monthly household income

According to the results, 77 (43.8%) of the respondents reported an average monthly household income of less than Kshs. 5,000. A further 21 (11.9%) of those interviewed reported an average income of Ksh. 5,000-10,000 while the rest 52 (29.5%) reported earning more than Kshs. 10,000 a month. Figure 4.5 below shows the distribution of respondents by monthly household income.

Figure 4.5: Distribution of respondents based on monthly household income

4.1.6 Distribution of respondents by religion

The results indicate that 161 (91.5%) of the respondents were practicing Christians with a further 4 (2.3%) practicing Islam, 5.7% of the respondents reported being in traditional religion while 1 (0.6%) did not prescribe to any religion. Figure 4.6 below shows the distribution of respondents by religion.
4.1.7 Distribution of the respondents by occupation

The results indicated that the majority of the respondents were engaged in some form of business at 32.4% (57) followed by those who reported being professionals in gainful employment at 25.0% (44). Twenty four percent (42) of the respondents reported being casual laborers performing various menial jobs with the least being unemployed representing 18.8% (33). Figure 4.7 below shows the distribution of the respondents by occupation.
Figure 4.7: Distribution of respondents based occupation

4.2 Behavioral factors and CPT uptake

Patients' adherence to prescribed drug regimen has been shown to be greatly influenced by individual behavior patterns that have a direct bearing on how well the patient sticks to their medication.

4.2.1 Drug and substance abuse

According to the results obtained from the study, 67(38.1%) of the respondents reported engaging in drugs and other substance abuse while 109(61.9%) of the respondents did not use any substance as shown below (Figure 4.8).
4.2.2 Type of substance used

The results indicate that alcohol was the most widely used substance among the respondents at 52(29.5%) followed by cigarettes at 9(5.1%). Other substances as reported by the respondents include Miraa (Khat) at 4(.3%) and cannabis sativa (marijuana) at 1.1% (figure 4.9).

![Figure 4.8: Distribution of respondents based on whether or not they use substance](image)

![Figure 4.9: Distribution of respondents based on type of substance used](image)
4.2.3 Reasons for substance use

When asked why they engaged in drug use, 42 (62.7%) of the respondents who reported using drugs gave psychosocial stress as their main reason for doing so, 12 (18%) of them reported habit developed over time even before infection with HIV/AIDS while 6 (9%) cited curiosity as the reason behind drug use. A further 2 (2.9%) reported engaging in drug use as a result of influence from close friends while 5 (7.4%) reported using drugs for no specific reason (Figure 4.10).

![Figure 4.10: Distribution of respondents based on reason for substance use](image-url)
4.3 Client knowledge and practices on CTX as a preventive therapy for opportunistic infection in HIV

4.3.1 Determination of CTX knowledge index

Fifteen (15) questions were used to score the level of client’s knowledge on CTX as a preventative therapy for opportunistic infections in HIV. A response was considered valid if it provided the correct answer, that is, ‘YES’. One point was given for every valid response and zero for invalid response. Respondents overall knowledge on CTX as a preventive therapy for opportunistic infections in HIV patients was rated on scale of 0-15 points thus:

1=Low knowledge (0-4 points),
2=Average knowledge (5-9 points), and
3=High knowledge (10-15 points).

Overall level of knowledge of the population under study was taken by the number who provided valid responses for all the 15 questions. From the results obtained, 54.6% of the respondents had a low knowledge level on CTX as a preventive therapy for opportunistic infections in HIV patients while 4.1% had a high knowledge level (Figure 4.11).
4.3.2 Determination of client's knowledge on opportunistic infections

According to the result 70.5% of the respondents were aware of opportunistic infections as those infections that take advantage of a weakened immune system as a result of HIV while 29.5% of the respondents were not aware. When asked whether they had suffered any of these opportunistic infections 68.8% of the respondents indicated that they had indeed suffered one of the infections while 31.9% reported that they had never suffered any such infections.

4.3.3 Current use of CPT

The finding indicate that 98.3% of the respondents reported that CPT was part of their current treatment regime while 1.7% indicated that they were not on CPT but were using Dapson as alternative after they reported side effects from CPT usage (Figure 4.13).
4.3.4 Ever missed a dose

According to the results, 67% of the respondents reported that they had missed at least one dose of CPT within the last one month while 33% had not missed any dose within the same period (Table 4.1).

<table>
<thead>
<tr>
<th>Ever missed a dose (n=176)</th>
<th>Frequency</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>118</td>
<td>67.0</td>
</tr>
<tr>
<td>No</td>
<td>58</td>
<td>33.0</td>
</tr>
</tbody>
</table>

4.3.5 Number of doses missed

From the findings 63.6% of the respondents reported that they had missed more than two doses within the last one month while 27.1% had missed two doses. A further 9.3%
reported missing one dose within the same time period. Figure 4.14 below shows the number of doses missed by the respondents.

Figure 4.13: Number of doses missed within the last one month

### 4.3.6 Hospitalization

The results indicate that 47.2% of the respondents had been hospitalized within the last one month while 52.8% had not been hospitalized as illustrated in table 4.2 below

<table>
<thead>
<tr>
<th>Table 4.2: Number of respondents who reported being admitted to hospital within the last one month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Been admitted to Hospital (n=176)</td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
4.3.7 Cause of hospitalization

According to the results, 38.6% of those who had been admitted to hospital reported TB as the cause of admission to hospital, diarrhea (28.9%), Malaria (22.2%) while 9.6% reported having been admitted for various other reasons ranging from sexually transmitted infections to respiratory infections (Figure 4.16).

