Linking Mental Health and Substance Use, and Their Subsequent Associations with HIV Risk Behavior Among Gay, Bisexual, and Other Men Who Have Sex With Men (MSM) in Vancouver, British Columbia, Canada

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Background

- Syndemic factors (e.g., substance use and mental health) are associated with HIV risk behavior among gay bisexual and other men who have sex with men (MSM)
- However, evidence examining both mental health and substance use on sexual HIV risk behavior is mixed.

Objectives

1. To develop population-weighted estimates of self reported substance use and doctor-diagnosed mental health conditions among MSM in Vancouver
2. To determine what substance use and mental health factors were associated with HIV risk

Methods

Eligibility Criteria:
- Received RDS voucher
- Aged 16 years or greater
- Gender identify as male
- Had sex with another man in the past 6 months
- Residing in Metro Vancouver

Primary Outcome:
- ***sexual HIV risk behavior*** was defined as unprotected anal intercourse with a known serodiscordant or unknown serostatus partner in the past 6 months

Explanatory Variables:
- Substance use in the past 6 months
- Alcohol Use Disorders Identification Test (AUDIT)
- Hospital Anxiety and Depression Scale (HADS)
- Doctor-diagnosed mental health disorder
- Demographics

Data Analysis
- All analyses were weighted for network size and homophily given use of RDS
- Multivariate logistic regression with manual backward selection was used to examine independent associations with risky sex (p<0.05 considered significant)

Results

Overall
- Of 719 participants recruited from February 2012 to February 2014, 23.4% were HIV-positive, 68.0% were White, and median age was 33 years (IQR 26-47)

Table 1. Sample Demographics

	n	RDS %
Sexual Identity		
Gay or bisexual	678	96
Other	41	4.0
Race/Ethnicity		
White	539	68.0
Not white	180	32.0
Immigration Status		
Citizen or Permanent Resident	683	93.5
Refugee or Visa	36	6.5
Formal Education		
No greater than secondary school	168	34.4
Greater than secondary school	537	65.6
Annual Income		
<$30,000	457	74.3
≥$30,000	262	25.7
Last HIV Test Result		
Negative	520	76.6
Positive	199	23.4
# Male Anal Sex Partners, P6M		
0-1	196	33.7
2--3	182	23.2
4--7	164	18.8
8+	176	24.3

Mental Health
- Of all 719 participants, half (52.1%) had a doctor-diagnosed mental health condition during their lifetime: Depression, 42.4%; Anxiety, 25.9%; Substance Dependence, 14.8%; and Alcohol Dependence, 6.9%.
- Of those diagnosed, 46.1% were currently receiving treatment for a mental health condition.
- A number of MSM reported multiple diagnoses: 23.5% only one diagnosis, 19.0% had two diagnoses, 7.7% had three diagnoses, and 2.8% had four or more.
- Figure 1 presents categorized HADS Scores. Median HADS-Depression score was 3 (Q1-Q3: 2-6) and HADS-Anxiety score was 8 (Q1-Q3: 5-11).
- After controlling for significant demographics and sexual behaviours, mental health diagnosis was associated with greater odds of substance use:
  - Tobacco daily (AOR=1.75 [95% CI: 1.10 - 2.80]),
  - EDDs (e.g. Viagra: AOR=2.30 [95% CI: 1.32 - 4.02])
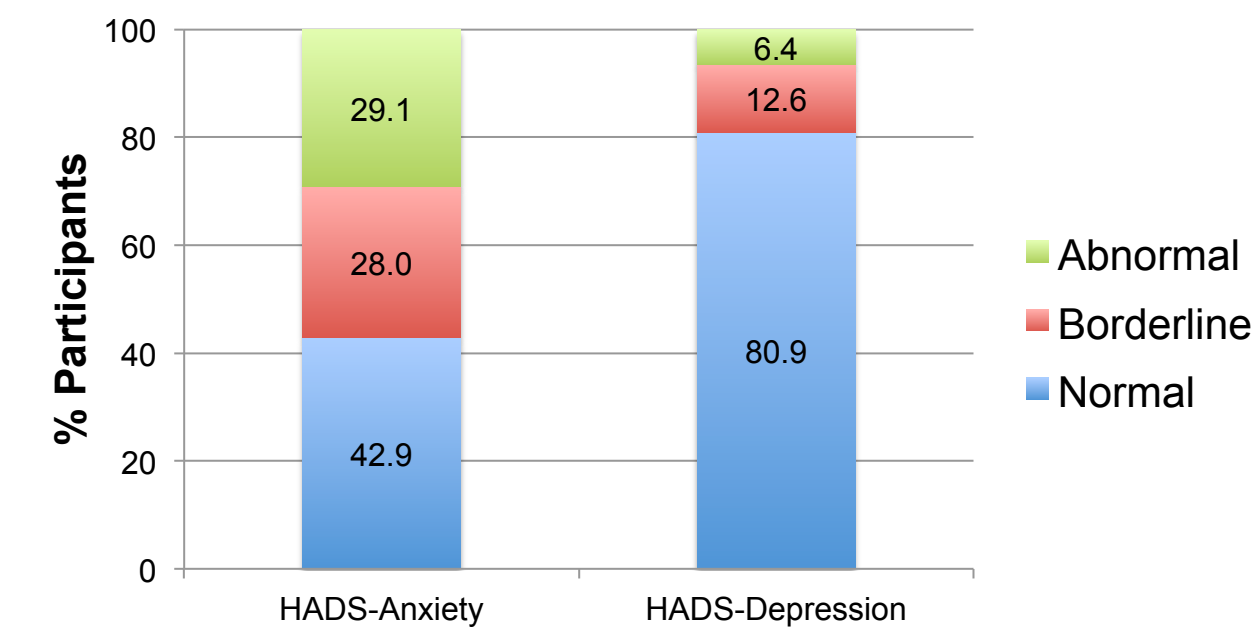 - Heroin (AOR=11.14 [95% CI: 1.24 - 100.31]).

