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Benzodiazepine dependence among young adult participants in the club scene who use drugs

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Abstract

Young adults ages 18–29 report the highest rates of BZD misuse in the United States. The majority of club drug users are also in this age group, and BZD misuse is prevalent among participants in club scenes. This paper examines BZD dependence and its correlates among young adult participants in the electronic dance music (EDM) culture in Miami, Florida who use drugs. Structured interviews with men and women (N=356) ages 18 to 29 who reported regular attendance at EDM venues and recent use of both club drugs and BZDs. Prevalences of BZD-related problems were 12.6% for BZD dependence, 21.1% BZD abuse, and 24.2% BZD abuse and/or dependence. In a multivariate logistic regression model, younger age (OR 0.85; 95% CI 0.76, 0.96), severe mental distress (OR 8.30; 95% CI 3.07, 22.49), daily marijuana use (OR 2.10; 95% CI 1.03, 4.27), and heavy opioid use (OR 2.33; 95% CI 1.12, 4.83), were associated with BZD dependence. BZD dependence was higher in this sample than in other populations described in the literature. The links between BZD dependence, overdose history, and heavy opioid misuse are especially worrisome among this young sample. Recommendations for intervention and research are discussed.

Keywords

benzodiazepine; young adult; club drugs; drug dependence

Benzodiazepines (BZDs) are central nervous system depressants frequently prescribed for short-term use to patients suffering from anxiety, acute stress attacks, and sleep disorders (National Institute on Drug Abuse, 2005), as well as more serious mental illnesses, such as post-traumatic stress disorder (Guina et al., 2015), schizophrenia, and bipolar disorder (Brunette et al., 2003). BZDs are also often co-prescribed with opioid analgesics to chronic pain patients (Webster et al., 2015; Jones & McAninch, 2015). In the U.S., total BZD prescriptions dispensed rose 226% between 2009 and 2014 (U.S. Drug Enforcement

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Administration [DEA], 2016). Alprazolam, a short-acting medication, is the most frequently prescribed BZD.

In the U.S., non-medical use of BZDs ranks third behind marijuana and prescription opioids (SAMHSA, 2014). Relaxation and intoxication effects, Schedule IV status that contributes to prescribing (Jones et al., 2012), and very low costs in informal markets (http://streetrx.com) facilitate misuse. Past month misuse for the population ages 12 and older was estimated at about 1.7 million people in 2013 (SAMHSA, 2014). The DEA reported that seizures of alprazolam, the most common BZD involved in law enforcement actions, increased from 5.96 cases per 10,000 prescriptions during 2001–2005 to 9.39 cases for the period 2009–2014 (DEA, 2016).

Health consequences of BZD misuse have also escalated. Emergency room visits involving the medications reached almost a third of all visits in 2011 (SAMHSA, 2013), and prescription opioid-BZD combination substance abuse treatment admissions more than tripled between 2004 and 2010 (SAMHSA, 2012). Although the misuse of prescription opioids has had the larger impact on morbidity and mortality (Volkow & McClellan, 2016), BZDs have recently received increased scrutiny because of their co-occurring role in opioid overdose deaths (Volkow & McClellan, 2016) and poor treatment outcomes (Jones et al., 2012).

Benzodiazepine polydrug use among young adults

Young adults ages 18–25 report the highest prevalence of BZD misuse in the U.S. (SAMHSA, 2014). Among nightclub-going samples, most frequently young adults, prevalence approaches 65%–90% lifetime (Kelly & Parsons, 2007; Grov et al., 2009; Kurtz et al., 2013); a study of a representative sample of drug using young adults ages 18–29 recruited at clubs found a 47.1% recent (past 4 months) prevalence (Kelly & Parsons, 2007). Participants in electronic dance music (EDM) cultures are especially vulnerable to polydrug use (Kelly et al., 2015), which involves the ingestion of multiple psychoactive substances to increase or moderate the effects of other drugs. Research with club scene participants indicates that BZDs are often included in drug combinations intended to increase the intensity of intoxication (Hansen et al., 2001; Inciardi et al., 2007), to mimic the effects of a drug they could not obtain, and to come down from stimulants (Kurtz, 2004). Polydrug use involving BZDs is particularly dangerous when combined with other central nervous system depressants, including alcohol and opioids (Jones et al., 2014).

