ADHERENCE AND FACTORS ASSOCIATED WITH ADHERENCE TO TUBERCULOSIS TREATMENT AMONG HIV PATIENTS ACCESSING HEALTHCARE SERVICES AT MENGO HOSPITAL

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DECLARATION AND APPROVAL

I, **Sarah Webombesa,** declare that this research report titled "adherence and factors associated with adherence to TB treatment among HIV patients accessing healthcare services from Mengo hospital" is my own work and has never been presented before for any academic award or for publication. Work from other people which was used in the development of this report was put as complete references

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This research report was submitted with the approval of the College's supervisor.

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DEDICATION

This research report is dedicated to my family in particular; my loving mother Miss. Nabuduwa Esther, my siblings Mr. Mafabi Ronald, Mr. Wamoni William, my sister Miss. Neumbe Proscovia, and lastly to my late father Dasani Wanadamba.

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First and foremost, all glory and honour to the Lord for granting me good health and the gift of life that has enabled me to undertake my studies to completion. Thank you Lord.

Special thanks go to Dr Gabriel Tumwine for his tireless efforts aimed at assisting and guiding me to accomplish this research.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ART:	Antiretroviral therapy
ARVs:	Antiretrovirals
COVAB:	College of Veterinary Medicine, Animal Resources and Biosecurity
CT:	Computerised tomography
DOTS:	Directly observed therapy short course
HIV:	Human Immuno-deficiency Virus
KCCA:	Kampala Capital City Authority
LTFU:	Loss to follow up
SSA:	Sub-Saharan Africa
TB:	Tuberculosis
WHO:	World Health Organisation

DEFINITION OF KEY TERMS

Adherence: This refers to the quality or process of sticking fast to TB treatment

HIV: This stands for human immunodeficiency virus which is a retrovirus that infects cells of the human immune system (mainly CD4-positive T-cells and macrophages) leading to AIDS

Tuberculosis: This is an infectious disease usually caused by *Mycobacterium tuberculosis* bacteria

ABSTRACT

Background: TB is a highly contagious disease affecting a big number of people and is majorly caused by *Mycobacterium tuberculosis*. The study had a purpose of assessing the adherence and factors associated with TB treatment among TB-HIV coinfected patients at Mengo hospital.

Methods: A cross-sectional study was carried out to assess the adherence and factors associated with adherence to TB treatment among 80 randomly selected HIV positive patients at Mengo hospital in May 2023. Data was collected by use of a questionnaire and later on analysed

Results: The findings were such that the rate of adherence to TB treatment was only 37.5%. The factors that negatively affected adherence to TB treatment among study participants were forgetfulness to take TB medication (62.5% vs 37.5%),being too busy or busy with work (90% vs 5.3%), stigma (77.8% vs 54.7%), alcohol consumption(73.1% vs 58.5%), age of 30 to 49 years, and male gender (66.7% vs 33.3%).

Conclusion: The rate of adherence to TB treatment was found to be low and a number of factors deterred adherence to TB treatment like forgetfulness, being too busy with work among others.

Recommendations: We recommend that the government of Uganda through its Ministries of Health and Local Government should continue sensitizing masses of people about TB being a curable disease whichneeds to be treated early enough to avoid complications. This will minimize the stigma associatedwith the disease among the community members.

Mengo Hospital through its outreach programmes should strengthen support supervision and improve counselling in order to increase adherence and minimize forgetfulness and stigma associated with TB treatment. They should also health educate people about not taking alcohol in order to improve treatment adherence

CHAPTER ONE: INTRODUCTION

1.1 Back ground

Globally, an estimated 10 million people were infected with tuberculosis (TB) and an estimated 251,000 deaths occurred among HIV positive people (WHO, 2019). The risk of mortality from TBis significantly higher in the HIV-infected population (Ogyiri, *et al*. 2019). The co-infection has emerged as a major public health threat throughout the world compared to patients with TB alone (Fiseha, *et al.* 2015; Madan, *et al*. 2018).

TB is an infectious disease caused by a bacterium called *Mycobacterium tuberculosis*, which is an acid-fast bacillus spread mainly via the respiratory pathway. One in three persons across the world, representing 2 to 3 billion individuals, is known to be infected with *Mycobacterium tuberculosis*,of which 5%–15% are likely to develop active TB disease during their lifetime (World Health Organization, 2018). HIV infection predisposes patients to the development of active TB, and the course of HIV-related immunodeficiency is worsened by active TB infection (Amare, 2015). Management of co-infected patients can be complex because of overlapping drug toxicities and interactions (Ejeta, Birhanu, & Wolde, 2014).

Duration of treatment, frequency of drug administration, pill burden, and complications of therapy are some of the challenges associated with the coinfection (Sinshaw, et al. 2017) and lead to poor treatment adherence (Tola, *et al*. 2019). Co-infection adversely affects socio-economic development and challenges treatment outcome (Kefale, & Anagaw, 2017). Early diagnosis and effective treatment of active TB disease in HIV-infected patients is imperative for curing TB and decreasing its ill effects (Saini, Singh, & Garg, 2016). In a study done in Argentina, Herrero,

Ramos, & Arrossi, (2015) reported that challenges with accessing healthcare due to distance or cost for transportation were risk factors for non-adherence to TB treatment.

About 80% of the total burden of TB infection in HIV patients is found in countries of sub-Saharan Africa (SSA), where it is associated with the highest rates of cases and deaths per capita (Ali, et al. 2016). However, despite the availability of free ART and the implementation of different strategies, the burden, and mortality of TB-HIV co-infected patients remains a challenge in Ethiopia (Gebremariam, *et al.* 2016). In Nigeria, the factors that undermined TB control were TBpatients' characteristics, inaccessibility to directly observed therapy short course (DOTS) centers,perceived quality of care, and inability to afford high-quality TB care (Benbaba, *et al*. 2015).
In Kenya, the rates of adherence to uptake of TB drugs among the TB patients was 65.3% and adherence was affected by age and occupation of the patient (Mumbe, *et al*. 2020).

In Uganda, adherence to TB medication defined as taking >90% of the prescribed drugs in a previous month by children attending TB clinics in Mulago Hospital, Nsambya Home Care and Kawempe Kampala Capital City Authority (KCCA) Health Centre was reported as 85.4% at one month of initiating TB therapy (Nakiranda, 2014).

In Mengo hospital, despite of the presence of TB and HIV treatment clinics, no study has assessed the prevalence of adherence to treatment of TB and its associated factors yet this is crucial for development of intervention measures aimed at reducing the prevalence of non-adherence.

1.2 Problem statement

Despite efforts by government of Uganda introducing DOTS for TB treatment, challenges still remain with adherence (Nakiranda, 2014). Tuberculosis non-adherence is the major challenge in TB treatment which leads to development of multidrug as well as extended drug-resistant TB

(Krasniqi, *et al*. 2017). Combating non-adherence is the key and cornerstone of anti TB treatment. However, the prevalence of non-adherence to TB treatment at Mengo hospital remains unknown,let alone the factors contributing to it since no study has assessed them despite of the fact that patients present with complications of TB even after starting treatment.

If no such study was done, we risked having an increase in patients with complications of TB like drug resistance which could be reduced by improving adherence through efforts geared towards addressing the factors limiting adherence. It is for this reason that this study was undertaken.

1.3 General Objective

To assess the adherence and factors associated with it to TB treatment among HIV patients accessing healthcare services at Mengo hospital

1.4 Specific Objectives

i) To determine the rate of adherence to TB treatment among HIV positive patients accessing health care services at Mengo hospital

ii) To assess the factors affecting adherence to TB treatment among HIV positive patients accessing healthcare services at Mengo hospital

1.5 Research questions

i) What is the rate of adherence to TB treatment among HIV positive patients accessing health care services at Mengo hospital?

ii) What are the factors affecting adherence to TB treatment among HIV positive patients accessing healthcare services at Mengo hospital?

1.6 Justification of the study

Management of co-infected patients can be complex because of overlapping drug toxicities and interactions (Ejeta, Birhanu, & Wolde, 2014). Although TB can be cured with first-line antibiotics treatment of 6 months regimen, non-adherence is the main challenge for TB control and prevention programs (Tola, *et al*. 2019). The factors responsible for non-adherence to TB treatment at Mengo hospital remained unknown, yet patients presented at this hospital with TB resistance and other complications which were attributable to non-adherence to TB treatment. If nothing was done about it, the morbidity and mortality associated with TB was bound to continue going up at Mengo hospital. It is for this reason that this study was undertaken such that mitigation measures could bedevised and implemented. This would improve treatment adherence and in the long run reduce themorbidity and mortality associated with TB infection among HIV patients.

1.7 Significance of the study

The findings of this study will benefit TB/HIV coinfected patients because they will be educated about the rate of adherence through dissemination of the research findings and can also receive sensitization about the dangers of poor adherence to TB treatment. This will enable them to become more compliant with TB treatment which will in tun enable them to have long healthier lives. This will be achieved after they are sensitized through dissemination of research findings.

The findings of the study will be used to create awareness to TB program coordinators about the extent of TB adherence and factors affecting it among HIV positive patients with the disease and as such can also be used by the management of Mengo hospital to mitigate against non-adherenceto TB treatment as a way of improving health of the TB/HIV coinfected patients. This will in turn enable the TB/HIV coinfected patients to live healthier longer lives and as such, this will minimizemorbidity and mortality associated with TB.

