Ageing and Renal Insufficiency in Persons Living with and without HIV in AFRICOS

David Chang[1], Allahna Esber[1,2], Nicole Dear[1,2], Michael Iroezindu[1,3], Emmanuel Bahemana[1,4], Hannah Kibuuka[5], John Owuoth[6,7], Jonah Maswai[1,8],Trevor A. Crowell[1,2], Christina S. Polyak[1,2], Julie A. Ake[1], Catherine Godfrey[9] on behalf of the AFRICOS Study Group

1U.S. Military HIV Research Program, Walter Reed Army Institute of Research, Silver Spring, MD, USA; 2Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, MD, USA; 3IHSF Medical Research International, Abuja, Nigeria; 4 HJF Medical Research International, Mbeya, Tanzania; 5Makerere University Walter Reed Project, Kampala, Uganda; 6U.S. Army Medical Research Directorate – Africa, Kisumu, Kenya; 7HJF Medical Research International, Kisumu, Kenya; 8IHSF Medical Research International, Kericho, Kenya; 9Office of the Global AIDS Coordinator, Department of State

BACKGROUND

People living with HIV (PLWH) are at risk for renal insufficiency[1]. There are multiple etiologies for renal insufficiency in PLWH. This can include HIV associated nephropathy, medication related (e.g. tenofovir disoproxil fumarate), or more traditional risk factors (e.g. hypertension, diabetes)[2,3].

Unfortunately, renal insufficiency is not well characterized in ageing African cohorts[4]. This is particularly important from a programmatic standpoint to understand disease prevalence for screening and appropriate treatment. We examine the prevalence of renal insufficiency in PLWH and factors associated in its development.

METHODS

The African Cohort Study is a prospective cohort enrolling adults with and without HIV at 12 sites in Kenya, Tanzania, Uganda and Nigeria.

Data were collected from January 2013 to December 2020 evaluating for the prevalence at enrollment and subsequent development of renal insufficiency and elevated blood pressure (BP).

Renal insufficiency was defined as having one value of estimated glomerular filtration rate <60 mL/minute/1.73m^2.

Elevated BP was defined as having any systolic blood pressure of >139 mmHg or diastolic BP of >89 mmHg.

Multivariable logistic regression with generalized estimating equations was used to estimate odds ratios and 95% confidence intervals (CI) for factors associated with renal insufficiency.

AFRICOS Site Team, Kisumu, Kenya

RESULTS

Participant Characteristics

- 3557 participants were enrolled between January 2013 and December 2020.
- The majority of participants were female, n=2070 (58.3%) females, n=1487 (41.8%) males.
- 2953 (83.0%) of participants were PLWH. Among those living with HIV, most were under the age of 50, n=2473 (83.7%).

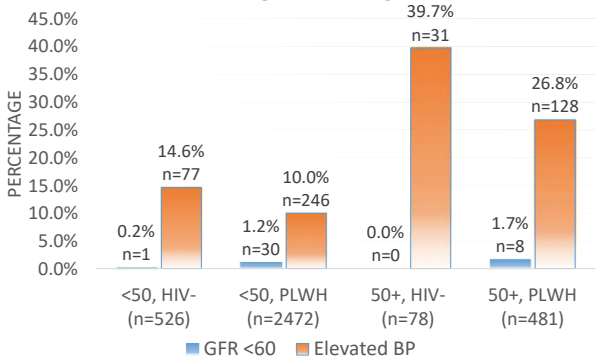

Figure 1: Prevalence of GFR <60 and elevated BP at the enrollment visit into AFRICOS