Benzodiazepine dependence

BZDs are Schedule IV under the Controlled Substances Act (CSA), indicating consensus that these drugs carry significantly lower risk of dependence compared to other drug classes like opioids or cocaine. BZD primary substance abuse treatment admissions are low; however polydrug BZD admissions are very high and rising (SAMHSA, 2012). Research suggests that BZD dependence may emerge in the context of recreational use and/or polydrug self-medication (Soumerai et al., 2003; Neilsen, 2015). Moreover, shorter-acting BZDs, such as alprazolam, may have higher abuse liability because of stronger reinforcing

effects, as well as exacerbated levels of rebound withdrawal symptoms (e.g., anxiety, insomnia) (Wolf & Griffiths, 1991; Neilsen, 2015).

Data from the National Survey on Drug Use and Health (NSDUH) indicated that 9.8% of sedative/tranquilizer misusers met DSM-IV criteria for abuse *and/or* dependence (Becker et al., 2007). A large study of club-going young adults who use drugs found 7.9% BZD dependence and 25% abuse and/or dependence prevalences (Kurtz et al., 2011). However, as with pharmaceutical opioids, much of the literature on problematic use addresses concerns with prescribing practices (Grossbard et al., 2014), and research on the epidemiology and health consequences of recreational BZD misuse among high risk groups remains scant. This paper describes the prevalence of BZD dependence among young adult participants in Miami's EDM scene who use drugs, and examines health and social problems associated with BZD dependence.

Methods

The population of Miami-Dade County, Florida, a diverse community of 2.6 million people, is 66.2% Hispanic, 18.9% Black and 14.8% White (U.S. Census Bureau, 2015). The metropolitan area is a national and international destination for partying, sexual tourism, and drug use. The county has been designated a High Intensity Drug Trafficking Area (HIDTA) by the DEA since 1990 (U. S. Department of Justice, 2011). The most recent South Florida HIDTA report specifies the misuse and diversion of controlled prescription drugs as the highest priority drug threat in the region.

Sampling plan and client recruitment

Data are drawn from baseline assessments conducted as part of a behavioral intervention trial designed for young adults who use drugs in the context of the EDM club scene. The trial is testing the efficacy of two low-threshold interventions to reduce substance use and sexual risks. A total of 498 participants completed baseline comprehensive health and social risk assessments between September 2011 and November 2014. Eligibility requirements included: 1) sex with an opposite-sex partner in the past 90 days; 2) ages 18–39; 3) use of one or more club drugs (i.e., cocaine, MDMA, GHB, methamphetamine, ketamine, LSD) at least three times in the past 90 days; 4) non-medical use (*hereafter, misuse*; "we're only interested in the times you used prescription medications other than as prescribed by a doctor, for instance, to get high, for fun, to relax or to come down") of one or more psychoactive medications at least once in the past 90 days; and, 5) attendance at large EDM nightclubs once or more in a typical month Eligibility was restricted to men and women who reported recent heterosexual behavior because the sexual risk reduction component of the intervention would need to be carefully targeted to be meaningful; men and women who also reported same-gender sex were not excluded. Substance use criteria were selected to ensure that drug use was sufficiently intense and complex as to require intervention. Pregnant women and anyone currently enrolled in a substance abuse treatment program were excluded.

The present analyses are based on a sub-sample of participants who were 18 to 29 years old and who reported at least one occasion of misuse of "a prescription sedative "such as Xanax,

Valium or Klonopin" in the past 90 days (n=356). This age group was selected for analysis because they are the most highly impacted by the prescription drug epidemic (SAMHSA 2014). Those reporting no recent BZD misuse were excluded from analysis in order to examine differences between dependent and non-dependent BZD misusers.

