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Differences in Substance-related Risk Behavior Between Dual and Triple Diagnosed Severely Mentally Ill Adults

Michelle Hampton
Samuel Merritt University

Linda Chafetz
University of California, San Francisco

Carmen Portillo
University of California, San Francisco

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Abstract:

Objectives: The purpose of this study was to determine if differences exist between adults with dual and triple diagnoses with regard to substance-related risk behaviors. Methods: This secondary analysis was a cross-sectional study. There were 252 subjects with dual and triple diagnoses recruited from residential crisis programs in San Francisco. Using descriptive and logistic regression analyses, subjects in the two groups were compared with regard to demographic data, types of substances, and routes of administration used in the previous 30 days to determine risk for exposure and/or transmission of HIV/HCV. Results: When compared to the dual diagnosis group, subjects with triple diagnoses were four times more likely to have engaged in IDU (p=.001) and 2.6 times more likely to use amphetamines (p=.05). They also reported using more types of substances over the lifetime (p<.0001). But with regard to other risk behaviors such as alcohol use to intoxication and cocaine/crack use, there were no significant differences. Conclusion: Though many substance-related risk behaviors occurred in both groups, adults with triple diagnoses were more likely to engage in IDU, amphetamine use, and to use more types of substances over the lifetime. This information has the potential to inform interventions that might prevent/reduce substance-related risk in this population.

Key Words: severe mental illness, substance use, HIV, HCV

Introduction

Substance use disorders are highly prevalent among adults with schizophrenia, bipolar, and severe major depressive disorders, also known as severe mental illness (SMI). Among SMI adults in acute care settings, estimated rates of dual diagnosis range from 50-60% (Dixon, 1999; Levin & Hennessy, 2004). As a result, this population is at significant risk for the negative outcomes associated with substance use.

Of the many health risks associated with risky substance use behaviors among SMI adults, HIV (human immunodeficiency virus) and HCV (hepatitis C virus) have received increasing attention. Prevalence rates among SMI adults were reported to range between 1.7-5.0% for HIV and 19% for HCV (Rosenberg et al 2001); greatly exceeding the rates of 0.5% for HIV (McQuillan & Kruszon-Moran, 2008) and 1.6% for HCV (Armstrong, et al., 2006) in the general population.

Substance-related risk behaviors associated with HIV and HCV infection have been identified in a number of studies. Injection drug use (IDU) is a common method of direct transmission that was associated with both HIV (McKinnon & Cournos, 1998) and HCV (Butterfield, et al., 2004) in SMI populations. Studies by Osher et al and Strauss et al reported IDU rates of 17-20% among mental health consumers (Osher, et al., 2003; Strauss, Bosworth, Stechuchak, Meador, & Butterfield, 2006) that far exceeded the 0.17% rate reported for the general population (SAMSHA, 2009). In addition, another potential source of direct risk identified among this population for HCV infection was sniffing or snorting crack (S. D. Rosenberg, et al., 2001); likely related to sharing non-IDU paraphernalia (Tortu, McMahon, Pouget, & Hamid, 2004).

Substance-related risk also includes sexual risk that occurs as a result of substance use. In a study of 150 SMI outpatients, Meade & Sikkema reported that increased substance use severity was associated with sex with multiple partners and sex trading for drugs, alcohol or money (Meade & Sikkema, 2007). Furthermore, when these behaviors occur within high-risk networks, the risk is increased. Wright & Gayman, reported that mental health consumers sexual networks are frequently formed in both inpatient and outpatient treatment settings. In their study of SMI adults in the Indiana Mental Health Services and HIV Risk Study (N=401), they reported that approximately 5-9% of used injection drugs, had partners who exchanged sex for goods or money, and/or were HIV positive (Wright & Gayman, 2005).

The term triple diagnosis refers to individuals who have a diagnosis of HIV in the context of a dual diagnosis (MacPhee & Douaihy, 2005). For the purposes of this study, triple diagnosis will also include those with HCV. Not only do these infections share substance-related risk factors, co-infection was also reported in 1.7% of SMI adults and found to be associated with ongoing substance use (S. D. Rosenberg, Drake, Brunette, Wolford, & Marsh, 2005).

