A Study on the Prevalence of Kidney Dysfunction and Associated Risk Factors among ART-Naïve HIV-1 infected Adults at the University Teaching Hospital in Lusaka, Zambia

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A dissertation submitted to the University of Zambia, School of Medicine, in partial fulfillment of the requirement for the award of Master of Medicine (MMed), Internal Medicine Degree.

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DEDICATION

This research work is dedicated to my dear wife Judith Ziba and our dear children Wongani, Kutemwa and Wanase.

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DECLARATION

I, Simon M. Tembo, do hereby declare that this dissertation is my own original work. It has been presented in accordance with the guidelines for the MMed dissertation of the University of Zambia. It has not been submitted before for any degree or examination in any other University.

Signed: ..... Date: .....Simon M Tembo (Candidate)

Supervisor: I have read this dissertation and approved it for examination.

Dr. Aggrey Mweemba Signature: ..... Date: .....

CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of Simon M Tembo in partial fulfilment of the requirement for the award of the Master of Medicine (MMED) in Internal Medicine by the University of Zambia.

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ABSTRACT

Background: Chronic HIV infection is associated with renal complications including renal dysfunction. Risk factors found in literature for kidney disease in the HIV population include hypertension, diabetes mellitus, cardiovascular disease, low CD4 count, high viral load, hepatitis C virus co-infection, hypoalbuminemia, and a family history of CKD, black race, nephrotoxic drugs including antiretroviral medication. Other factors implicated being underweight, obesity, herbal medication use, chronic NSAID use. No local studies have been done to validate these risk factors in our ART naïve HIV infected adult population.

General objective: To determine the prevalence of renal dysfunction and associated risk factors in ART naïve HIV infected adults at the University Teaching Hospital, Lusaka.

Methods: This was a cross sectional analytical study which enrolled 206 participants from outpatient care service points and from the inpatient wards. A structured questionnaire was used to collect data and blood and urine samples collected for tests. Data was entered onto a Microsoft office excel spread sheet, and analysed using STATA version 13. We first looked at the proportion of renal dysfunction among the participants. We then investigated the association between the dependent variable and each independent variable using chi square. All variables that were significant and those variables that are known in literature to be associated with renal dysfunction were included in the logistic regression. A backward stepwise regression was used to come up with a model for our study.

Results: The prevalence of renal dysfunction was 24.76%. The mean age for the whole sample population was 36.62 (renal=37.53 and non-renal 35.47). The study population comprised more females (54.63%) than males. Hypertension OR=2.63, (95% CI 1.11, 6.12) was the only factor found to be predictive of renal dysfunction.

Conclusion: The prevalence of renal dysfunction among ART naïve HIV infected adults was high. Hypertension was the only factor found to be predictive of renal dysfunction.

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LIST OF ABREVIATIONS AND ACRONYMS

AKI	-	Acute Kidney Injury
AIDC	-	Adult Infectious Disease Center
ACEI	-	Angiotensin Converting Enzyme Inhibitors
AMEU	-	Adult Medical Emergency Unit
ARB	-	Angiotensin Receptor Blocker
ART	-	Anti-Retroviral Therapy
AZT	-	Zidovudine
cART	-	Combination Anti-Retroviral Therapy
CKD	-	Chronic Kidney Disease
DM	-	Diabetes Mellitus
ESRD	-	End Stage Renal Disease
eGFR	-	Estimated Glomerular Filtration Rate
GFR	-	Glomerular Filtration Rate
HAART	-	Highly Active Anti-Retroviral Therapy
HIVAN	-	HIV Associated Nephropathy
HIVICK	-	HIV Immune Complex Kidney Disease
HR	-	Hazard Ratio
HTN	-	Hypertension
HIV	-	Human Immunodeficiency Virus
MAW	-	Medical Admission Ward
NSAID	-	Non-Steroidal Anti-Inflammatory Drugs
PEP	-	Post Exposure Prophylaxis
PrEP	-	Pre Exposure Prophylaxis
TDF	-	Tenofovir Disoproxil Fumarate
NRTI	-	Nucleoside Reverse Transcriptase Inhibitor
NNRTI	-	Non Nucleoside Reverse Transcriptase Inhibitor

ESRD	-	End Stage Renal Disease
HAART	-	Highly Active Anti-Retroviral Therapy
OIs	-	Opportunistic Infections
CIDRZ	-	Centre for Infectious Disease Research in Zambia
UTH	-	University Teaching Hospital
PI	-	Principal Investigator
ALT	-	Alanine Aminotransferase
HB	-	Hemoglobin
RPR	-	Rapid Plasma Reaginin
RBS	-	Random Blood Sugar
RNA	-	Ribonucleic Acid
UTH	-	University Teaching Hospital
VCT	-	Voluntary Counselling and Testing

CHAPTER 1 – INTRODUCTION

Since the beginning of the Human Immunodeficiency Virus (HIV) epidemic, almost 78 million people have been infected with the HIV virus and about 39 million people have died of HIV. Globally, 35.0 million [33.2–37.2 million] people were living with HIV as at the end of 2013. An estimated 0.8% of adults aged 15–49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions, Sub-Saharan Africa remains the most severely affected, with nearly 1 in every 20 adults living with HIV and accounting for nearly 71% of the people living with HIV worldwide[1].

Chronic infection with HIV is associated with numerous renal complications[2,3,4]. Risk factors for nephrotoxicity in HIV disease are numerous and depend on underlying individual patient characteristics[5]. Nephropathy in HIV can be attributed to HIV-related and non-HIV-related factors[6]. Non-HIV related factors for kidney disease include hypertension and diabetes mellitus, atherosclerosis, nephrotoxic drugs, primary and secondary nephropathies, hepatitis C virus infection[7]. Renal dysfunction can also be caused by direct HIV related factors such as HIV associated nephropathy (HIVAN) and HIV Immune Complex Disease (HIVICK)[8], HIV thrombotic microangiopathy. Renal dysfunction can also be caused by treatment with nephrotoxic antiretroviral agents such as Tenofovir Disoproxil Fumarate (TDF), Atazanavir and Indinavir[9]. Nephrotoxic drugs used to treat opportunistic infections such as Amphotericin B used in the treatment of cryptococcal meningitis can also cause renal dysfunction.

Thus, the vast etiologic spectrum of renal disease in HIV-infected patients is daunting. Studies done to assess the risk factors for renal dysfunction in HIV have identified risk factors that have been found to positively contribute to the development of renal dysfunction. In addition, the Ministry of Health has developed a screening algorithm for renal dysfunction in the HIV population initiating first line combination Antiretroviral Therapy (cART) for the purpose of guiding treatment with nephrotoxic Anti-Retroviral drugs such as TDF[10]. The list of factors in this screening algorithm was generated by data from studies done outside of Zambia.

As far as we know, there exists no validated data on the risk factors associated with renal dysfunction in our ART naïve HIV infected population.

This validation study was undertaken to analyze risk factors for renal dysfunction in ART naïve HIV-1 infected adults in order to determine the predictor's kidney dysfunction.

CHAPTER 2 – LITERATURE REVIEW

The prevalence of renal dysfunction among HIV infected individuals is variable in different population groups. A review of the prevalence and risk factors for chronic kidney disease (CKD) in HIV infection by Naicker et al[11] reported prevalence of CKD in HIV-infected patients ranges from 6 - 48.5%. They also found factors with high risk for development of chronic kidney disease with HIV infection are black race, CD4 count < 200 cells/mm3, HIV RNA levels > 4,000 copies/ml, family history of CKD and presence of diabetes mellitus, hypertension and hepatitis C co-infection.

Most available data on HIV-associated kidney disease are derived from African-Americans. The prevalence of renal dysfunction from this review is as tabulated in the table below;

Table 1*. Prevalence of CKD in HIV

Country	Percentage (%)
United States	11
Europe, Israel and Argentina	3.5 – 4.7
Hong Kong	18
Brazil	1.1-5.6
Switzerland	18
India	27
Iran	12.3
South Africa	5.5-6
Nigeria	38
Cote d'Ivoire	26
Tanzania	28.4
Kenya	25
Uganda	20-48.5
Zambia	33.5

** Naicker et al[11]*

Zambia has a very high burden of renal dysfunction, third highest overall surpassed only by Uganda and Nigeria.

Mulenga et al[12] found that in Zambians in Lusaka, the prevalence of kidney disease in the HIV infected population is 33.5%. This was among HIV infected adults initiating first line cART. They found that renal dysfunction was highly prevalent among those starting ART. Risk for mortality at or before 90 days was elevated for those with mildly [adjusted hazard ratio (AHR)1⁄41.7; 95% confidence interval (95% CI)1⁄41.5–1.9], moderately (AHR 1⁄4 2.3; 95% CI 1⁄4 2.0 – 2.7), and severely (AHR 1⁄4 4.3; 95% CI 1⁄4 3.1 – 5.5) reduced creatinine clearance.