![Cause of admission](image)

Figure 4.14: Cause of admission within the last one month

4.4 Health facility service delivery factors

4.4.1 Access to CPT at the facility

The results indicated that 90.3% of the respondents at Machakos District Hospital received regular supply of CPT and did not encounter any difficulties accessing the drug from the facility while 9.7% of respondents reported being unable to acquire the drug when they needed it (Table 4.3).
Table 4.3: Number of respondents who reported experiencing difficulties in accessing CPT at facility

<table>
<thead>
<tr>
<th>Difficulty in accessing CPT at facility</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>9.7</td>
</tr>
<tr>
<td>No</td>
<td>159</td>
<td>90.3</td>
</tr>
</tbody>
</table>

4.4.2 Type of problems encountered at facility in accessing CPT

Of those who reported encountering problems in accessing CPT and other HIV related care at the health facility, 6.8% cited frequent drug out of stock as the major problem while 1.6% reported long hospital procedures as their major problem. Unfriendly hospital staff and long distance to the health facility were also cited by 0.6% each as shown in the Figure 4.15 below.

![Facility related problems encountered](image)

Figure 4.15: Type of problems encountered in accessing CPT at the facility
4.4.3 Facility social support services for HIV patients

When asked about provision of social support 83.5% of respondents reported not receiving any form of social support from the hospital while 16.5% had received hospital based social support during their course of treatment. The reported social support consisted of counseling on positive living and nutritional advice. This information is shown in the Table 4.4 below.

Table 4.4: Type of support services available for HIV patients at the facility

<table>
<thead>
<tr>
<th>(n=176)</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Group for HIV patients available at facility</td>
<td>No</td>
<td>147</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Counseling</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Home based cell support</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>176</td>
<td>100</td>
</tr>
</tbody>
</table>
4.5 Independent predictors of adherence to CPT

Multiple logistic regressions were used to identify the independent predictors of CPT uptake as shown on Table 4.9.

Table 4.5: Independent predictors of adherence to CPT

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients level of knowledge on CPT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ref=high level of knowledge)</td>
<td></td>
<td><strong>0.001</strong></td>
</tr>
<tr>
<td>Low level of knowledge</td>
<td>7.048 (0.639-87.746)</td>
<td>0.079</td>
</tr>
<tr>
<td>Average level of knowledge</td>
<td>1.896 (0.178-20.694)</td>
<td>0.578</td>
</tr>
<tr>
<td><strong>Behavioral factors (ref=taking drugs)</strong></td>
<td></td>
<td><strong>0.028</strong></td>
</tr>
<tr>
<td>Substance abuse</td>
<td>0.293 (0.109-0.822)</td>
<td>0.018</td>
</tr>
<tr>
<td>Type of drug taken</td>
<td>0.276 (0.101-0.795)</td>
<td>0.017</td>
</tr>
<tr>
<td><strong>Knowledge on OI</strong></td>
<td></td>
<td><strong>0.000</strong></td>
</tr>
<tr>
<td>What it is used to treat</td>
<td>0.171 (0.067-0.368)</td>
<td>0.000</td>
</tr>
<tr>
<td>Ever suffered any of OI</td>
<td>1.402 (0.499-3.603)</td>
<td>0.511</td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td><strong>0.069</strong></td>
</tr>
<tr>
<td>Primary</td>
<td>0.413 (0.174-1.007)</td>
<td>0.049</td>
</tr>
<tr>
<td>Secondary</td>
<td>0.372 (0.133-1.018)</td>
<td>0.052</td>
</tr>
<tr>
<td>Tertiary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiving psychosocial support</td>
<td>0.175 (0.073-0.411)</td>
<td><strong>0.000</strong></td>
</tr>
</tbody>
</table>
According to the Table 4.9, the strongest independent predictors of adherence to CPT are knowledge of opportunistic infections in HIV (OR=0.171 (0.067-0.368), p=<0.000) and receiving psychosocial support (OR=0.175 (0.073-0.411), p=<0.000). Other independent predictors of adherence to CPT were high patient knowledge on CPT as a preventive therapy for OIs in HIV (p=0.001) and drug/substance use among the patients (OR=0.293 (0.109-0.822), p=0.018).
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Summary of Discussion

Cotrimoxazole preventive therapy has been recommended for all persons diagnosed with HIV for the prevention of opportunistic infections and this drug plays an important role in improving their quality of life. However, the level of compliance to the prescribed dosage is important to the effectiveness of the treatment and directly relates to the benefits ascribed to the therapy. Maintaining and adapting to adherence behavior has been shown to be influenced by a number of factors. This section presents an in-depth review of the literature and elucidates on the factors that correlate adherence to CPT behavior to the different variables under study and to the relationship with the health professional. A thorough understanding of these factors is therefore paramount to the development of health interventions that will not only improve adherence to therapeutic regimens among people with HIV/AIDS but also help foster a culture of understanding as to the underlying benefits of such regimen.

5.1 Discussion

The summary and overview from this study draws from the demographic and behavioral/psychosocial characteristics, patients' knowledge, attitude and practices as well as healthcare administrative service delivery factors that were deemed potentially relevant to CPT adherence among HIV infected patients. The study set out to establish the determinants of adherence to cotrimoxazole preventive therapy among already infected
persons on treatment and as can be deduced from the discussion, the research objectives were met.

The study findings indicated that the level of patient's knowledge on CPT as a preventive therapy in prevention of opportunistic infections is low (54.5%). Socio-demographic factors such as age, sex, occupation and household income did not significantly influence adherence among the study participants while drug use, level of education and knowledge level of respondents were identified as key determinants of adherence. The availability and affordability of CPT and treatment services for opportunistic infections was variously noted as a major factor promoting its utilization. Most importantly, the fact that the drug was offered free of charge during HIV related care and management promoted a wider acceptability among patients.

