

# Co-Occurring Polysubstance Use and Physical Disease of Persons with Mental Disorders in Residential Treatment Program

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## Abstract

The purpose of this study was to describe the prevalence of co-occurring polysubstance use and to examine the differences in physical disease between polysubstance users and single/no substance users with mental disorders. This retrospective cross-sectional study included 1949 clinical records of psychiatric patients from 11 residential treatment programs between 2007 and 2011. Demographic variables, psychiatric diagnoses, and data on substance use and physical disease were obtained from the clinical records. Chi-square analyses were used to examine substance use difference in the prevalence of each physical disease category. This study found that the prevalence of co-occurring polysubstance use was 53.5%. Chi-square analyses identified that co-occurring polysubstance users reported more respiratory, digestive, musculoskeletal, and HIV/AIDS diseases but less endocrine diseases than single/no substance users. Therefore, integrated treatment programs for treating patients with co-occurring substance use and physical disease should be developed and expanded for this high-risk group.

## Keywords

Mental Disorders, Physical Disease, Polysubstance Use

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## 1. Introduction

Current research studies have explored relationships among mental disorder, substance use, and physical disease. Persons with mental disorders compared to those without mental disorders reported higher prevalence in binge drinking (31% vs. 25%) and illicit drug use (37% vs. 16%). This past-year's preva-

lence of co-occurring substance use and mental disorder was 3.7% [1] and lifetime prevalence was about 7% based on another study [2]. Persons who used substances such as cocaine, cannabis, opiates, and amphetamines were more likely to report psychotic symptoms compared to those who did not use substances [3]. However, among Medicaid beneficiaries, there was no significant difference in the prevalence of substance use between persons with mental disorders and those without mental disorders [4]. Although there were some inconsistent findings in the prevalence of co-occurring substance use and mental disorder, it is generally considered that mental disorder is a risk factor for substance use.

In terms of physical disease, Medicaid beneficiaries with mental disorders reported a significantly higher prevalence of physical diseases such as hypertension, heart disease, diabetes, gastrointestinal disorders, skin infections, malignant neoplasm, asthma, and acute respiratory disorders than those without mental disorders. Also, persons with mental disorders showed a higher prevalence in having two or more physical diseases than those without mental disorders (26% vs. 12%) [4]. In another study, about 20% of the psychiatric patients reported substance use and showed higher prevalence in infectious and digestive diseases. Co-occurring substance users, however, showed a lower prevalence in endocrine disease [5]. Based on the literature, having mental disorders with or without substance use may lead to an increased risk of certain types of and numbers of physical disease.

Although knowledge about the relationships among mental disorder, substance use, and physical disease has been established, little is known about co-occurring polysubstance use and physical disease in persons with mental disorders. Polysubstance use refers to the concurrent or simultaneous use of two or more substances including illicit drugs or non-medically used prescription-type drugs with a dependence upon at least one substance [6]. Polysubstance use is common among substance users. In publically funded treatment programs, 56% of the users were admitted for treatment of their polysubstance use [7]. The most common pattern of polysubstance use was the combination of alcohol and other drugs. About 12% of the polysubstance users reported a combination of alcohol and cocaine, followed by 8.9% reporting a combination of alcohol, cocaine, and marijuana, and 7.4% reporting a combination of alcohol and marijuana [8]. Co-occurring polysubstance users may have an increased risk of physical disease, thus needing more intensive treatment and care than single/no substance users. Therefore, there is a need to look at substance use differences in physical diseases in persons with mental disorders.

The purposes of this study were to 1) describe the prevalence of co-occurring polysubstance use in patients with mental disorders in residential treatment programs; and 2) examine differences in the prevalence of physical disease between co-occurring polysubstance users and single/no substance users in residential treatment programs.

## 2. Methods

### 2.1. Study Design

This study used a retrospective cross-sectional design to look at the prevalence of co-occurring polysubstance use and physical disease in residential treatment program users with mental disorders. It used clinical data obtained from residential treatment programs in California. This data was from the Primary Health Care for the Mentally Ill Adults study (Principal Investigator: Dr. Chafetz). This study was approved by the Committee on Human Research, University of California San Francisco (UCSF).

### 2.2. Sample and Setting

This study included 1949 adult patients with mental disorders in the San Francisco Bay Area, California. This study was conducted between 2011 and 2013. Inclusion criteria were: 1) being at least 18 years old; 2) having at least one psychiatric disorder; 3) ever having used residential treatment services provided by the UCSF School of Nursing's clinical faculty between 2007 and 2011; and 4) having a recent clinical record if one had received services more than one time. Exclusion criteria were: 1) being under 18 years old; 2) never having been diagnosed with a psychiatric disorder; 3) never having used residential treatment services provided by the UCSF School of Nursing's clinical faculty between 2007 and 2011; and 4) not having a recent clinical record if one had received the services more than once.

The settings were 11 residential treatment programs including crisis, transitional, and long-term treatment programs, operated by the San Francisco Progress Foundation. Individuals who are referred from inpatient or crisis services are provided with voluntary care in these home-like programs. As a faculty community outreach practice, the clinical faculty at the UCSF School of Nursing provide integrated primary health care to the residential treatment program users.