A large study which looked at the risk factors for kidney dysfunction in HIV and also went further to stratify the risks was the **veterans' study**[13]. This Retrospective cohort evaluated 22,156 HIV-infected veterans without pre-existing End Stage Renal Disease (ESRD) between 1996 and 2004 found 366 cases of ESRD occurred. Factors associated independently with ESRD risk were **Hypertension**, **Diabetes Mellitus**, **Cardiovascular disease, CD4 lymphocyte count <200 cells/µL**, **HIV viral load ≥30,000 copies/mL**, **Hepatitis C virus co-infection**, and **Hypoalbuminemia** <3.5mg/dL. The limitation of this study is that its results may not be generalizable to female and nonveteran populations.

HIV can cause direct injury to the kidneys as manifested by HIV-associated nephropathy (HIVAN). This entity was described before the era of HAART but continues to be a significant problem despite the advent of HAART[14,15,16]. HIVAN is the third leading cause of ESRD in African Americans who are also 18 times more likely to progress to ESRD than their white American counterparts[17]. Fabian et al[18] conducted a study among HIV infected patients in Durban, South Africa in which they screened HIV patients for proteinuria and microalbuminuria. They found persistent proteinuria in 6%; of these 72.4% had HIVAN and the prevalence of HIVAN in those with persistent microalbuminuria was 85.7%.

Hypertension and diabetes mellitus are the most common causes of CKD worldwide both in the general population and in HIV infected individuals[19]. Robert N Peck et al[20] compared Hypertension, kidney disease, HIV and antiretroviral therapy among Tanzanian adults and found that HIV-infected adults on ART >2 years had two-fold greater odds of hypertension than HIV-

negative controls. HIV-infected adults with hypertension were rarely aware of their diagnosis but often have evidence of kidney disease.

The risk of kidney disease in HIV infected individuals increases in patients with diabetes mellitus compared to the general population. Medapalli R et al[21] studied the association of kidney disease in patients with HIV and diabetes mellitus. They found that Compared to people without HIV or diabetes, the risk of chronic kidney disease was increased for patients with diabetes alone (HR = 2.48; 95% CI, 2.19-2.80) and HIV only (HR = 2.80; 95% CI, 2.50-3.15). However, the risk was over four-fold higher for people with both HIV and diabetes (HR = 4.47; 95% CI, 3.87-5.17).

Cheung et al[22] studied the Prevalence of chronic kidney disease in Chinese HIV-infected patients. Among the 322 participants in the study, CKD was found to be significantly ($P < 0.05$) associated with older age, hypertension, diabetes mellitus, use of indinavir therapy and lower CD4 count (both absolute and <100 cells/ml) and peak viral load 100 000 copies/ml.

Black race is a well-documented risk factor of kidney disease. The U.S. Renal Data System (USRDS) reported that, of the incident patients initiating chronic dialysis between January 1992 and June 1997, 1% had HIVAN[23] and 87% of these were African-American[17].

A study by Banda et al[24] at the University Teaching Hospital in Lusaka, Zambia, on the prevalence and risk factors of kidney dysfunction among HIV positive and HIV negative adults found a prevalence of 42% among the HIV infected group compared to 27% in the controls. Factors associated with renal dysfunction were vomiting and WHO stage III. Among the HIV negative group predictors of renal dysfunction were hypertension, vomiting and the use of ACEIs.

The 2014 Zambia HIV treatment guidelines highlights risk factors for renal dysfunction[10]. These include **hypertension, black race, hypotension, diabetes mellitus, Body Mass Index (BMI)**

<18.5, **persistent hematuria, persistent proteinuria**, **chronic diarrhea**, **chronic NSAID use** and acutely ill patients or recent hospitalization. The list of factors in this screening algorithm have not been locally validated to ascertain their individual and/or collective contribution to renal dysfunction in our HIV infected population.

Identifiable Risk Factors

It follows from the above studies above and the current screening algorithm of the Zambia consolidated HIV treatment guidelines that the risk factors identified for the development of chronic kidney disease are **hypertension, diabetes mellitus, cardiovascular disease, low CD4 count, high viral load, hepatitis C virus co-infection, hypoalbuminemia, and a family history of CKD, black race, high BMI, Herbal Medication, Chronic NSAID use, Chronic/persistent diarrhea**. This study was to test the validity of the association of these factors to the renal dysfunction in our HIV infected population.

CHAPTER 3 – METHODOLOGY

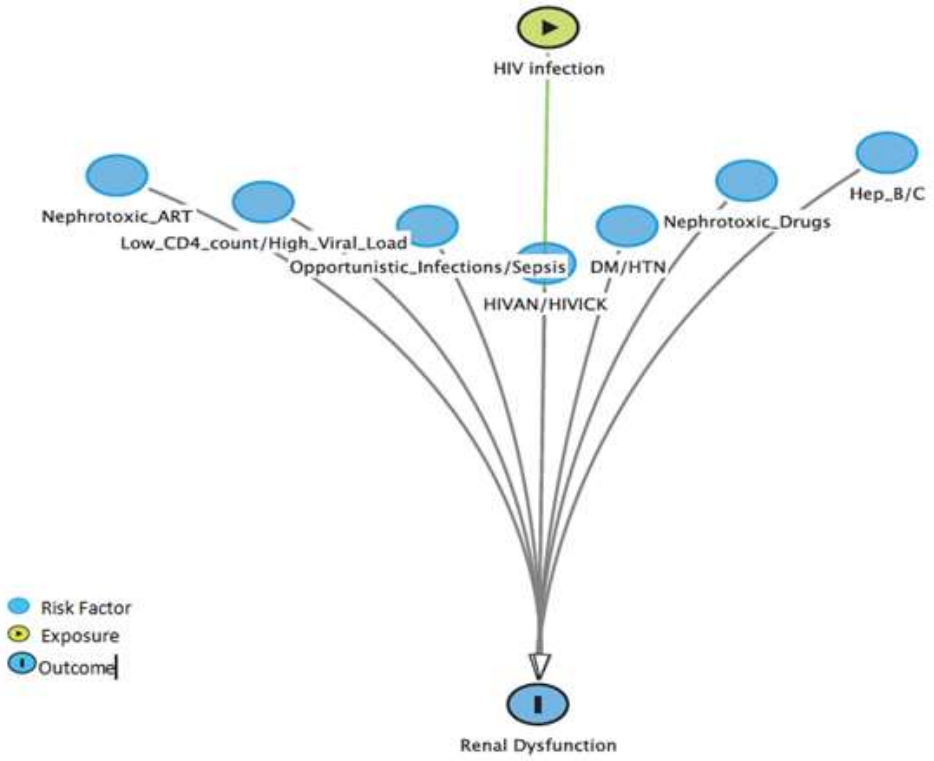
3.1 Statement of the Problem

Kidney dysfunction is highly prevalent in HIV disease with variable causes and risk factors. It is important to characterize the population at risk of kidney dysfunction based on identifiable factors in HIV infection in order to optimize prevention and management strategies.

3.2 The Conceptual Framework

Factors responsible for kidney dysfunction in the setting of HIV infection are many. Their independent and compound contribution to this risk in our population has not been studied as far we know. As shown in the diagram below, there are HIV related factors and non-HIV related factors. It can be postulated that the more risk factors an individual has, the higher the risk of having kidney dysfunction. The common exposure in this case being HIV infection with the associated risk factors leading to kidney dysfunction.

Fig 1: Conceptual framework



3.3 Research Question

What is the prevalence and risk factors associated with kidney dysfunction in ART naïve HIV-1 infected adults at the University Teaching Hospital in Lusaka, Zambia?

3.4 Rationale

As far as we are aware, this is the first study examining the question of the risk of developing renal dysfunction in the ART naïve HIV-1 infected population in Zambia with identifiable risk factors. This study looked at the prevalence of renal dysfunction and the risk factors associated with it in ART naïve adults whereas the other two Zambian studies looked at other aspects. Mulenga et al looked at the association between baseline renal dysfunction and mortality in adults initiating ART but did not examine risk factors for renal dysfunction. Although Banda et al studied risk factors for renal dysfunction in adults, his respondents were a mixed group comprising both ART naïve and ART exposed individuals. It is hoped that the findings of this study will add to the current knowledge base with regards to the understanding of the extent of the risk of developing renal dysfunction with the identifiable risk factors and will guide current

practice guidelines with locally generated evidence. Current screening protocols are based on evidence from other countries and continents with different population characteristics.