However, occasional drug stock-outs compounded by long waiting time for health services within the hospital CCC were noted as the major barriers to the utilization of HIV related care at the hospital. In addition, some of the respondents reported having walked long distances to get to the facility only to be met by drug stock-outs at the hospital and this was a big contributor to non-adherence which effectively represents a missed opportunity to capitalize on the gains made towards universal access and adherence.

Due to the clearly demonstrated overlap among these variables influencing adherence to this important therapy, the factors need not be considered in isolation but in association with each other as they interplay to influence non-adherence to CPT. Health care interventions and programs aimed at enhancing adherence to cotrimoxazole preventive therapy among HIV/AIDS infected patients will as such need to put emphasis not only on
the psychosocial aspect but also on access to health care with particular emphasis on the poor. They should also address the special barrier of age-specific target populations since findings indicate decreased adherence with increasing age.

**5.1.1 Socio-demographic characteristics as determinants of adherence to CPT**

A chi square test was employed to assess whether there was any association between the various socio-demographic variables like age, sex, level of education, occupation and adherence to CPT uptake. According to the findings, there was no significant association between the measured socio-demographics factors and adherence to CPT except for religion (p<0.001) and level of education (p<0.001).

The results indicated that 39.8% of the respondents were aged between 29-35 years while 36-42 and 43-49 years groups were 18.2% which is consistent with KAIS (2008) study that reported that majority of those living with HIV are within the reproductive age bracket. The results indicated more female patients (17.6%) adhering to CPT as compared to male patients (15.3%). These finding are similar to those of Walsten *et al.*, 1995 who reported that male gender was associated with decreased adherence. Furthermore, the findings indicate that respondents with a lower monthly income at less than Ksh. 5,000 were more likely to adhere than those earning more than Ksh. 10,000. This concurs with findings from CDC (2006) that interventions aimed at increasing compliance among especially in developing countries may have to take into account cultural and social network issues independent of socioeconomic status and level of education CDC (2006).
This study furthermore demonstrates 66.5% of the respondents were married, 21.6% were single/never married while 11.9% were widowed, divorced or separated. This is in agreement with KAIS (2008) study which reported that majority of those living with HIV in Kenya being in heterosexual marriage union. With regard to level of education, 52.4% of the respondents had primary school education, 39.6% had attained secondary level education and 4.8% had attained tertiary level of education while 3.2% reported having no formal education. According to the findings, the percentage of respondents who reported being separated or divorced is slightly higher among the study population compared to national divorce/separation rate of 6% among women (KDHS, 2008/9). As noted during FGD, this may be attributed to the HIV positive status of all the respondents as one FGD discussant explained: “Majority of us have been forced to conceal our HIV status from our husbands because as soon as you disclose your status you are abandoned. That is why most of the women here are separated or divorced. Even the ARVs we have to make sure that our partners never get to see them”. The results also indicated that 32.4% of the respondents engaged in some form of business and 18.8% were unemployed. Those who reported being in formal employment as professionals in various fields represented 25% while the remaining 23.9% reported surviving on casual labor.

Table 5.1 illustrates the uptake of CPT among the different socio-demographic categories with a test of significance performed using a chi-square with significance set at p<0.05
Table 5.1: Socio-demographic profile as determinants of adherence to CPT uptake

<table>
<thead>
<tr>
<th>Variable (n=176)</th>
<th>Adhering to CPT</th>
<th>Chi Square (X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes Frequency (%)</td>
<td>No Frequency (%)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27 (15.3)</td>
<td>58 (33.0)</td>
</tr>
<tr>
<td>Female</td>
<td>31 (17.6)</td>
<td>60 (34.1)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22-28 Years</td>
<td>11 (6.3)</td>
<td>31 (17.6)</td>
</tr>
<tr>
<td>29-35 Years</td>
<td>26 (14.8)</td>
<td>44 (25.0)</td>
</tr>
<tr>
<td>36-42 Years</td>
<td>12 (6.8)</td>
<td>20 (11.4)</td>
</tr>
<tr>
<td>43-49 Years</td>
<td>9 (5.1)</td>
<td>23 (13.1)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>12 (6.8)</td>
<td>26 (14.8)</td>
</tr>
<tr>
<td>Married</td>
<td>37 (21.0)</td>
<td>80 (45.5)</td>
</tr>
<tr>
<td>Separated/Divorced/widowed</td>
<td>9 (5.1)</td>
<td>12 (6.8)</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>53 (30.1)</td>
<td>108 (61.4)</td>
</tr>
<tr>
<td>Muslim</td>
<td>3 (1.7)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Traditional</td>
<td>1 (0.6)</td>
<td>9 (5.1)</td>
</tr>
<tr>
<td>None</td>
<td>0 (0.0)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>33 (18.8)</td>
<td>6 (3.4)</td>
</tr>
<tr>
<td>Casual</td>
<td>42 (23.9)</td>
<td>14 (8.0)</td>
</tr>
<tr>
<td>Business</td>
<td>57 (32.4)</td>
<td>22 (12.5)</td>
</tr>
<tr>
<td>Professional</td>
<td>44 (25.0)</td>
<td>16 (9.1)</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No income</td>
<td>20 (11.4)</td>
<td>6 (3.4)</td>
</tr>
<tr>
<td>&lt; 5000</td>
<td>55 (31.3)</td>
<td>22 (12.5)</td>
</tr>
<tr>
<td>5 000-10 000</td>
<td>12 (6.8)</td>
<td>9 (5.1)</td>
</tr>
<tr>
<td>&gt; 10 000</td>
<td>31 (17.6)</td>
<td>21 (11.9)</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>20 (21.7)</td>
<td>72 (78.3)</td>
</tr>
<tr>
<td>Secondary</td>
<td>33 (47.1)</td>
<td>37 (52.9)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>5 (75.0)</td>
<td>2 (25.0)</td>
</tr>
<tr>
<td>No education</td>
<td>1 (17.7)</td>
<td>5 (83.3)</td>
</tr>
</tbody>
</table>
5.1.2 Behavioral factors as determinants of CPT uptake

