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Characteristics of Rural Crack and Powder Cocaine Users: Gender and Other Correlates

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Abstract

Background—Little is known about the relationship of gender with cocaine use in rural areas. This study describes these relationships among stimulant users residing in rural areas of Arkansas, Kentucky and Ohio.

Objectives—Understanding characteristics of crack and powder cocaine users in rural areas may help inform prevention, education and treatment efforts to address rural stimulant use.

Methods—Participants were 690 stimulant users, including 274 (38.6%) females, residing in 9 rural counties. Cocaine use was measured by self-report of cocaine use, frequency of use, age of first use, and cocaine abuse/dependence. Powder cocaine use was reported by 49% of this sample of stimulant users and 59% reported using crack cocaine.

Findings—Differing use patterns emerged for female and male cocaine users in this rural sample; females began using alcohol, marijuana, and cocaine at later ages than males but there were no gender differences in current powder cocaine use. Females reported more frequent use of crack cocaine and more cocaine abuse/dependence than males, and in regression analyses, female crack cocaine users had 1.8 times greater odds of reporting frequent crack use than male crack users.

Conclusions and Scientific Significance—These findings suggest differing profiles and patterns of cocaine use for male and female users in rural areas, supporting previous findings in urban areas of gender-based vulnerability to negative consequences of cocaine use. Further research on cocaine use in rural areas can provide insights into gender differences that can inform development and refinement of effective interventions in rural communities.

Keywords

cocaine; rural; substance abuse; gender

Introduction

Even though the crack epidemic peaked in 1990, powder and crack cocaine use has remained a significant US public health problem. The National Survey on Drug Use and Health reports that in 2008, an estimated 5.3 million persons reported cocaine use (powder or crack) in the past year (1). In 2007, nearly 1 million people aged 12 years and older used cocaine for the first time (1).

Since illicit drug use, in general, is more prevalent in urban than in rural areas (1), the majority of research has focused on urban populations (2) and treatment settings (3). However, cocaine use has appeared in many small towns and rural areas (4;5), with rural use remaining steady at relatively high levels (1). Research on rural/urban differences in substance abuse patterns has primarily focused on alcohol use and indicates that access and availability of drugs, stigma, social networks, religiosity, and other factors are responsible for some of the differences associated with use. Little of this research has focused on rural cocaine use or characteristics of rural cocaine users.

In national samples, males typically report more cocaine use than females (18% versus 11% lifetime use in 2007) (6), with US prevalence data showing little or no decrease in powder or crack cocaine use by either gender from 2006 to 2007 (1). Although substance abuse literature has primarily focused on men (7), research on female abuse has increased in recent years (8). These studies reveal that women cocaine users typically experience higher rates of dependence and co-morbid conditions than men (9), and women progress from use to dependence at an accelerated pace (7).

Women in urban areas report drug treatment barriers, including lack of space, no childcare options, and male-oriented treatment approaches (10). Treatment in rural areas is further limited with fewer specialized substance abuse treatment services, mental health services, and health professionals than in metropolitan areas (11).

Few studies have examined community-based samples of cocaine users and even fewer have examined community-based rural users (12). This research reports results from a multi-site study of stimulant users recruited from 9 rural counties in 3 states that was conducted in order to ascertain a more complete picture of users in rural areas. This paper describes characteristics of crack and powder cocaine users and examines gender differences in use and frequency of use of cocaine in this sample of rural stimulant users. Further, the study identifies factors associated with more frequent use among crack cocaine and powder cocaine users.

Methods

Study Design and sample

This study used data from the Rural Stimulant Study (RSS), a natural history research study designed to identify stimulant users in three rural counties each in eastern Arkansas, western Kentucky and western Ohio. Rural was identified using the U.S. Census Bureau definition of a non-metropolitan area. Rural counties were chosen to provide a range of demographic characteristics. Central recruiting bases in each county were small towns with fewer than 20,000 people where there was evidence that stimulants were being used and that were within drivable distances from RSS university sites (3).

Participants were selected using Respondent-Driven Sampling, a variant of snowball sampling used to identify “hidden populations,” such as illegal drug users and HIV positive individuals. RDS has been shown to converge to stable population characteristics following

successive recruitment waves and does not require that initial recruitment “seeds” (initial study participants) be random samples of the target population. RDS, described in detail elsewhere (4), uses incentives for referral of additional subjects and requires potential participants to contact the study directly. Theoretically, RDS can provide a sample that is more representative of a hidden population than other snowballing or targeted sampling (13;14), primarily due to controls on volunteerism and masking in the recruitment process.