3.5 The Null Hypothesis

There are no risk factors associated with kidney dysfunction in ART naive HIV-1 infected individuals.

3.6 The Alternate Hypothesis

There are risk factors associated with kidney dysfunction in ART naïve HIV-1 infected individuals.

3.7 General Objective

To determine the prevalence and associated risk factors of kidney dysfunction among HIV infected ART naïve individuals seen at UTH in Lusaka, Zambia.

3.8 Specific Objectives

3.8.1 To determine the prevalence of kidney dysfunction in HIV infected individuals.

3.8.2 To determine the risk of kidney dysfunction among HIV infected individuals with each identifiable risk factor.

3.8.3 To determine the predictors of Kidney dysfunction in HIV.

3.9 Study Justification

This was a validation study of risk factors identified from previous studies as well as those that are listed in the Zambia consolidated HIV treatment guidelines of 2013 on the screening algorithm for renal dysfunction. These risk factors were tested to see if they are applicable in our HIV infected population specifically in the ART naïve individuals. It is also hoped that the findings of this study will add to the body of knowledge and inform clinical practice.

3.10 Study design

This was a Cross Sectional Analytical study conducted between 30th November 2015 and 30th April 2016.

3.11 Study site

The study site was the University Teaching Hospital (UTH) which is the largest referral hospital in Zambia. It has a total in-patient bed capacity of 1600 and specialized out-patient clinics. Patients in the Department of Internal Medicine are admitted via the Adult Medical Emergency Unit (AMEU) into the Medical Admission Ward (MAW) for onward transfer to the main medical wards. Patients are also admitted via the out-patient HIV-clinic at the Adult Infectious Diseases Clinic (AIDC). This clinic handles HIV-infected patients (both treatment-naive and treatment- experienced) referred from the various adult in-patient facilities as well as from outside the hospital.

Being the main points of admission of HIV-infected patients to the UTH, AMEU, MAW and AIDC were selected as sites for recruitment of patients for the study. Other points of enrolment into the study were the main medical wards and the Voluntary Counselling and Testing (VCT) center located at the casualty entrance.

3.12 Study population

The target population for the study was HIV infected adults who were ART naïve.

3.13 Eligibility Criteria

Table 2: Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
ART naïve HIV infected in and out Patients With/without kidney dysfunction	ART exposure
Age > 16 years	Pregnancy

3.14 Sampling and sample size calculation

The sample size for the study was calculated using the formula for prevalence studies which is;

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

Where;
n = sample size,
Z = Z statistic for a level of confidence. For the level of confidence of 95%, Z value is 1.96
P = expected prevalence (in this case 33.5%, P = 0.335), derived from Mulenga et al's study.
d = precision (in proportion of one; if 5%, d = 0.05).

Thus, the calculated sample size was 342. Study respondents were recruited by consecutive enrolment at the recruitment points.

3.15 Recruitment Protocol

Patient recruitment was conducted during working hours from Mondays to Fridays during working hours from 08:00 hours to 16:00 hours at the Adult Infectious Disease Center, Adult Medical Emergency Unit, medical admission ward and medical wards by the principal investigator and trained research assistants. Four research assistants were trained in data collection methods and a pilot study of the data collection tools was performed before the full roll out of the recruitment process. Each research assistant administered five questionnaires during the pilot study to help minimize bias during the actual study. Screening and enrolment was done in the study sites as per eligibility criteria. All eligible participants were enrolled into the study. Written informed Consent was sought from the patient or the next of kin.

Recruitment into the study was done by consecutive enrolment guided firstly by the presence of documented HIV sero-status. A structured questionnaire was administered to all study respondents by a member of the research team to obtain information on baseline participant characteristics such as age, sex, household, socio-economic position and education level attained. Initial data regarding the patients' HIV status was collected with a history of ART to guide eligibility into the study. This information was entered on the initial data sheet and determination was made as to which respondents were eligible for enrolment. Respondents aged 16 years and above with documented HIV seropositive status who were ART naïve were enrolled into the study and made to complete answering the rest of the questionnaire and also had blood and urine samples collected to complete the recruitment process. Most of the respondents had already tested for HIV on presentation as they were either referred from the local clinics further management at UTH or they had presented themselves at the voluntary counselling and testing center. Others had been tested for HIV as part of the Provider Initiated Counselling and testing process after presenting with AIDS associated or AIDS defining pathologies.

The respondents Blood Pressure and weight were measured using a sphygmanometer and weighing scale respectively. Height was measured in standing upright position.

A total of 1,328 respondents were approached by the principal investigator and his research assistants during the five months of recruitment out of which 360 respondents were deemed eligible for enrolment into the study.

Quality of data collected was monitored through random checks on the research assistants by direct observation on how they were collecting data and checking of the collected data for completeness at the end of each day.

3.16 Study Variables

Table 3: study variables

Independent Variables	Scale measurement	Dependent Variable
Age	Continuous	Renal Dysfunction (yes/no) Defined as CrCl<90ml/kg/m2
CD4 Count	Categorical	
Viral Load	Continuous	
Chronic diarrhea	Categorical	
Current diarrhea	Categorical	
Random Blood Sugar	Continuous	
Blood Pressure	Continuous	
Hepatitis C	Nominal	
Hypoalbuminemia	Continuous	
Cardiovascular Disease	Nominal	

BMI	Categorical	
Herbal Medication	Nominal	
NSAIDs use	Nominal	
Hematuria	Continuous	
Proteinuria	Continuous	

3.17 Laboratory

Peripheral venous blood samples were collected for full blood count, creatinine, CD4 T- cell count, Viral Load, Hepatitis C antibody, Hepatitis B surface Antigen, Albumin levels, Rapid Plasma Reagin (RPR). Blood was tested for anti - HIV antibodies using two sequential rapid tests; Alere Determine^{TM} and Unigold^{TM}. Serum Creatinine were processed using the Beck Man Coulter AU480^{TM} with Beck Man Coulter AU480 reagents^{TM}. CD4 T-cell count was performed using flow cytometry. The process was done using a Becton Dickinson Facs Count machine with BD Facs Count ReagentTM. Hematology panel was processed with Sysmex 2000 and micros-60 machines. Pin prick was used to test for random blood sugar using portable point of care glucometer. Urine samples were collected in sterile urine containers for an on the spot urine analysis of Proteinuria, Hematuria.

3.18 Data Analysis

The collected data was analysed using Stata version 13. Descriptive statistics were used to show the baseline characteristics. We used a chi square test and or fishers exact where necessary to determine the association between the dependent and independent variables. In the bivariate logistic regression, a P-value of 0.2 was used to determine possible predictors or factors associated with kidney dysfunction in ART naïve HIV infected individuals. Multivariate logistic regression was used to determine predictors of kidney dysfunction with P-Value set at 0.05.

3.19 Ethical Considerations

All necessary permissions for the study were obtained from the relevant authorities and bodies.

These included the school of medicine and the university teaching hospital. The study was approved by the Ethics Committee of ERES Converge approval number **2015-Feb-010**. Written informed consent was obtained from all study participants. The purpose of the study was explained to them and they were informed of their right to opt-out without compromise to their medical care. None of the participants received remuneration. No related serious adverse events were recorded during the study.