Ministries of Health and Local Government upon learning about the extent of adherence to TB treatment and the factors associated with it among TB/HIV coinfected patients accessing healthcare services from TB/HIV clinics of Mengo hospital will come up with and implement the measures of improving adherence to TB treatment for better health of TB/HIV coinfected patients.

The research findings can also be used by researchers who will be conducting related studies in future when they use it as a point of reference for their studies. This has therefore added to the available body of knowledge about adherence to TB treatment and factors affecting the adherence. The findings have also been used to identify other gaps in the area which can form a basis of further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 TB/HIV co-infection rates

The twin epidemics of Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) are the major global health challenges of the twenty-first century (Bruchfeld, Correia-Neves, & Llenius, 2015). These two infectious diseases have a bidirectional relationship that poses a dual public health burden to resource-limited countries (Tesfaye, *et al.* 2018). HIV, because of its immunosuppressive nature, is a strong risk factor for the development of TB (WHO, 2018). TB isthe most frequent life-threatening opportunistic infection and the leading cause of death among HIV positive people (Bruchfeld, Correia-Neves, & Llenius, 2015).

The prevalence of pulmonary TB/HIV coinfection was 40.4% in Ethiopia (Belay, Bjune, & Abebe, 2015) and in a retrospective study at Hiwot Fana hospital, the prevalence of TB/HIV infection was 37.4% (Zeru, 2021). On the contrary, a study done in Ghana revealed that the prevalence of TB/HIV co-infection was 18.6% (Salisu, *et al.* 2022). However, adherence to both TB treatment and ART is a key determinant of TB/HIV treatment outcomes, including lower morbidity and mortality. It is also essential to minimize the emergence of both TB and ART drug resistance (Uyei, *et al.* 2014).

TB treatment particularly for M/XDR-TB has been associated with less tolerability and higher pill burden which lessens treatment adherence. This calls for development of new regimens for drug-resistant TB with better efficacy, lower pill burden and fewer adverse effects to enhance adherenceto treatment of TB among TB/HIV coinfected people (Daftary, Padayatchi, & O'Donnell, 2014). However, TB/HIV coinfected patients should be aware of the need to complete the TB treatment regimen to obtain a cure, and should adhere to antiretroviral drugs to increase survival and prevent transmission of either TB or HIV/AIDS to other people (Picelli, & Díaz-Bermúdez, 2014).

2.2 Adherence to TB treatment among TB infected HIV positive patients

A descriptive cross-sectional study was conducted in Mpigi district of Uganda and it wasdiscovered that 36% of the study participants were adherent to their prescribed anti-TB medication(Nakibirige, 2017). Similarly, a cross-sectional study in public health facilities in Kano and Kaduna States also established that the prevalence of non-adherence to tuberculosis medication was 30.5% (Iweama, *et al*. 2021).

An Ethiopian cross-sectional study by Woimo, *et al*. (2017) revealed that the prevalence of non-adherence towards anti-TB treatment was 24.5%. Similarly, in a Chinese study by Lei, *et al*. (2016), it was also discovered that the prevalence of non-adherence to TB treatment was 36.0% and the loss to follow-up cases was 28.2%. However, Bea, *et al*. (2021) did a study which exploredadherence and the factors associated with it among TB patients in South Korea where they foundout that 43.5% of their study participants were non-adherent to TB treatment.

A retrospective cohort study of adult tuberculosis patients was done in two large health facilities in Ebonyi State, Nigeria and it was discovered that the default rate for TB treatment was 9.4%. Itwas also discovered that 35.7% of the treatment defaults occurred during the intensive phase of treatment (Alobu, *et al*. 2014). However, *Kidenya,* et al. (2017) found out that poor adherence to TB medications in the first 2 months of treatment was in 16.9% of the study patients.

A retrospective cohort study conducted at Mulago Hospital revealed that about 11.9% of the patients were non-adherent (Batte, *et al.* 2021). On the contrary, O'Donnell, et al. (2014) in a SouthAfrican based study found out that the prevalence of non-adherence was 32.3%.

In a systematic review analysis, Nellums, *et al.* (2018) found out that the prevalence of non-adherence to TB treatment among MDR patients was 20%.

2.3 Factors affecting adherence to TB treatment among HIV positive patients

Poor healthcare provider–patient relationship with communication gaps was a major factor that influenced non-adherence to TB medication. Loss-to-follow-up patients reported that the healthcare providers were seen as disrespectful of their patients and less committed to their profession which also led to non-adherence to TB treatment (Boru, Shimels, & Bilal, 2017; Getahun, & Nkosi, 2017). The quality of healthcare service and a patient's satisfaction with healthcare service affected non-adherence to TB medication. When patients perceived that they received less professional care and less time spent with the healthcare providers, and waited a longtime to get healthcare service, they were more likely to be non-adherent (Tesfahuneygn, Medhin,& Legesse, 2015; Getahun, & Nkosi, 2017). However, Woimo, *et al*. (2017) and Mindachew, et al. (2014) reported that patients who did not receive health information or education from health facilities were more likely to be non-adherent to TB treatment.

Studies by Ayele *et al*. (2017), Tesfahuneygn, Medhin, & Legesse, (2015) and Kiros, *et al*. (2014) reported that drug side-effects were the major therapy-related reason for non-adherence to TB medication. However, Boru, Shimels, & Bilal, (2017) reported pill burden as a factor contributingto non-adherence to TB medication among active TB and TB-HIV co-infected patients. More to that, Mekonnen, & Azagew, (2018) and Tesfahuneygn, Medhin, & Legesse, (2015) reported that the presence of more than one co-morbidity including TB-HIV co-infection was a factor contributing to non-adherence to TB medication. One study conducted in Addis Ababa by Tola, *etal*. (2017) found out that being on Antiretroviral Therapy (ART) was a factor associated with non-adherence to TB medication. Daksa, Kebede, & Dahjejot, (2016) further reported that symptom presence after initiation of anti-TB treatment and slow progression of the health status were significant non-adherence factors to TB treatment. Mekonnen, & Azagew, (2018) also reported that being in the continuation phase of the treatment (after the initial 2-month clinic-based treatment period) was a

factor associated with non-adherence and default of TB treatment.

Iweama, *et al*. (2021) in a multivariable logistic regression analysis found out that having a TB/HIV co-infection, use of antiretroviral treatment and cotrimoxazole prophylaxis therapy medications were associated with tuberculosis medication nonadherence.

In a study which assessed the factors associated with adherence to anti-tuberculosis treatment among children attending TB clinics in Mulago Hospital, Nsambya Home Care and Kawempe Health Centre IV, it was discovered that inability to get drugs from health facility, having no confidence in drugs prescribed, drug stock outs and forgetting to give the drugs (Nakiranda, 2014).

Research evidence by Balakrishnan, *et al*. (2016) suggested that TB patients with HIV had low drug adherence since they had several medications such as ARVs to take. Similarly, some Ethiopian studies reported that the health and health system factors which hindered adherence to anti-TB therapy were patients' being on the continuation phase of chemotherapy, TB/HIV co- infection, health system challenges, presence of more than one co-morbidity, poor patient-providerrelationship, patients' experience of side effects, and long waiting time before access to treatment(Gube, *et al.* 2018; Mekonnen, & Azagew, 2018). However, Alobu, *et al*. (2014) in their study found out that the risk of treatment default increased with being a smear-negative TB case, or having extrapulmonary TB and having received the longer treatment regimen.

In a Chinese study, being supervised while on TB treatment by home visits and phone calls from the health workers were factors which promoted adherence to TB treatment (Lei, *et al*. 2016).

In a Korean study, patients initiating quadruple regimen were more likely to adhere in comparisonto those on triple regimen while those with a history of dementia and with history of diabetes mellitus were less likely to adhere to the drug (Bea, *et al*. 2021).

According to an Ethiopian study by Sahile, Yared, & Kaba, (2018), forgetfulness was one of the patient related factors that affected patient adherence to TB treatment. Another patient related factor associated with non-adherence to TB medications was patient's educational status where the more the patient was educated, the less likely they were to adhere to TB medication (Daksa, Kebede, & Dahjejot, 2016).

Psychological distress was another factor reported in a study conducted in Addis Ababa by Tola, Karimi, & Yekaninejad, (2017) as indirectly influencing non-adherence to TB medication whereas Mindachew, *et al*. (2014) in another qualitative study conducted in Addis Ababa reported poor mental health status of a patient as a hinderance to adherence to TB treatment.

Some studies reported that patients not getting social support from families and neighbours for reminders to take their medication, lacking enough food and financial assistance contributed to non-adherence to TB medication (Mindachew, *et al*. 2014; Daksa, *et al*. 2016). Being busy with work and away from home for work or other social-related activities were factors which also contributed to non-adherence to TB medication (Mekonnen, & Azagew, 2018; Ayele, *et al*. 2017).Perceived and experienced stigma and discrimination also led the patient to non-adherence to TB treatment. Because of fear of stigma and discrimination, the patients were not disclosing their HIVstatus to their family, which in turn influenced their non-adherence to TB medication (Mindachew,*et al.* 2014; Boru, Shimels, & Bilal, 2017).

