Association between alcohol and substance use severity and antiretroviral therapy (ART) adherence over time in a nationally distributed cohort of patients in care across the United States

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Background

➤ Adherence to antiretroviral therapy reduces viral load and mortality among patients with HIV

➤ An association between substance use and poor ART adherence is known

➤ However, many studies were small, cross-sectional, and did not examine individual types of illicit drugs, drug use severity or polysubstance use

➤ We hypothesized that longitudinal associations of substance use with adherence would vary by drug class and severity of use

➤ We therefore conducted this study to better understand longitudinal associations between substance use and adherence among patients in clinical care in the US with a particular focus on the impact of types of drugs, overlapping drug use, and drug use severity

CNICS

Methods

➤ Participants: HIV-infected adults, 6 sites (UW, UAB, UNC, UCSF, UCSD, Fenway), completed clinical assessment as part of routine clinical care visit using touch-screen tablets, on ART

➤ Instruments: drug use (ASSIST), alcohol use (AUDIT-C) and ART adherence (30-day VAS)

➤ For each drug class (cocaine/crack, methamphetamines/crystal, illicit opioids, and marijuana), severity of use was defined by ASSIST score (0-39 points) and alcohol severity was defined by AUDIT-C score (0-12 points)

➤ Data sources: CNICS data repository captures clinical, medication, laboratory, and sociodemographic data

Analyses

➢ Mixed effects models to examine associations between baseline alcohol and substance use and longitudinal adherence adjusting for age, race/ethnicity, sex, site, baseline CD4 and viral load, and follow-up duration

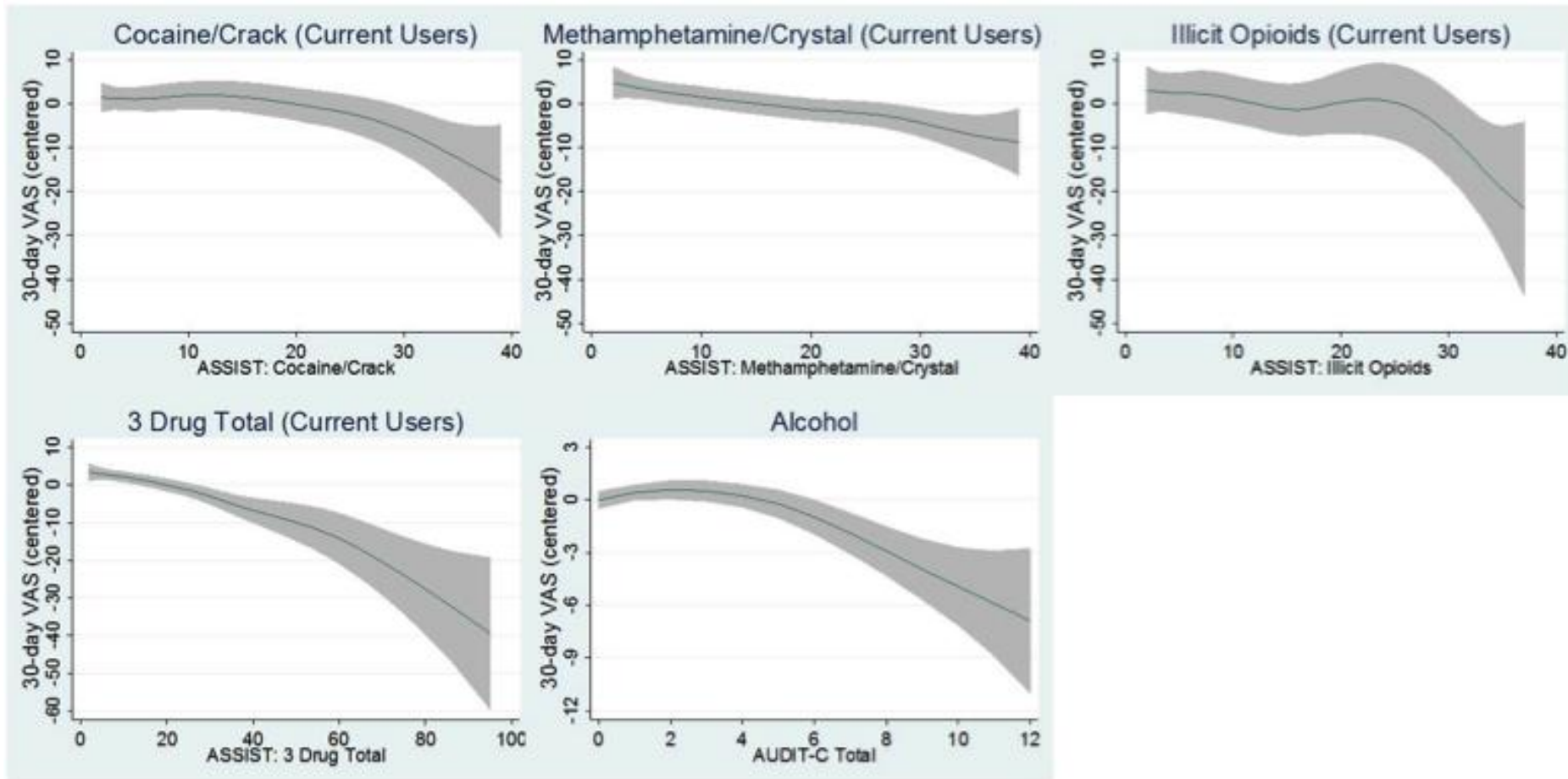➢ Sensitivity analyses included time-updated substance use

