



Characterizing the intersection of Co-occurring risk factors for illicit drug abuse and dependence in a U.S. nationally representative sample



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ABSTRACT

Few studies have attempted to characterize how co-occurring risk factors for substance use disorders intersect. A recent study examined this question regarding cigarette smoking and demonstrated that co-occurring risk factors generally act independently. The present study examines whether that same pattern of independent intersection of risk factors extends to illicit drug abuse/dependence using a U.S. nationally representative sample (National Survey on Drug Use and Health, 2011–2013). Logistic regression and classification and regression tree (CART) modeling were used to examine risk of past-year drug abuse/dependence associated with a well-established set of risk factors for substance use (age, gender, race/ethnicity, education, poverty, smoking status, alcohol abuse/dependence, mental illness). Each of these risk factors was associated with significant increases in the odds of drug abuse/dependence in univariate logistic regressions. Each remained significant in a multivariate model examining all eight risk factors simultaneously. CART modeling of these 8 risk factors identified sub-population risk profiles wherein drug abuse/dependence prevalence varied from <1% to >80% corresponding to differing combinations of risk factors present. Alcohol abuse/dependence and cigarette smoking had the strongest associations with drug abuse/dependence risk. These results demonstrate that co-occurring risk factors for illicit drug/abuse dependence generally intersect in the same independent manner as risk factors for cigarette smoking, underscoring further fundamental commonalities across these different types of substance use disorders. These results also underscore the fundamental importance of differences in the presence of co-occurring risk factors when considering the often strikingly different prevalence rates of illicit drug abuse/dependence in U.S. population subgroups.

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1. Introduction

Substance use disorders (SUDs) contribute to a high and preventable proportion of overall disability and premature mortality in the U.S. and other developed countries. Although the burden of SUDs and their consequences are borne out differentially across different population subgroups, the varying biological, social, and environmental risk factors for SUDs remain to be determined. While existing research has examined relations between individual risk factors and drug abuse or dependence (e.g., male sex, Compton et al., 2007; Native American/Alaska Native race, Huang et al., 2006; younger age, Han et al., 2009), these risk factors along with others inevitably co-occur. However, to our knowledge, few studies have explicitly examined the manner in

which common risk factors for substance use disorders intersect when present in these inevitable combinations.

One useful way to examine associations between co-occurring risk factors and risk of substance use (e.g., current cigarette smoking, past year alcohol or illicit drug abuse/dependence) is by using epidemiological surveys (e.g., the National Epidemiological Survey on Alcohol and Related Conditions [NESARC], the National Survey on Drug Use and Health [NSDUH]). These U.S. general national population surveys present a valid depiction of SUDs based on criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), and query respondents about numerous other factors known to be associated with SUDs (e.g., demographic and socioeconomic characteristics) in a nationally representative sample. For example, Higgins et al. (this issue) used the U.S. NSDUH (2011–2013), to characterize intersections between eight co-occurring risk factors for current cigarette smoking (age, sex, education, race/ethnicity, poverty status, past year mental illness, alcohol abuse/dependence, illicit drug abuse/dependence) in adults (≥18 years). The

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results indicated that when these common risk factors for cigarette smoking co-occur, they generally act independently (i.e., their effects are not conditional on the presence of the others). Higgins et al. also compared the relative strength of the risk factors while identifying sub-population risk profiles wherein smoking prevalence ranged from 11% to 74% depending on the risk-factor combinations present.

The purpose of the present study was to examine (a) whether the pattern of intersection among co-occurring risk factors for cigarette smoking has generality to illicit drug abuse/dependence, and (b) how combinations of these common risk-factors are associated with particularly low- and high-risk profiles for illicit drug abuse/dependence. In order to facilitate comparison between the current and prior study on cigarette smoking, we used the same three years of the NSDUH (2011–2013), with past-year illicit drug abuse replacing current smoking (past month) as the dependent variable in the present report, and current cigarette smoking taking the place of illicit drug abuse/dependence as an independent variable (Substance Abuse and Mental Health Services Administration, 2012, 2013, 2014). We expanded the timeframe to past year rather than past month that was used in the study on cigarette smoking because of the lower prevalence of illicit drug abuse/dependence relative to current cigarette smoking and the need for a sufficiently large sample to examine the relations of interest. Important to underscore is that the primary purpose of this study is to characterize the nature of the intersection among co-occurring risk factors using this set of eight common risk factors for substance use and not to identify a new or comprehensive profile of variables associated with illicit drug abuse/dependence.

2. Methods

2.1. Data source

The NSDUH is an annual nationally representative cross-sectional survey of the U.S. non-institutionalized population assessing prevalence and correlates of tobacco, alcohol and illicit drug use among individuals aged ≥ 12 years (Center for Behavioral Health Statistics and Quality, 2014). Only individuals aged ≥ 18 years were included in the present study to keep age of respondents consistent with the prior study on cigarette smoking.

Data from all civilian non-institutionalized respondents, including those in group homes, shelters, and college dormitories, were included in the NSDUH survey. Respondents on active military duty, in drug treatment programs, jail or homeless were excluded. The weighted interview response rates were 74.4%, 73.0% and 71.7% in 2011, 2012 and 2013, respectively. Data were weighted during analysis to adjust for the differential probability of selection and response. A detailed description of the survey procedures is provided by SAMHSA (2013).