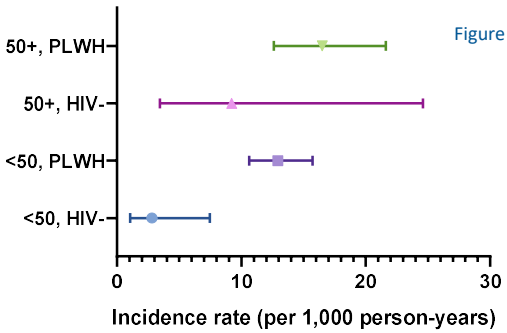

Figure 2: Incidence rate of renal insufficiency (GFR<60) by HIV status and age

		aOR	95% CI
Age, HIV status	<50, People w/o HIV	Ref	
	<50, PLWH	**3.50**	**1.44-8.50**
	50+, People w/o HIV	3.28	0.94-11.52
	50+, PLWH	**5.87**	**2.39-14.40**
Study Site	Kayunga, Uganda	Ref	
	South Rift Valley, Kenya	1.48	0.78-2.82
	Kisumu West, Kenya	1.43	0.60-3.08
	Mbeya, Tanzania	1.53	0.71-3.30
	Abuja & Lagos, Nigeria	**4.90**	**2.53-9.52**
Sex	Male	Ref	
	Female	1.42	0.99-2.05
Elevated BP	No	Ref	
	Yes	**2.01**	**1.38-2.92**

Table 1: Adjusted odds ratio of having GFR <60 at all study visits

Prevalence

- Prevalence of both GFR <60 and elevated BP was higher among participants in the older age group (figure 1).
- Elevated BP prevalence was lower in PLWH than in People w/o HIV in both age 50+ and age <50.
- There was overall a low prevalence of GFR <60.

Incidence Rate

- There is a higher incidence rate of GFR <60 in both PLWH and People w/o HIV age 50+ (figure 2).
- PLWH age <50 had an increased incidence of GFR <60 compared to their age matched counterparts. The incidence rate was approaching that of PLWH age 50+.

Odds of GFR <60

- PLWH age 50+ had the greatest odds of having GFR <60, but the confidence interval was wide (table 1).
- PLWH age <50 had a similar odds of having GFR <60 as People w/o HIV age 50+.
- Abuja and Lagos, Nigeria had the greatest odds of having GFR <60 compared to other study sites.

CONCLUSION

- **The prevalence of renal insufficiency in PLWH of all ages is 1.3%.**
  - **Renal insufficiency prevalence in PLWH age <50 and 50+ are 1.2% and 1.7% respectively.**
- **Important associations are age and elevated BP.**
  - **The prevalence of elevated BP over age 50 is 26.8% in PLWH and 39.7% in People w/o HIV.**
- **Age has a greater association with renal insufficiency and elevated blood pressure than HIV.**
- **There is geographic heterogeneity in development of renal insufficiency. This could be related to genetics and/or social factors such as diet. Further analysis will be needed to understand.**
- **There is a significant burden of disease in this cohort.**

References
1. Mallipattu SK, Salem F, Wyatt CM. The changing epidemiology of HIV-related chronic kidney disease in the era of antiretroviral therapy. Kidney Int. 2014 Aug;86(2):259-65. doi: 10.1038/ki.2014.44. Epub 2014 Feb 26. PMID: 24573317.
2. Alfano G, Cappelli G, Fontana F, et al. Kidney Disease in HIV Infection. J Clin Med. 2019;8(8):1254. Published 2019 Aug 19. doi:10.3390/jcm8081254
3. Wyatt CM. Kidney Disease and HIV Infection. Top Antivir Med. 2017;25(1):13-16.
4. George JA, Brandenburg JT, Fabian J, Crowther NJ, Agongo G, Alberts M, Ali S, Asiki G, Boua PR, Gómez-Olivé FX, Mashinya F, Micklesfield L, Mohamed SF, Mukomana F, Norris SA, Oduro AR, Soo C, Sorgho H, Wade A, Naicker S, Ramsay M; AWI-Gen and the H3Africa Consortium. Kidney damage and associated risk factors in rural and urban sub-Saharan Africa (AWI-Gen): a cross-sectional population study. Lancet Glob Health. 2019 Dec;7(12):e1632-e1643. doi: 10.1016/S2214-109X(19)30443-7. PMID: 31708144; PMCID: PMC7033368.

This work was supported by a cooperative agreement (W81XWH-18-2-0040) between the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and the U.S. Department of Defense (DoD). The views expressed are those of the authors and should not be construed to represent the positions of the U.S. Army, the Department of Defense, or HJF. The investigators have adhered to the policies for protection of human subjects as prescribed in AR 70–25.