

**CERTIFICATE OF APPROVAL**

The University of Zambia approves this dissertation by Mr Freeman W. Chabala in partial fulfilment for the requirements for the award of the degree of Master of Science in Biochemistry.

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**CERTIFICATE OF COMPLETION OF DISSERTATION**

I, **Freeman W. Chabala**, do hereby certify that this dissertation is the product of my own work and in submitting it for my Master of Science in Biochemistry programme, further attest that it has not been submitted to another University in part or whole for the award of any programme.

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I, **Dr S. Nyirenda**, having supervised and read this dissertation is satisfied that this is the original work of the author under whose name it is being presented. I confirm that the work has been completed satisfactorily and is ready for presentation to the examiners.

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**DECLARATION**

This dissertation is the original work of **MR. FREEMAN W. CHABALA**. It has been done in accordance with the guidelines for MSc. Biochemistry dissertations for the University of Zambia. It has not been submitted elsewhere for a degree at this or another University.

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## **ABSTRACT**

Studies have suggested that Sub-Sahara Africans are prone to HIV-related renal dysfunction. A study done in Zambia showed increased deaths among HIV/AIDS patients who had renal dysfunction. Tenofovir Disoproxil Fumarate (TDF) one of the first line antiretroviral drugs in Zambia, has been associated with renal tubulopathy and nephrotoxicity in many studies. In Zambia, TDF has been in use since 2007. This study was set out to determine whether TDF had similar Nephrotoxic effects in patients receiving TDF- based regimen at the largest Antiretroviral Therapy (ART) Centre in Lusaka. It aimed at determining the likelihood of patients with no renal dysfunction ( $CL_{cr}$  method) at initiation of therapy developing renal dysfunction after 1 year of treatment with TDF- based regimen compared to those on non- TDF- based regimen (these patients were either on Stavudine (D4T)- based regimen or Zidovudine (AZT)- based regimen).

An analytical cross- sectional study involved analysis of data obtained from 549 randomly selected HIV/AIDS patient files that were started on ART between September, 2007 and January, 2013. Out of the 549 patients, 275 patients were on TDF- based regimen and 274 patients were on non- TDF- based regimen.

Findings showed a significantly larger number of participants on TDF developing renal dysfunction from having no renal dysfunction at baseline compared to those on non- TDF- based regimen; 51 out of 180 verses 8 out of 207,  $P < 0.001$ . Upon controlling for age and sex, logistic regression model showed that HIV/AIDS patients on TDF- based regimen were 8.77 times more likely to develop renal dysfunction after one year of therapy from having no renal dysfunction at baseline compared to those on non- TDF- based regimen.

It was concluded that treatment with TDF- based regimen was strongly associated with developing renal dysfunction after 1 year of treatment compared to non TDF- based regimen. There is need for follow up of patients on TDF- based regimen or therapy modification to reduce cases of renal dysfunction in patients on treatment thereby allowing them benefit fully by the treatment.

## **DEDICATION**

This dissertation is dedicated to my mother; Mrs J. M. Chabala for all her input in my life; for raising us single handedly and striving to see us get a decent education and life but most importantly for teaching us to love and honor Jehovah the almighty and give sacred service only to Him alone. It is also dedicated to my siblings- Trustridah, Efford, Kingsley, Memory and David for their support and encouragement. It is a dedication to Njeleka my wife and to my son Jeremy for giving me reasons to work even harder and keep living.

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## **LIST OF ACRONYMS**

AIDC- Centre for Infectious Disease Research in Zambia  
AIDS- Acquired Immunodeficiency Syndrome  
AKI- Acute Kidney Injury  
ARF- Acute Renal Failure  
ART- Antiretroviral Therapy  
ARVs- Antiretroviral Drugs  
CKD- Chronic Kidney Disease  
CL<sub>cr</sub>- Creatinine Clearance  
eGFR- Estimated Glomerular Filtration rate  
WHO- World Health Organization  
EQA- External Quality Assurance  
HAART- Highly Active Antiretroviral Therapy  
HIV- Human Immunodeficiency Virus  
IQA- Internal Quality Assurance  
K/DOQI- Kidney Disease Outcome Quality Initiative  
MDRD- Modification of Diet in Renal Disease  
NNRTI- Non-Nucleoside Reverse Transcriptase Inhibitor  
NRTI- Nucleotide Analogue Reverse Transcriptase Inhibitor  
SCr- Serum Creatinine  
ESRD- Endstage Renal Disease  
MDRD- Modification of Diet in Renal Disease  
SOPs- Standard Operating Procedures  
TDF- Tenofovir Disoproxil Fumarate  
UTH- University Teaching Hospital  
MOHZ- Ministry of Health Zambia