Depressive Symptom Burden Predicts Diabetes Mellitus Control Among People Living with HIV

Poster 833

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BACKGROUND

- Depression is common among people with HIV (PWH) and increases the risk of non-communicable diseases such as diabetes mellitus (DM).
- Depressive symptoms are associated with poorer antiretroviral therapy (ART) adherence and adverse HIV outcomes, but less is known about how depression affects DM outcomes.
- Our objective was to evaluate the association between depressive symptoms and DM control among PWH and DM, and whether this relationship differs by race/ethnicity.

METHODS

SETTING

- The Center for AIDS Research Network of Integrated Clinical Systems (CNICS) is a dynamic clinical and research network of 10 HIV clinical centers in the United States.
- CNICS collects and integrates longitudinal demographic, clinical, biological and patient reported outcomes (PROs) data from over 48,000 PWH to support basic, translational, and epidemiological research.

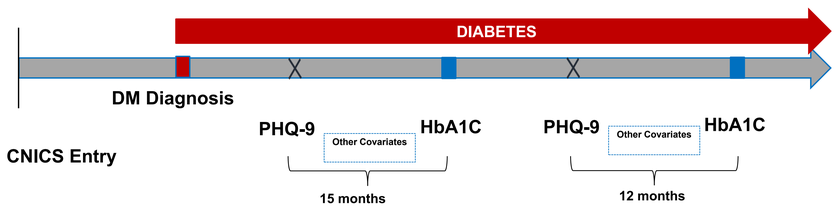
INCLUSION CRITERIA

- ≥18 years, ≥1 Patient Health Questionnaire PHQ-9 and ≥1 HbA1c measure, DM diagnosis (defined by HbA1c ≥6.5% or receipt of DM specific medication, or DM related medication and DM diagnosis).

STUDY DESIGN & DATA ANALYSIS

- Conducted a longitudinal, multilevel, repeated measures regression analysis among PWH with comorbid DM cared for at 8 of 10 CNICS between 2005-2023.
- Examined the association between HbA1c and recent depressive symptoms; PHQ-9 measured within 15 months prior to or at the date of HbA1c.

Figure 1: Analysis Schematic



- **Outcome: Diabetes control** assessed as categorical and continuous outcome (≤/>7.0% and continuous HbA1c values respectively).
- **Depression score** measured via PHQ-9 (score >9 = at least moderate symptoms).
- Additional covariates: sex at birth, race/ethnicity, HIV risk factor, CNICS site, and time-updated age, time since DM diagnosis, CD4 count, HIV RNA, year of HbA1c measurement, BMI, substance use, high-risk alcohol use, and DM medication use.
- Adjusted model for all additional covariates.
- Included natural cubic splines with 3 knots for all continuous variables.
- Included interaction terms between depression score and race/ethnicity to examine pre-specified effect modification

RESULTS

Cohort Description: N=2040 PWH and DM
Median: follow-up time 2.9 years (IQR: 0.9-5.9), 5 HbA1c measurements (IQR:3-10), time between HbA1c and PHQ-9 measurements 56 days (IQR:0-147)

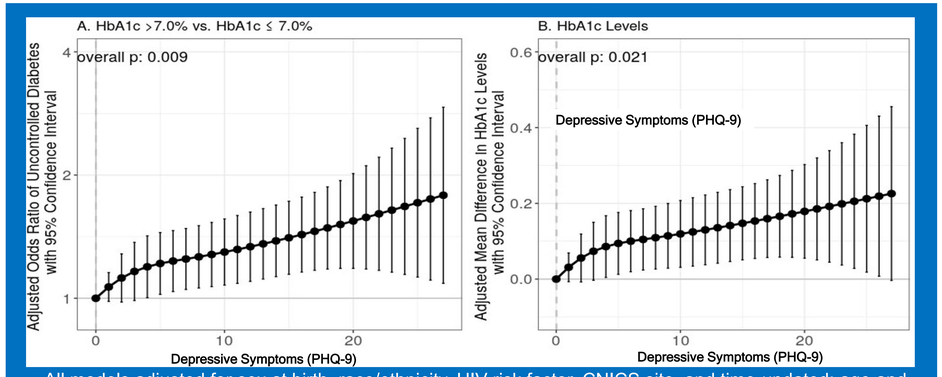
Table 1: Baseline Characteristics of Analysis Cohort Overall and By Race/Ethnicity