### 2.3. Data Collection

Data were extracted from clinical records by Nurse Practitioners (NPs). Demographic variables included age; gender (male vs. female); race/ethnicity (European American, African American, Mexican American, and others); living condition (homeless vs. other housing); insurance status (insured vs. uninsured); and smoking status (current smoker vs. non-smoker). Initially, up to three psychiatric diagnoses were extracted from the clinical records, and then the principal psychiatric diagnosis, which was the main reason for the referral to these residential treatment programs, was used for this study. Classifications based on the Diagnostic and Statistical Manual-IV (DSM-IV) included schizophrenia; schizoaffective disorder; bipolar disorder; depressive disorder; anxiety disorder; psychosis not otherwise specified (PNOS); and other psychiatric disorders (*i.e.* eating disorders, etc.) [9]. Substance use was noted as yes/no for current use of alcohol, stimulants, marijuana, opiate, sedative/hypnotics, and hallucinogens, and then

dichotomized into polysubstance use vs. single/no substance use. All medical diagnoses or chief complaints were initially taken from the clinical records, and then categorized into one of the major six disease categories based on the international classification of diseases-9 (ICD-9): circulatory disease (hypertension and other cardiac diseases); respiratory disease (asthma, emphysema, chronic obstructive pulmonary disease (COPD), bronchitis, and upper respiratory infection (URI)); digestive disease (gastrointestinal conditions and liver disease); endocrine disease (diabetes and thyroid disease); musculoskeletal disease (joint disease and injuries); and HIV/AIDS infection [10].

## 2.4. Data Analyses

The SPSS 21 was used to analyze data in this study. In order to explore sample characteristics, descriptive statistics were used including mean ( $M$ ) and standard deviations ( $SD$ ) for age and frequencies and percentage for all categorical variables. Participants with two or more substances were categorized as polysubstance users and those with at least one substance as single/no substance users. In order to examine substance use differences in the prevalence of physical disease, Chi-square tests were analyzed for each physical disease between polysubstance users and single/no substance users. Significance level was set at an alpha level of 0.05.

## 3. Results

The demographic characteristics of the participants are shown in **Table 1**. The mean age of the participants was 41.6 years ( $SD = 11.6$ ). About 67% ( $n = 1314$ ) of the participants were males and about 33% ( $n = 635$ ) were females. Of the racial/ethnic groups, about 46% ( $n = 900$ ) of the participants were European American, followed by 28.5% African American ( $n = 555$ ), 13.2% other racial/ethnic groups ( $n = 257$ ), and 12.1% Mexican American ( $n = 237$ ). About 62% of the participants were homeless and insured. Most of the participants were current smokers ( $n = 1459$ , 80.0%). For the principal psychiatric disease, about 40% ( $n = 781$ ) of the participants had depressive disorder, followed by 13.1% bipolar disorder ( $n = 255$ ), 11.6% PNOS ( $n = 227$ ), 11.0% schizophrenia ( $n = 214$ ), 10.9% other minor psychiatric disorders ( $n = 212$ ), 9.1% schizoaffective disorder ( $n = 178$ ), and 4.2% anxiety disorder ( $n = 82$ ).

**Table 2** shows the patterns of substance use among the study's participants. Among substances, alcohol was the most commonly used substance ( $n = 1204$ , 61.8%), followed by stimulants ( $n = 1000$ , 51.3%), marijuana ( $n = 626$ , 32.1%), opiates ( $n = 358$ , 18.4%), sedatives/hypnotics ( $n = 175$ , 9.0%), and hallucinogens ( $n = 125$ , 6.4%). More than half of the participants ( $n = 1042$ , 53.5%) were identified as polysubstance users and 46.5% ( $n = 907$ ) as single/no substance users.

Prevalence of physical disease is shown in **Table 3**. Circulatory disease ( $n = 459$ , 24.0%) was the most frequently reported disease, followed by digestive disease ( $n = 445$ , 22.8%), musculoskeletal disease ( $n = 364$ , 17.4%), respiratory

**Table 1.** Demographic characteristics of the participants ( $n = 1949$ ).

<b>Variable</b>	<b><i>n/M</i></b>	<b><i>%/SD</i></b>
<b>Age</b>	41.6	11.6
<b>Gender</b>		
Male	1314	67.4
Female	635	32.6
<b>Race/Ethnicity</b>		
European American	900	46.2
African American	555	28.5
Mexican American	237	12.1
Others	257	13.2
<b>Living condition</b>		
Homeless	1213	62.2
Others	736	37.8
<b>Insurance</b>		
Insured	1136*	62.6
Uninsured	679*	37.4
<b>Smoking status</b>		
Smoker	1459*	80.0
Non-smoker	365*	20.0
<b>Principal psychiatric disorder</b>		
Schizophrenia	214	11.0
Schizoaffective disorder	178	9.1
Bipolar disorder	255	13.1
Depressive disorder	781	40.1
Anxiety disorder	82	4.2
Psychosis, not other specified (PNOS)	227	11.6
Other minor psychiatric disorders	212	10.9

Note: \*valid case only.