Participants were recruited through respondent-driven sampling (RDS) (Heckathorn, 1997, 2002). Initial respondents (seeds) were chosen for diversity in gender, ethnicity, and age, and recruited through outreach at nightclubs and existing contacts in the EDM culture. Each seed and subsequent study participant was provided with up to five recruitment coupons to give to other club drug users in their social network, with the understanding that they would earn $50 for the recruitment of each additional eligible enrolled respondent. Although participants were not recruited at nightclubs, the clubs they reported patronizing most often were large venues focused on the EDM experience.

The project was housed in a field office strategically located to facilitate access to a diverse population of club drug users. At intake, each client was screened for eligibility, followed by written informed consent, self-administered brief assessment of recent sexual risk and drug use behaviors, and randomization to a self- or interviewer-administered comprehensive health and social risk assessment. All interviews were conducted in private offices, and lasted about 90 minutes. Clients received HIV and drug education literature, condoms, and a $50 stipend upon completion of these baseline activities. Human subjects protocols were approved by the Nova Southeastern University's Institutional Review Board.

Measures

The Global Appraisal of Individual Needs (GAIN; Dennis, 2006) has eight core sections (demographics, substance use, physical health, risk behaviors, mental health, environment, legal involvement and vocational attainment), with each containing questions on the recency of problems, breadth of symptoms, and recent prevalence in days or times. The items are combined into scales to assess DSM IV-based diagnoses for substance use and mental health problems. We adapted the GAIN by expanding prescription drug categories to include a wide range of psychoactive medications. Past year abuse and dependence symptoms, as well as routes of administration, were assessed for each drug. For questions about prescription drug use, participants were asked to only report on misuse, as defined earlier.

This analysis focuses on DSM-IV-based diagnostics of BZD dependence rather than abuse, which measures event-level rather than addiction-related symptoms. BZD dependence was assessed as endorsement of three or more of seven DSM-IV dependence criteria for BZDs (the individual items are listed in Table 2). A measure of BZD abuse, defined as the endorsement of at least one of four DSM-IV criteria (the individual items are listed in Table 2), was included for comparison to some other studies which report only dependence *and/or* abuse prevalence.

Past 90 day frequencies of use for the most prevalent non-BZD substances other than marijuana (alcohol, powder cocaine and MDMA) were dichotomized at the 75th percentile, with use above that mark defined as "heavy." Heavy marijuana use was defined as daily use, which was reported by 42.7% of the sample. Substance abuse treatment history was assessed

with the question, “when was the last time, if ever, you received any counseling, treatment, medication, case management or aftercare for your use of alcohol or any drug,” and was dichotomized into “ever” vs. “never.” Overdose history was assessed with the question, “how many times in your life, if ever, have you had a drug overdose or a drug related emergency,” and was reduced for analysis to “one or more times” vs. never.”

The General Mental Distress Scale (GMDS) is comprised of past year symptom counts for depression (9 items), anxiety (12 items), and somatic disorders (4 items). This scale is reducible to classifications indicating clinical significance (subclinical, moderate and severe; Dennis, 2006) and was further dichotomized here into “severe” and “not severe.” Alpha reliability coefficients for the depression, anxiety, and somaticism subscales in this study were 0.873, 0.870, and 0.798, respectively. Childhood victimization was assessed by an affirmative response to any of the following events before age 18: being attacked with a weapon; being beaten so as to cause bruises, cuts or broken bones; being forced to participate in sexual acts against one’s will; or being abused emotionally so as to cause very bad feelings about oneself or one’s life.

Data analyses

Analyses were conducted using the IBM SPSS Statistics version 24. Descriptive statistics were calculated for demographics; substance use and related consequences, including BZD DSM-IV abuse and dependence symptoms; mental distress; and childhood victimization. Descriptive information was also compiled on participants’ age of initiation of BZD misuse, extent of lifetime and recent BZD misuse, routes of ingestion, and sources of misused BZDs.