There was significant association between adherence to CPT and the use of drugs by the patients ($X^2 = 31.818$, df= 1, p=0.001). The result show that 76.5% of those who reported drug use cited alcohol use while 5.9% and 2.9% reported Miraa and marijuana use respectively. These findings are consistent with a study by Braithwaite et al., 2007 whose results indicates that alcohol consumption has substantial and consistent association with non-adherence, resulting in premature morbidity and mortality in HIV patients. In addition, 62.7% of these respondents said the main reason why they engage in drug use is because of the psychosocial stress associated with HIV infection. Alcohol use is common among HIV-infected individuals and is associated with decreased adherence to antiretroviral medication according to KDHS (2008). This could be attributed to negative health seeking behavioral patterns that is associated with drug and substance abuse resulting in poor memory and little attention paid to adherence (Table 5.2).

**Table 5.2: Behavioral factors as determinants of adherence to CPT uptake**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adhering to CPT</th>
<th>Chi Square ($X^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
</tr>
<tr>
<td>Using substance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>62 (35.2)</td>
<td>5 (2.8)</td>
</tr>
<tr>
<td>No</td>
<td>56 (31.8)</td>
<td>53 (30.1)</td>
</tr>
<tr>
<td>Type of substance used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>36 (55.4)</td>
<td>40 (58.9)</td>
</tr>
<tr>
<td>Cigarette</td>
<td>14 (20.6)</td>
<td>5 (7.4)</td>
</tr>
<tr>
<td>Miraa</td>
<td>12 (17.4)</td>
<td>2 (2.9)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>0 (0.0)</td>
<td>2 (2.9)</td>
</tr>
<tr>
<td>Reason for Substance use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>24 (32.4)</td>
<td>30 (40.5)</td>
</tr>
<tr>
<td>Curiosity</td>
<td>12 (16.4)</td>
<td>3 (4.1)</td>
</tr>
<tr>
<td>Habitual</td>
<td>10 (13.6)</td>
<td>7 (9.5)</td>
</tr>
<tr>
<td>Influence</td>
<td>10 (13.6)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (9.7)</td>
<td>5 (6.8)</td>
</tr>
</tbody>
</table>
5.1.3 Knowledge and practices on CPT as a preventive therapy for opportunistic infections

5.1.3.1 Determination of knowledge matrix

As demonstrated by this study (subsection 4.3.1) 99.4% of the respondents had heard of CPT, 0.6% had never heard of CPT while 93.8% reported that they heard it first from a healthcare provider during routine medical care. These results do not agree with a similar study done by Hutchinson et al., 2008 who observed that majority of patients had not heard of CPT before they were enrolled into HIV care program despite having suffered related opportunistic infections prior to diagnosis with HIV. This is an indication that the concerted efforts by the government towards provider initiated testing and counseling (PITC) are bearing fruit and that more and more patients are heeding the call to know their HIV status and equipping themselves with knowledge to combat opportunistic infections. In particular, the great number of clients knowing their status from the hospital as opposed to those knowing through VCT centers (6.3%) could be attributed to the presence of several points of service that offered testing in the facility where this data was collected. The presence of social support groups within the hospital significantly contributed to many of the patients remaining in the care program as one discussant explained during an FGD: “Sometimes when alone at home you find yourself with many questions in mind but on Wednesdays when I come here and see my friends it gives me hope and am able to get my medication refilled. We also get to talk about common issues and this encourages all of us to keep taking our drugs. We also get to encourage some of our friends who have given up resuming taking drugs and coming here (at the CCC”).
Result further show that 70.5% of the respondents were aware of opportunistic infections that take advantage of a weakened immune system from HIV as opposed to 29.5% who were not. The results agree with those of Zachariah *et al.*, 2007 who observed that majority of HIV patients are aware of opportunistic infections that occur as a result of infection with HIV.

5.1.4: Patient knowledge on CPT as a determinant of adherence to CPT uptake

On analysis of patients knowledge and practice of CTX as a preventative measure for opportunistic infections in HIV against adherence to CPT as dependent variable, all variables with the exception of knowledge on opportunistic infections suffered as a result of HIV ($X^2 = 0.564, df=1, p=0.453$) were significantly associated to the dependent variable as illustrated in Table 5.3. These include previous admission to hospital ($X^2 = 31.073, df=1, p=0.001$), What CTX is used to treat ($p=0.001$), ever hearing of the drug ($p=0.001$), ever suffered an opportunistic infection ($p=0.001$) and what medication they used to treat the opportunistic infection ($p=0.001$). These study findings are consistent with those of Wallsten *et al.*, 2004 who observed that adherence was significantly associated with the patient having had previous history of hospitalization or that chronic medication have to be taken continuously and consistently as per doctor’s prescription and the purpose for which the patient was taking the medication.

With regard to current use of CPT among the respondents, 98.3% of the respondents were on CPT compared to 1.7% who were not using CPT. This is an indication of the wide availability and acceptability of the antibiotic which is in agreement with the findings of Date *et al.*, 2008. The reason given for non-use of CPT was adverse side...
effects manifested in rash and other skin reactions. These findings concur with those from a similar study Hutchinson et al., 2008 and WHO (2006) both of whom noted that adverse effects from CPT are rare and only occur in less than 3% of the patients.