While it is well established that SMI adults engage in high-risk behaviors, it is unknown if there are differences in the type of substance-related risk behaviors in which adults with dual and triple diagnoses engage. The purpose of this study was to examine substance use behaviors between both groups and to compare them with regard to the types of substances and routes of administration used in the past 30 days.

Methods

Design and Sample

This cross-sectional study, approved by the University of California, San Francisco institutional review board, was based on a secondary analysis of data collected in the "Clinical Trial of Wellness Training" between 2001 and 2004 (Chafetz, White, Collins-Bride, Cooper, & Nickens, 2008). This study was a randomized controlled trial that tested a health promotion intervention. Since this cross-sectional analysis examined the participants at enrollment only, the intervention was not considered as an outcome or covariate.

Written informed consent was obtained for each participant upon recruitment from each of four crisis residential programs (CRPs) operated by Progress Foundation, a psychosocial rehabilitation organization providing a range of residential treatment programs (Chafetz, White, Collins-Bride, & Nickens, 2004). CRPs provide short-term (typically ≤14 days) voluntary residential treatment that serves as an alternative to hospital care for individuals referred from crisis services or following inpatient admission. Subjects were eligible for the study if they were 1) ≥18 years of age, 2) admitted to a CRP, and 3) able to speak English. Further details on this study can be found in Chafetz, et al (2008).

All 309 of the subjects in the clinical trial were eligible for inclusion in this study. Subjects were excluded who: 1) denied any history of lifetime substance use (n=23, none of whom reported HIV or HCV diagnoses) and spent ≥ three weeks in the hospital in the 30 days prior to enrollment (n=34). The exclusions were made to ensure that the sample represented SMI with previous histories of substance use that were not restricted from use due to confinement.

Data and Measurement

Data were obtained from several sources. The majority of data was based on self-report from baseline interviews that included selected items from standardized instruments. Comprehensive health assessments completed at the CRPs as well as mental health service utilization records were also utilized.

Mental health service utilization records. Mental health service utilization data were used to establish eligibility for the study. County billing records were included in subjects' clinical records and included all mental health services billed to the county including outpatient, psychiatric emergency, and inpatient services. For most participants, mental health service billing records (for San Francisco county) extended for a period both before and after the time frame of this study. However, there was a subset of participants whose mental health service billing records began with the residential treatment admission at the time of their recruitment into the study.

To rule out the possibility of institutionalization in another county (and thus lack of opportunity to use substances), this group of 50 was compared to the remaining 202 subjects with regard to use of five substances the 30 days prior to CRP admission: alcohol use to intoxication, amphetamines, cocaine, heroin, and marijuana. There were no significant differences between groups with regard to use of any substances except amphetamines (p=.006) and marijuana (p=.009) of which the group of 50 (with no prior mental health service billing data) exceeded the group of 202. As a result, no exclusions were necessary based on this data.

Clinical records. CRP clinical records were the source of diagnostic information. DSM-IV diagnoses reflecting the primary reason for admission were collected and grouped into four categories: schizophrenia-spectrum disorders, bipolar

disorder, major depressive disorder, and other. The other category was small and consisted of primary diagnoses of severe anxiety disorders [n=5], adjustment disorders with severe substance abuse, mood, and anxiety symptoms [n=7], and substance-related disorders with mood or psychotic symptoms [n=3]). After analyses revealed no significant differences between bipolar, major depressive, and other disorders with regard to socio-demographic variables and/or substance use outcomes, the three categories were combined and the variable was dichotomized as "schizophrenia" and "non-schizophrenia."

HIV and HCV diagnoses were obtained from records of baseline health assessments conducted by nurse practitioners and reflect self-reports and/or data from prior clinical records. Assessments included thorough and systematic history and physical examinations, but diagnoses were not confirmed with serological testing.