Bivariate logistic regression models examined relationships between demographics, drug overdose and treatment histories, mental health, victimization, non-BZD substance use, and BZD dependence. Measures that exhibited significant predictive values in the bivariate models were included in a multivariate logistic regression model, using the backward step likelihood ratio procedure, withdrawing variables that failed to meet the .05 significance level.

Results

Sample characteristics

The sample includes 356 participants ages 18 to 29 who reported at least one occasion of BZD misuse in the past 90 days. Alprazolam was endorsed as the most frequently misused BZD by both non-dependent (76%) and dependent (87%) participants. Forty-five (12.6%) of recent BZD misusers met DSM-IV dependence criteria for BZDs. Demographic, substance use, mental health, and victimization history characteristics of BZD dependent and non-dependent misusers are shown in Table 1.

Mean age was 21.5 (SD = 3.2); almost half (44.7%) had completed some college education. The racial/ethnic makeup of the sample is broadly representative of the population of Miami-Dade County, and also reflects the ethnic diversity of the local EDM scene. Severe levels of mental distress were reported by 51.4% of respondents. Almost two-thirds (61.8%) said that they were victimized as minors.

Substance use

Participants reported using alcohol on an average of 46.5 days (SD = 24.5), marijuana 66.2 days (SD = 30.30), cocaine 30.5 days (SD = 25.4), MDMA 30.6 (SD = 23.50) days, and prescription opioids 33.4 days (SD = 29.1) in the past 90 days (data not shown). These were the most prevalent non-BZD substances, as 99.4% of participants used alcohol, 96.9% marijuana, 96.6% MDMA, 92.1% cocaine and 91% prescription opioids. Other current drug use included LSD (53.7% of the sample), other hallucinogens (60.4%), crack cocaine (27.5%), methamphetamine (23.9%), heroin (23.6%), and GHB (16.6%), as well as misuse of prescription stimulants (53.7%), antipsychotics (29.8%) and antidepressants (25.6%). More than three-quarters (75.6%) of BZD-dependent participants, and 13.2% of non-BZD-dependent respondents, met DSM-IV criteria for BZD abuse (21.1% overall, with a 24.2% BZD abuse and/or dependence prevalence).

Differences between BZD-dependent and non-dependent misusers

Summary results of tests for significant differences by BZD dependence status are shown in Table 1. BZD-dependent men and women were 1.5 years younger, on average, than other participants; no other demographic differences were noted. Daily marijuana use and heavy prescription opioid misuse were associated with BZD dependence, while heavy use of alcohol, cocaine or MDMA did not exhibit such relationships. Drug overdose history, severe mental distress and childhood victimization were also associated with BZD dependence.

BZD-dependent participants reported using BZDs on more than twice as many days lifetime, almost twice as many days in the past 3 months, and used nearly 2.5 times as many pills in the past 90 days, as non-BZD dependent misusers. BZD dependent misusers reported their first misuse at an average age of 16, compared to age 19 for non-dependent misusers. BZD-dependent misusers were more likely to report crushing, snorting, smoking or injecting their BZD pills compared to non-dependent participants. As well, BZD-dependent misusers identified more varied sources of illicit supply of BZD pills, and more frequently acquired them through theft and street drug dealers, compared to non BZD-dependent participants.

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Table 2 shows the percentage of BZD dependent misusers who endorsed each BZD-specific abuse or dependence criterion. Commonly endorsed abuse criteria were failing to meet responsibilities, using BZDs in unsafe situations, and using despite recognizing BZD-related social problems. Using BZDs despite repeated problems with the law was reported by less than one-quarter (22.2%) of BZD-dependent participants.