When asked about the cause of admission to hospital within the last one month, 38.6% of the respondents reported TB as the cause of admission with 28.9% reporting diarrheal related diseases as the cause of hospitalization while a further 22.9% reported being hospitalized from malaria. The remaining 9.6% had been hospitalized from other ailments. This can be attributed to the fact that non-adherence to cotrimoxazole is usually associated with increased rates of diarrhea, malaria and hospitalization, which concur with reports by WHO (2006).

A notable observation from the findings is the sizeable number of patients (43.2%) who do not know what CPT is used to treat. Similarly, 44.3% of the respondents reported that the drug is used for the treatment of HIV while 2.9% reported that the drug is used to treat coughs and colds with a further 0.6% reporting that the drug is used for the treatment of malaria. This underscores the urgent need for concerted effort by all stakeholders (government, non-governmental organizations, CBO’s, FBO’s) to improve community awareness on the importance and role of CPT in the management of opportunistic infections in HIV and by extension that of its adherence. Such efforts should be sustained and improved through social mobilization and education; as summarized in Table 5.3.'
Table 5.3: Patient knowledge on CPT as a determinant of adherence to CPT uptake

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adhering to CPT</th>
<th>Chi Square (X²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
</tr>
<tr>
<td>Ever heard of CTX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57 (32.4)</td>
<td>118 (67.0)</td>
</tr>
<tr>
<td>No</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>What does it treat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>47 (26.7)</td>
<td>31 (17.6)</td>
</tr>
<tr>
<td>Malaria</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Cough/Cold</td>
<td>4 (2.3)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>DK</td>
<td>51 (29.0)</td>
<td>25 (14.2)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (8.5)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Ever Used CTX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>117 (66.5)</td>
<td>57 (32.4)</td>
</tr>
<tr>
<td>No</td>
<td>1 (0.6)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Ever suffered OI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>79 (44.9)</td>
<td>37 (21.0)</td>
</tr>
<tr>
<td>Malaria</td>
<td>2 (1.1)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Cough/Cold</td>
<td>23 (13.1)</td>
<td>11 (6.3)</td>
</tr>
<tr>
<td>UTI</td>
<td>2 (1.1)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>DK</td>
<td>11 (6.3)</td>
<td>5 (2.8)</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1 (0.6)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Do you know any OI suffered as a result of HIV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81 (46.0)</td>
<td>43 (24.4)</td>
</tr>
<tr>
<td>No</td>
<td>37 (21.0)</td>
<td>15 (8.5)</td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARV</td>
<td>19 (10.8)</td>
<td>3 (1.7)</td>
</tr>
<tr>
<td>Traditional</td>
<td>0 (0.0)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Can't recall</td>
<td>23 (1.1)</td>
<td>15 (1.1)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>38 (13.1)</td>
<td>18 (10.2)</td>
</tr>
<tr>
<td>Others</td>
<td>2 (1.1)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Not applicable</td>
<td>36 (20.5)</td>
<td>19 (10.8)</td>
</tr>
<tr>
<td>Ever been admitted to hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73 (41.5)</td>
<td>10 (5.7)</td>
</tr>
<tr>
<td>No</td>
<td>45 (25.6)</td>
<td>48 (27.3)</td>
</tr>
<tr>
<td>Cause of admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>18 (10.2)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>TB</td>
<td>28 (15.9)</td>
<td>4 (2.3)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>19 (10.8)</td>
<td>5 (2.8)</td>
</tr>
<tr>
<td>STI</td>
<td>8 (4.5)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Not applicable</td>
<td>45 (25.6)</td>
<td>48 (27.3)</td>
</tr>
</tbody>
</table>
5.1.5 Health facility delivery factors as determinants of adherence to CPT

When the uptake of CPT was measured by the facility factors deemed to influence its uptake, the type of support available to HIV patients at the facility (p<0.001) was found to have significant association with adherence to cotrimoxazole. These study findings concur with those from a similar study by Singh (2004) which noted that there were increased levels of adherence among individuals with greater social support. Despite majority (90.3%) of respondents not experiencing any facility related difficulties in accessing CPT, a significant number 56/159 (31.8%) were not adhering to the preventive therapy. This, on the one hand, is a clear pointer to the success of government efforts to enhance service delivery at health facilities with regard to HIV care and treatment, and on the other hand highlights the need to cushion such gains by increasing similar efforts geared towards ensuring drug adherence among patients. From a programmatic point of view, interventions need to be put in place to address individual factors contributing to non-adherence despite availability. Challenges encountered at the facility include sporadic drug shortages (6.8%), long procedures in obtaining the drugs from the pharmacy (1.7%) and unfriendly hospital staff (0.6%). This is illustrated in Table 5.5
Table 5.4: Health facility factors as determinants of adherence to CPT

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adhering</th>
<th></th>
<th>Chi Square (X²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
<td></td>
</tr>
<tr>
<td>Experiencing problems accessing CPT</td>
<td>Yes</td>
<td>15 (8.5)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>103 (58.5)</td>
<td>56 (31.8)</td>
</tr>
<tr>
<td>Type of problems encountered</td>
<td>Lack of drugs</td>
<td>6 (35.3)</td>
<td>6 (35.3)</td>
</tr>
<tr>
<td></td>
<td>Long hospital procedures</td>
<td>2 (11.8)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td></td>
<td>Unfriendly staff</td>
<td>1 (5.9)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td></td>
<td>Long distance to facility</td>
<td>1 (5.9)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td>Support available for HIV patients</td>
<td>Yes</td>
<td>22 (12.5)</td>
<td>7 (4.0)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>96 (54.5)</td>
<td>51 (29.0)</td>
</tr>
<tr>
<td>Type of support available at facility</td>
<td>Counseling</td>
<td>5 (38.5)</td>
<td>8 (61.5)</td>
</tr>
<tr>
<td></td>
<td>Nutritional support</td>
<td>2 (50)</td>
<td>2 (50)</td>
</tr>
<tr>
<td></td>
<td>Other psychosocial groups</td>
<td>5 (41.7)</td>
<td>7 (58.3)</td>
</tr>
</tbody>
</table>

5.1.6 Factors that promote adherence to CPT

The availability and affordability of CPT and treatment services for opportunistic infections was variously cited as key factors that promoted its use among the discussants participating in FGD as well as KII. Most importantly, the fact that the drug was offered free of charge during HIV related care and management promoted a wider acceptability among patients.