Quality of life interview. Descriptive data on a broad range of socio-demographic characteristics were collected utilizing relevant items from the Lehman Quality of Life Interview, brief version, I (Lehman, 2000). For the purposes of this study, data regarding age (at the time of baseline interview), gender, and race as well as items that were specific to high-risk groups of SMI adults, including being a victim of violent crime, receipt of social security benefits, and homelessness were collected and examined in bivariate analyses. Homelessness was determined by participants' report of usual housing, ≥50% of the time, over the previous six months and was dichotomized as homeless versus non-homeless (i.e. any housing, including but not limited to shelters, hotels, and board and care homes). Age was analyzed as a continuous variable.

Reliability and validity of this instrument was demonstrated in a number of studies (Lehman, 2000).

Addiction severity index. A portion of the Addiction Severity Index (ASI), lite version, was used. It measured both lifetime and recent (past 30 days) substance use in 13 categories including: alcohol for any purpose, alcohol to intoxication, heroin, methadone, other opiates or analgesics, barbiturates, other sedatives, cocaine/crack, amphetamines or stimulants, marijuana, inhalants, hallucinogens, or any other drug (McLellan, 2000).

For this study, data utilized included subject reports of the number of days of use in the past 30 days for each substance category and this count was dichotomized into either use or no use of that substance to indicate potential for exposure. Similarly, administration routes (i.e. oral, injection, smoking, or nasal) for each substance category used in the past 30 days were dichotomized as use or no use of that route. In addition, a count of the number of substance categories used over the lifetime (these data were not available for the previous 30 days) was calculated, i.e. a person who reported any lifetime use of opiates, amphetamines, and marijuana would have a count of three.

The ASI is an instrument with established reliability and validity in similar populations (Joyner, Wright, & Devine, 1996).

Analysis

The analysis was conducted using SPSS, version 11.0. Overall use of substances and administration routes used within the sample population were examined. Variables were selected based on factors significantly associated with substance use in the literature and availability in this pre-existing data set. Subjects with triple diagnoses were

compared to those with dual diagnoses descriptively on socio-demographic and substance use variables using chi-square and t-test analyses. Logistic regression models were constructed to determine the likelihood of high risk substance use behaviors while controlling for socio-demographic variables that were significant in bivariate analysis (p=.05).

Results

Demographic and Descriptive Data

There were 252 subjects included in the analysis and all reported a lifetime history of substance use in at least one of the categories assessed. The sample included predominantly White (n=113, 44.8%) males (n=175, 69.4%) with a mean age of 38.1±9.8 years and a non-schizophrenia diagnosis (n=176, 69.8%). See Table 1 for the distribution between dual and triple diagnosis groups.

Of the 252 subjects, 64 (25.4%) reported a diagnosis of either HIV or HCV (triple diagnosis) and 188 were either disease free or unaware of infection (dual diagnosis). Among the triple diagnosis group, 15 (6.0% of sample) reported a diagnosis of HIV only, 38 (15.1%) reported HCV only, and 11 (4.4%) reported co-infection with both HIV and HCV.

The most frequently used substances and routes of administration reported over the previous 30 days were examined for associations. The number of drugs used over the lifetime was significantly higher among the triple diagnosis group with a mean of five categories reported compared to 4 (p<.0001). Amphetamine use (p=.02) and IDU (p=.002) were more frequently reported amongst the triple diagnosis group as well. Of the 34 subjects who reported amphetamine use, 52.9% (n=18) reported injection as the

route of administration (not shown in table). (Although methadone use also appeared to have a significant result, the total number of methadone users (n=9) was low and was therefore excluded from subsequent analyses). There were no significant differences between groups with regard to the use of alcohol to intoxication (34.6% vs. 31.3%), cocaine/crack (23.9% vs. 31.3%), and marijuana (21.3% vs. 18.8%); nor with regard to smoking (18.6% vs. 18.8% for crack) and nasal (6.9% vs. 7.8%) routes of administration.