Past year illicit drug abuse/dependence was defined based on a statistical model developed from clinical interviews that assessed disorders based on criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The illicit drugs captured by this variable included marijuana, hallucinogens, heroin, inhalants, tranquilizers, cocaine, pain relievers, stimulants, and sedatives. With respect to the risk factors that were used as independent variables, past year alcohol abuse/dependence was based on DSM-IV criteria like drug abuse/dependence. Current cigarette smoking was defined as smoking at least part of a cigarette in the past month and ≥ 100 cigarettes lifetime. Race was defined based on the six mutually exclusive racial/ethnic categories used by the NSDUH. More specifically, respondents who identified as Hispanic may be of any race whereas those identifying as White, Black, Asian, American Indian/Alaska Native, or Other (i.e., Native Hawaiians or other Pacific Islanders and respondents of ≥ 2 races) were all non-Hispanic. Poverty status (at or below versus above the federal poverty line) was defined using thresholds determined by the U.S. Census Bureau. Past year mental illness was based on participant responses to two scales measuring psychological distress (Kessler-6) and disability

(World Health Organization Disability Assessment Schedule) where scores on both scales were used to determine the presence of any mental illness based on a statistical model derived from DSM-IV criteria.

2.2. Statistical methods

Sample-adjusted frequencies and confidence intervals (CIs) were generated across all respondents aged ≥ 18 years. We examined associations between the eight risk factors of interest (age, gender, race/ethnicity, education, poverty, smoking status, alcohol abuse/dependence, mental illness) and illicit drug abuse/dependence.

Associations of risk factors with illicit drug abuse/dependence were first examined in separate analyses. For each risk factor, weighted, univariate logistic regression analyses were conducted to identify those

Table 1

Prevalence of illicit drug abuse/dependence and results from univariate logistic regression analyses examining associations between drug abuse/dependence^a among adults (aged ≥ 18 years) and eight potential risk factors ($n = 114,426$) – National Survey on Drug Use and Health (NSDUH), United States, 2011–2013.

	Illicit Drug Abuse/Dependence		Univariate Logistic Regression	
	%	(95% CI)	OR	(95% CI)
Overall	2.5	(2.4, 2.7)		
Gender				
Male	3.4	(3.2, 3.7)	2.1***	(1.8, 2.3)
Female	1.7	(1.5, 1.8)	Ref. group	
Age group (years)				
18–25	7.7	(7.3, 8.0)	35.3***	(22.0, 56.7)
26–44	3.0	(2.7, 3.3)	13.2***	(8.3, 20.8)
45–64	1.1	(0.9, 1.3)	4.7***	(3.0, 7.3)
≥ 65	0.2	(0.1, 0.3)	Ref. group	
Race/ethnicity ^b				
White	2.4	(2.3, 2.6)	2.7***	(1.8, 3.8)
Black	3.4	(2.9, 3.9)	3.8***	(2.5, 5.6)
Hispanic	2.6	(2.3, 2.9)	2.8***	(2.0, 4.1)
American Indian/Alaska Native	5.5	(3.7, 7.4)	6.2***	(3.8, 10.1)
Asian	0.9	(0.6, 1.3)	Ref. group	
Other	3.6	(2.8, 4.4)	3.9***	(2.5, 6.1)
Education level				
<High school	3.9	(3.6, 4.3)	3.9***	(3.3, 4.5)
High school graduate	3.0	(2.7, 3.3)	2.9***	(2.5, 3.4)
Some college	2.9	(2.6, 3.2)	2.8***	(2.4, 3.3)
College graduate	1.1	(0.9, 1.2)	Ref. group	
Poverty status ^c				
Below poverty level	4.7	(4.2, 5.1)	2.3***	(2.0, 2.5)
At or above poverty level	2.1	(2.0, 2.3)	Ref. group	
Any mental illness ^d				
Yes	6.8	(6.2, 7.3)	4.5***	(4.1, 5.0)
No	1.6	(1.4, 1.7)	Ref. group	
Alcohol abuse/dependence ^a				
Yes	14.4	(13.2, 15.6)	10.0***	(9.0, 11.2)
No	1.6	(1.5, 1.8)	Ref. group	
Current cigarette smoking ^e				
Yes	7.5	(6.9, 8.1)	6.8***	(6.1, 7.6)
No	1.2	(1.1, 1.3)	Ref. group	

Notes. OR = Odds ratio, CI = Confidence interval, Ref. group = Reference group.

*** $p < 0.001$.

^a Drug and alcohol abuse and dependence criteria used in the NSDUH were defined based upon the criteria listed in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Illicit substances included marijuana, hallucinogens, heroin, inhalants, tranquilizers, cocaine, pain relievers, stimulants, and sedatives.

^b The five racial/ethnicity categories (White, Black, Hispanic, American Indian/Alaska Native, Asian, Other) are mutually exclusive; "Other" includes Native Hawaiians or Other Pacific Islanders and persons of two or more races. Persons identified as Hispanic might be of any race.

^c Based on reported family income and poverty thresholds published by the U.S. Census Bureau.

^d Any mental illness is defined by the NSDUH as a diagnosable mental, behavioral, or emotional disorder, other than a developmental or substance use disorder, that met the criteria found in the DSM-IV. For details on the methodology, see Section B.4.3 in Appendix B of the Results from the 2011 NSDUH: Mental Health Findings.

^e Persons who reported ever smoking all or part of a cigarette in the 30 days preceding the interview AND smoked ≥ 100 cigarettes in their lifetime.

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