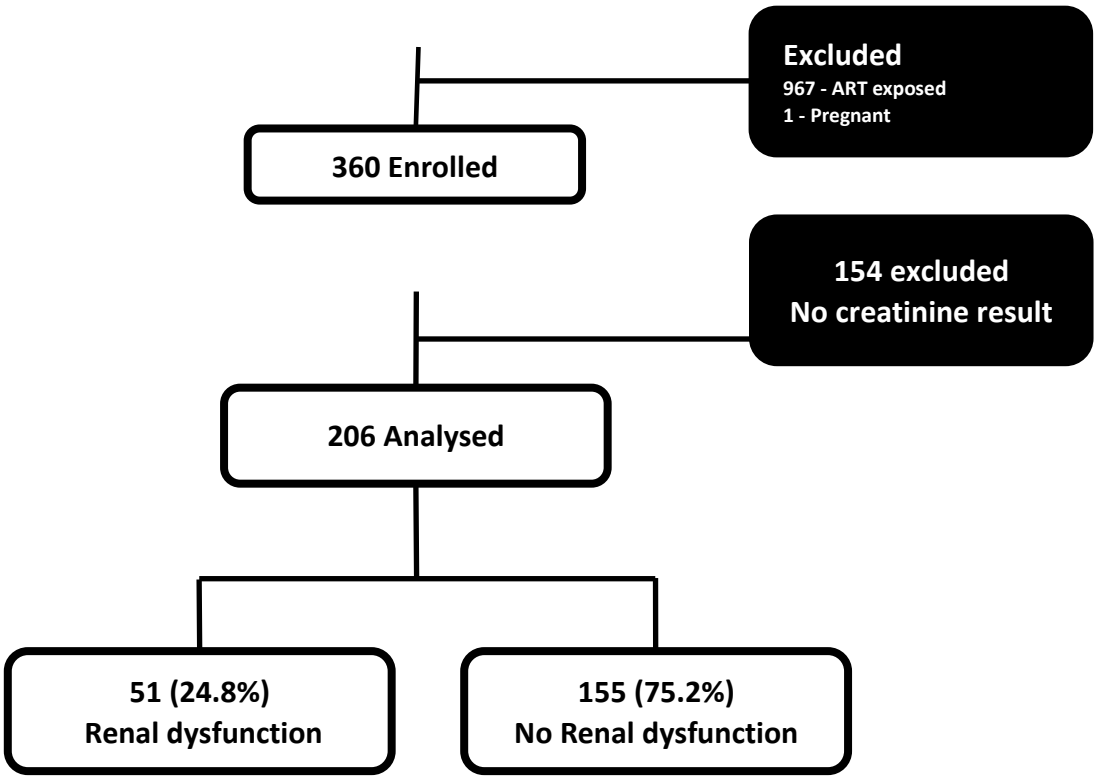
Information obtained has been kept under lock and key. Results of investigations have been availed to patients' attending physicians for the purpose of clinical management. Otherwise, access to this information has been restricted to the Principal Investigator and the Study Supervisors. Patient identity numbers and not names were used for confidentiality.

CHAPTER FOUR – RESULTS

4.1 Recruitment Process

We enrolled 360 participants between 30th November 2015 and 30th April, 2016, who presented to UTH through the adult medical emergency unit (AMEU), the medical admission ward (MAW), the inpatient wards and the adult infectious disease center (AIDC). A quarter (n=51) of participants had renal dysfunction. The majority of the patients (60.8%) were recruited from the outpatient department of the Hospital. In the study population 70.8% had more than secondary education level. There were more married participants accounting for 54.4% of the study population.

Figure 3: Patient Enrolment



4.2 Baseline Characteristics

Table 1 below shows the demographic characteristics of the study population. The study had a mean age of 36.6 years with more females (54.6%) than males. The majority of patients with renal dysfunction were between 25 and 49 years accounting for 68.6% of participants with renal dysfunction. The mean age of the respondents with renal dysfunction was 37.7 years (SD=10.9) while that of those without renal dysfunction was 35.9 years (SD=11.41). About two thirds (65.5%) of the study population were below 40 years.

The median systolic blood pressure was 115 mmHg for the whole population with an interquartile range [IQR] of [130-103.5] while that of the diastolic blood pressure was 74 mmHg with an [IQR] of [83-67].

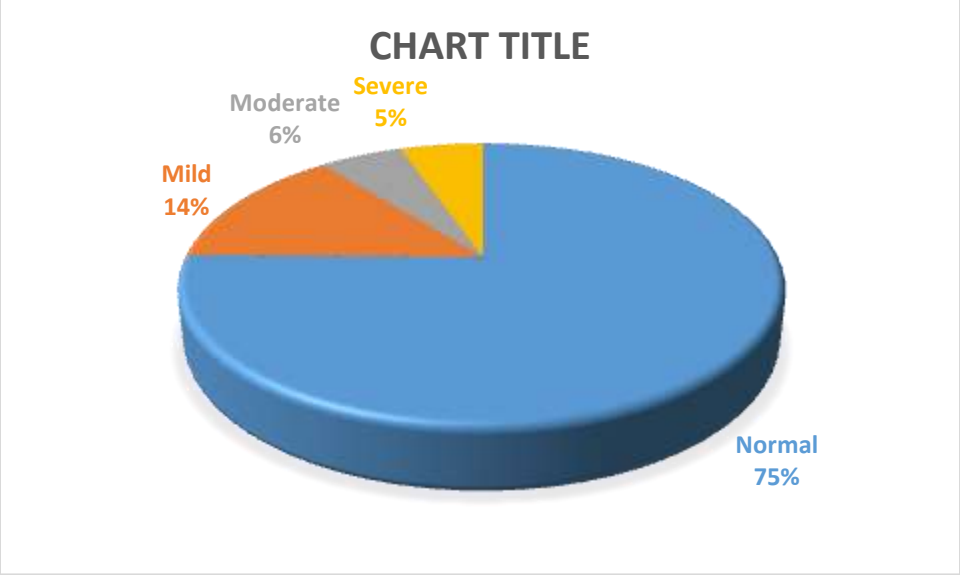
Table 5. Background laboratory characteristics

Characteristic	Mean [Median]
Serum Albumin (g/L), **Mean (SD)**	33.8 (7.9)
WCC (10^9/L), **Mean (SD)**	5.0 (2.8)

Hemoglobin (g/dL), **Median [IQR]**	10.5 [8.5 – 12.4]
Platelets (10^9/L), **Mean (SD)**	260 (134)
Creatinine (µmol/L), Mean (SD)	93.9 (120.1)
eGFR (Kgs/m^2), Mean(SD)	137.5 (70.4)
Urea (mmol/L), **Mean (SD)**	3.5 (8.4)
Random Blood Sugar (mmol/L), **Mean (SD)**	5.1 (1.1)
Viral Load (copies/ml), **Median [IQR]**	176,827 [39,059 – 581,148]
CD4 count (cells/µL), **Median [IQR]**	134 [79 – 270]

Proportion of Renal Dysfunction

Graph 2: Chart showing Proportion of participants with Renal dysfunction



We used published clinical guidelines from the US National Kidney Foundation's Kidney Disease Outcome Quality Initiative (K/DOQI) to categorize renal insufficiency[25]. Creatinine clearance of at least 90 ml/min was considered normal. Individuals with a creatinine clearance of 60 – 89 ml/min (K/DOQI stage 2) were categorized as mild renal insufficiency; 30– 59 ml/min as moderate insufficiency (K/DOQI stage 3); and less than 30 ml/min as severe insufficiency (K/DOQI stage 4 and 5).

4.3 Bivariate Analysis

The bivariate analysis showed that, hypertension (p-value = 0.018), BMI (p-value = 0.124), proteinuria (p-value = 0.167), syphilis (p-value = 0.118), chronic diarrhea (p-value = 0.117) and

current diarrhea (p-value = 0.048) were significantly associated with increased risk of renal dysfunction. We considered these variables as a priority in the multivariate analysis. The p value for the bivariate analysis was set at 0.200.

Table 6. Bivariate analysis

Characteristic	**No Kidney Disease n (%)** 155 (75.24)	**Kidney Disease n (%)** 51 (24.76)	***P* Value**
Age			0.413
<25 years	22 (14.2)	6 (11.8)	
25 – 49 years	114 (73.6)	35 (68.6)	
≥ 50 years	19 (12.3)	10 (19.6)	
Gender			0.309
Male	73 (47.4)	20 (39.2)	
Female	81 (52.6)	31 (60.8)	
Education			0.378
None	2 (1.3)	0 (0.0)	
Primary	43 (27.7)	15 (29.4)	
Secondary	85 (54.8)	23 (45.1)	
Tertiary	25 (16.1)	13 (25.5)	
Marital status			0.250
Married	87 (56.1)	25 (49.0)	
Divorced/Separated	25 (16.1)	15 (29.4)	
Widowed	17 (11.0)	4 (7.8)	
Single	26 (16.8)	7 (13.7)	
Location			0.741
In-Patients	59 (38.6)	21 (41.2)	
Out-Patients	94 (61.4)	30 (58.2)	
Occupation			0.725
Formal Employment	45 (29.0)	19 (37.3)	
Informal Employment	62 (40.0)	20 (39.2)	
Unemployed	26 (16.8)	7 (13.7)	
Student	5 (3.2)	2 (3.9)	
Housewife	17 (11.0)	3 (5.9)	
Smoking			0.521
Never smoked	110 (71.0)	38 (74.5)	
Daily Smoker	12 (7.7)	1 (2.0)	
Occasional smoker	4 (2.6)	1 (2.0)	
Ex-smoker	29 (18.7)	11 (21.6)	