Substances Used in the Past 30 Days

The five most frequently used substances and the lifetime number of drug types used were entered simultaneously into a logistic regression model controlling for age and race (see Table 2). Subjects in the triple diagnosis group were 2.6 times more likely to have used amphetamines in the past 30 days than those in the dual diagnosis group (p=.05) and to report using more types of drugs over the lifetime by a factor of 1.6 (p<.0001). Dual and triple diagnosis groups did not differ in their use of alcohol to intoxication, heroin, cocaine/crack, or marijuana.

Routes of Administration Used in the Past 30 Days

In a second logistic regression analysis, all non-oral routes of administration were entered simultaneously into the model controlling for age and race (see Table 2). Subjects in the triple diagnosis group were 3.9 times more likely to report IDU in the past 30 days and were significantly older than the dual diagnosis group by a factor of 1.04 (p=.03). Use of the nasal route, smoking crack, or smoking other (non-nicotine) substances in the past 30 days did not differ between groups.

Discussion

The results of this study demonstrated that adults with triple diagnoses engaged in more substance-related risk behaviors than did those with dual diagnoses. Although historical IDU would be expected, past 30-day IDU was nearly 4 times more likely to have occurred among subjects with triple versus dual diagnoses. This highlights the risk for transmission to others and the urgent need to increase efforts to address this risk factor among adults with triple diagnosis.

Furthermore, amphetamine use was 2.6 times more likely to be reported among the triple diagnosis group in this sample (>50% by injection). A recent study of newly diagnosed HIV-positive young men found that methamphetamine use was associated with significantly higher odds of using other substances such as alcohol, marijuana, and cocaine/crack as well as reports of sex with anonymous partners (Hurt, et al., June 2010). Therefore, use of this particular drug that increased from the years 2000-2005, increased the potential for exposure in both the substance-related and sexual risk domains.

Subjects with triple diagnoses were also more likely to report significantly higher numbers of drug types used over the lifetime and older age. These two factors could indicate that over time, the severity of addiction increased and use patterns escalated to include behaviors associated with higher risk such as IDU. Older age could also indicate that there was more time for multiple exposures to occur, for subjects to develop symptoms of HIV or HCV, and to seek treatment.

For other substance-related risk behaviors, there were no significant differences between the dual and triple diagnosis groups. In particular, there were no significant differences in alcohol use to intoxication and cocaine/crack use between groups. In previous research, alcohol use was associated with higher risk of HIV among hospitalized

SMI (McKinnon & Cournos, 1998); and cocaine dependence was associated with HIV risk behaviors such as sex trading (Meade, Graff, Griffin, & Weiss, 2008) not to mention the direct HIV/HCV risk that can occur with sharing implements for snorting or smoking crack (Tortu, et al., 2004). Therefore, it is important to provide preventive care to dually diagnosed adults as well.

In the pool of potential subjects for this study, only 23 were excluded because they reported no lifetime history of substance use. Additionally, none of these 23 potential subjects were diagnosed with HIV or HCV. Considering the data regarding the high likelihood of IDU in the triple diagnosis group, it is logical to conclude that substance-related risk might at least equal if not outweigh sexual risk in this population. Nonetheless, HIV and HCV prevention studies among SMI adults have had a strong focus on reducing sexual risk (Berkman, et al., 2007; Berkman, et al., 2005; Collins, Geller, Miller, Toro, & Susser, 2001; Johnson-Masotti, Pinkerton, Kelly, & Stevenson, 2000; Padron, 2008; Pinkerton, Johnson-Masotti, Otto-Salaj, Stevenson, & Hoffmann, 2001; Sikkema, et al., 2007; Tate & Longo, 2000). Only two of the studies located in our PubMed search (keywords: HIV, HCV, prevention, severe mental illness, schizophrenia, and bipolar disorder) identified that substance use behavior change was a focus of education or intervention (Padron, 2008; Sikkema, et al., 2007). These studies included small samples (N=28 and N=53, respectively) and the results reported focused on reduction of sexual risk behaviors.