Regarding dependence criteria, about three-quarters of BZD-dependent misusers reported spending a lot of time getting, using, and feeling the effects of BZDs (75.6%) and the development of tolerance (73.3%). Majorities of BZD-dependent participants reported using more drug than intended; being unable to quit or cut down; continued use despite recognition that BZDs caused medical, emotional or psychological problems; and having problems at work, home or school because of BZD misuse. Somewhat fewer than half (44.4%) of BZD-dependent participants reported suffering withdrawal symptoms.

Results of bivariate logistic regression models predicting BZD dependence are shown in Table 3. Older age and Black race/ethnicity were associated with lower odds of BZD dependence. In terms of substance use, daily marijuana and heavy prescription opioid use were both associated with an approximate 2.5 times higher odds of being BZD-dependent, compared to participants who used these substances less frequently. Heavy use of alcohol, cocaine or MDMA was not significantly related to BZD dependence. Those with drug overdose history had 3.4 times higher odds of BZD dependence compared to those who reported no such history. Odds of BZD dependence for participants scoring in the severe clinical range on mental distress were *9.4 times higher* than for those reporting lower levels of mental distress. Those reporting childhood abuse had 2.1 times higher odds of BZD dependence than those who did not.

Finally, the significant bivariate predictors of BZD dependence were included in a multivariate logistic regression model (See Table 4). Black race/ethnicity and childhood victimization failed to reach significance in the multivariate model and were removed. Younger age, severe mental distress, and heavy use of both marijuana and prescription opioids were significantly associated with BZD dependence in the model; overdose history approached significance. Mental distress was the single most powerful influence on the BZD dependence outcome, with those reporting clinically severe levels of mental health problems having more than 8 times higher odds of BZD dependence compared to participants with lower levels of symptoms.

Discussion

Among our sample of BZD misusers, we found 12.6% prevalence of BZD dependence, 21.1% BZD abuse, and 24.2% BZD abuse and/or dependence. Other reports of prevalence of BZ dependence among BZ misusers are rare. One study of club-goers who used drugs, including BZDs, found 7.9% BZD dependence and 25% abuse and/or dependence prevalences (Kurtz et. al 2011); Becker and colleagues (2007) found a 9.8% sedative/tranquilizer abuse *and/or* dependence rate in a large national sample of sedative/tranquilizer misusers. The higher levels of BZD dependence among our sample compared to other available reports may have multiple explanations, including the multidrug use eligibility requirements for our study; higher frequencies and/or larger quantities of use by our participants compared to respondents in other reported studies; or the increase in BZD misuse among young adults in the years since those studies were completed. Although data are not available to answer these questions, BZD abuse and dependence problems may be concentrated in certain high risk populations. Compared to substance abuse treatment clients, club drug users are a hidden population that exhibits broad patterns of polydrug use. Their levels of BZD-related problems are serious concerns.

Also worrisome is the young age of BZD initiation among dependent misusers, who were age 16, on average, at BZD initiation compared to age 19 for non-dependent misusers. Recent national studies have found that almost 10% of U.S. high school seniors have been exposed to BZDs, that non-medical use exceeds medical use among them (McCabe & West 2014); and that non-medical BZD use is initiated more frequently among emerging adults than any other age group (SAMHSA, 2014).

One alarming finding is that heavy prescription opioid misusers had more than twice the odds of BZD-dependence compared to other study participants. The evolving national prescription opioid epidemic has affected young adults more than any other age group (SAMHSA, 2014), and has led to a number of indirect consequences, including BZD-opioid polydrug treatment admissions (SAMHSA, 2014) and BZD-opioid polydrug overdose deaths (Darke et al., 2014).

We also found that daily marijuana users had higher odds of BZD-dependence compared to participants who used marijuana less frequently. Although formal studies of BZD-cannabis polydrug use or BZD-cannabis drug interactions are not apparent, internet-based drug use discussion boards describe paranoia-reducing and relaxation-increasing benefits of BZDs for marijuana users.