Alcohol Consumption			0.825
Never drunk	53 (34.2)	20 (39.2)	
Daily drinker	12 (7.7)	4 (7.8)	
Occasional drinker	40 (25.8)	14 (27.5)	
Ex-Drinker	50 (32.3)	13 (25.49)	
Hypertension			**0.018****
No	132 (88.0)	37 (74.0)	
Yes	18 (12.0)	13 (26.0)	
Body Mass Index (BMI)			**0.124***
Under weight	32 (23.4)	9 (19.2)	
Normal weight	79 (57.7)	22 (46.8)	
Over weight	20 (14.6)	10 (21.3)	
Obese	6 (4.4)	6 (12.8)	
Proteinuria			**0.167***
<2+	128 (83.7)	47 (92.2)	
>2+	25 (16.3)	4 (7.8)	
Hematuria			0.710
<2+	146 (95.4)	47 (94.0)	
≥2+	7 (4.6)	3 (6.0)	
CD4 Count			0.749
< 200 cells/μL	35 (38.0)	14 (41.2)	
≥ 200 cells/μL	57 (62.0)	20 (58.8)	
Viral Load			0.538
< 30,000 copies/μL	86 (76.8)	31 (81.6)	
≥ 30,000 copies/μL	26 (23.2)	7 (18.4)	
Hypoalbuminemia (g/L)			0.310
<35	38 (45.8)	9 (60.0)	
>35	45 (54.2)	6 (40.0)	
Syphilis			**0.118***
Negative	47 (78.3)	17 (94.4)	
Positive	13 (21.7)	1 (5.6)	
Diarrhea > 1 Month			**0.117***
No	27 (17.5)	4 (8.0)	
Yes	127 (82.5)	46 (92.0)	

Current Diarrhea			**0.048****
No	18 (12.1)	1 (2.1)	
Yes	131 (87.9)	46 (97.9)	
Diabetes			0.406
No	154 (99.4)	50 (98.0)	
Yes	1 (0.6)	1 (2.0)	
Hepatitis B			**0.061***
No	64 (85.3)	26 (100.0)	
Yes	11 (14.7)	0 (00.0)	
Herbal Medication			0.366
No	86 (57.3)	25 (50.0)	
Yes	64 (42.7)	25 (50.0)	
Herbal Duration Use			**0.164***
< 1 year	82 (92.1)	25 (83.3)	
1 – 3 years	7 (7.9)	4 (13.1)	
> 3 years	0 (0)	1 (3.3)	
NSAID Use			0.642
No	12 (7.7)	5 (9.8)	
Yes	143 (92.3)	46 (90.2)	
NSAID Duration use			1.000
< 3 months	118 (91.5)	37 (92.5)	
3 – 12 months	6 (4.7)	2 (5)	
> 1 year	5 (3.9)	1 (2.5)	

Note: Pearson's chi-square test was used to obtain p values. For frequencies less than 5, fishers exact was used.

*p<0.2, **p<0.05

Table 7. Univariate Logistic regression

Characteristic	**Odds Ratio (OR)**	***P* Value**	**95% CI**
Age			
0 – 24 years	Ref		
25 – 49 years	1.126	0.813	0.423 – 2.996
50 – 74 years	1.930	0.272	0.591 – 6.304
Gender			
Male	Ref		
Female	1.397	0.310	0.733 – 2.663
Marital status			

Married	Ref		
Divorced/Separated	2.088	**0.064**	0.958 – 4.552
Widowed	0.819	0.739	0.254 – 2.655
Single	0.937	0.893	0.364 – 2.412
Enrolment Location			
In-Patients	Ref		
Out-Patients	0.897	0.741	0.470 – 1.710
Occupation			
Formal Employment	Ref		
Informal Employment	0.764	0.473	0.366 – 1.595
Unemployed	0.638	0.374	0.236 – 1.720
Student	0.947	0.951	0.169 – 5.319
Housewife	0.418	0.202	0.110 – 1.595
Smoking			
Never smoked	Ref		
Daily Smoker	0.214	**0.179**	0.030 – 1.918
Occasional smoker	0.724	0.775	0.078 – 6.677
Ex-smoker	1.098	0.816	0.500 – 2.410
Alcohol Consumption			
Never drunk	Ref		
Daily drinker	0.883	0.845	0.255 – 3.062
Occasional drinker	0.928	0.853	0.418 – 2.058
Ex-Drinker	0.689	0.360	0.310 – 1.530
Body Mass Index (Kg/m^2)			
Under weight	Ref		
Normal weight	0.990	0.982	0.412 – 2.381
Over weight	1.778	0.287	0.616 – 5.130
Obese	3.556	**0.066**	0.920 – 13.74
Proteinuria			
< 2+	Ref		
≥ 2+	0.436	**0.141**	0.144 – 1.318
Hematuria			
< 1+	Ref		
≥ 1+	0.913	0.893	0.241 – 3.457
CD4 Count			
< 200 cells/μL	Ref		
≥ 200 cells/μL	0.877	0.749	0.393 – 1.957
Viral Load			
< 30,000 copies/ml	Ref		
≥ 30,000 copies/ml	0.582	0.505	0.118 – 2.863
Hypertension			
No	Ref		
Yes	2.577	**0.021**	**1.156 – 5.741**
Hypoalbuminemia			
No	Ref		

Yes	0.563	0.315	0.184 – 1.725
Syphilis			
No	Ref		
Yes	0.213	**0.150**	0.026 – 1.751
Diarrhea > 1 Month			
No	Ref		
Yes	2.445	**0.112**	0.811 – 7.366
Current Diarrhea			
No	Ref		
Yes	6.321	**0.077**	0.821 – 48.68
Diabetes			
No	Ref		
Yes	0.325	0.429	0.020 – 5.287

4.4 Multivariate Analysis

The multivariate analysis showed that only Hypertension OR=2.63, (95% CI 1.11 – 6.12) was predictive of renal dysfunction.

Table 8. Multivariate Logistic regression

Characteristic	**Odds Ratio (OR)**	***P* Value**	**95% CI**
Hypertension			
No	Ref		
Yes	2.630	**0.027**	**1.115 – 6.199**

CHAPTER FIVE – DISCUSSION

Discussion of Findings

The study found that the prevalence of renal dysfunction in the study population was 24.67% which is lower than reported by Mulenga et al (33.5%)[12] and Banda et al (42%)[24] in previous studies among Zambians. This finding is similar to that found by Fernando et al (24%)[26] in Americans. However, it was much lower than the prevalence observed among Nigerians by Agaba et al (51.8%)[27], Emem et al (38%)[28], and that found among Tanzanians by Janabi et al (28%)[29]. The observed reduction in prevalence could be due to several factors. Mulenga et al[12]

studied the effect of ART on baseline renal insufficiency and mortality in patients initiating ART in outpatients whereas Banda et el[5] was an inpatient study. Our study was both an in and outpatient study which may explain the lower prevalence rate. The other explanation could be change in guidelines (Banda and Mulenga et el studies were conducted when the CD4 threshold for initiating cART was < 350 cells/μL and 200 cells/μL respectively whereas our study was conducted when the threshold was <500copies/μl.

In this study the only **predictor of renal dysfunction was hypertension**. This finding is consistent with findings of the Naicker et al review in south Africa and the veterans study in the USA, which found hypertension to be an independent predictor of renal dysfunction in HIV infected individuals among other risk factors[11,13]. In contrast to our findings, other studies found that hypertension was not a predictor of renal dysfunction[29,30,31,32,33]. Hypertension has been a well-documented traditional risk factor for kidney dysfunction in the general population. The relationship between hypertension and renal dysfunction is cyclic. Hypertension can cause renal dysfunction and vice versa. Connell et al found that approximately 80-85% of patient with chronic kidney disease had hypertension.[34]

In this study, age was not significant predictor of renal dysfunction. This finding is similar to that reported by Ayokunle et al whose mean age was 40.3+/-10.3 years among nigerians[30]. The probable explanation for this finding in our study is that the sample population was a relatively young population with a mean age of 36.62 years. In contrast Wyatt et al who conducted a retrospective study at the Mount Sinai AIDS Center, East Harlem, New York, Crum-Ciamflone et al's study conducted among Americans attending HIV clinics at the Naval Medical Center San Diego (NMCSD) and National Naval Medical Center (NNMC) HIV clinics from June 1, 2004 through June 30, 2005, and Cheung et al among Chinese, all found that older age was associated with renal dysfunction especially in those aged above 40 years [31,33,35]. Advancing age is a well-recognized risk factor for declining creatinine clearance in the general population as reported by Davies and Shock[36].

Diabetes Mellitus, a known risk factor for renal dysfunction in the general population was not associated with renal dysfunction in our study[27,28,29,30]. This finding concurs with other studies[29,31,32]. In contrast Jotwani et al, Cheung et al and Naicker S and Fabian found Diabetes

Mellitus to be positively predictive of renal disease[11,13,35]. Only two patients in our study had Diabetes mellitus where one participant had renal dysfunction and one did not. Random blood sugar tests done on all the participants were below 8mmol/L. The low prevalence of diabetes mellitus in our study population accounts for the observed negative finding. The prevalence of diabetes mellitus in Zambia is less than 4% as at 2013 statistics in the age group 20 to 70years[37].