Currently, there is an absence of widely accepted evidence-based prevention interventions developed specifically for the reduction of substance-related HIV and HCV risk among SMI populations. The Compendium of Evidence-Based HIV Prevention

Interventions, first published in 1999, is a compilation of evidence-based behavioral interventions that are categorized by the high-risk group for which the intervention was developed: individuals who use substances, heterosexual adults, people living with HIV/AIDS or HCV, etc. (CDC, 2009). Although there is no specific categorization for SMI adults, the results of this study and previous research support the use of interventions aimed at substance using groups and those for people living with HIV/AIDS or HCV.

One example of a Compendium cited intervention is the "Healthy Living Program" (Rotheram-Borus, et al., 2008). In this study, 270 HIV-positive homeless individuals participated in an intensive intervention that was effective at reducing the number of risky substance use as well as sexual behaviors. Other risk management strategies falling within the harm reduction model (O'Hare, 2007) that might be effective for this population include needle-syringe (exchange) programs. Although needle-syringe programs are a resource that might have been accessed by subjects in this study, more intensive outreach and education might be required to address the risk factors associated with triple diagnoses. A study by Cao and Treolar (2006) reported that methamphetamine users were less likely to utilize needle-syringe programs than were subjects who used heroin (Cao & Treloar, 2006).

Because crack/cocaine use was as likely to occur in the dual diagnosis as the triple diagnosis group, augmenting needle-syringe programs with safe smoking and/or snorting devices, could increase their effectiveness at reducing overall risk. In a Canadian study by Leonard et al, an intervention was implemented to provide safer crack-smoking paraphernalia to users. Not only was risk associated with smoking crack reduced, but

subjects also reported that they were less likely to inject drugs as a result of greater access to safer smoking devices (Leonard, et al., 2008). Finally, Bravo et al, in their study of 900 heroin users in Spain, recommended utilizing education efforts to prevent the initiation or transition to IDU before drug tolerance and social pressures influence IDU adoption (Bravo, et al., 2003). These recommendations are a sample of the potential components of an intervention that could potentially reduce substance-related risk behaviors among SMI adults.

Strengths and limitations. This study was a secondary analysis of data from a clinical trial that had effective recruitment rates (Hampton, White, & Chafetz, 2009) and is representative of a treated community sample of SMI adults with dual diagnoses. Substance use data as well as HIV and HCV diagnoses were self-reported. Because there was no serologic confirmation of diagnoses, it is possible that HIV and HCV diagnoses were underreported. It is also possible that substance-related risk behaviors were underreported as well. Additionally, selection bias could have occurred considering participants in the study were recruited for a clinical trial and there might be inherent differences between subjects who agree to participate in a study versus those who decline.

Conclusion. While there are certain substance-related risk behaviors that are common to adults with dual and triple diagnoses, the results of this study indicate that adults with triple diagnosis are significantly more likely to engage in amphetamine and injection drug use. Interventions to reduce substance-related risk behaviors that have demonstrated effectiveness include: intensive counseling, education, and harm reduction strategies that might include continued use of needle exchange programs with specific

outreach to methamphetamine users and the addition of access to safe crack smoking implements. Considering that with time, addiction severity and subsequently HIV and HCV risk behaviors are likely to escalate, it is advisable to prioritize SMI adults as a primary target for reduction of substance-related risk behaviors for the prevention of HIV and HCV. Not only is the risk of initial exposure high, but also the risk for transmission to others is a serious concern within, but by no means confined to, the SMI population.