Beliefs about the disease and treatment, such as perceived wellness or cure, perceived risk, and perceived barriers over the benefits, were significant factors for non-adherence to TB medication (Daksa, Kebede, & Dahjejot, 2016; Tola, Karimi, & Yekaninejad, 2017).

Economic constraints limit the patient's ability to have adequate food which influences non-adherence (Boru, Shimels, & Bilal, 2017). However, alcohol consumption was reported in another study as a factor that influenced non-adherence to TB medication and so was cigarette smoking and khat chewing (Tesfahuneygn, Medhin, & Legesse, 2015; Daba, *et al*. 2019).

Grigoryan, *et al*. (2022) conducted a study in Armenia and found out that former patients' awareness of TB and its treatment, beliefs about TB, trust in TB healthcare providers, and a sense of responsibility were the most common factors that predisposed them to complete the treatment. Support received from family, and friends, a desire to avoid TB-associated stigma, and good tolerance of TB medications were the main reinforcing factors. Enabling factors included a relatively simple regimen of TB treatment and accessibility and affordability of TB services.

Multivariable logistic regression analysis showed that monthly income, being widowed or married and having a distance <5 km to directly observed treatment short-course center from home were associated with tuberculosis medication nonadherence (Iweama, *et al*. 2021).

A previous study which examined risk factors for Loss to follow up (LTFU) reported that low knowledge about the cause of TB, its transmission and the consequences of its incomplete treatment played a role in lower treatment compliance (Rondags, *et al*. 2014).

In a Ugandan based study, Nakiranda, (2014) discovered that the factors that were associated with non-adherence were forgetting to give the drugs to the study children, long distance from clients' homes the health facility, seeing and thinking that the child was much better and had improved.

Some studies conducted in different regions of Ethiopia reported that factors such as patients' forgetfulness, patient's socio-economic attributes, poor knowledge about TB and anti-TB therapy, alcohol intake and the distance of the patients' home to the health facility were strong predictors of anti-TB medication nonadherence (Gube, *et al*. 2018; Mekonnen, & Azagew, 2018). Similarly,a Japanese study by Shiratani (2019) revealed that non-acceptance, frustration, and anxiety amongTB patients were associated with anti-TB treatment nonadherence. A study conducted in Indonesia reported that a lack of knowledge and incorrect perception of TB before therapy were associated with anti-TB treatment default (Putera, Pakasi, & Karyadi, 2015).

In a Chinese study by Lei, *et al*. (2016), being observed by family members and paying monthly service expenses above 450 RMB were predisposing factors to non-adherence to TB treatment. Similarly, the factors that influenced adherence to TB medication according to a study done in Mpigi district in Uganda were; age, marital status, occupation, level of education, smoking, drinking alcohol, meals per day, knowledge about TB, and distance from the hospital (Nakibirige,2017).

Multiple logistic regression analysis by Woimo, *et al*. (2017) demonstrated that poor knowledge towards tuberculosis and its treatment, cost of medication other than TB, having of health information at every visit and distance of DOTS center from individual home were significantly associated with non-adherence towards anti- tuberculosis treatment.

CHAPTER THREE: METHODS AND MATERIALS

3.1 Study site

This study was carried out in Mengo Hospital, also known as Namirembe Hospital, the oldest hospital in Uganda which is also a Private Not For Profit hospital. The hospital is located on Namirembe Hill in rubaga Division, in northwestern Kampala, approximately 5 kilometres (3 mi),by road, southwest of Mulago National Referral Hospital. The coordinates of Mengo Hospital are 0°18'46.0"N, 32°33'30.0"E (Latitude:0.312778;Longitude:32.558333). The hospital belongs to the Anglican Church of Uganda and is a member of the Uganda ProtestantMedical Bureau with a capacity of over 250 beds. It offers several health care services among which is TB and HIV care. It has medical, surgical, maternity wards. The hospital offers a range of diagnostic services through its medical laboratory, X-ray, CT scan and ultrasound services and also renders rehabilitative services through its physiotherapy department. These services are not limited to patients from Kampala but other districts that are close and far since it also doubles as aspecialist services facility and also serves as a regional referral hospital.

3.2 Study design

This was a cross-sectional study which assessed the adherence and factors associated withadherence to TB treatment among HIV patients accessing healthcare services at Mengo hospital. The study took approximately 2 weeks for data to be collected from the study participants in May 2023. It was a cross-sectional study because the nature of data to be collected was at only one point in time and there was no need for follow-up.

3.3 Study population

The study population comprised of all TB/HIV coinfected patients who were accessing services from Mengo hospital during the time of the study.

3.3.1 Inclusion criteria

All consenting TB/HIV coinfected patients who were accessing healthcare services from Mengo hospital were eligible for inclusion in the study.

3.3.2 Exclusion Criteria

All non-consenting TB/HIV coinfected patients were excluded from the study.

3.4 Sample size determination

Slovin's formula was used to calculate the sample size necessary to achieve the desired confidence interval when sampling a population. This formula was also used because we didn't have enough information about the participants' rate of adherence and the factors associated with it. The formula was as below:

$$n = \frac{N}{1+Ne^2}$$

Where n = desired sample size, N = population of TB/HIV coinfected patients who were available during the two weeks of data collection = 100 and e = degree of freedom/level of precision, whichis 0.05.

$$n = \frac{100}{1 + (100 \times 0.05 \times 0.05)} = 80$$

From the above calculation, a total of 80 TB/HIV coinfected patients who were accessing healthcare services from Mengo hospital were selected into the study.

3.5 Sampling Technique

Simple random sampling technique was used to select the study sample. This was achieved by having 80 small pieces of paper labeled with the word “YES” and another 20 small identical papers labeled with the word “NO.” All the 100 labeled papers were folded and put into a small box where they were mixed. Each consenting patient was asked to blindly pick one piece of paper from the box and this was reviewed to see the word written on it. Only those patients who picked the paperslabeled with the word “YES” were included in the study.

3.6 Data collection Tool

A questionnaire was used to collect data. It comprised of predominantly close-ended questions (Appendix II). The questionnaire was pre-tested on 5 patients and adjustments made in it before it was used for the actual data collection. The questionnaire also comprised of a section for laboratory findings where results were entered following analysis of sputum samples.

3.7 Data collection

Data was collected by distributing questionnaires to the randomly selected study respondents who filled their responses in their respective questionnaires, at the end of which, they submitted the filled questionnaires to the researcher. The researcher reviewed the questionnaires for completeness of filling and where some questionnaires were partially filled in, the researcher handed them back to the respective study respondent for completion before being re-submitted.

The researcher verbally administered questionnaires to respondents who were unable to read and write for themselves. She then filled their responses for them in their respective questionnaires.

The respondents were instructed on how to collect sputum samples and subsequently given containers to collect the spot sputum samples. They were instructed to cough deeply in order to get

the sputum which they had to put in the container carefully such that the container wasn't contaminated.

3.8 Data Analysis and Presentation

Data generated from the collection process was entered in Microsoft Excel where it was analyzed as per the study objectives. The rate of adherence was done by establishing the frequency of adherent participants and expressing them as a percentage of the total number of participants. For factors affecting adherence or non-adherence, cross-tabulation was done where percentages of adherent and non-adherent were established for each factor where it was and wasn't available among the participants. The data was then presented using tables, pie charts and bar graphs.

3.9 Ethical consideration

Before commencing with the study, permission was sought from Makerere University College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB). This was after the proposal had been approved and duly signed by my research supervisor. CoVAB then issued an introductoryletter for the researcher to present to Mengo Hospital, the research centre. This letter together witha copy of the approved proposal were duly presented to the IRB of Mengo Hospital which in turncleared the researcher to conduct the study at Mengo hospital.

After this, the purpose and benefits of the study were explained to each and every potential study participant from whom informed consent was obtained before they were enrolled into the study.

Confidentiality was maintained such that any data collected from the study respondents was not shared with any unauthorised persons. Efforts were also made to observe anonymity of the study respondents and this was achieved by using study numbers and not the participant's names during data collection.

CHAPTER FOUR: RESULTS

4.1 Demographics of study participants

Table 1: Demographics of study participants

Table 1 below shows demographic characteristics of the study participants most, 53 (66.7%) of who were male. Majority, 59 (73.3%) of them were aged between 30 and 49 years, with half, 40 (50.0%) of the study participants reported to be married.

Variable	Status	Frequency (n = 80)	Percentage (%)
Sex	Male	53	66.7
	Female	27	33.3
Age	Less than 10 years	0	0.0
	10 to 29 years	8	10.0
	30 to 49 years	59	73.3
	50 years and above	13	16.7
Marital status	Married	40	50.0
	Single	21	26.7
	Separated/divorced	13	16.7
	Widowed	5	6.7

4.2 Rate of adherence to TB treatment among HIV positive patients accessing health care services at Mengo hospital

Figure 1 below shows that 30 (37.5%) of the study participants had never missed taking anti-TB drugs, 29 (36.7%) had ever missed taking the anti-TBs once whereas 21 (26.7%) of them had missed taking the anti-TBs for a number of times.

