The Impact of HIV Infection on All-Cause Mortality Among Individuals Treated for HBV in Rwanda

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BACKGROUND

- Antiviral treatments have significantly reduced liver-related morbidity and mortality rates in individuals co-infected with hepatitis B virus (HBV) and human immunodeficiency virus (HIV) [1,2].
- HIV co-infection contributes to the acceleration of liver disease progression, leading to greater mortality risk compared to HBV mono-infection [3,4].
- In Sub-Saharan Africa, data on HBV-related mortality are limited.
- We aimed to evaluate the crude all-cause mortality rates among people with chronic HBV on treatment and assessed the impact of HBV/HIV co-infection on all-cause mortality

METHODS

- We used data from the District Health Information System 2 (DHIS2) from January 2016 to June 2023.
- DHIS2 includes information on screening, diagnosis, treatment, follow-up, outcomes such as death, and various demographic and comorbidities.
- We included individuals aged 2 years and above at diagnosis who received treatment during the study period for at least one year.
- Individuals were followed from the HBV treatment initiation date until death or end of the study period (June 30, 2023).
- Individuals who received one of the following antiviral treatments: tenofovir, entecavir, and other antiviral containing lamivudine, were considered as treated for HBV.
- Multilevel Cox proportional hazard regression models, accounting for clustering by hospital, adjusting for socio-demographic and clinical characteristics, were used to assess the impact of HBV/HIV co-infection on all-cause mortality.

RESULTS

- Overall, 4,849 people received HBV treatment during the study period (3,905 with HBV mono-infection and 838 with HBV/HIV co-infection) and were followed for a median of 3.8 (interquartile range 2.8) years.
- During follow-up, 34 deaths occurred, yielding an overall crude mortality rate of 1.6 per 1,000 person-years (PY).
- The mortality rate for people with HBV/HIV co-infection was higher than that for those with HBV mono-infection (3.3 vs 1.1 per 1,000 PY, respectively).
- In the multilevel model, HBV/HIV co-infection was associated with a higher hazard of all-cause mortality (adjusted hazard ratio 3.33, 95% confidence interval: 1.47, 7.56).

Among individuals receiving HBV treatment in Rwanda, the overall mortality rate was low, but those with HBV/HIV co-infection experienced a significantly higher risk of all-cause mortality compared to those with HBV mono-infection. HBV/HIV co-infection was associated with a more than threefold increase in mortality risk, highlighting the need for enhanced clinical management and follow-up for co-infected individuals.

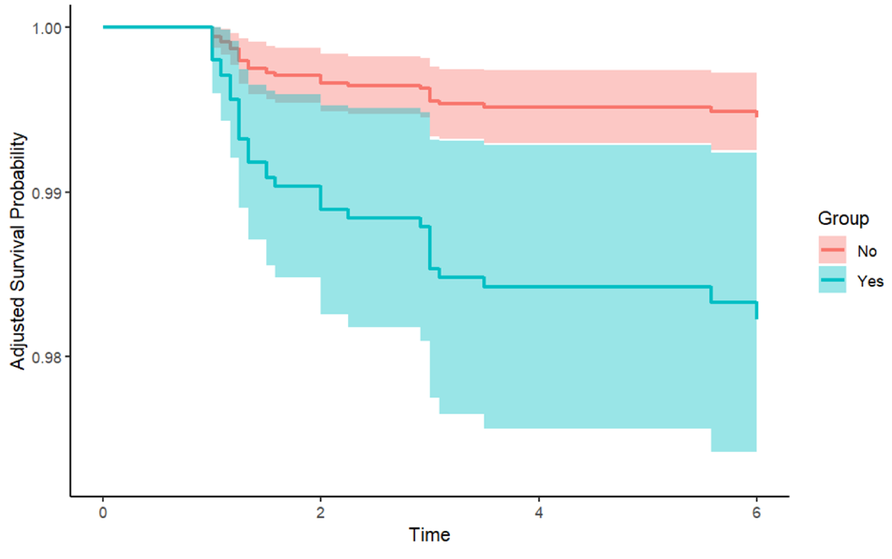


Figure 1*: HBV The 7.5 years adjusted survival probability rate of all-cause of mortality for individuals living with HBV treated for HBV mono- vs. co-infected in Rwanda.

*Soft red: individuals with HBV-mono-infection; soft blue: those with HBV/HIV co-infection

Covariates	Hazard ratios (95% confidence intervals)	
	Unadjusted	Adjusted
Coinfection HBV_HIV *(Ref: No)*		
Yes	2.47 (1.44, 4.24)	3.14 (1.56, 6.33)
Coinfection HBV_HCV *(Ref: No)*		
Yes	1.95 (0.72, 12.09)	3.39 (0.69, 16.68)
Screening period *(Ref: January 2016 to June 2023)*		
July 2019-June 2023	0.50 (0.28, 0.88)	0.51 (0.22, 1.19)
Sex *(Ref: Female)*		
Male	1.59 (0.91, 2.78)	1.22 (0.66, 2.25)
Age group *(Ref: < 35 years old)*		
35 to 54 years	1.81 (0.92, 3.57)	1.18 (0.56, 2.47)
55 years or older	1.80 (0.78, 4.16)	0.91 (0.35, 2.37)
Missing	1.15 (0.46, 2.81)	0.86 (0.27, 2.72)
Health insurance *(Ref: CBHI)*		
RAMA	1.13 (0.41, 3.14)	1.14 (0.32, 3.99)
MMI, Private or None	0.11 (0.02,0.83)	NA
Missing	0.78 (0.28, 2.16)	0.73 (0.21, 2.54)
Type of health facility *(Ref: Health center)*		
District hospital	2.29 (1.25, 4.18)	1.91 (0.93, 3.90)
Provincial and Referral	1.46 (0.75, 2.82)	4.86 (1,95, 12.11)
Cirrhosis *(Ref: No or Unknown)*		
Yes	12.08 (6.14, 23.78)	15.54 (7.23, 33.40)
Missing	2.79 (1.46, 5.32)	2.57 (1.17, 5.66)
HBV Current Treatment Regimen *(Ref: TDF based)*		
Entecavir based	0.61 (0.08, 4.43)	0.48 (0.06, 3.87)
Other antiviral	NA	NA

Table 1. Hierarchical Cox regression analysis for the association of HBV/HIV co-infection with all-cause mortality in Rwanda

CONCLUSIONS

- **Among people in Rwanda who received HBV treatment, HBV/HIV co-infection was associated with mortality risk. Moreover, HIV co-infection was associated with increased mortality risk.**
- **These findings underscore the critical importance of closer follow-up of individuals with HBV/HIV co-infection.**
- **Further studies could explore the role of HIV viral load suppression on all-cause mortality among individuals with HBV/HIV co-infection.**

REFERENCES

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