In addition, membership to and regular attendance of already established support group meetings within the hospital was also a major factor promoting adherence to CPT. However, Chi-square analysis shows no significant relationship between facility factors such as support group and adherence to CPT. This finding differ with those of Njozing et al., 2007 which showed that HIV patients who belonged to and regularly attended a
support group were more likely to adhere to treatment regimen. From interactions with the patients during FGDs, this can be attributed to a much needed social support that the patients receive during such forum which was cited as key way in overcoming fear, anxiety and perceived guilt. A female discussant who has been living with HIV for seven years explains: "One thing that has kept me going strong for the last seven years since I diagnosed HIV positive is the kind of moral support we accord each other that cheers my spirit. I have seen many of my friends die soon after knowing their status because they refuse to come to our groups choosing to keep to themselves. Soon, they can't handle the emotions and they die. But these groups have given us a life of our own free of our fears". The projected sense of acceptance and a feeling of belonging combined with health education which was noted within the facility served to encourage open participation by influencing community perception towards those living with HIV. This is in tandem with results of CDC/UNICEF (2008) study which recommends that support groups are an integral part of HIV care and management that can significantly improve the results of the HIV/AIDS programme. They serve not only to address socio-cultural impediments to HIV care and treatment, but also provide an appropriate forum for psychosocial support.

5.1.7 Factors that constrain adherence to CPT

Occasional drug stock-outs compounded by long waiting time for health services within the CCC were noted as the key impediments to the utilization of HIV related care at the hospital. Some of the respondents reported having walked long distances to get to the
facility only to be met by drug stock-outs at the hospital, choosing not to return immediately. This represents missed opportunities for provision of services.

Also inadequate staff training on the new WHO guidelines on CPT was identified by KIs as major constrain to patients adherence to the antibiotic. Majority of the respondents were unaware that CPT was indeed an antibiotic with no antiviral activity. Furthermore, according to one KII, most patients are unaware of its role in preventing opportunistic infections and therefore tended to handle CPT as an unwanted additional treatment for HIV discontinuing its use at will. These findings are in agreement with those of Johnson et al., 2001 who observed that some patients were reluctant to continue with their medication if they do not notice any changes in their condition in the short term, underscoring the importance of explaining to patients about chronic conditions and the need for continued use of medication.

5.2 Conclusion

Renewed patient education and dissemination of evidence based information regarding the benefits of cotrimoxazole preventive therapy is urgently required both at the national as well as county level. As can be deduced from the findings of the study, opportunistic infections including tuberculosis, malaria and diarrhea were the most common illnesses reported by the patients and therefore represent a potential threat to the significant benefits achieved by the scale up of HIV care and treatment services. In light of these considerations, implementation of CPT guidelines should be central to the delivery of HIV care and treatment.
Given the critical role played by CPT in the management of opportunistic infections in HIV/AIDS patients, hospital management should put in place necessary mechanism to ensure that potentially non-adherent client/patient are identified in a timely manner and that barriers to adherence are appropriately addressed during counseling sessions with health service providers.

In addition, since the study identifies social support as key in promoting adherence, facility based strategy could be devised to help identify an adherence partner or buddy, or a peer educator and encourage social networking for behavior modification aimed at encouraging adherence to prescribed drug regimen.

5.3 Recommendations

Based on the results of this study and putting into consideration the conclusions drawn from this study, the following recommendations can be made:

i) Concerted effort by all stakeholders (government, non-governmental organizations; CBO’s, FBO’s) to improve community awareness on the importance of adherence to regimen among HIV/AIDS patients should be sustained and improved through social mobilization and advocacy.

ii) Closer supervision in the implementation of existing guidelines that would enhance adherence to CPT and other related antibiotics

iii) Where applicable, incentives can be used (e.g., having income-generating projects for health care givers and providing transport on clinic days, or
providing food) and enhanced through incorporating referrals to community-based health care workers and NGOs for close monitoring and reminders.

iv) Need to continuously screen and treat patients for drug use as a part of ongoing HIV care and but also policy formulation that would enhance adherence to CPT and other related antibiotics
REFERENCES:


Kenya Demographic and Health Survey (KDHS) 2008/2009

Kenya AIDS Indicator Survey (KAIS) 2007/2008


APPENDICES:

Appendix 1: Map of Machakos County
Appendix 2: Guide to semi-structured Interview Schedule

Introduction: *(To be read out loud to the respondent)*

Hallo, my name is Jackson Musembi. I am a master’s student from Kenyatta university school of public health. I am carrying out a study aimed at investigating determinants of adherence to cotrimoxazole preventive therapy among HIV infected persons who are on treatment in Machakos district hospital, Machakos County. It is a survey among those currently under observation and attending to the hospital for provision of HIV related care and support.

You are kindly requested to be honest with your answers, bearing in mind that your name will not appear on the questionnaire. Furthermore, your response will be treated in utmost confidentiality and will only be used for the limited purpose of this study. The responses will not be attributed or linked to you in any way; neither will they be discussed with your friends, acquaintances or any member of your family. Utmost confidentiality will be guaranteed.