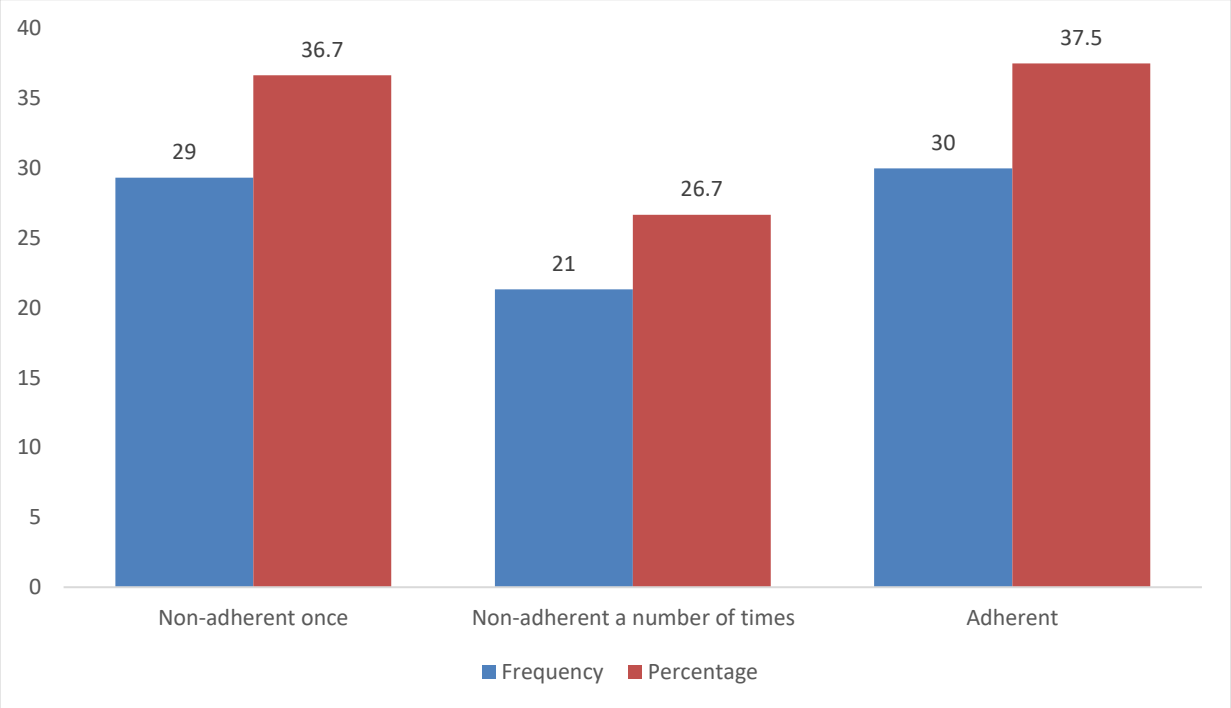

Figure 1: Prevalence to adherence to anti-TB treatment among study participants

4.3 Factors affecting adherence to TB treatment HIV positive patients accessing healthcare services at Mengo hospital

Figure 2 below shows that 64 (80%) of the study participants had never had stockouts of drugs to make them miss taking anti-TB whereas 16 (20.0%) had ever missed taking anti-TB treatment dueto drug stockouts.

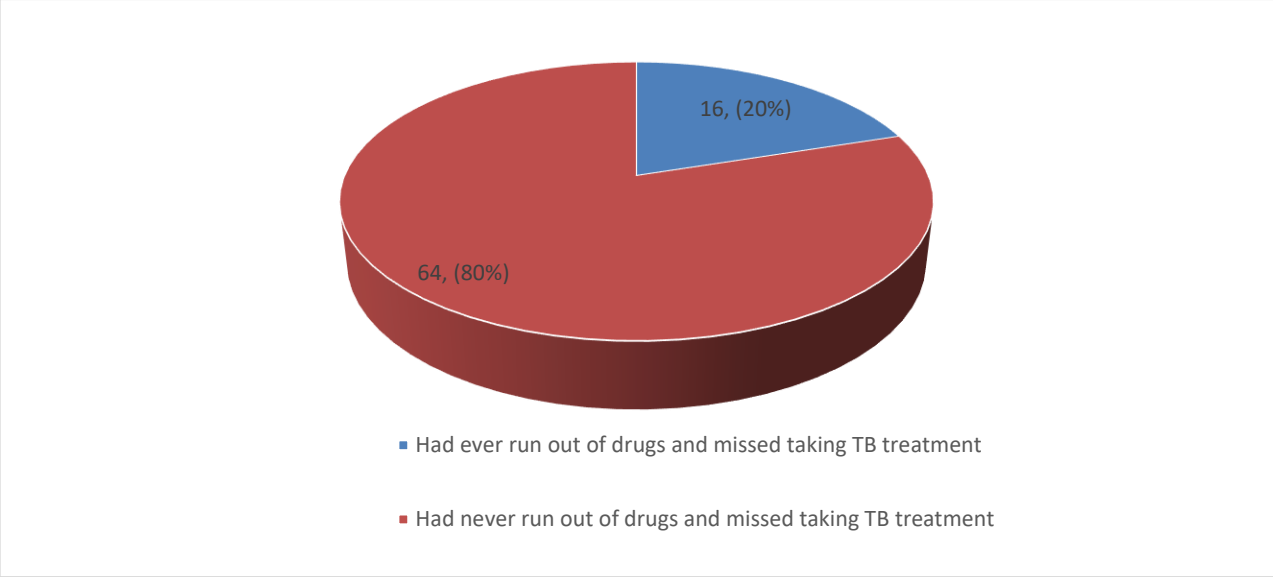

Figure 2: Non-adherence to anti-TB drugs due stock outs

Table 2 below shows that none, (0%) of the study participants missed drug refills because of fear of health worker rudeness or were non-adherent because of limited interaction with the health workers or because of fear of long waiting times at hospital.

The table also shows that over half, 45 (56.7%) of the study participants were non-adherent to medication for TB because they felt that they weren't given enough information about it, half, 40 (50.0%) were non-adherent at some point in time because they experienced undesired effects of drugs whereas more than three quarters of the study participants, 61 (76.7%) were non-adherent because of treatment fatigue.

Table 2: Rudeness of health workers, patient-health worker interaction status, waiting time, non-provision of informationby health team, non-desired drug effects and drug fatigue correlated with adherence to TB treatment among study participants

Variable	Status	Frequency	Percentage (%)
Fear of health workers' rudeness hindered drug	Yes	0	0.0
refilling by participant	No	80	100.0
Had been non-adherent because of limited	Yes	0	0.0
interaction with health worker	No	80	100.0
Had ever failed to do TB treatment drug refill	Yes	16	20.0
for fear of long waiting time at the hospital	No	64	80.0
Had ever been non-adherent to treatment	Yes	45	56.7
because of limited information TB treatment	No	35	43.3
Had ever been non-adherent to TB treatment	Yes	40	50.0
because of drug undesired effects	No	40	50.0
Have ever been non-adherent because of drug	Yes	19	23.3
fatigue	No	61	76.7

Figure 3 below shows that close to three quarters, 59 (73.3%) of the study participants never had treatment for another chronic illness other than HIV infection limiting their TB treatment adherence.

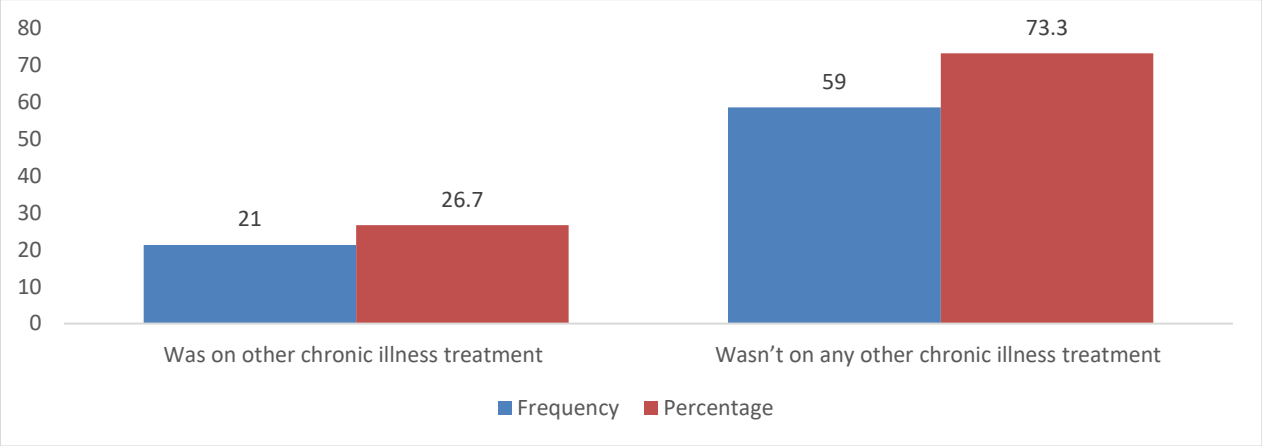

Figure 3: Treatment of other chronic illness other than HIV correlated with TB treatment adherence among study participants

Figure 4 below shows that only 3 (3%) of the study participants were cigarette smokers who were non-adherent to TB treatment.