Results

- 8,672 patients completed 25,234 assessments
- Mean age was 46 years
- Mean CD4+ cell count nadir was 284 cells/mm^3
- Female sex, Black race, and Hispanic ethnicity were associated with lower adherence
- Among current users, median severity scores ranged from 7 (marijuana) to 15 (methamphetamines)

Co-occurrence of alcohol and drug use

		Methamphetamines/Crystal			Cocaine/Crack			Illicit Opioids/Heroin		
		Never	Former	Current	Never	Former	Current	Never	Former	Current
		61%	29%	10%	52%	41%	6%	86%	12%	2%
Alcohol use	No Alcohol	34%	32%	28%	34%	33%	16%	31%	43%	31%
	Not at risk	52%	47%	55%	545	48%	43%	53%	38%	41%
	At risk	14%	21%	17%	11%	18%	42%	16%	19%	28%
Methamphetamine	Never				87%	31%	46%	68%	18%	26%
	Former				9%	56%	22%	23%	68%	35%
	Current				4%	13%	32%	8%	14%	39%
Cocaine/crack	Never	74%	16%	22%				60%	7%	15%
	Former	21%	79%	56%				35%	85%	53%
	Current	5%	5%	22%				6%	8%	32%
Illicit Opioids	Never	96%	69%	74%	98%	72%	75%			
	Former	4%	29%	18%	2%	25%	15%			
	Current	1%	3%	9%	1%	3%	10%			

Generalized additive models of substance use severity and adherence

Mixed effects model to examine associations between baseline alcohol and substance use and longitudinal adherence

Amphetamine/crystal use Current, per point severity	-0.25; -0.29 - -0.22, <0.001
Cocaine/crack use Current, per point severity	-0.20; -0.26 - -0.14, <0.001
Opiate/heroin use Current, per point severity	-0.14; -0.23 - -0.05, <0.001
Marijuana use Current, per point severity	-0.10; -0.15- -0.06, <0.001
Alcohol use At-risk, per point severity	-0.24; 0.33- -0.15, <0.001

*adjusted for sex, age, race/ethnicity, site, follow-up duration

Mixed effects model to examine associations between time-updated alcohol and substance use and longitudinal adherence

Amphetamine/crystal use	
Current, per point severity	-0.37; -0.41 - -0.33, <0.001
Cocaine/crack use	
Current, per point severity	-0.34; -0.39 - -0.28, <0.001
Opiate/heroin use	
Current, per point severity	-0.21; -0.30 - -0.12, <0.001
Marijuana use	
Current, per point severity	-0.13; -0.17- -0.08, <0.001
Alcohol use	
At-risk, per point severity	-0.3; 0.39- -0.22, <0.001

*adjusted for sex, age, race/ethnicity, site, follow-up duration

Results

➢Baseline severity of use for all drugs and alcohol use were associated with significantly poorer adherence over time (p values <0.05)

➢However, the impact of baseline alcohol, methamphetamine, and cocaine/crack was approximately double that of opioid and marijuana use

➢In mixed models that included time-updated substance use, findings were similar although the impact of severity of use was greater

Strengths and limitations

➢ Strengths
- ➢ Large diverse cohort
- ➢ Multiple sites across US
- ➢ Ability to examine impact of individual drugs and alcohol use
- ➢ Ability to examine severity of use
- ➢ Ability to consider overlapping use

➢ Limitations
- ➢ Substance use and adherence collected by self-report (although not interviewer-based, no incentives)

Discussion/Conclusion

➢ Severity of substance use is associated with adherence over time and these associations differ across drug classes

➢ This highlights the importance of examining impact ond associations of substance use by individual drug class and by severity of use taking into account polysubstance use. Highlights avoiding "current substance use" and focusing on each individual drug class.

➢ Given these results, harm reduction strategies focused on decreasing severity may improve ART adherence even without achieving complete cessation.

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