Finally, participants reporting severe mental health distress had more than 8 times higher odds of BZ dependence compared to those with lower levels of mental health symptoms. Although we did not collect lifetime developmental data that might illuminate whether mental health problems pre-dated BZD misuse, the relationship is likely complex. Prior research demonstrates that people with psychiatric disorders experience high rates of BZD misuse and dependence (Kidorf et al., 1996; Martinez-Cano et al., 1999; Brunette et al., 2003 SAMHSA, 2011), but studies have also shown that depressive symptoms tend to decline as BZD use declines (Schreiber et al., 2008).

Our ability to generalize the findings to larger populations of EDM club participants may be limited by the study eligibility requirements requiring regular, recent use of club drugs and misuse of prescription medications. The data rely on self-report, potentially leading to underreporting of socially undesirable behaviors. Given the high levels of health and social risk behaviors reported by study participants, however, this would appear unlikely. We also note that mental distress symptoms were self-assessed rather than by clinical professionals; as such, caution is warranted when comparing the prevalence of psychological distress in our study with those using clinician-administered interviews. Finally, our analyses relied on cross-sectional data that do not enable causal conclusions between BZD dependence and the health and social problems we found.

Notwithstanding limitations, study findings are consistent with the rapidly expanding research literature and public health data indicating that BZDs are an important aspect of the prescription opioid epidemic in the U.S. However, research into psychosocial, social-environmental, structural, and policy aspects of the BZD misuse problem lags behind opioids in attention and activity. In-depth studies with high risk populations, especially youth and young adults at risk for BZD initiation, progression, polydrug use, and dependence are needed. In addition to participants in EDM cultures described here, young adults in rural and impoverished urban settings have also been shown to be at high risk (Havens, 2010; Silva et al., 2013).

The prevalence and consequences of BZD misuse among our sample emphasize the importance of strengthened measures to stem the diversion of psychoactive medications into illicit markets. BZDs are Schedule IV under the CSA, and they are inexpensive and widely

available in informal markets. Given the evidence of the role of BZDs in morbidity and mortality, the FDA recently required manufacturers of BZDs to improve labeling to address the serious risks and death from combined use with opioids (FDA, 2016). Labeling that also warns against the diversion, sharing and trading of the medications may also be helpful in reducing misuse and its consequences.

Demand reduction measures are also needed for BZD misusers who acquire their medications without the benefit of packaging describing appropriate uses and warnings. Knowledge of the risks of BZD misuse is likely low among men and women in the club scene, and these risks are exacerbated by their use of BZDs in sequence or combination with a wide range of other substances. Developing intervention approaches specific to this population is a complex undertaking, however, because drug use is considered to be fashionable, not problematic, in the club scene (Abdulrahim, Bowden-Jones, 2015). Given that young adults tend to be suspicious of public health messages about risks associated with substance use (Marsden et al., 2006; Whittingham et al., 2009; Kurtz et al., 2011), peer-based approaches would likely meet with greater success, including, perhaps, web- and venue-based informational campaigns that do not rely on expert-delivered information.

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Table 1

Sample Characteristics by past year benzodiazepine dependence (N=356)

	Non-dependent misusers		Dependent misusers	
Variable	**N (311)**	**% (87.4)**	**N (45)**	**% (12.6)**
Age (mean; SD)	23.0 (3.1)		21.5 (3.2)[1]	**
Gender				
Male	171	55.0	18	40.0
Female	140	45.0	27	60.0
Race/ethnicity				
Hispanic	221	71.1	38	84.4
Black non-Hispanic	49	15.8	1	2.2
White non-Hispanic	33	10.6	5	11.1
Other	8	2.6	1	2.2
Education				
High school diploma/GED or less	169	54.3	28	62.2
Some college or more	142	45.7	17	37.8
Health and social characteristics				
Substance abuse treatment history	76	24.4	17	37.8
Drug overdose history	64	20.6	21	46.7***
Severe mental distress (GMDS scale)	143	46.0	40	88.9***
Victimized before age 18	186	59.8	34	75.6*
Heavy substance use				
Alcohol[2]	85	27.3	13	28.9
Marijuana[2]	124	39.9	28	62.2**
Cocaine[2]	82	26.4	12	26.7
MDMA[2]	75	24.1	15	33.3
Rx opioids[2]	70	22.5	20	44.4**
DSM-IV BZD abuse	41	13.2	34	75.6***
Benzodiazepine misuse	(Mean; SD)		(Mean; SD)	
Age at first misuse	19 (3.4)		16 (2.3)	***
Days misuse lifetime	436 (618.3)		886 (763.6)	***
Days misuse past 90 days	35 (28.7)		62 (26.5)	***
Pills misused past 90 days	63 (87.2)		156 (149.4)	***
Route of ingestion	N	%	N	%
Whole pill only	232	74.6	27	60.0
Crushing, snorting, smoking, injecting	79	25.4	18	40.0*
Sources of BZD supply	N	%	N	%