Figure 1. Anxiety & Depression Scale Scores

Substance Use
- Alcohol, tobacco, and marijuana use were most commonly reported (see Table 2 for all substances).
- In the past 6 months, alcohol was used at least once a month by 55.8% of MSM and daily by 5.6%.
- One third (37.1%) used tobacco daily or regularly.
- One third (38.5%) used marijuana at least weekly.
- Figure 2 presents categorized AUDIT scores (median=6, Q1-Q3: 3-11).
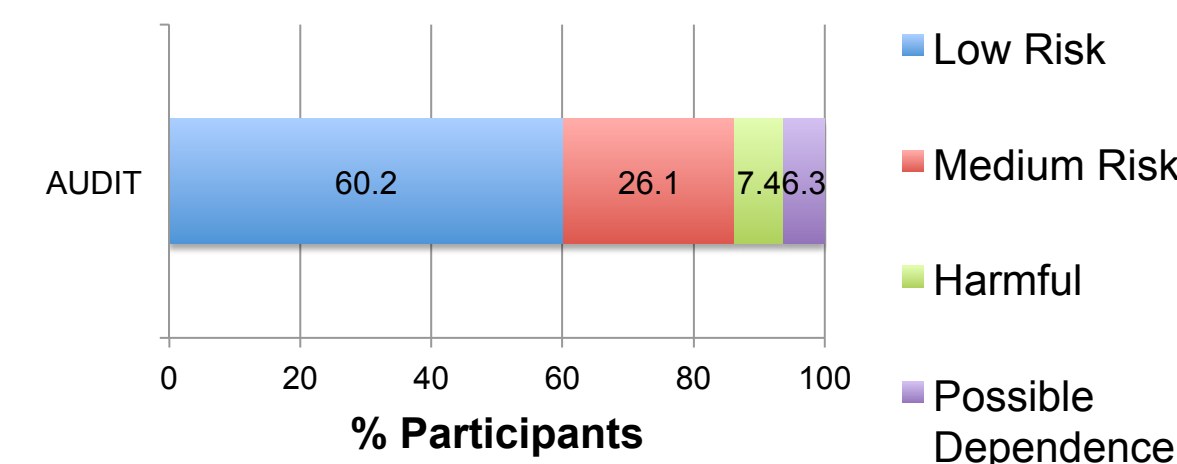

Figure 2. Alcohol Use Disorders Scores

Table 2. Recent Substance Use

Used in Past 6 Months…	n	RDS %
Poppers	266	34.1
Cocaine	179	29.5
Crystal methamphetamine	136	19.5
Ecstasy	176	18.9
GHB	125	18.3
Erectile Dysfunction Drugs	161	17.2
Crack	69	17.2
Ketamine	94	12.0
Mushrooms	82	9.7
Codeine	40	7.1
Speed	40	6.2
LSD	31	5.4
Heroin	26	4.3

HIV Risk Factors
- Of all MSM, 35.9% reported sexual HIV risk behavior
- None of the following were significant factors in the multivariable model for HIV risk (Table 3): any lifetime doctor-diagnosed mental health disorder (irrespective of current treatment status), HADS-Depression score, HADS-Anxiety score, and AUDIT score

Table 3. Preliminary multivariable model for HIV risk

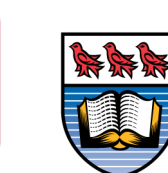|	HIV Risk No RDS %	HIV Risk Yes RDS %	AOR	95% CI
Ethnicity				
White	67.1	32.9	1.00	
Asian	71.8	28.2	0.92	0.48 - 1.76
Aboriginal	48.8	51.2	**2.42**	**1.27 - 4.63**
Latin American	35.4	64.6	**7.30**	**3.67 – 14.6**
Other	82.6	17.4	0.38	0.13 - 1.05
Annual Income				
<$30,000	66.9	33.1	1.00	
≥$30,000	57.8	42.2	**1.62**	**1.08 - 2.43**
Used EDDs in P6M				
No	70.2	29.8	1.00	
Yes	38.9	61.1	**3.01**	**1.88 - 4.81**
Used Poppers in P6M				
No	72.6	27.4	1.00	
Yes, used monthly or less	50.3	49.7	**2.65**	**1.74 - 4.03**
Yes, used weekly or more	38.3	61.7	**3.45**	**1.67 - 7.11**
Used Crystal in P6M				
No	69.1	30.9	1.00	
Yes, used monthly or less	45.8	54.2	**2.57**	**1.49 - 4.43**
Yes, used weekly or more	35.8	64.2	2.17	0.83 - 5.67
Used LSD in P6M				
No	63.2	36.8	1.00	
Yes	80.0	20.0	**0.23**	**0.09 - 0.55**
Asks Partner's HIV Status				
<50% of time	57.8	42.2	1.00	
>50% of time	66.1	33.9	0.90	0.60 - 1.37
Always (100% of time)	75.2	24.8	**0.35**	**0.21 - 0.59**

AOR = adjusted odds ratio; 95%CI = 95% Confidence Interval; P6M = past 6 months

Conclusion

- Mental health conditions and substance use were prevalent
- Our preliminary model indicated that substance use alone provides a better explanation of HIV risk, which may be due to it's proximal causal relationship to sex
- Future analyses will explore use of a syndemic framework (e.g., concurrent poly-drug use and mental health symptoms)