I would greatly appreciate you participating in this study. However, you are free to choose whether to participate in this study. Do you want to participate in this study?

Yes..........  

No..........  

Name of location.................................  

Date of interview...............................
PART 1: Socio-economic, demographic and cultural information

Q1. Sex

Male (1)

Female (2)

Q2. Age in years

15 to 21 (1)

22 to 28 (2)

29 to 35 (3)

36 to 42 (4)

43 to 49 (5)
Q3. What is your marital status?

Single (1)
Married (2)
Cohabiting (3)
Separated (4)
Divorced (5)
Widowed (6)

Q4 To which ethnic group do you belong

Q5. What is your religion?

Christian (1)
Muslim (2)
Traditional (3)
Budhist (4)
No religion (5)
Other (6)

Q6. What is your occupation?

Student (1)
Unemployed (2)
Casual (3)
Business (4)
Professional (5)

Q7. How much income do you earn per month?

No income (1)
Q8) What is the highest level of education you have attained?

None (1)  Secondary (3)
Primary (2)  College/university (4)

**PART 2: Behavior information**

Q8. a) Do you take drugs?

   Yes (1)  No (2)

b) If yes, which ones?

   Alcohol (1)  Miraa (2)  Bhang (3)  Cigarette (4)  Cocaine (5)

   Other (Specify) ................................................................. (6)

Q9. Reasons for taking drugs

   Stress (1)  Curiosity (2)  Habitual (3)  Influence (4)

   Other (Specify) ................................................................. (5)
PART 3 a) Knowledge, Attitude and Practice on cotrimoxazole Preventive Therapy

Q10.a) Have you ever heard of cotrimoxazole preventive therapy?

Yes (1)

No (2)

b) If yes, where?

Hospital/Clinic (1)

VCT center (2)

School (3)

Peers (4)

Other (Specify)...........................................................................................................(5)

Q11. What is it used to treat?

HIV/AIDS (1)

Malaria (2)

Coughs/colds (3)

Urinary tract infections (UTIs) (4)

Don’t know (5)

Other (Specify)...........................................................................................................(6)

Q12.a) Have you ever used cotrimoxazole preventive therapy?

Yes (1)

No (2)

b) If yes, to treat what?

HIV/AIDS (1)

Malaria (2)
Cough/colds (3)
Urinary tract infections (UTIs) (4)
All of the above (5)
Other (Specify)................................. (6)

Q13.a) Would you use cotrimoxazole preventive therapy if it was recommended for you?
   Yes (1)
   No (2)

b) If no, why?
   Not safe (1)
   Not used to it (2)
   It will not change my status (3)
   My friends do not use it (4)

Q14. a) Is cotrimoxazole part of your current treatment regimen?
   Yes (1)
   No (2)

b) If yes, how long have you been taking the drug?
   One week (1)
   Two weeks (1)
   Three weeks (3)
   One month (4)
   Other (Specify)............................... (5)

c) If no, what is the main reason why you are not taking cotrimoxazole?
   Had side effects/ Rash (1)
   Trouble taking tablet daily/can’t remember (2)
Cannot afford it (3)
Don’t think I need it/ don’t feel sick (4)
Too busy/No time to pick up medicine (5)
Other (Specify) ........................................ (6)

Q15. a) Have you missed any dose of this drug during this period?
Yes (1)
No (2)

b) If yes, how many doses have you missed?
One (1)
Two (2)
More than Two (3)

16.

<table>
<thead>
<tr>
<th>Q no.</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Do you know what opportunistic infections in HIV refer to? (Allow respondent to define in own words)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>If yes, can you briefly explain what they are?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Can opportunistic infections be reduced during infection with HIV?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Do you of any medication that can prevent opportunistic infections in HIV?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>If yes, can you tell me the name of the medication?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Are there ways through opportunistic infections in HIV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>PART 3 b)</strong> Knowledge, Attitude and Practice on opportunistic infections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q16a) Do you know of diseases that affect someone as a result of having HIV/AIDS?

- **Yes** *(1)*
- **No** *(2)*

b) If yes, like which ones?

1.
Q17.a) Have you ever suffered from any of these diseases?

Yes (1)
No (2)

b) If yes, which ones?

1.
2.
3.
4.

Q18. What medication did you use to treat them?

ARV (1)
Traditional (herbs) (2)
Cannot recall (3)
Antibiotics (4)
Other (Specify).................................(5)

Q19. What messages should be given to people about these diseases?

Education/awareness (1)
Counseling (2)
Causes (3)
Treatment (4)
Other (Specify)........................................... (5)
Q20. Who do you think is at risk of these diseases?

- Everyone (1)
- Those with HIV/AIDS (2)
- Women (3)
- Children (4)

Q21. Who should be involved in handling these diseases?

- Doctors (1)
- Patients (2)
- Government (3)
- All of us (4)
- Other (Specify) (5)

Q22. A) Have you ever been admitted to hospital as a result of any of these diseases?

Yes (1)

No (2)

b) If yes, cause for admission


PART 4: Health facility factors

Q23. Do you encounter any problems accessing cotrimoxazole preventive therapy from the health facility?

Yes [1]

No [2]

b) If yes, what kind of problems did you face?
Unfriendly hospital staff (1)

Long procedure in getting drugs (2)

Lack of drugs (3)

Long distance from home (4)

Lack of drug information from the clinic staff (5)

Lack of privacy and confidentiality (6)

Any other (7)

Q24 a) Does the facility offer any support group services for HIV patients?
   Yes (1)
   No (2)

b) What are some of these services?