Study participants met the following eligibility criteria: 1) 18 years of age or older; 2) used cocaine (powder or crack) or methamphetamine by any route within the previous 30 days; 3) were not in formal treatment within the past 30 days; and 4) had a verified address in one of the selected geographic areas. Each participant provided informed consent and completed a 2-3 hour face-to-face baseline interview with a trained research staff member between October 2002 and September 2004. Complete sample methodology and details are described elsewhere (3;15).

To examine characteristics associated with more frequent use of **cocaine**, all participants interviewed at baseline were included, except for 20 participants who were of race/ethnicity other than black or white. This resulted in a sample size of 690 stimulant users for these analyses.

Measures

The outcome measures for these analyses were self-reported use in the past 30 days of crack and powder cocaine. We did not include methamphetamine in these analyses because of the complexity of defining multiple modes of administration, but we will address methamphetamine use in a subsequent paper. Analyses examined crack and powder cocaine separately because of differences in intensity and duration, adverse effects, costs and availability of powder versus crack cocaine (16). Injection cocaine use was not examined due to low injection rates in this sample. Participants using both powder and crack cocaine were included in both outcome measures.

For these analyses, type of cocaine use was categorized as no use, 1-14 days in the past 30 days (~3 times/week or less), and 15-30 days in the past 30 days (>3 times/week). These cutpoints were chosen to provide a rough method of delineating occasional from frequent users. Treatment samples sometimes use 20 days or more as the cutpoint for frequent use; however, in this non-treatment sample the number of participants using cocaine in this higher category was too small for meaningful comparisons.

Characteristics of crack and powder cocaine use included age at first use, use frequency in the previous 3 days and 6 months, injected cocaine use in the previous 6 months, and cocaine abuse/dependence in the previous 12 months. DSM-IV diagnoses of cocaine abuse/dependence were measured using the Substance Abuse Outcomes Module (17).

The independent measures examined were chosen to be representative of sociodemographic, health, social support and behavioral variables that may be associated with stimulant use. Sociodemographic variables included age (range 18-55 years), race (black/white), gender, marital status (unmarried versus married), education (< HS graduate versus HS graduate/GED or greater), and working full time (< 35 hours/week). State of residence was included in all multivariate models. Concurrent other substance use included number of days drinking alcohol and number of days smoking marijuana in the past 30 days, coded as continuous variables.

Psychological distress was measured with the Brief Symptom Inventory (BSI), which includes depression and anxiety subscales(18). Physical health was measured with self-rated

health status in the prior 6 months, categorized as excellent, very good/good, and fair/poor. Social support was measured with a 7-question scale assessing non-drug using support, coded as a continuous variable (19).

Data analysis

Bivariate analyses (Chi-square and Student's t-tests) were used to compare individual characteristics across categories of use for crack and powder cocaine. Stratified bivariate analyses were computed to describe gender-specific use characteristics for crack and powder cocaine users. A significance level of less than .05 was used for bivariate analyses.

Multivariate logistic regression models were fit by the method of maximum likelihood separately for powder cocaine and crack cocaine users to identify the relationships of the independent variables with occasional (1-14 days/month) versus frequent (15-30 days/month) use for each type of cocaine. Variables considered for inclusion in the regression models were either considered important based on previous literature (3;9;10) or were significant at $p < 0.25$ in bivariate analyses (20). In each regression model, variables that were not significant ($p > 0.05$) in the full model were eliminated from the reduced model. Exclusion of these variables did not affect the relationship of the remaining variables with the outcomes (less than 10% change in the beta) (21). All analyses were conducted with SAS statistical software.

Results

This sample of stimulant users ($N=690$) included 274 (38.6%) females. The mean age of the sample was 32.6 years (range 18 – 61 years) with males being older than females (37.1 versus 30.6 years, $p < 0.00001$). Almost 70% of the participants were white. Over all three sites, 49% of the sample used powder cocaine and 59% used crack cocaine. More details regarding the sample have been published elsewhere (3).