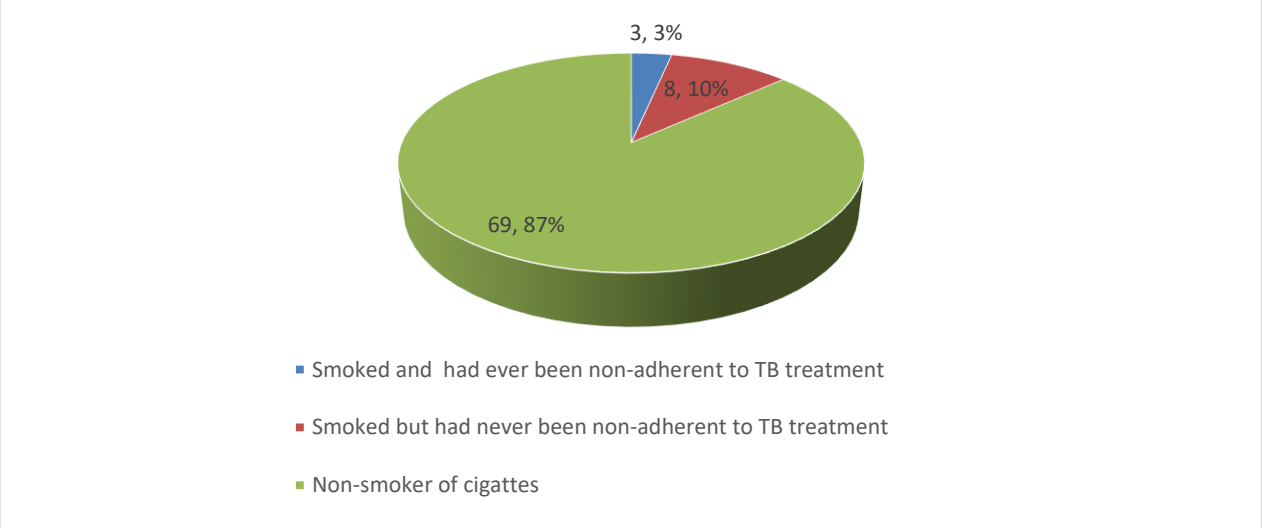

Figure 4: Cigarette smoking correlated with TB treatment adherence among the study participants

Figure 5 below shows that non-adherence to TB treatment due to forgetfulness was 50 (62.5%).

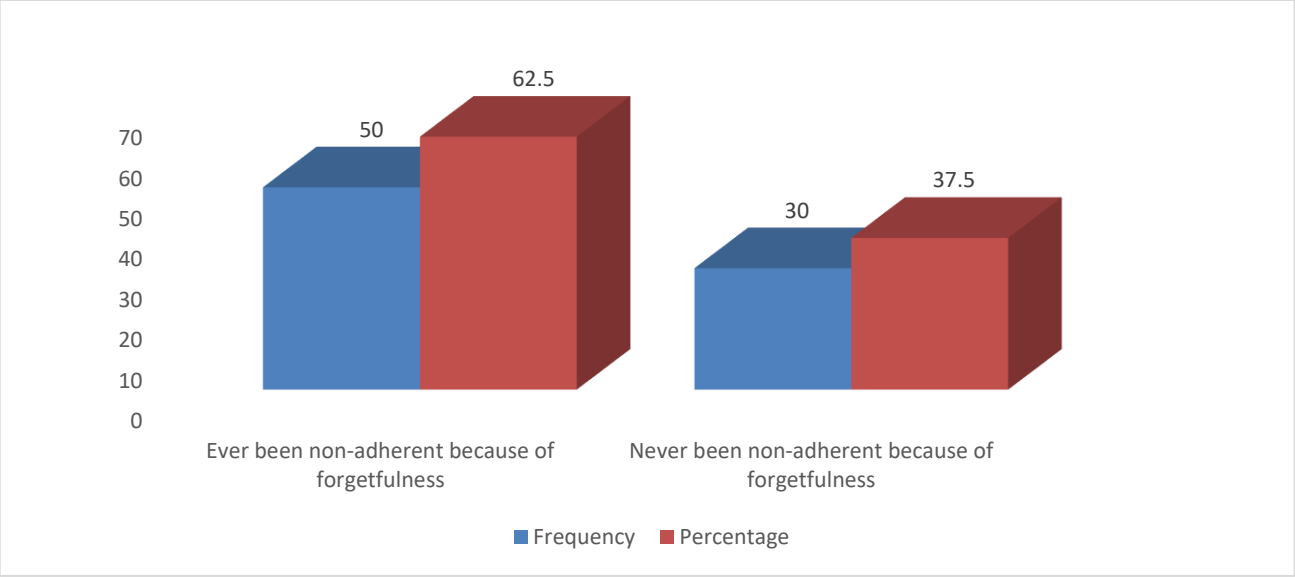

Figure 5: Forgetfulness correlated with non-adherence to TB treatment among the study participants

Table 3 below shows that the rate of adherence was 38.7% and 20.0% among participants who were aware and not aware of the fact that TB was curable respectively.

Table 3 below also shows that TB treatment adherence was 53.8%, 16.7%, 42.9% and 50.0% among participants who were illiterate, primary dropouts, secondary drop outs and tertiary education achievers respectively.

Table 3 below further shows that TB treatment adherence was 67.5% and 7.5% among participants with and without someone to remind them to take their anti-TB drugs respectively.

Table 3 below also shows that the rate of adherence to TB treatment was 0% as opposed to 37.5% among the study participants with mental illness and without mental illness being managed respectively.

Lastly, table 3 below shows that the prevalence of adherence to TB treatment was 36.0%, 60.0%

and 0% among participants who always, sometimes and never had enough food daily respectively.

Table 3: Participants' awareness about TB being curable, level of education, mental illness treatment, food security and possession of treatment support family member correlated with anti-TB adherence

Variable	Status	Adherent (%)	Non-adherent (%)	Total (%)
TB curable with treatment	Yes	29 (38.7%)	46 (61.3%)	**75 (100%)**
	No	1 (20.0%)	4 (80.0%)	**5 (100%)**
Highest level of education attained	Illiterate	7 (53.8%)	6 (46.2%)	**13 (100%)**
	Still school going	0 (0%)	0 (0%)	**0 (0%)**
	Primary school	4 (16.7%)	20 (83.3%)	**24 (100%)**
	Secondary	15 (42.9%)	20 (57.1%)	**35 (100%)**
	Tertiary	4 (50.0%)	4 (50.0%)	**8 (100%)**
Had someone reminding them to take TB medicines	Yes	27 (67.5%)	13 (32.5%)	**40 (100%)**
	No	3 (7.5%)	37 (92.5%)	**40 (100%)**
Had mental illness treatment	Yes	0 (0%)	0 (0%)	**0 (0%)**
	No	30 (37.5%)	50 (62.5%)	80 (100%)
Had enough food to take daily	Yes, always	27 (36.0%)	48 (64.0%)	**75 (100%)**
	Yes, sometimes	3 (60.0%)	2 (40.0%)	**5 (100%)**
	No	0 (0%)	0 (0%)	**0 (0%)**

Table 4 below shows that adherence rates were 36.2% and 45.5% for participants whose income was just sufficient and insufficient respectively.

Table 4 below shows that adherence to TB treatment was 10%, 63.6% and 94.7% among very busy, busy and non-busy participants by their schedule of work respectively.

Table 4 below also shows that the rate of adherence to TB treatment was 22.2% and 45.3% among participants who feared and never feared people around them knowing that they were on TB treatment respectively.

Table 4 below further shows that the prevalence of adherence to TB treatment was 66.7% and 36.4% among participants who would default on treatment and wouldn't default on treatment because of the perception that they were cured of the disease before completing the treatment course of TB respectively.

Lastly, the adherence rate to TB treatment was 26.9% and 41.5% among participants who were drinking and not drinking alcohol respectively.

Table 4: Participants' socio-economic status, pre-occupation, stigma of TB treatment, perception of being cured midway treatment and alcohol consumption correlated with their adherence to anti-TBs

Variable	Status	Adherent (%)	Non-adherent (%)	Total (%)
Rate your income	More than sufficient	0 (0%)	0 (0%)	**0 (0%)**
	Just sufficient	25 (36.2%)	44 (63.8%)	**69 (100%)**
	Insufficient	5 (45.5%)	6 (54.5%)	**11 (100%)**
	Very insufficient	0 (0%)	0 (0%)	**0 (0%)**
Rate you working schedule	Very busy	5 (10.0%)	45 (90.0%)	**50 (100%)**
	Busy	7 (63.6%)	4 (36.4%)	**11 (100%)**
	Not busy	18 (94.7%)	1 (5.3%)	**19 (100%)**
Feared people knowing about their TB treatment	Yes	6 (22.2%)	21 (77.8%)	**27 (100%)**
	No	24 (45.3%)	29 (54.7%)	**53 (100%)**
Would stop treatment when better	Yes	2 (66.7%)	1 (33.3%)	**3 (100%)**
	No	28 (36.4%)	49 (63.6%)	**77 (100%)**
Drinking alcohol?	Yes	8 (29.6%)	19 (70.4%)	**27 (100%)**
	No	22 (41.5%)	31 (58.5%)	**53 (100%)**

Table 5 below shows that the rate of adherence to TB treatment was 50.0% and 36.8% among participants who were and weren't widows/widowers respectively.

Table 5 below also shows that the rate of adherence to TB treatment was 21.1%, 48.6% and 33.3% among study participants living less than 5km, 5 to 10km and more than 10km from Mengo hospital respectively.

