

MODIFIABLE RISK FACTORS AND INCIDENT CHRONIC KIDNEY DISEASE AND CARDIOVASCULAR DISEASE AMONG PERSONS WITH HIV AND HIV- ADULTS

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BACKGROUND

- HIV increases the risk of chronic kidney disease (CKD) and cardiovascular disease (CVD), but whether the association of preventable or treatable ("modifiable") risk factors with incident CKD or CVD is similar in persons with HIV (PWH) and HIV-uninfected people is unknown.
- We explore the extent that modifiable risk factors for CKD or CVD affected the rates of incident CKD or CVD among PWH compared with HIV-uninfected adults within multiple large integrated health systems.

METHODS

- We evaluated the association of modifiable risk factors with incident CKD (sustained eGFR <60 ml/min/1.73m^2, ≥2 measures ≥90 days apart) and CVD (hospitalized coronary heart disease, including unstable angina, or stroke) among adult (≥21 years) PWH and matched HIV-uninfected patients
- PWH and HIV-uninfected were frequency matched 1:10 on age, sex, race/ethnicity, medical center, and calendar year from Kaiser Permanente (KP) Northern California, Southern California and Mid-Atlantic States (District of Columbia, Maryland, Virginia) healthcare systems during 1/1/2000 to 12/31/2016. Patients were followed until the earliest of the clinical event of interest, health plan disenrollment, death or end of 2016.
- We excluded patients with prior known CKD or CVD.
- **Potentially modifiable risk factors included diabetes mellitus, hypertension, dyslipidemia, smoking (ever documented history within the electronic health record under smoking history) and alcohol use disorder.**
- We compared rate ratios (RRs) for each risk factor and outcome by HIV status using Poisson regression with terms for HIV status, risk factor of interest, and HIV*risk factor interaction term.
- Models additionally adjusted for sociodemographic characteristics (time-updated: age, sex, race/ethnicity, socioeconomic status, insurance type, KP region), years of KP membership, obesity (BMI>25), drug use disorder (coded within electronic health record), CKD (for CVD), CVD (for CKD).
- Results are reported individually for CKD and CVD, for PWH and HIV-uninfected. P values compare rate ratios by HIV status.

Modifiable risk factors are less strongly associated with chronic kidney disease and cardiovascular disease among people with HIV compared with HIV-uninfected people

RESULTS

- The overall cohort (PWH and HIV-uninfected) was 88% male, 38%, non-Hispanic White, 21% Black, 20% Hispanic, and 4% Asian/Pacific Islander. For age, 18% were 21-30 years old, 63% 31-50 years old, and 19% over 50 years.
  - There was no statistically significant difference between the two groups for any of these baseline demographics.
- 38,545 PWH and 384,658 HIV-uninfected without prior CKD; there were 3,084 and 10,257 incident CKD events, with rates of 1.7 and 0.5 per 100 person-years, respectively.
- 38,757 PWH and 384,404 HIV-uninfected without prior CVD; there were 1,227 and 10,039 incident CVD events, with rates of 0.6 and 0.4 per 100 patient-years, respectively.

Table. Association of modifiable risk factors with CKD and CVD among PWH and HIV-uninfected adults

CHRONIC KIDNEY DISEASE:	PWH	HIV-	P value comparing RR by HIV status
Adjusted Rate Ratio (95% CI) for risk factors by HIV status			
Alcohol Use Disorder History	0.80 (0.72, 0.89)	0.99 (0.93, 1.05)	p=0.0006
Diabetes Mellitus	1.02 (0.93, 1.22)	2.37 (2.27, 2.48)	p<0.0001
Dyslipidemia	0.71 (0.66, 0.76)	1.62 (1.54, 1.70)	p<0.0001
Hypertension	1.31 (1.21, 1.41)	4.44 (4.21, 4.68)	p<0.0001
Smoking History	0.94 (0.87, 1.01)	1.20 (1.15, 1.25)	p<0.0001
CARDIOVASCULAR DISEASE:			
Adjusted Rate Ratio (95% CI) for risk factors by HIV status			
Alcohol Use Disorder History	1.09 (0.94, 1.26)	1.19 (1.12, 1.26)	p=0.26
Diabetes Mellitus	1.47 (1.29, 1.68)	1.54 (1.47, 1.61)	p=0.54
Dyslipidemia	1.23 (1.10, 1.39)	1.58 (1.51, 1.66)	p=0.0001
Hypertension	1.79 (1.60, 2.01)	1.96 (1.87, 2.05)	p=0.14
Smoking History	1.24 (1.11, 1.40)	1.40 (1.34, 1.45)	p=0.06

Models adjusted for: demographics (updated age, sex, race/ethnicity, socioeconomic status, insurance type), drug use disorder history, years of KP membership, drug abuse (ICD code), CKD (for CVD), CVD (for CKD) and obesity (BMI>25) , and the modifiable risk factors smoking, diabetes mellitus, hypertension, alcohol use disorder, and dyslipidemia, including interaction term for that risk

CONCLUSIONS

- A differing risk profile was noted across HIV status for both CKD and CVD, as well as between CKD and CVD.
- **CKD:**
  - Risk was elevated for diabetes mellitus, dyslipidemia, hypertension and smoking among HIV-uninfected, but in PWH only hypertension remained as a modifiable risk factor associated with CKD.
  - Dyslipidemia was actually associated with a protective effect in PWH, potentially due to successful treatment for this risk factors (data not available).
- **CVD:**
  - For diabetes mellitus, dyslipidemia, hypertension and smoking, risk remains elevated regardless of HIV status, although dyslipidemia did show a trend to lower significance in PWH, again potentially due to successful treatment.
- Limitations of our analysis include lack of data on diabetes, dyslipidemia, hypertension and substance use treatment, and success/failure of such treatment.
- Mitigation of traditional clinical risk factors is important but may have a greater effect on CKD and CVD among HIV-uninfected people.
- These surprising results may indicate greater engagement in care and attention to such risk factors among PWH within our care systems.

ADDITIONAL KEY INFORMATION

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