	Non-dependent misusers		Dependent misusers	
Variable	**N (311)**	**% (87.4)**	**N (45)**	**% (12.6)**
Medical sources	19	6.1	4	8.9
Theft	17	5.5	9	20.0***
Dealer	239	76.8	44	97.8***
Sharing / trading	150	48.2	24	53.3

[1]Mean comparisons conducted using T-tests, and comparison of proportions conducted using chi-square tests.

[2]Heavy substance use defined as : Alcohol, 4th quartile = 65 or more days use in past 90 days; Marijuana, Every day = 90 days use; Cocaine, 4th quartile = 50 or more days use; MDMA, 4th quartile = 48 or more days use; Rx opioids, 4th quartile = 60 or more days use.

* p < .05,

** p < .01,

*** p < .001

Table 2

Abuse and dependence criteria endorsed by BZD dependent participants (N=45)

Abuse Criteria	**N**	**% of BZD dependent**
Kept using BZD, despite causing failure to meet responsibilities	24	53.3
Used BZD in unsafe or dangerous situations	22	48.9
Kept using BZD, despite causing social problems (e.g., fights)	20	44.4
BZD use caused repeated problems with the law	10	22.2
Dependence Criteria		
Spent a lot of time getting, using or feeling the effects of BZD	34	75.6
Needed more BZD to get the same high	33	73.3
Used BZD in larger amounts or more often than intended	31	68.9
Unable to cut down or stop using BZD	28	62.2
Kept using BZD despite causing medical, emotional, psych problems	26	57.8
BZD use caused you to give up or problems at work, home or school	25	55.6
Had BZD withdrawal problems (e.g., shaking, trouble sleeping)	20	44.4

Table 3

Bivariate logistic regression models predicting BZD dependence (N=356)

	p	*OR*	95% CI
Demographic characteristics			
Age	.005	0.855	0.767, 0.954
Female	.062	1.832	0.969, 3.464
Black non-Hispanic	.038	0.119	0.016, 0.885
Education > high school	.322	0.723	0.380, 1.374
Health and social characteristics			
Substance abuse treatment history	.060	1.877	0.974, 3.617
Drug overdose history	<.001	3.377	1.768, 6.449
Severe mental distress (GMDS scale)	<.001	9.399	3.613, 24.450
Victimized before age 18	.046	2.077	1.014, 4.253
Heavy substance use			
Alcohol	.827	1.080	0.541, 2.156
Marijuana	.006	2.484	1.305, 4.729
Cocaine	.966	1.016	0.501, 2.060
MDMA	.186	1.573	0.803, 3.081
Rx opioids	.002	2.754	1.444, 5.252

Table 4

Multivariate logistic regression model predicting BZD dependence (N=356)

	p	*OR*	95% CI
Age	.007	0.853	0.759, 0.958
Drug overdose history	.057	2.006	0.981, 4.102
Severe mental distress (GMDS scale)	<.001	8.300	3.063, 22.493
Heavy marijuana use	.042	2.095	1.029, 4.268
Heavy Rx opioid misuse	.023	2.327	1.122, 4.828