Thank you for your cooperation!
Appendix 3: Guide to Focus Group Discussion for participants

1. What is your knowledge, attitude and practice on opportunistic infections in HIV

2. What is your knowledge, attitude and practice on cotrimoxazole as an antibiotic for reducing opportunistic infections in HIV

3. What is your experience with cotrimoxazole and opportunistic infections

4. What do you think should be done to make more people take cotrimoxazole

5. What factors determine whether or not you take this particular drug

6. Who should be involved in enhancing awareness and promoting use of this drug

7. What would you like to add about what we have just discussed?

Appendix 4: Guide to Key Informant Interview with health Care Providers

1. Which category of HIV infected persons are most at risk of dying from opportunistic infections? Why?

2. What messages on opportunistic infections are available to those infected with HIV?

3. What measures can be adopted to increase awareness and uptake of cotrimoxazole preventive therapy by HIV/AIDS patients?

4. What are the successes in provision of medication to HIV/AIDS patients in this hospital?
5. What are the challenges in provision of care and treatment to HIV/AIDS patients in this hospital?

6. What facility factors influence uptake of cotrimoxazole by HIV infected persons?

7. What are some of the patient support groups available to HIV/AIDS patients within the hospital

8. What would you like to add about what we have just discussed?
APPENDIX 5: Focus Group Note-taker Form
Form No: ____________________________

Date: ____________________________

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>RESPONSE</th>
<th>OBSERVATION</th>
</tr>
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</tbody>
</table>
Appendix 6: Ethical clearance: Kenyatta University Ethics Review Committee

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
Website: www.ku.ac.ke

P. O. Box 43844
Nairobi, 00100
Tel: 8710901/12

Our Ref: KUI/R/COMM/81/158

Dear Mr. Musembi,

APPLICATION NUMBER P/KU/097/186 OF 2015 – ‘COTRIMOXAZOLE PREVENTIVE THERAPY AMONG HIV INFECTED PERSONS ON TREATMENT IN MACHAKOS DISTRICT HOSPITAL, MACHAKOS COUNTY, KENYA’ – VERSION 2

Date: April 16th, 2013

1. IDENTIFICATION OF PROTOCOL

The application before the committee is with a research topic, ‘Cotrimoxazole Preventive Therapy Among HIV Infected Persons on Treatment in Machakos District Hospital, Machakos County, Kenya’ version 2 dated 10th January 2013.

2. APPLICANT

Jackson Musembi
School of Public Health
Kenyatta University
Nairobi

3. SITE

Machakos District Hospital, Machakos County, Kenya

4. DECISION

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines, and is of the view that against the following elements of review,

(i) Scientific design and conduct of study,
(ii) Recruitment of research participant,
(iii) Care and protection of research participants,
(iv) Protection of research participant’s confidentiality,
(v) Informed consent process,
(vi) Community considerations.

AND APPROVED that the research may proceed for a period of ONE year from 16th April 2013
5. **ADVICE/CONDITIONS**

i. Progress reports are submitted to the Kenyatta University Ethics Review Committee (KU-ERC) every six months and a full report is submitted at the end of the study.

ii. Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.

iii. Notify the KU-ERC of any amendments to the protocol.

iv. Submit an electronic copy of the revised proposal to KU-ERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

![Signature]

**I accept the advice given and will fulfill the conditions therein.**

Signature: [Signature]

Dated this day 16th of April 2013.

cc. Vice-Chancellor

Director: Institute for Research Science and Technology
Appendix 7: Research permit: National Council for Science and Technology (NCST)

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787, 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: NCST/RCD/12A/013/34

Jackson Musembi
Kenyatta University
P.O.Box 43844-00100
Nairobi.

Date: 2nd May, 2013

RE: RESEARCH AUTHORIZATION

Following your application dated 26th March, 2013 for authority to carry out research on “Cotrimoxazole preventive therapy among HIV Infected persons on treatment in Machakos District Hospital, Machakos County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Machakos County for a period ending 31st December, 2013.

You are advised to report to the District Commissioners, the District Education Officers and the District Medical Officers of Health, Machakos County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. M. K. RUGUTT, Ph.D, HSc
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioners
The District Education Officers
The District Medical Officers of Health
Machakos County.

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development."
THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss/Institution

Jackson Musembi

of (Address) Kanyatta University
P.O.Box 43844-00100, Nairobi,

has been permitted to conduct research in

Machakos District Hospital

Location

District

Machakos

County

on the topic: Cotrimoxazole preventive therapy among HIV infected persons on treatment in Machakos District Hospital, Machakos County, Kenya.

for a period ending: 31st December, 2013.

Research Permit No. NCST/RCD/12A/013/34

Date of issue
2nd May, 2013

Fee received
KSH. 1,000

Applicant's Signature

Secretary
National Council for Science & Technology
Appendix 8: Research authorization: Ministry of Public Health and Sanitation

MINISTRY OF PUBLIC HEALTH AND SANITATION
OFFICE OF THE DIRECTOR

Telegram: "MINIHEALTH", Nairobi
Telephone: 254-20- 2717077
Email: pshp@health.go.ke
Fax: 254-20-2715239

Ref: MOPHS/ADM/2/1

DMOH
Machakos District Hospital
Machakos County

RESEARCH AUTHORIZATION FOR JACKSON MUSEMBI — REG. NO. P57/22974/11

I write to introduce Mr. Jackson Musembi who is a Postgraduate Student of Kenyatta University. He is registered for M.P.H degree programme in the Department of Community Health.

This is to inform you that Mr Musembi has been given a go ahead to conduct a research on "Determinants of Adherence to Cotrimoxazole Preventive Therapy among HIV infected Persons in Machakos district hospital."

Please accord him necessary cooperation.

DR. S.K. SHARIF, MBChB, M.Med, MSc, MBS
DIRECTOR PUBLIC HEALTH & SANITATION

13th March, 2013