The level of CD4 count was not associated with renal dysfunction in contrast to findings of Naicker et al, Jotwani et al, Emem et al, Wyatt et al, Cheung et al[11,13,29,31,35]. These studies showed that low CD4 nadir <200 cells/μL were significantly associated with renal dysfunction. The negative finding in our study could be due to the effect of missing data 39% of our patients had no CD4 count result for analysis. Although, both Mulenga and Banda et al's earlier findings agree with our findings that CD4 count is not associated with renal dysfunction in our settings[12,24].

Viral Load was not significantly associated with renal dysfunction in contrast to Jotwani et al and Naicker et al in the USA and South Africa respectively. Jotwani and Naicker et al reported that high viral load > 30,000 copies/μL and 4,000 copies/μL respectively were associated with renal dysfunction[11,13]. The negative finding in our study could be attributed to the missing data (27%).

Hepatitis C virus infection has been associated with renal dysfunction [11,13,31,33] but we had no patient in this study that tested positive for Hepatitis C. Kapembwa et al[41] found a prevalence of 1.2% Hepatitis C infection in Lusaka and therefore it is not surprising that no patient had Hepatitis C in our study[32]. Similarly, Hepatitis B infection was not significant. 26 participants had co-infection with hepatitis B and none of them had renal dysfunction.

Proteinuria and hematuria were not significant as predictors of renal dysfunction in this study but both are known to be risk factors and markers of kidney dysfunction[31]. This is due to the fact that the sample was based on prevalence formula and not based on patients having CKD or not having CKD. AKI can also be a confounder of CKD at the time of admission. Studies that found proteinuria to be significant include Jotwani et al and Ayokunle[13,30].

Study Limitations

The study had missing data especially involving laboratory results. The most severely affected was the results for syphilis test accounting for about 67% of missing data. Others parameters affected to a much less extent included CD4 count (39%), viral load (27%) and albumin (52%). This limitation impacts negatively on the analysis as it reduces the power of the study.

Diabetes mellitus was diagnosed by patient reporting (whether they were diabetic or not) or by performing a random blood sugar. Random blood sugar was only performed once and we did not perform Fasting Blood Sugar or HbA1c.

In this study, we could not differentiate between acute kidney injury and chronic kidney disease. This was because we could not perform renal ultrasound scans due to costs limitation. Secondly, there was no prior assessment of renal function in our participants. Most of our patients are unaware of their specific diagnosis and could thus not report having chronic kidney disease or not.

Conclusions

The prevalence of renal dysfunction in the ART naïve HIV population is high and hypertension was found to be an independent risk for renal dysfunction.

Recommendations

From the findings of this study we recommend as follows;

- Screening for hypertension in HIV cART naïve individuals should be routine and those found to be hypertensive should be further investigated for renal dysfunction and monitored routinely during cART.
- A more robust prospective cohort study with a higher sample size should be conducted to further assess the risk associated with viral load, Diabetes mellitus, hepatitis B and other opportunistic infections.

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APPENDIX I: RESPONDENTS INFORMATION SHEET

Information for Potential Respondents of a Study of Risk Factors For Kidney Dysfunction In Art Naïve Hiv-1 Infected Adults At The Adult Infectious Disease Centre At University Teaching Hospital in Lusaka.

You are invited to take part in a study to improve our understanding of what causes kidney failure in people who have HIV disease. This will help to prevent development of kidney failure. Information on the study is supplied in this leaflet. A trained research assistant will be on hand to explain and answer all your questions. Please check that you understand everything in this document. If you decide to take part, you will be asked to give written consent before you take part.

Who is doing the study?

This study is being done by Dr. Simon Tembo, a Master of Medicine student from the School of Medicine, Department of Internal Medicine at the University Teaching Hospital here in Lusaka. The results to this research will contribute to the thesis for my Master of Medicine degree and also add to knowledge about the risk factors of kidney failure in HIV patients. Dr. Tembo and his research assistants will be responsible for the day to day running of the study.

Principal Investigator	**Supervisors**	**Research Assistants**
Dr. Simon M Tembo 0954739699	Dr. Aggrey Mweemba (0961357599) Dr. Lloyd B Mulenga (0977344604)	Sr. Mundende (0977315908)

If you have any questions about the study, feel free to contact:

The Chairperson

ERES CONVERGE IRB

33 Joseph Mwilwa Road, Rhodes Park

Lusaka

Phone: 0955155633, 0955155634, 0966765503

Email:eresconverge@yahoo.co.uk

What is the purpose of this study?

The main aim of this study is to improve our understanding of the risk factors that lead to the development of kidney failure in people with HIV infection. Studies done before in other countries have shown that people with HIV are at increased risk of developing kidney failure when they have certain risk factors such as high blood pressure, diabetes mellitus, old age, high viral load, low CD4 count, hepatitis C infection, . We also know that the some medicines used in the treatment of HIV infection cause kidney failure. Knowing what is associated with developing kidney failure in our environment will help prevent it by screening our patients for the risk factors that will be identified so that they are not given the ARV drugs that cause kidney failure hence reducing the risk of having kidney failure.

Confidentiality

Data for this study will be kept confidential under lock and key. Only the researcher and the supervisors will have access to the information. In the event of publication of the research, no personally identifying information will be disclosed.

Respondents Rights

By consenting to participate in this study, you do not waiver any of your legal rights. Giving consent means you have read or heard the information about the study and you agree to participate. You will not suffer any penalty or lose any benefits to which you are entitled by participating in the study.

Right to refuse or withdraw

Participation in this study is voluntary. If you feel uncomfortable with any of the questions in the study you have the right to refuse to take part in the study. If you decide to be in the study and then change your mind; you can withdraw from the study at any point. Your decision to withdraw will not affect the standard of care that you will receive from the hospital.

Procedures

1. If you agree to take part in the general study:

i. We will as you a number of questions.
ii. We will draw blood to check for the presence or absence of kidney failure. This will enable us to place you in one the two groups of the study.
iii. Then we will complete the study questionnaire by doing tests in accordance with study protocol.

2. We will get information about you and the history of your illness. Blood and urine will be collected to test:

i. CD4 count
ii. Viral Load
iii. Random Blood Sugar (to test for diabetes)
iv. Creatinine (to test for presence of renal failure)
v. Serum Albumin
vi. Hepatitis C virus
vii. Protein in Urine
viii. Blood in Urine
ix. Syphilis
x. Protein in Blood

Potential risks and discomfort

i. The procedures mentioned above carry minimal risks:
ii. Blood collection and needle pricks may cause pain at the collection site
iii. Blood collection and needle pricks will be done by the doctor or trained research assistant
iv. Infection at the site of collection rarely occurs (<1%), to prevent such problems the doctor or trained research assistant will collect blood or perform needle

APPENDIX II: CONSENT FORM

Informed consent form for study to study the risk factors associated with renal dysfunction among ART naïve HIV infected individuals (persons aged 16 years and older)

1. I confirm that I have read the information sheet, and that the information and procedures involved in my taking part in this study have been explained to me.

2. I confirm that I have had the opportunity to ask questions about the study and that I am satisfied with the answers provided.

3. I have been given time and opportunity to read the information carefully, to discuss it with others and to decide whether or not to take part in this study.

4. I understand that blood tests for kidney failure will be done on me and that the result will be given to me and appropriate referral will be made where I am found to have kidney failure for further treatment as I also undergo further tests in accordance with the study protocol.

5. I understand that blood tests will be done on me to look for the risk factors for kidney dysfunction and the results will be made known to me and that I will be referred to the clinic for appropriate care where necessary.

6. I understand that my blood specimens will be kept in a sample bank with only a bar code on (not my name) and that these samples can be used in future.

7. I understand that the researchers will keep all my personal information confidential.

8. I understand that I will not get any financial reward for taking part in this study.

9. I understand that the results of this study will be published in scientific journals but that my name will not be used.

10. I understand that I may in future be requested to participate in follow-up studies.

11. I agree to take part in the study.

Respondents signature/thumbprint: _____ Date _____

Respondents name: _____ (please print)

The person who obtains the informed consent discussion must also sign and date this form.

