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Research Article

Assessment of Renal Insufficiency among Patients under Anti-retroviral Therapy at Gitwe District Hospital

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Abstract

Background: Several antiretroviral agents (ARVs) are associated with chronic renal impairment. Renal insufficiency is poor function of the kidneys that may be due to a reduction in blood-flow to the kidneys caused by renal artery disease. Globally the prevalence of renal insufficiency, defined as an estimated glomerular filtration rate (eGFR) of <60 mL/min/1.73 m², among Adolescents living with HIV (ALHIV) ranges between 3% - 7%.

Aim: This study aims to determine the Prevalence of Renal Insufficiency among Patients under Antiretroviral Therapy at Gitwe District Hospital.

Methodology: An institution-based retrospective study was conducted from 2023 to 2024 on a subset of HIV-infected patients. Data were collected from the register book of patients under antiretroviral therapy attending Gitwe District Hospital.

Results: After data analysis, the findings have shown that the majority of patients 68(46.9%) were with moderate renal insufficiency, 53(36.6%) were with mild renal insufficiency, 20(13.8%) were with normal kidney function and 4(2.8%) were with severe renal insufficiency.

Conclusion: Moderate and mild renal insufficiency have a high prevalence among patients exposed to antiretroviral therapy at Gitwe District Hospital. Severe renal insufficiency was observed to be reduced in HIV Patients exposed to ART. Normal kidney cases were few compared to renal insufficiency cases. Further studies are recommended to determine the need of drinking water in prevention of progression from mild and moderate to severe renal insufficiency.

Keywords: Renal insufficiency, Antiretroviral Therapy, HIV.

INTRODUCTION

People living with HIV (PLWH) are at risk of kidney function impairment due to HIV-related inflammation and antiretroviral therapy (ART). Older persons may experience a higher burden of chronic kidney disease (CKD) as kidney function declines with increasing age¹. Several antiretroviral agents (ARVs) are associated with chronic renal impairment². Other risk factors for renal insufficiency such as high blood pressure (BP), obesity, diabetes, and dyslipidaemia are also growing³. Preventing long-term kidney toxicity from an antiretroviral therapy (ART) is therefore critical⁴. Globally the prevalence of renal insufficiency, defined as an estimated glomerular filtration rate (eGFR) of <60 mL/min/1.73 m², among Adolescents living with HIV (ALHIV) ranges between 3% - 7%. In Sub-Saharan Africa

(SSA), where over two-thirds of the world's population of ALHIV reside, the pooled prevalence of renal insufficiency among ALHIV is reported to be as high as 12%⁵. HIV infection itself and antiretroviral therapy (ART) can lead to the impaired kidney function that in turn can significantly impact the quality of life and clinical outcomes in people living with HIV⁶. Different studies have documented several mechanisms through which HIV infection increases the risk of renal insufficiency. These include long-term use of nephrotoxic ART (tenofovir, indinavir, and lopinavir/ritonavir) and direct renal cell injury from HIV infection associated chronic inflammation. Other HIV infection-related risk factors include low CD4⁺ T cell counts, high HIV viral loads (VLs), and coinfection with hepatitis C and/or Hepatitis B virus⁷. Selected antiretroviral agents, especially tenofovir disoproxil fumarate (TDF) and some

ritonavir-boosted protease inhibitors (PI/rs), have been associated with increased risk of chronic kidney diseases (CKD). CKD risk in HIV-positive individuals can be further minimized by timely identification of those with worsening renal function and discontinuation of potentially nephrotoxic agents. Clinicians can use several monitoring tools, including the routine measurements of estimated glomerular filtration (eGFR) and proteinuria, to identify high-risk individuals who may require an intervention. Tenofovir alafenamide (TAF), a TDF alternative, promises to be safer in terms of TDF-associated kidney and bone toxicity⁴. Human immunodeficiency virus (HIV) continues to pose significant public health challenges around the world. Its burden is known to be heavier in sub-Saharan Africa compared to other regions of the world. This is made worse by a combination of factors including ignorance, high illiteracy levels and comorbid diseases⁸. Chronic kidney disease (CKD) has emerged as one of the primary comorbidities affecting individuals infected with human immunodeficiency virus (HIV), even after the initiation of highly active antiretroviral therapy (HAART)⁹. Prolonged use of antiretroviral therapy and the consequent increased longevity of HIV patients had led to emergence of non-AIDS-related outcomes, including cardiovascular disease, malignancies, bone and renal disease. Now, increasing attention is directed towards prevention and treatment of co morbidities and the side effects of antiretroviral therapy¹⁰. Therefore, this study aimed at determining Prevalence of Renal Insufficiency among Patients under Antiretroviral Therapy.

METHODOLOGY

RESULTS

Table 1: Socio-demographic characteristics of patients

Gender	Frequency	Percent	Cumulative Percent
Male	70	48.3	48.3
Female	75	51.7	100.0
Total	145	100.0	

The table above shows the distribution of patients based on gender where 70(48.3%) were male and 75(51.7 %) were female.