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Table 1. Descriptive Data: Socio-demographic and Substance Use Variables

Variable	Dual Diagnosis (n=188) n(%)	Triple Diagnosis* (n=64) n(%)	χ^2	p
SOCIO-DEMOGRAPHICS				
Gender			3.05	.08
Male	125(66.5)	50(78.1)		
Female	63(33.5)	14(21.9)		
Diagnosis			1.84	.18
Schizophrenia	61(32.4)	15(23.4)		
Non-schizophrenia (Bipolar, Major Depression, other)	127(67.6)	49(76.6)		
Homeless			.01	.92
Yes	66(35.1)	22(34.4)		
No	122(64.9)	42(65.6)		
Victim of violence past 6 months			.57	.45
Yes	56(29.9)	16(25.0)		
No	131(70.1)	48(75.0)		
Race			10.59	.03
White	78(41.5)	35(54.7)		
African American	43(22.9)	18(28.1)		
Latino	13(6.9)	5(7.8)		
Asian/ Pacific Islander	10(5.3)	0(0)		
Other	44(23.4)	6(9.4)		
**Mean Age (S.D.)	37.4±10.3	40.1±8.0	n/a	.04
SUBSTANCE-RELATED RISK BEHAVIORS				
**Mean Number of Drugs (Lifetime)	4.0±1.6	5.0±1.4	n/a	<.0001
30 DAY SUBSTANCE USE				
Alcohol to intoxication			.24	.63
No	123(65.4)	44(68.8)		
Yes	65(34.6)	20(31.3)		
Heroin			1.24	.33
No	180(95.7)	59(92.2)		
Yes	8(4.3)	5(7.8)		
Methadone			8.39	.01
No	185(98.4)	58(90.6)		
Yes	3(1.6)	6(9.4)		
Cocaine/crack			1.33	.25
No	143(76.1)	44(68.8)		
Yes	45(23.9)	20(31.3)		
Amphetamines			5.17	.02
No	168(89.4)	50(78.1)		
Yes	20(10.6)	14(21.9)		
Marijuana			.19	.67
No	148(78.7)	52(81.3)		
Yes	40(21.3)	12(18.8)		
30 DAY ROUTE OF ADMINISTRATION				
IDU*** last 30 days			9.86	.002
No	172(91.5)	49(76.6)		
Yes	16(8.5)	15(23.4)		
Smoking last 30 days(non-crack, non-nicotine)			.005	.94
No	152(80.9)	52(81.3)		
Yes	36(19.1)	12(18.8)		
Smoking last 30 days (crack)			.001	.98
No	153(81.4)	52(81.3)		
Yes	35(18.6)	12(18.8)		
Nasal use last 30 days			.06	.78
No	175(93.1)	59(92.2)		
Yes	13(6.9)	5(7.8)		

*Includes HIV and/or HCV diagnoses; **t-test used; ***IDU=injection drug use

Table 2. *Substances and Routes of Administration Used in the Past 30 Days by Adults with Dual and Triple Diagnoses

Independent Variable	**Adj. Odds Ratio	95% CI	p
SUBSTANCES USED			
Alcohol to intoxication last 30	.58	.27-1.24	.16
Heroin last 30	1.04	.26-4.14	.96
Cocaine/crack last 30	1.47	.69-3.12	.32
Amphetamines last 30	2.60	1.02-6.67	.05
Marijuana use last 30	.55	.23-1.32	.12
Number of drugs over lifetime	1.60	1.28-2.01	<.0001
Age	1.03	.99-1.07	.10
Race			
White (reference)			.18
AA	.95	.45-1.98	.88
Latino	.62	.18-2.13	.45
Asian	.001	.000-3.06E+12	.70
Other	.33	.12-.88	.02
ROUTES OF ADMINISTRATION			
IDU last 30 days *	3.90	1.67-9.04	.001
Smoking route (other than crack or nicotine)*	1.07	.46-2.45	.88
Smoking route (crack) last 30*	1.16	.52-2.59	.72
Nasal route last 30*	.95	.29-3.16	.94
Age	1.04	1.00-1.07	.03
Race			
White (reference)			.26
AA	.95	.46-1.94	.88
Latino	.77	.23-2.55	.67
Asian	.001	.000-5.19E+09	.70
Other	.29	.11-.78	.03

*Reference category: dual diagnosis
**Adjusted by race and age
Continuous variable(s) are in italics.