Signature: _____Date _____

Name: _____ (please print)

(If respondent is unable to consent, next-of- kin can consent)

Name of next of kin: _____

Signature: _____

Thumb print (if illiterate):_____

Date: _____

Signature of witness (if applicable)

Signature of witness: _____Date_____

Witnessed by (print name):

_____

APPENDIX III: INITIAL DATA SHEET FOR INTERVIEWERS

Following consent, document the following

1. Sex……

Male	1
Female	2

2. Age (years)…… | | |

3. HIV status…….....

Negative	1
Positive	2

4. When were you first diagnosed HIV Positive?..... | | | | |

5. Are you on ARV drugs?.....

Yes	1
No	2

6. If answer to 4 is No, have you ever taken ARV drugs?.....

Yes	1
No	2

7. Weight (Kgs)…… | | | - | |

8. Height (m)…… | | |

9. Serum Creatinine(umol/L) …… | | | - | |

10. Blood Pressure…… | | | | / | | | |

APPENDIX IV: RESPONDENTS QUESTIONNAIRE

Section A: Respondents' Personal Details

S/N	Question	Answer				
1	Interview Date	/ /				
2	Interviewer Code					
3	Recruitment Point	In patient			Out patient	
		1			2	
4	Sex	M			F	
		1			2	
5	What is your race?	Black	White	Asian	Colored	Other
		1	2	3	4	5
6	Date of Birth (DOB)					
7	Age as of last birthday					
8	Disability	None	blindness	Deaf	Speech impaired	Physically disabled	Mentally disabled
		1	2	3	4	5	6
9	Consent	Yes			No	
		1			2	

Section B: Social History

S/N	Question	Answer				
10	What is your marital status?	Married	Divorced/separated	Widowed	Single	
		1	2	3	4	
11	What is your	Formal	Informal employment	Unemployed	Student	Housewife

	occupation?	employment				
		1	2	3	4	5
12	How would you classify you smoking habits?	Never smoked	Daily smoker	Occasional smoker	Ex-smoker	
		1	2	3	4	
13	How would you classify you drinking habits?	Never drunk	Daily drinker	Occasional drinker	Ex-drinker	
		1	2	3	4	
14	What is the highest level of education you have attained?	No formal education	Primary (grades 1-7)	Secondary (grades 8-12)	Tertiary (college/university)	
		1	2	3	4	

Section C: Past Medical History

S/N	Question	Answer		
15	Have you ever been told you have diabetes?	Yes	No	
		1	2	
16	If yes, are you currently on any treatment for diabetes?	Yes	No	
		1	2	
17	What treatment are you on?	Dietary control	Tablets	Injections
		1	2	3
18	Have you ever been admitted for diabetes?	Yes	No	
		1	2	
19	Have you ever been told you have hypertension?	Yes	No	
		1	2	

20	If yes, are you currently on any treatment for hypertension?	Yes			No	
		1			2	
21	Have you ever been admitted for hypertension?	Yes			No	
		1			2	
22	Have you ever been told that you have a heart problem?	Yes			No	
		1			2	
23	Have you had diarrhea for more than 3 months?	Yes			No	
		1			2	
24	Are you currently suffering from diarrhea?	Yes			No	
		1			2	
25	Have you ever used herbal medicines?	Yes			No	
		1			2	
26	If yes, for how long have you been using herbal medication?	<1year	1-3 years		3-5years	>5years
		1	2		3	4
27	Have you ever been told that you have a kidney disease?	Yes			No	
		1			2	
28	Have you ever used any of the following medicines?	Ibuprofen	Indomethacin	Aspirin	Piroxicam	Mefenamic Acid
		1	2	3	4	5
29	If yes to 27, for how long have you used the drug?	<3months	3months – 1year		1-3years	>5years
		1	2		3	4

Section D: Test Results Record

S/N	Test	Result
1	CD4 count	
2	Viral Load	
3	Hepatitis C virus Ab	
4	RPR	
5	Serum Albumin	
6	Random Blood Sugar	
7	Urinalysis (hematuria)	
8	Urinalysis (proteinuria)	

APPENDIX V: TRANSLATED DOCUMENT RESPONDENTS INFORMATION FORM

Kuonjeza koyamba (I): Chipepala cha Nkhani ya otengako mbali

Muitanidwa kutengako mbali mukufufuza mukupitisa pasogolo pakunvesesa kwanthu pa zamene zimene zimapangisa kuti inso ikange kugwila nchito ku anthu ali ndi kadoyo ka HIV. Ichi chizathandiza kuchingiliza kukanga kwa kugwila nchito kwa inso. Nkhani ya kufuza ipasidwa muchipepala ichi. Ophuzila othandizila pa za kufufuza azakhalapo kudongosola ndi kuyankha mafunso anu onse. Choonde muone kuti munvesesa zonese mu chipepala ichi. Ngati mwavomela kutengako mbali, muzapemphedwa kupasa chivomelezo mwakulemba mukalibe kutengako mbali.

Ndani amene achita kufufuza uku?

Kufufuza uku kuchitidwa ndi a Dotolo a Simon Tembo, ophunzila a zamankhwala pa sikulu la mamphunzilo apamwamba la mu Zambia ku UTH, muno mu Lusaka. Zopezeka mu kufufuza uku zizathandizila pa maonedwe pa maphunzilo anga apamwamba amankwala ndiponso kuonjezela pakuziwa za zoopsa pa zamene zipangisa kukanga kugwila nchito kwa inso mu odwala ali ndi kadoyo ka HIV. A dotolo Tembo ndi a zofufuza othandizila azayangananila pachitidwe ka kufufuza uku pa siku ndi siku.

Akulu a zofufuza	**Oyanganila**	**Othandizila zofufuza**
A Dotolo a Simon M Tembo 0954739699	A Dotolo a Aggrey Mweemba (0961357599) A Dotolo a Lloyd B Mulenga (0977344604) A Dotolo a Patrick Musonda (0963256318)	A Nurse a Mundende (0977315908)

Ngati muli ndi mafunso ali onse pa za kufufuza uku, mukhale omasuka kutiona:

Akumpando

ERES CONVERGE IRB

33 Joseph Mwilwa Road, Rhodes Park

Mu Lusaka

Phone: 0955155633, 0955155634, 0966765503

Email:eresconverge@yahoo.co.uk

Chilingo cha kufufuza uku nichani?

Chilingo chikulu cha kufufuza uku ndikupitisa pasogolo manvesesedwe anthu pa zoopsa zamene zimapangisa kukanga kugwila nchito kwa inso mu anthu ali ndi kadoyo ka HIV.

Kufufuza kwamene kunachitidwa mu maiko ena kuonesa kuti anthu amene ali ndi kadoyo ka HIV ali oopsa kwambili kupezeka ndi kukanga kugwila nchito kwa inso ngati ali ndi zina monga BP, matenda a suga, okalamba, kupaka kwa tudoyo, a chichingililo chochepa muthupi, kupima mu liva. Tiziwanso ku mankhwala ena amene agwilisidwa nchito pa kadoyo ka HIV amapangisa kukanga kugwila nchito kwa inso. Kuziwa zimene zigwilizana ndi kukanga kugwila nchito kwa inso pamene tipezeka kuzathandizila kuchingiliza odwala athu pa zoopsa zamene zoziwika kuti asapasidwe mankhwala a kadoyo ka HIV ma ARV amene apangisa kukanga kugwila nchito kwa inso ndipo ichi chizachepesa kuopsa kwa kukhala ndi kuanga kugwila nchito kwa inso.

Chisinsi

Zotengedwa mu kufufuza uku zizasungidwa mwa chisinsi pansi pa loko ndi kii. Data for this study will be kept confidential under lock and key. Koma chabe ofufuza ndi oyanganila ndio azakhala ndi danga pa nkhani. Ngati kuzakhala zoulusidwa pa kufufuza, kulibe nkhani yanu ilionse izaziwika.

Ufulu wa otengako mbali

Pakuvomeleza kutengako mbali mu kufufuza uku, simutaya ufulu wanu ulionse. Kuvomela kutanthauza kuti mwawelenga kapena mwanvela nkhani ya kufufuza ndipo muvomela kutengako mbali. Simuzapasidwa mulandu ulionse kapena kutaya phindu lililonse lamene muyenela kukhala nalo mu kufufuza uku.

Ufulu wokana kapen kuchoka

Kutengako mbali mu kufufuza uku ndi kozipeleka. Ngati munvela kumangika ndi mafunso alionse mukufufuza muli ndi ufulu wokana kutengako mbali mukufufuza uku. Ngati mwavomela kukhala mu kufufza uku ndipo mwachinja nzelu; mungachoke mu kufufuza pa nthawi ilionse. Kusankha kuchoka mu kufufuza kwanu sikuzasokoneka muyeso wa nthandizo lamene mulandila kuchipatala.