Table 5 below further shows that adherence to TB treatment was 25.4% and 82.4% among study participants who were aware and not aware about TB transmission mode respectively.

Lastly, table 5 below shows that the adherence to TB treatment was 40.0% and 34.3% among the participants who were aware and unaware about the complications of non-adherence to TB treatment.

Table 5: Widow/widower status, distance lived from Mengo hospital, awareness about TB transmission mode and disease complication correlated with their adherence to TB treatment

Variable	Status	Adherent (%)	Non-adherent (%)	Total (%)
Widow or widower?	Yes	2 (50.0%)	2 (50.0%)	**4 (100%)**
	No	28 (36.8%)	48 (63.2%)	**76 (100%)**
Distance lived from Mengo hospital	< 5 km	4 (21.1%)	15 (78.9%)	19 (100%)
	5 to 10 km	18 (48.6%)	19 (51.4%)	37 (100%)
	> 10 km	8 (33.3%)	16 (66.7%)	24 (100%)
Knew how TB is transmitted	Yes	16 (25.4%)	47 (74.6%)	**63 (100%)**
	No	14 (82.4%)	3 (17.6%)	**17 (100%)**
Knew about complications of non-adherence to TB treatment	Yes	18 (40.0%)	27 (60.0%)	**45 (100%)**
	No	12 (34.3%)	23 (65.7%)	**35 (100%)**

CHAPTER FIVE: DISCUSSION

5.1 Discussion

The findings obtained from chapter four of this study have been given in-depth analysis and inferences made about them before there were compared with previous study findings as per the literature review by way of discussion. It is discussed as adherence rate to TB treatment and factors affecting the rate of adherence.

This study established that only 37.5% of the participants were completely adherent to TB treatment. This might have been due to lack of awareness about dangers associated with being non-adherent to treatment among the study participants. This was in consistence with another study that was carried out in Mpigi district (Nakibirige, 2017) that reported adherence rate of 36%, a prevalence that is nearly equal between the two studies. Another study with nearly the same adherence rate was done in Nigeria where the prevalence of adherence to TB treatment was 30.5% (Iweama, *et al*. 2021). However, better adherence rates of 56.5%, 75.5% and 64.0% were reported in studies done South Korea, Ethiopia and China respectively (Bea, *et al*. 2021; Woimo, *et al*. 2017; Lei,*et al*. 2016). Higher rates of adherence of 80%, 88.1% and 67.7% were reported in other studies done by Nellums, et al. (2018), Batte, et al. (2021) and O'Donnell, et al. (2014) respectively. The higher rates of adherence in the latter studies could have been attributed to better awareness about the disease among its participants while the participants of this study could have had a knowledge gap in TB care and its complications when mismanaged.

More than three quarters, 64 (80%) of the study participants had never had stockouts of drugs to make them miss taking anti-TB (Figure 2). This ruled out drug stockouts as a predisposing factor to non-adherence since majority of the participants had ready access to these drugs. Contrary results were documented by Nakiranda, (2014) who reported that inability to get drug refills contributed to

non-adherence to TB treatment in health facilities like Mulago, Nsambya and Kawempe in Uganda. The difference could have been attributed to public health facilities like Mulago hospital having stockouts of anti-TB drugs yet the clientalle served is of people who may even lack transport to come for drug refills.

None, (0%) of the study participants failed to get drug refills because of fear of health worker's rudeness (Table 2). This ruled out rudeness of health workers as a hinderance of seeking drug refills for TB treatment and wasn't a factor contributing to non- adherence to TB treatment. This is because the health workers weren't perceived as rude by the study participants. However, contrary findings were reported in studies done in Ethiopia by Boru, Shimels, & Bilal, (2017) and Getahun, & Nkosi, (2017) who reported provider-patient relationship as a limiting factor adherence to TB treatment.

None, (0%) of the study participants skipped taking their TB medication because they felt that the health workers at hospital hadn't interacted with them well (Table 2). This meant that the participants were satisfied with the duration they spent with the health workers at the hospital and therefore ruled it out as a hindrance to TB treatment adherence. However, studies done by Tesfahuneygn, Medhin, & Legesse, (2015) and Getahun, & Nkosi, (2017) instead found out that less time spent with the healthcare providers was associated with non-adherence to TB treatment because of lack of ample time to get adequate explanations about the treatment of TB.

More than three quarters, 64 (80.0%) of the study participants never missed drug refill dates for fear of long waiting times at hospital (Table 2). This was because they had experienced a long waiting time the last time they went to hospital and as such ruled out long waiting time as a hinderance to treatment adherence. On the contrary, findings of studies done by Tesfahuneygn, Medhin, & Legesse, (2015) and Getahun, & Nkosi, (2017) reported long waiting time as a predisposing factor to non- adherence among patients on TB treatment.

Up to 45 (56.7%) of the study participants had missed taking medication for TB because they felt that they weren't given enough information about it whereas 35 (43.3%) hadn't missed taking the anti-TB drugs because of lack of information provision by health workers (Table 2). The variation between 56.7% and 43.3% registered above was minimal and therefore ruled out limited information access from health workers as a predisposingfactor to non-adherence to TB treatment. This might be because the participants' levels of knowledge on TB treatment were high and independent of information provided by the health workers for the treatment of TB. Contrary to this study, Woimo, et al. (2017) and Mindachew, et al. (2014) reported that patients who did not receive health education from health facilities were non-adherent to TB treatment.

Half, 40 (50.0%) of the study participants had skipped taking TB medication because they experienced an undesired effect whereas the other half, 40 (50.0%) never missed taking the TB medication because of undesired effects (Table 2). The equal proportions of non-adherence and adherence due to side effects ruled out anti-TB side effects as a predisposing factor to non-adherence contrary to the findings of studies by Ayele *et al*. (2017), Tesfahuneygn, Medhin, & Legesse, (2015) and Kiros, *et al*. (2014) who reported that drug side-effects were the major therapy-related reason for non- adherence to TB medication.

Over three quarters, 61 (76.7%) of the study participants had never missed taking anti-TBs because they felt tired of taking them as opposed to 19 (23.3%) who had missed doing so because they felt tired of taking medications (table 2). This was because the participants were motivated to get completely cured of the disease which motivated them to remain adherent to the TB treatment. This finding ruled out pill burden as a predisposing factor to non-adherence to TB treatment which was contrary to the findings of a study done by Boru, Shimels, & Bilal, (2017) who instead reported pill burden as a predisposing factor to non-adherence to TB medication among their study participants.

Majority, 59 (73.3%) of the study participants never had treatment for another chronic illness other than HIV limiting their TB treatment adherence (Figure 3). Presence of another co-morbidity other than HIV/AIDS should have increased pill burden but this wasn't the case in this study. This therefore ruled out comorbidity as a predisposing factor to non-adherence to TB treatment. On the contrary, Mekonnen, & Azagew,(2018) and Tesfahuneygn, Medhin, & Legesse, (2015) reported that the presence of more than one comorbidity was a predisposing factor to non-adherence to TB treatment.

Up to 69 (87%) of the study participants weren't smoking cigarettes (Figure 4). Because majority of the study participants weren't cigarette smokers, it could be assumed that smoking never affected their memory or competed for the time needed to take anti-TB drugs. This therefore ruled out association between cigarette smoking and adherence to TB treatment in this study which was contrary to the findings of studies done by Nakibirige, (2017), Tesfahuneygn, Medhin, & Legesse, (2015) and Daba, et al. (2019) who instead found a significant association between smoking and non-adherence to TB treatment.

Non-adherence to TB treatment due to forgetfulness was 50 (62.5%) as opposed to adherence rate of 30 (37.5%) that was free of effect of forgetfulness (Figure 5). The considerably large variation in the percentages of study participants who had skipped a drug because of forgetfulness and those that hadn't done so, made forgetfulness to be a predisposing factor to non-adherence to TB treatment. Similarly, studies done by Gube, et al. (2018), Sahile, Yared, & Kaba, (2018) and Mekonnen, & Azagew, (2018) also reported forgetfulness as a predisposing factor to non- adherence to TB treatment.

TB treatment adherence was 53.8%, 16.7%, 42.9% and 50.0% among participants who were illiterate, primary dropouts, secondary drop outs and tertiary education achievers respectively (Table 3). Lack of a clear trend in the adherence with literacy levels ruled out association between literacy and adherence to TB treatment. This was contrary to the findings of a study done in Mpigi general hospital by Nakibirige, (2017) who instead got a significant association between literacy and adherence to TB treatment.

Better TB treatment adherence of 67.5% was registered among participants with someone to remind them to take their anti-TB drugs than adherence of 7.5% registered among participants without a person to remind them to take their TB treatment (Table 3). It was clear from the above findings that being reminded to take drugs improved adherence to TB treatment which agreed with the findings of a study done in China (Lei, *etal*. 2016).

No patient was on treatment for mental illness which ruled it out as a limitation to TB treatment adherence (Table 3). This was contrary to the findings of a study done in Korean where a significant association was registered between non-adherence to TB treatment and dementia (Bea, *et al*. 2021).

Adherence to TB treatment was 36.0% and 60.0% among participants who always and sometimes had enough food daily respectively (table 3). Least adherence was registered in participants who always had enough food daily and as such ruled out food inadequacy as a predisposing factor to non-adherence to TB treatment contrary to the findings of studies done by Mindachew, *et al*. (2014) and Daksa, *et al*. (2016).