Table 2: Distribution of patients based on their ages

Age	Frequency	Percent	Cumulative Percent
<40 years old	16	11.0	11.0
40+ years old	129	89.0	100.0
Total	145	100.0	

The table above shows the distribution of patients based on age where 129 (89.0%) were forty years and above (40+ years old) and 11(11.0%) were below 40 years old.

Study design and period

An institution-based retrospective descriptive cross-sectional study was conducted from records of 2023–2024 data during November 2024 at Gitwe District Hospital. The hospital is located in Ruhango district, Southern Province in Rwanda, which acts as the district hospitals.

Sampling Technique and Study Population

The population size was 227 patients with creatinine and creatinine clearance valid test results in the register book of patients under antiretroviral therapy attending Gitwe District Hospital. The sample size of 145 patients was taken from this population after calculation using Yaman's formula. These patients had been previously screened for renal dysfunction when they were initiated for HAART. The patients who had regular follow-up by creatinine and creatinine clearance test were included in the study. The glomerular filtration rate (GFR) was estimated using levels of renal insufficiency

Data Collection and Analysis

Data collection was done using a register of all patients under ART. All odd numbers were considered in a systematic random sampling technique. Data processing and analysis were done using SPSS. The findings were presented in tables respecting the specific objectives. The research study was conducted after obtaining ethical clearance from the University of Gitwe. The investigators obtained permission from the research committee of Gitwe District Hospital to conduct research, respecting the rules and regulations of ethical research.

Table 3: Distribution of patients based on their serum Creatinine level

Level of serum creatinine		Frequency	Percent	Cumulative Percent
	Normal level	90	62.1	62.1
	Abnormal level	55	37.9	100.0
	Total	145	100.0	

This table shows that 90(62.1%) with normal level of creatinine, and 55(37.9%) with abnormal level of creatinine.

Table 4: Distribution of patients based on their level of kidney function

Level of Kidney function		Frequency	Percent	Cumulative Percent
	Normal kidney function	20	13.8	13.8
	Mild renal insufficiency	53	36.6	50.3
	Moderate renal insufficiency	68	46.9	97.2
	Severe renal insufficiency	4	2.8	100.0
	Total	145	100.0	

The table above shows distribution of patients based on their renal insufficiency level (or serum creatinine clearance level), among 145 participant 20(13.8%) were normal for kidney function, 53(36.6%) were with mild renal insufficiency, 68 (46.9%) were with moderate renal insufficiency and 4(2.8%) were with severe renal insufficiency.

Table 5: Distribution of patients based on renal insufficiency

Renal insufficiency	Frequency	Percent	Cumulative Percent
Mild r& Moderate insufficiency	121	96.8	
Severe renal insufficiency	4	3.2	100.0
Total	125	100.0	

The table above showed the distributions of patients based on mild & moderate and severe kidney damage (renal insufficiency), among 125 patients with kidney insufficiency 121 (96.8%) were with mild & moderate and 4(3.2%) were with severe renal insufficiency.

Table 6 Determination of prevalence of kidney damage

Prevalence of kidney function	Frequency	Percent	Cumulative Percent
Normal kidney function	20	13.4	13.4
Kidney damage (renal insufficiency)	125	86.6	100.0
Total	145	100.0	

The table above shows that the prevalence of kidney damage was 125(86.6%) and 20(13.4%) with normal kidney function.

DISCUSSION

In this study, we investigated the prevalence of renal insufficiency among patients exposed to ART and the progression from normal renal function to mild, moderate and severe levels of chronic renal insufficiency. Prevention of deterioration in renal function is currently attracting much attention of professional healthy providers by periodic measurement of renal impairment. The primary findings of this analysis were that the prevalence for normal kidney function was fewer (13.4%) than prevalence of renal insufficiency (86.6%) among patients on HAART, because of their risk of side effect on the nephron. Regarding the severe renal insufficiency in this study, very few cases (2.8%) were observed because of the effort made by health professional providers in preventing progression of

renal insufficiency from mild and moderate to severe renal insufficiency by changing ART medications and advising patients to drink enough water.

In contrast to other recent studies, this study showed higher moderate prevalence of renal insufficiency (46.9%) which is higher than that observed in Ghana in the Ashanti region where the correspondent renal insufficiency was reported at 13% among HIV Patients¹¹. This study highlights the need for continued an ongoing monitoring of renal function among HIV-positive persons for an increased awareness of ARVs with an association with impaired renal function.

Renal insufficiency is the major problem and is present in HAART patients. It can lead to loss of kidney function, leading to kidney failure and development of

cardiovascular disease. Many patients had mild and moderate renal insufficiency and case of severe renal insufficiency were rare because patients were advised by health professional providers to drink enough water a long side with taking properly HAART or using less kidney toxic medications.

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