Machitidwe

1. Ngati muvomela kutengako mbali mukufufuza:

i. Tizakufunsani mafunso.

ii. Tizatenga magazi kuchoka kwainu kuone kupezekamo kapena kusapezekamo kwa kukanga kugwila nchito kwa inso. Ichi chizapangisa kuti tikuikeni mu gulu imodzi mwa awili akufufuza.

iii. Ndipo tizasiliza chipepala cha mafunso pakupima kulingana ndi mundondomeko wa mapimidwe.

2. Tizatenga nkhani yanu ndi mayambidwe a kudwala kwanu. Magazi ndi mitundo zizatengedwa kupimamo:

i. Chichingililo cha muthupi, CD4

ii. kupima tudoyo

iii. Matenda a suga

iv. Kupima kukanga kugwila nchito kwa inso

v. Kupima zolimbisa thupi

vi. Kupima mu liva

vii. Zolimbisa thupi mumitundo

viii. Magazi mumitundo

ix. Matenda otengela achinzonono

x. Zolimbisa thupi mu magazi

Zoopsa zoyenela ndi kusanvela bwino

v. Machitidwe amene akambidwa ali ndi zoopsa zochepekela:

vi. Kutenga magazi ndi kulasa nyeleti kungapangise kuwawa pamalo potengela magazi.

vii. Kutenga magazi ndi kulasa nyeleti kuzachitidwa ndi a dotolo kapena ophunzisidwa othandizila za kufufuza.

viii. Kuchitika kwa matenda pamalo otengela magazi kambili sikuchitika (<1%), kuchingiliza mabvuto yotelo a dotolo kapena ophunzisidwa othandizila za kufufuza azatenga magazi kapena kuchita nyeleti …….

APPENDIX VI: TRANSLATED DOCUMENT CONSENT FORM

Kuonjeza Kwa Chiwili (Ii): Chipepala Chachivomelezo Cha Otengako Mbali

Chipepala cha chivomelezo cha otengako mbali kuti kufufuza kuchitike kwa zoopsa zamene zimapangisa kukanga kugwila nchito kwa inso mu anthu amankhwala akadoyo ka HIV. (anthu azaka khumi limozi, zisanu ndi limozi (16) ndi kupita pamwamba)

1. Ndivomekeza kuti ndawelenga chipepala cha nkhani, ndipo kuti nkhani ndi machitidwe amene apezekamo pakutengako mbali kwanga mukufufuza uku kwadongosoledwa kwa ine.

2. Ndivomekeza kuti napasidwa danga lofunsa mafunso pa kufufuza ndipo ndakondwela nao mayankho amene ndapasidwa.

3. Ndapasidwa nthawi ndi danga kuwelenga chipepala cha nkhani mosamalila, kukambilana ndi ena ndi kusankha kutengako mbali kapena kusatengako mbali mu kufufuza uku.

4. Ndanvesesa kuti kupimidwa kwa mumamagazi pa kukanga kugwila nchito kwa inso kuzachitidwa pa ine ndi kuti zopezekamo zizapasidwa kwa ine ndi kuti kutumizidwa koyenela kuzachitidwa ngati ndapezeka ndi kukanga kugwila nchito kwa inso kuti ndipasidwe mankhwala mopitilila pakupitiliza mapimidwe ena apasogolo monga mwandondomeko ya kufufuza.

5. Ndanvesesa kuti kupima kwa magazi kuzachitika kwa ine kufuna kuona zoopsa zamenen zima pangisa kukanga kugwila nchito kwa inso ndipo zopezekamo zizauzidwa kwa ine ndipo ndizatumizidwa kuchipatala ching'ono pakusamalila koenela ngati nikoyenela.

6. Ndanvesesa kuti magazi anga azasungidwa mu banki mosungila magazi ndi nambala chabe (osati zina langa) ndi kuti magazi awa angagwilisidwe nchito musogolo.

7. Ndanvesesa kuti ofufuza zasunga zones zaine mwa chisinsi.

8. Ndanvesesa kuti sindizalandila malipilo alionse andalama pakutengako mbali mu kufufuza uku.

9. Ndanvesesa kuti zopezekamo zizaulusidwa molembedwa mu ma book azamaphunzilo koma koma zina langa siliza gwilisidwa nchito.

10. Ndanvesesa kuti musogolo ndinga pempedwe kutengako mbali mukubwezapo pa zakufufuza.

11. Ndavomela kutengako mbali muku fufuza.

Chisindikizo/kufwatika: _____ Siku _____

Zina la otengako mbali: _____ (Lembani)

Otenga kukambilana pa chivomelezo ichi ayenela kusidikisa ndi kulemba siku pa chipepala ichi.

chisindikizo: _____Siku _____

Zina: _____ (Lembani)

(Ngati otengako mbali sakwanisa kulemba chivomelezo, a banja angalembe chivomelezo)

Zina la wabanja: _____

Chsindikizo: _____

Kufwatika (Ngati saziwa kulemba):_____

Siku: _____

Chisindikizo cha mboni (Ngati nikofunikila)

Chisindikizo cha mboni: _____Siku_____

Umboni wachitidwa ndi (Zina): _____

APPENDIX VII: AUTHORISATION LETTER FROM SCHOOL OF MEDICINE

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE

Telephone : +260211252641
Telegram: UNZA, Lusaka
Telex: UNZALU ZA 44370
P.O Box 50110
Lusaka, Zambia
Email: assistantdeanpgmedicine@unza.zm

27th January, 2015

Dr. Simon Major Tembo
Department of Internal Medicine
School of Medicine
UNZA
LUSAKA

Dear Dr. Tembo,

RE: GRADUATE PROPOSAL PRESENTATION FORUM

Having assessed your dissertation entitled **"A Cross – Sectional Study of Risk Factors Associated with Kidney Dysfunction among ART – Naïve HIV – 1 infected Individuals at the University Teaching Hospital in Lusaka".** We are satisfied that all the corrections to your research proposal have been done. The proposal meets the standard as laid down by the Board of Graduate Studies.

You can proceed and present to the Research Ethics.

Yours faithfully,

Dr. S.H. Nzala
ASSISTANT DEAN, POSTGRADUATE
CC: HOD, Internal Medicine

UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
27 JAN 2015
ASSISTANT DEAN (PG)
P.O BOX 50110, LUSAKA

Appendix VIII: AUTHORIZATION LETTER FROM STUDY SITE

LC/mchk

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH
University Teaching Hospital

P/Bag Rw 1X
Lusaka - Zambia
Fax: +260 211 250305
Tel: +260 211 253947 (Switch Board)
e-mail: mduth@yahoo.com
+260 211 251451
OFFICE OF THE SENIOR MEDICAL SUPERINTENDENT

Our Ref:
Your Ref:

UTH/HCC/9/8

28th January, 2015

The Head of Department
The University of Zambia
Department of Internal Medicine
P.O. Box 50110
LUSAKA

Dear Sir/Madam

RE: RESEARCH PROJECT: SIMON TEMBO

Reference is made to your letter of 26th January, 2015.

I wish to inform you that permission has been granted to Dr. Simon Tembo to conduct research at University Teaching Hospital. He is advised to liaise with the Head of Department, Internal Medicine

Yours faithfully

Dr. P. Tembo
A/Head Clinical Care
For Senior Medical Superintendent
UNIVERSITY TEACHING HOSPITAL

Appendix IX: ETHICS APPROVAL LETTER

ERES CONVERGE

33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
+260 955 155 634
Cell: +260 966 765 503
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
E.W.A. No. 00011697

30th November, 2015

Ref. No. 2015-Feb-010

The Principal Investigator
Dr. Simon Tembo
University Teaching Hospital
Dept. of Internal Medicine
P/Bag R/W 1X,
LUSAKA.

Dear Dr. Tembo,

RE: A CROSS SECTIONAL STUDY OF RISK FACTORS ASSOCIATED WITH KIDNEY DYSFUNCTION AMONG ART NAÏVE HIV -1 INFECTED INDIVIDUAL AT UNIVERSITY TEACHING HOSPITAL IN LUSAKA, ZAMBIA.

Reference is made to your corrections dated 2nd November, 2015. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	**Fast track**	Approval No. **2015-Feb-010**
Approval and Expiry Date	Approval Date: 30th November, 2015	Expiry Date: 29th November, 2016
Protocol Version and Date	Version-Nil	29th November, 2016
Information Sheet, Consent Forms and Dates	• English	29th November, 2016
Consent form ID and Date	Version-Nil	29th November, 2016
Recruitment Materials	Nil	29th November, 2016
Other Study Documents	Questionnaires.	29th November, 2016
Number of participants approved for study	-	

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

f/g Dr. E. Munalula-Nkandu
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD
CHAIRPERSON