Adherence rate was lower for participants whose income was just sufficient (36.2%) than for participants with insufficient income (45.5%) which was the reverse of the expected trend (Table 4). This ruled out low socio-economic status as a predisposing factor to non-adherence to TB treatment. This was contrary to the findings of a study done by Boru, Shimels, & Bilal, (2017) who

found out that economic constraints limited the patient's ability to have adequate food which led to non- adherence to TB treatment.

Adherence to TB treatment decreased with increase in being busy evidenced by the fact that it was 10%, 63.6% and 94.7% among very busy, busy and non-busy participants respectively (Table 4). This made excessive pre-occupation with work to be a limiting factor to adherence as was the case for studies done by Mekonnen, & Azagew, (2018) and Ayele, *et al*. (2017) who also associated being busy with work with non-adherence to TB treatment.

The rate of adherence to TB treatment was 22.2% and 45.3% among participants who feared and never feared people around them knowing that they were on TB treatment respectively (Table 4). Poorer adherence to TB treatment in the group that feared other people knowing that they were on TB treatment meant that there was non-acceptance, fear and stigma among them which hindered adherence to treatment as was the case in studies done by Shiratani (2019), Mindachew, *et al.* (2014) and Boru, Shimels, & Bilal, (2017).

The prevalence of adherence to TB treatment was 66.7% among participants who would default on treatment as opposed to 36.4% of the participants who wouldn't default on treatment because of the perception that they were cured of the disease before completing the treatment course of TB (Table 4). Better adherence registered among the group of participants that would default on treatment on the assumption that their TB was cured ruled it out as a predisposing factor to non- adherence to treatment. On the contrary, Daksa, Kebede, & Dahjejot, (2016) and Tola, Karimi,& Yekaninejad, 2017) reported that perceived wellness or cure was a predisposing factor to non-adherence to TB treatment.

Non-adherence to TB treatment was 73.1% as opposed 58.5% among participants who were

drinking and not drinking alcohol respectively (Table 5). This meant that alcohol consumption increased odds of non-adherence to TB treatment. This could precipitate forgetfulness of taking medication for TB among alcohol consumers the reason for the bigger prevalence of non-adherence registered in this category of study participants. This finding was in concordance with the findings of studies done by Nakibirige, (2017), Gube, et al. (2018), Tesfahuneygn, Medhin, & Legesse, (2015), Daba, *et al*. (2019) and Mekonnen, & Azagew, (2018) who also reported a significant association between alcohol consumption and non-adherence to TB treatment.

The rates of adherence to TB treatment were 21.1%, 48.6% and 33.3% among study participants living less than 5km, 5 to 10km and more than 10km from Mengo hospital respectively (Table 5). This ruled out long distance to treatment centre as a predisposing factor to non-adherence since the ones living closest had the least adherence. By this finding, non-adherence to TB treatment was possibly associated with another factor not distance lived from the health facility by thr patient. This study's findings were therefore contrary to the findings of studies done by Woimo,et al (2017), Gube, et al. (2018), Mekonnen, & Azagew, (2018) and Nakibirige, (2017) who instead found a significant association between increasing distance travelled to the health facility and adherence to TB treatment.

Adherence to TB treatment was 25.4% and 82.4% among study participants who were and weren't aware about the mode transmission of TB respectively. This showed that adherence was least among participants who were aware about mode of transmission of TB and therefore ruled out lack of knowledge on TB as a predisposing factor to non-adherence to its treatment (Table 5). Another finding in this study that the adherence to TB treatment was 40.0% and 34.3% among the participants who were aware and unaware about the complications of non-adherence to TB treatment ruled out ignorance of the disease as a predisposing factor to non-adherence to TB treatment (Table 5).

Contrary to this study, Woimo, *et al*. (2017), Gube, et al. (2018) and Mekonnen, & Azagew, 2018) demonstrated that poor knowledge about TB transmission was associated with treatment defaulting.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The rate of adherence to TB treatment was reported at 37.5%. The factors negatively affecting adherence to TB treatment among HIV positive patients accessing healthcare services at Mengo hospital were more among groups that reported forgetfulness to take TB medication (62.5% vs 37.5%), being too busy (90% vs 5.3%), stigma (77.8% vs 54.7%), alcohol consumption (73.1% vs 58.5%), age of 30 to 49 years, and male gender (66.7% vs 33.3%), though having someone to remind patients to take their anti-TB drugs promoted adherence to TB treatment (67.5% vs 7.5%).

6.2 Recommendations

- Need for continued sensitization of masses of people about TB and adherence to TB drugs since TB is a curable disease which needs to be treated early enough to avoid complications. This will minimize the stigma associated with the disease among the community members.
- Mengo Hospital through its outreach programmes should strengthen support supervision and improve counselling in order to increase adherence and minimize stigma associated with TB treatment.
- Patients should be encouraged to open up with their family members by way of counselling in order to minimize stigma associated with TB which will in turn improve adherence to TB treatment.
- Patients should be encouraged to have a treatment calendar to avoid forgetfulness.

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APPENDIX I: CLIENT CONSENT FORM

I am **Webombesa Sarah,** a final year student undertaking a training for the award of a degree in Biomedical Laboratory Technology of Makerere University. I am conducting this as an academic study, to be used as a partial requirement for the degree stated above. The study is about the adherence and factors associated with it to TB treatment among HIV patients accessing healthcare services at Mengo hospital.

Risks for taking part in the study

There aren't any foreseen risks of taking part in this study but you will get a little bit of inconvenience to get us a sputum specimen for laboratory analysis.

Benefits from the study

There is no direct financial benefit from this study but you will be able to access free screening for TB resistance and if you are found to have it, a doctor will be notified so that you can get treatment for better health outcomes.

Kindly spare a few minutes and answer questions regarding this topic. Please note that the information you share with us will be kept confidentially and your identity will remain unknown because we don't need your names for this study. Your participation in this study is voluntary and you are free to object to the study or withdraw from it at any point in time if you so wish and stillbe able to access treatment from this facility without any discrimination.

Client's consent

I have been reliably informed about the above-mentioned study to which I have freely accepted to take part in. I have been informed that I am also free to withdraw from it at any time if I so wish but still remain eligible to receiving the services at Mengo hospital.

I have also been told that the study requires me to answer some questions and to give a sample of sputum for TB screening. I have willingly accepted to take part in it and also understand that the information I give in this study will be treated with strict confidentiality. In case of abnormality in the results, they will be given to my doctor for better management of my health.

Signature/Thumbprint …… **Date** ……

Respondent

APPENDIX II: QUESTIONNAIRE

Topic: Adherence and factors associated with it to TB treatment among HIV patients accessing healthcare services from Mengo hospital

Instructions to respondents

- Answer questions under here by ticking against the answer of your choice or filling it in the space provided alongside the question
- Be as sincere as possible when answering the questions in this questionnaire because all answers are correct depending on one's circumstances

Part One. Demographics of study participants

1. What is your sex?
    a) Male
    b) Female
2. How old are you?
    a) Less than 10 years
    b) 10 to 29 years
    c) 30 to 49 years
    d) 50 years and above
3. What is your marital status?
    a) Married
    b) Single
    c) Separated/divorced
    d) Widowed
    e) Still a child

Part two: Rate of adherence to TB treatment among HIV positive patients accessing healthcare services at Mengo hospital

4. Have you ever run out of drugs for TB treatment and you missed taking the drugs on any one occasion?
    a) Yes
    b) No
5. Have you skipped taking TB medicines?
    a) Yes, once
    b) Yes, a number of times
    c) Never

Part three: Factors affecting adherence to TB treatment HIV positive patients accessing healthcare services at Mengo hospital

6. Have you ever failed to go for drug refilling because you feared rudeness or unbecoming behavior from a health worker if you went to the health centre?
    a) Yes
    b) No
7. Have ever failed to take medication because you felt that the health worker wasn't thorough in the way they interacted with you while you were at the hospital?
    a) Yes
    b) No

8. Have you ever failed to go for a drug refill for TB treatment because you feared waiting too long or spending a long time in the health centre or hospital?
    a) Yes
    b) No
9. Have you ever missed taking medication for TB because you felt that you weren't given enough information about it?
    a) Yes
    b) No
10. Have you ever skipped taking TB treatment because the drugs gave you undesired effects?
    a) Yes
    b) No
11. Have you ever felt tired of taking TB medicines that it made you miss taking a dose or two?
    a) Yes
    b) No
12. Do you have another long-standing illness (like diabetes or high blood pressure, etc) for which you are getting treatment which could have made you tired of taking medicines that you had to miss taking TB drugs at one point in time?
    a) Yes
    b) No