Table 1 shows unadjusted relationships of each variable examined in relationship to levels of crack and powder cocaine use. Although there were no gender differences comparing non-users, occasional and frequent users of crack cocaine in the past 30 days, crack cocaine users were more likely than non-users to be black, older, not working, and report greater symptoms of depression and anxiety, more days drinking alcohol, and fewer days smoking marijuana. Users of powder cocaine in the past 30 days were more likely than non-users to be male, white, unmarried, younger, and report more symptoms of anxiety and more days smoking marijuana.

Table 2 examines users of each mode of cocaine administration and describes gender-specific characteristics of these users. For both crack cocaine users and powder cocaine users, males began using alcohol and marijuana at earlier ages than females. For crack cocaine users, there were no age differences between males and female and no differences in age at first use of crack; however, female crack users used crack more frequently than males in the past 30 days and in the past 6 months, and reported greater cocaine abuse/dependence. Male powder cocaine users were younger and initiated powder cocaine use at an earlier age than female powder cocaine users but there were no other gender differences in powder cocaine use characteristics. There were no gender differences in the percent injecting cocaine in the past 6 months or in substance abuse treatment in the past 3 months or lifetime for either crack or powder users.

The regression model for frequent versus occasional use of crack cocaine (Table 3) among crack users indicates that female crack cocaine users had 1.8 times greater odds of reporting frequent crack use than male crack users. Additionally, among crack users, more frequent

crack use was associated with being black, reporting more days drinking alcohol and more days smoking marijuana. The regression model for powder cocaine users revealed no gender differences between frequent versus occasional use of powder cocaine, with more frequent powder cocaine use associated with being black, younger, and reporting greater anxiety.

Discussion

This study of rural stimulant users reveals no gender differences of high versus low frequency of use among powder cocaine users whereas female crack cocaine users reported more frequent use and were also more likely to report cocaine abuse/dependence than male crack cocaine users. These findings add insights into gender differences in rural drug use patterns and support previous findings of gender-based vulnerability to negative consequences of cocaine abuse (22). Studies have shown that females are more likely than males to develop features of cocaine dependence (23), which is supported by research in rats showing sex differences in neural and hormonal factors that influence regulation of cocaine uptake (24).

The research methods used in this study are an improvement over traditional techniques for identifying at-risk populations and allowed recruitment of diverse rural populations and entry into hidden drug-using communities; however, several limitations restrict our ability to generalize our findings. First, sampling from multiple sites could introduce some variations in recruitment, but numerous data collection methods and protocols were implemented (3) and all multivariate models statistically adjusted for site. Second, since this sample was limited to three rural areas, results may not be generalizable to all rural regions. The racial compositions varied across sites, reflecting the local population characteristics (4). The economies and attitudes in rural areas may explain some of the variations in behavior. Third, all data were self-report and therefore may be susceptible to reporting biases. Additionally, we did not include methamphetamine use in these analyses since there were very few black methamphetamine users in this sample and these few were all located in Arkansas.

These findings support future cocaine-targeted research in rural areas that includes good female representation and extends our understanding of factors associated with more frequent cocaine use, potentially with qualitative data. Further insight into gender differences in cocaine use can inform development and refinement of interventions that will be effective in preventing and treating use and abuse in rural communities.

Rural communities struggle with having enough substance abuse services due to limited funding, difficulty attracting substance abuse professionals, and logistics of providing service over large areas (25). Women in rural areas face additional barriers to treatment due to lack of personal and environmental resources, concerns about confidentiality, and cultural gender/power norms of many rural communities (8). These data support the need for substance abuse prevention, intervention and treatment programs in rural areas and emphasize the importance of including women in program outreach efforts.

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Table 1
Characteristics of Non-users, Occasional, and Frequent Users of Crack and Powder Cocaine in the Past 30 Days

