Dose-response relationships of binge drinking, cannabis, inhaled nitrites (poppers), and methamphetamine with risky sex and viral load among men who have sex with men in Los Angeles

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Background

- Drug use is thought to contribute to risky sex and poor HIV management.
- Binge drinking and cannabis haven't received as much attention as methamphetamine and nitrites.
- If there are associations, do these associations show a dose-response pattern?
Data

• The mSTUDY is an ongoing longitudinal study (since 2014) of MSM in Los Angeles
  ■ who are HIV+ (and prescribed ARVs) or at risk
  ■ but who don't use injection drugs.

• We used 1,319 observations of 482 men (51% HIV+).
  ■ The 4 men who seroconverted were omitted.

• Predictors:
  ■ race; age; time between observations
  ■ self-reported frequency (in the past 6 months) of
    • binge drinking (6+ drinks)
    • cannabis, nitrites, and methamphetamine use

• DVs:
  ■ any self-reported risky sex (in the past 3 months)
  ■ detectable viral load (≥ 20 copies / mL)
Data: frequency options

- Subjects could choose these frequency options (in the past 6 months) for each drug:
  1. never
  2. once
  3. less than monthly
  4. monthly
  5. weekly
  6. daily

- Exceptions for binge drinking:
  - no "once"
  - "daily" replaced with "daily or almost daily"
Analysis

- We fit three models, varying by DV and subsample:
  1. risky sex among HIV− men (650 observations)
  2. risky sex among HIV+ men (669 observations)
  3. detectable viral load among HIV+ men (669 observations)

- Each model used logistic regression and had a per-subject random intercept.

- Each frequency of drug use gets a dummy variable.
  - No use is the reference category.

- There were 24 fixed effects in total.
Results: odds ratios: risky sex, HIV-

- Binge drinking: all near 1
- Cannabis: "less than monthly" at 1.7; others near 1
- Nitrites: "once" at 1.6; others near 2.4
- Methamphetamine: increasing with frequency from 1.5 for "once" to 9.0 for "daily"
Results: odds ratios: risky sex, HIV+

- Binge drinking: all near 1
- Cannabis: "monthly" at 0.5; others near 1
- Nitrites: inconsistent ("less than monthly" at 2.0, "once" at 0.4)
- Methamphetamine: increasing from 1.2 for "once" to 2.29 for "weekly"
Results: odds ratios: detectable viral load, HIV+

- Binge drinking: inconsistent ("monthly" at 1.8, "daily" at 0.4)
- Cannabis: inconsistent ("monthly" at 0.3; "weekly" at 2.0)
- Nitrites: inconsistent (two near 0.5; one at 1.4)
- Methamphetamine: increasing from 0.8 for "once" to 3.3 for "daily"
Summary

- Methamphetamine is bad news, and the only drug with clear evidence of a monotonic dose-response relationship.
  - The biggest effect is the 9× increase in odds of risky sex among HIV− men with daily use.
- Binge drinking has the weakest effects.
- Cannabis and nitrites have inconsistent effects at different levels
  - except for a consistent association of nitrite with risky sex among HIV− men.
Conclusions

- These results provide some support for the practice of measuring drug use dichotomously, except for methamphetamine.

- The association of methamphetamine with detectable viral load is worth further study.
  - Do methamphetamine users have more trouble taking ARVs?
  - Does methamphetamine reduce the efficacy of ARVs?