13. Do you smoke cigarettes?

    a) Yes, and I have ever missed taking TB treatment

    b) Yes, but I have never missed taking TB treatment

    c) No

14. Is TB curable when medicines are taken properly?

    a) Yes

    b) No

15. Have you ever forgotten taking your TB medicines and skipped the treatment?

    a) Yes, once

    b) Yes, a number of times

    c) Never

16. What is your highest level of education attained?

    a) Never went to school

    b) Still school going

    c) Stopped in primary school

    d) Stopped in secondary school

    e) Attained tertiary level of education

17. Do you have anyone who reminds you to take medicines for TB treatment?

    a) Yes

    b) No

18. Do you have any mental illness for which you are being treated?

    a) Yes

    b) No

19. Do you have enough food to take daily?
    a) Yes, always
    b) Yes, sometimes
    c) No
20. How would you rate your income with regard to helping you get basic things in life like food, medicines, shelter and clothing?
    a) More than sufficient
    b) Just sufficient
    c) Insufficient
    d) Very insufficient
21. How would you describe your working schedule?
    a) Very busy
    b) Busy
    c) Not busy
22. Do you fear people around you to know that you are on TB treatment?
    a) Yes
    b) No
23. When you feel well enough, will you stop taking the TB treatment even before completing the time recommended by the doctor?
    a) Yes
    b) No

24. Do you drink alcohol?

    a) Yes

    b) No

25. Are you a widow or widower?

    a) Yes

    b) No

26. How far do you live from Mengo hospital?

    a) Less than 5 km

    b) 5 to 10 km

    c) More than 10 km

27. How is TB spread from one person to the next?

    ……

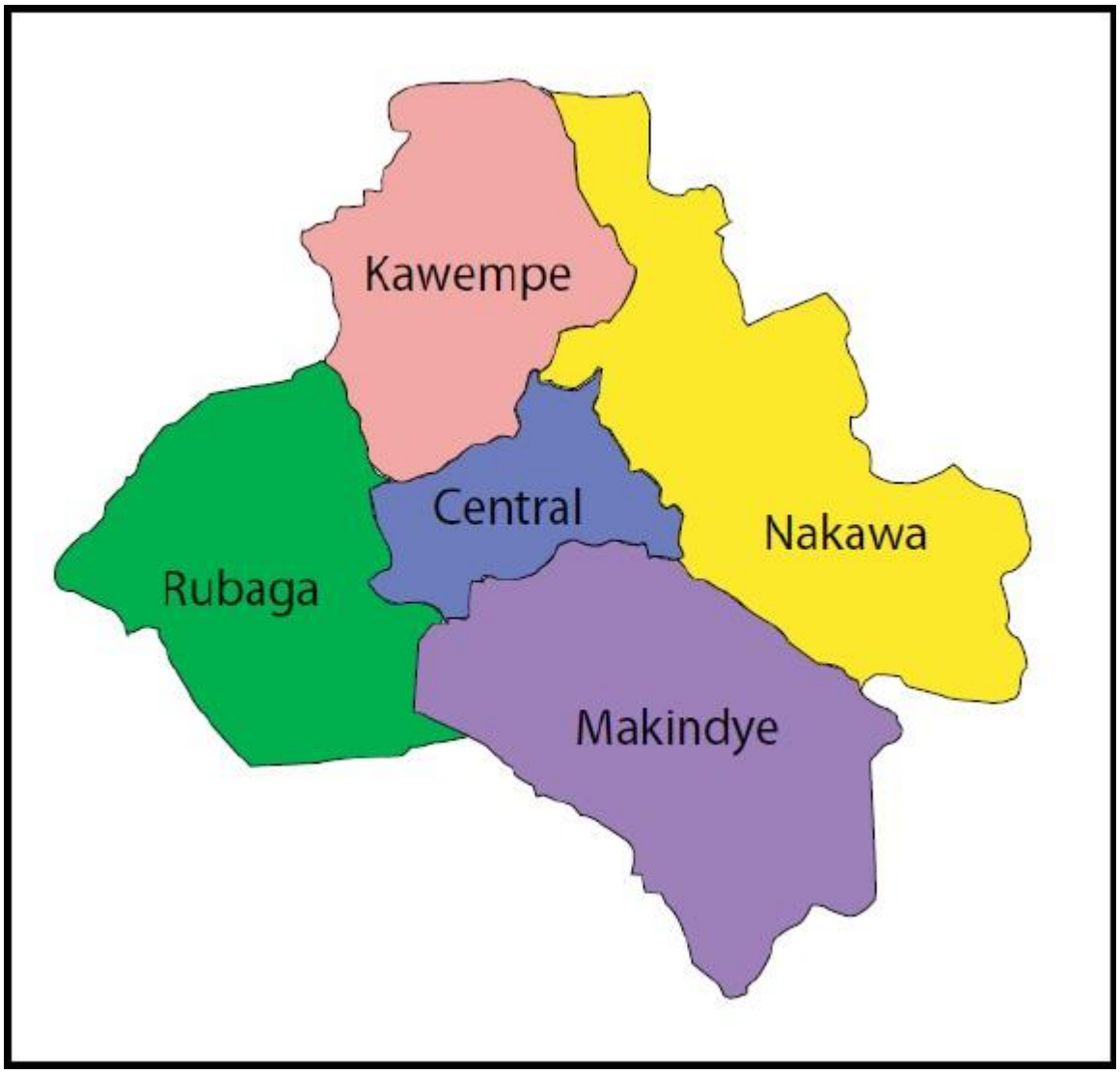
28. If TB treatment is not completed, what might happen to the affected person?

    ……

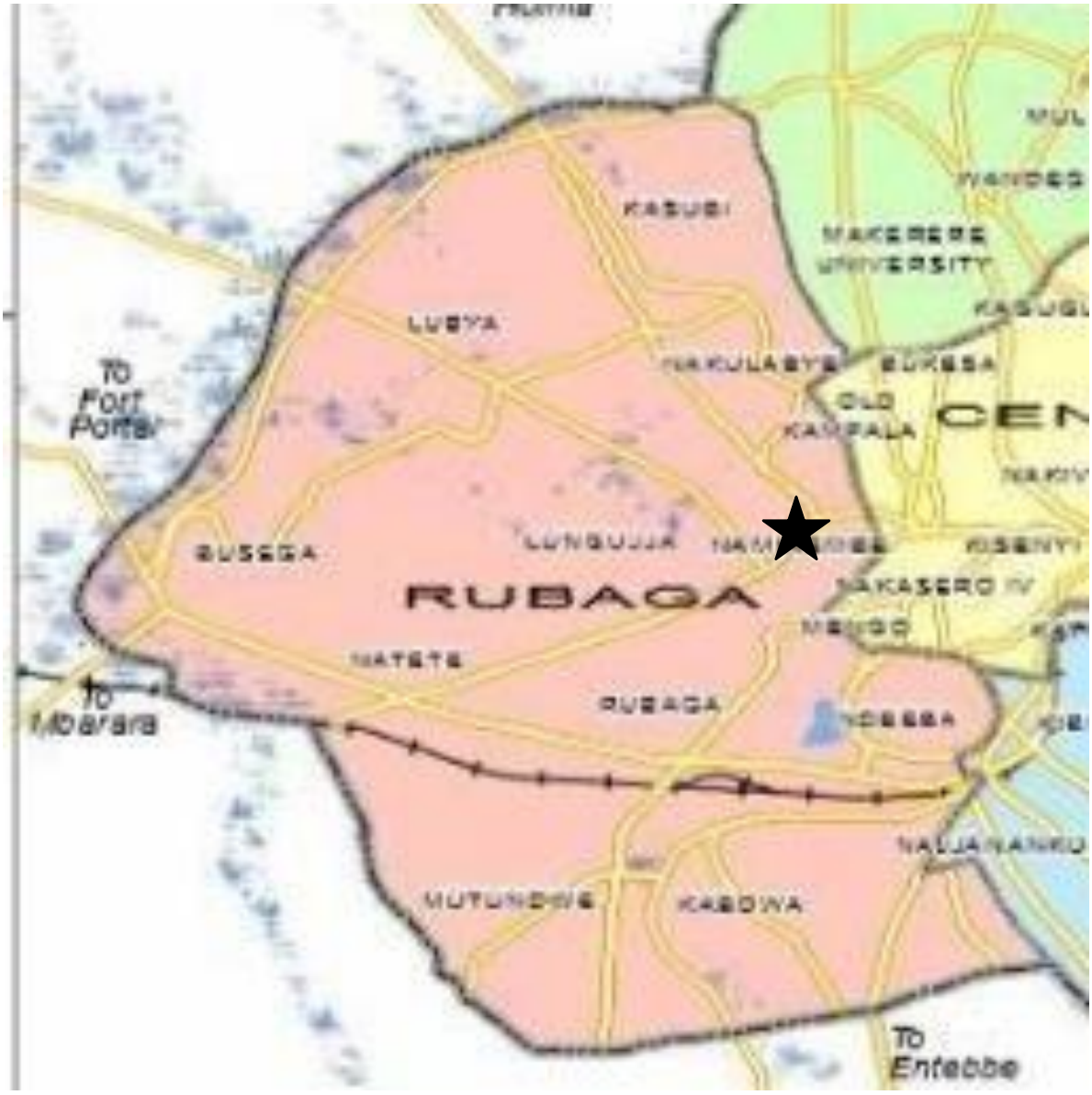
APPENDIX III: RESEARCH APPROVAL LETTER

APPENDIX IV: MAP OF UGANDA SHOWING LOCATION OF KAMPALA DISTRICT

APPENDIX V: MAP OF KAMPALA SHOWING RUBAGA DIVISION



APPENDIX VI: MAP OF RUBAGA DIVISION SHOWING LOCATION OF MENGO HOSPITAL



Key

★ Location of Mengo Hospital