	NH Black* N=1012	NH White* N=650	Hispanic N=295	Other N=83	Total N=2040
Age(yrs) median [IQR]	54 [47,60]	54 [49,59]	52 [44,58]	53 [48,53]	54 [47,59]
Birth Sex Male % (N)	63% (640)	88% (570)	84% (249)	90% (75)	75% (1534)
CD4 cell count median [IQR]	644 [429,877]	612 [398,867]	551 [371,762]	522 [343,696]	617 [402,850]
HIV RNA <400/mL % (N)	89% (899)	94% (613)	93% (275)	95% (79)	91% (1866)
Years since DM diagnosis median (IQR)	1.6 [0.4, 5.9]	1.1 [0.4, 4.1]	1.0 [0.3, 3.4]	1.2 [0.5, 4.2]	1.3 [0.4, 4.7]
On DM meds % (N)	**53%** (535)	58% (376)	66% (196)	65% (54)	57% (1161)
HbA1C median [IQR]	6.5 [6.0, 7.9]	6.5 [5.9, 7.4]	6.7 [6.0, 8.1]	6.5 [6.1, 7.4]	6.5 [5.9, 7.7]
Depression diagnosis % (N)	54% (550)	62% (405)	52% (153)	52% (43)	**56%** (1151)
On Antidepressant %v (N)	**42%** (428)	61% (395)	52% (153)	48% (40)	50% (1016)
PHQ-9 >9 % (N)	**18%** (182)	25% (162)	29% (83)	30% (453)	22% (449)

**NH=Non-Hispanic*

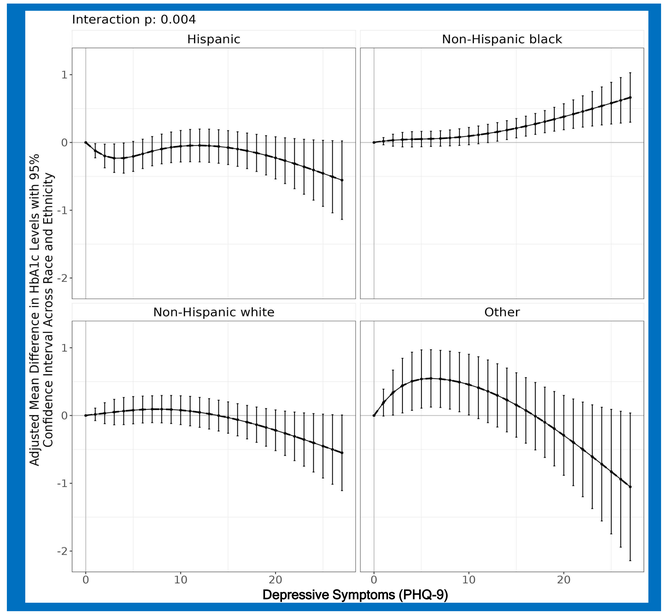
***KEY POINTS:** Diagnosed depression was prevalent (56%) and more common among NH White individuals than other race/ethnicities. Antidepressant and diabetes medication use as well as depressive symptoms were lower among NH Blacks compared to other race/ethnicities. HgbA1C did not differ significantly by race/ethnicity. P <0.01 for all significant differences.*

Figure 2: Depressive Symptoms (via PHQ-9) are Associated with Increased Odds of Uncontrolled DM (Panel A) and Higher Hba1C (Panel B)



All models adjusted for sex at birth, race/ethnicity, HIV risk factor, CNICS site, and time-updated: age and ART, and DM medication use, time since DM diagnosis, baseline CD4 count, HIV RNA, BMI, substance use, high-risk alcohol use, and year of HbA1c measurement.

Figure 3: Depressive Symptoms (via PHQ-9) Associated with Higher Hba1C Among Non-Hispanic Black Individuals, but not Other Race/Ethnicities



CONCLUSIONS

- In a multisite US cohort diagnosed depression was common among PWH and DM.
- NH Black individuals had lower prevalence of diagnosed depression, depressive symptoms, and antidepressant use than NH Whites and other race/ethnicities.
- Higher depressive symptom burden was associated with poor DM control, but this relationship differed significantly by race/ethnicity.
- Diagnosis and management of depression remains critical for long-term HIV and DM outcomes.

IMPLICATIONS

Our findings underscore the importance of targeted interventions to ensure equitable screening and access to culturally appropriate mental health services across racial and ethnic groups to optimize DM outcomes among PWH.

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