Characteristic	Crack Cocaine			Powder Cocaine		
	Non-user N=282	Occasional User (1-14 days/ mo) N=239	Frequent User (15+days/ mo) N=169	Non-user N=351	Occasional User (1-14 days/ mo) N=255	Frequent User (15+days/ mo) N=84
	%	%	%	%	%	%
Female	36.9	36.0	45.0	44.7 ^a	32.2	32.1
White	85.5 ^c	69.0	45.0	65.2 ^b	78.8	61.9
Unmarried	50.7	44.4	53.3	41.9 ^c	56.1	64.3
Graduate/GED	36.5	43.9	45.0	40.5	40.8	45.2
Full-time work	23.4 ^b	19.7	9.5	19.7	17.7	17.9
Good/Excellent Health	60.5	56.5	49.1	53.2	62.4	51.2
	Mean (SD) [*]	Mean (SD) [*]	Mean (SD) [*]	Mean (SD) [*]	Mean (SD) [*]	Mean (SD) [*]
Age	29.0 (9.5) ^c	34.3 (10.6)	36.0 (9.6)	35.6 (10.2) ^c	30.1 (9.8)	27.2 (8.2)
Depressive Symptoms	4.3 (4.8) ^a	5.8 (5.6)	5.6 (5.6)	5.2 (5.4)	4.7 (4.9)	6.2 (5.7)
Anxiety Symptoms	4.5 (4.8) ^a	5.8 (5.4)	5.9 (5.9)	4.9 (5.3) ^b	4.9 (5.2)	7.1 (5.6)
Days Drinking Alcohol	6.8 (9.0) ^c	10.7 (10.9)	16.3 (11.4)	9.6 (11.2)	11.0 (10.6)	12.5 (10.5)
Days Smoking Marijuana	15.1 (12.0) ^b	11.7 (12.3)	13.4 (11.8)	10.3 (11.2) ^c	15.8 (12.2)	19.9 (11.2)

^{*} SD=Standard Deviation

^a $P < 0.05$ across user categories (non-use, occasional use, frequent use)

^b $P < 0.001$ across user categories (non-use, occasional use, frequent use)

^c $P < 0.0001$ across user categories (non-use, occasional use, frequent use)

Table 2

Gender-Specific Use Characteristics among Users of Crack Cocaine and Users of Powder Cocaine.

Characteristics	Crack Cocaine Users		Powder Cocaine Users	
	Male (N=246)	Female (N=162)	Male (N=230)	Female (N=109)
Age	35.0 (10.7)	35.1 (9.5)	28.4 (9.3) ^a	31.5 (9.7)
Age at first use of alcohol	14.0 (3.7) ^c	15.7 (4.8)	13.6 (2.9) ^b	15.1 (4.3)
Age at first use of marijuana	14.6 (4.5) ^a	15.9 (4.4)	13.6 (3.1) ^c	15.1 (3.3)
Age at first use of cocaine *	24.9 (8.7)	26.0 (8.4)	19.3 (6.1) ^b	21.4 (6.7)
Days used/past 30 days *	11.0 (9.7) ^a	13.1 (10.0)	8.3 (8.6)	8.2 (8.8)
Use in past 6 months * (1=none to 6=daily)	3.5 (1.7) ^a	4.1 (1.7)	3.1 (1.7)	3.0 (1.6)
Injected cocaine/past 6 months *	5.7%	4.9%	15.7%	12.8%
Cocaine abuse/dependence	73.2% ^a	81.5%	71.3%	69.7%
SA TX **/Past 3 months	22.0%	21.6%	21.3%	16.5%
SA TX **/Lifetime	54.5%	51.9%	43.9%	44.1%

* Characteristics are related to use of the substance listed in the columns- ie, "age at first use of cocaine" for crack cocaine users is age at first use of crack cocaine.

** SA TX = substance abuse treatment

Significant difference between males and females:

^aP<0.05

^bP<0.001

^cP<0.0001

Table 3

Odds Ratios (OR) and 95% Confidence Intervals (CI) for Frequent (15+ days/month) versus Occasional Use (1-14 days/month) in the Past 30 Days Among Crack Cocaine Users and Among Powder Cocaine Users Calculated from Logistic Regression Analyses. *

	Crack Cocaine Frequent (N=169) versus Occasional Use (N=237) OR (95% CI)	Powder Cocaine Frequent (N=84) versus Occasional Use (N=254) OR (95% CI)
Characteristics:		
Female	1.76 (1.12, 2.76) [§]	
Black	3.20 (1.84, 5.55) [‡]	3.82 (1.62, 8.98) [‡]
Age		0.96 (0.93, 0.99) [§]
Anxiety Symptoms		1.11 (1.06, 1.17) [‡]
Days Drinking Alcohol	1.04 (1.02, 1.06) [‡]	
Days Using Marijuana	1.03 (1.01, 1.05) [‡]	

* All regression models control for site.

[‡]P<0.0001

[‡]P<0.001

[§]P<0.05