**Table 2.** Patterns of substance use ( $n = 1949$ ).

<b>Variable</b>	<b><i>n</i></b>	<b><i>%</i></b>
<b>Types of substance</b>		
Alcohol	1204	61.8
Stimulants	1000	51.3
Marijuana	626	32.1
Opiate	358	18.4
Sedatives/Hypnotics	175	9.0
Hallucinogens	125	6.4
<b>Types of substance user</b>		
Polysubstance user	1042	53.5
Single/No substance user	907	46.5

**Table 3.** Chi-square analyses for physical disease between polysubstance and single/no substance users ( $n = 1949$ ).

Variable	Polysubstance user		Single/No substance user		$\chi^2$ ( $p$ )	Total (%)
	$n$	%	$n$	%		
Circulatory Disease	224	48.8	235	51.2	1.7 (0.19)	459 (24.0)
Respiratory Disease	174	57.0	131	43.0	5.0*	305 (15.6)
Digestive Disease	265	59.6	180	40.4	8.3**	445 (22.8)
Endocrine Disease	100	45.2	121	54.8	6.4*	221 (11.3)
Musculoskeletal Disease	222	61.0	142	39.0	9.8**	364 (17.4)
HIV/AIDS infection	92	66.7	46	33.3	9.8**	138 (7.1)

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ .

disease ( $n = 305$ , 15.6%), endocrine disease ( $n = 221$ , 11.3%), and HIV/AIDS infection ( $n = 138$ , 7.1%). Chi-square results showed that polysubstance users reported significantly higher proportions of respiratory disease (57.0% vs. 43.0%,  $p < 0.05$ ), digestive disease (59.6% vs. 40.4%,  $p < 0.01$ ), musculoskeletal disease (61.0% vs. 39.0%,  $p < 0.01$ ), and HIV/AIDS infection (66.7% vs. 33.3%,  $p < 0.01$ ) compared to single/no substance users. On the contrary, polysubstance users reported a significantly lower proportion of endocrine disease (45.2% vs. 54.8%,  $p < 0.05$ ) compared to single/no substance users. There was no significant difference in the prevalence of circulatory disease between the two groups.

#### 4. Discussion

This study investigated the prevalence of co-occurring polysubstance use and whether there was a significant difference in physical diseases between polysubstance users and single/no substance users in residential treatment programs. The prevalence of co-occurring polysubstance use was 53.5% in this study population. Chi-square analyses revealed that polysubstance users with any type of mental disorder reported more respiratory disease, digestive disease, musculoskeletal disease, and HIV/AIDS infection but less endocrine disease than single/no substance users.

Over 60% of this study population was homeless due to the characteristics of the study settings, residential treatment programs located in the San Francisco Bay area, which has a high number of homeless people. The population also showed a higher prevalence of polysubstance use which is consistent with findings from another study showing that an unstable housing condition, especially homelessness, is a risk factor for substance use [11]. In this study, depressive disorder was a major psychiatric disorder which was inconsistent with the findings from another study with Asian Americans in which more than half of the study sample had schizophrenia and schizoaffective disorder [12]. This suggests that further analyses are recommended to examine racial/ethnic differences in the prevalence of psychiatric disorders. Schizospectrum disorders including schi-

zophrenia, schizoaffective disorder, and PNOS took the 2<sup>nd</sup> major psychiatric disorder. Bipolar disorder and anxiety disorder, however, were uncommon in this study sample. Although there are psychiatric diagnoses differences in the prevalence of substance use, *i.e.* depressive disorder is a risk factor for alcohol use whereas schizophrenia is a protective factor for alcohol use [12] [13] [14], having a mental disorder is generally considered to increase vulnerability to substance use. When considering that 40% of this study sample had depressive disorder, it is not surprising that the prevalence of co-occurring polysubstance use was 53.5% in this study population, which was comparable to findings from SAMHSA [7]. Combination patterns of substances have not been examined in this study, however, other literatures consistently have supported that the combination of alcohol and one or more substances is the common polysubstance pattern [8] [15].

Findings from this study identified that polysubstance users with mental disorders experienced more digestive and HIV/AIDS diseases, which were consistent with findings from another study that showed co-occurring substance use as a risk factor for digestive and infectious diseases [5]. Moreover, this study found that polysubstance users reported more respiratory and musculoskeletal diseases because using multiple substances rather than a single substance may have more deteriorating effects on almost all body systems. On the other hand, polysubstance users in this study reported less endocrine disease which was consistent with report from Frasch *et al.*'s study [5]. This finding can be supported by the understanding that endocrine disease, especially diabetes, is a common complication of 2<sup>nd</sup> generation antipsychotics which are often used to treat psychotic symptoms for schizophrenic patients, and polysubstance use is less common among schizophrenic patients [13] [14]. Further studies are needed to examine the interactions between polysubstance use and each psychiatric disorder on each physical disease to specifically determine which patients are at high risk.

Dickey and colleagues [4] found that the total mean annual treatment cost for schizophrenic patients with substance use disorder was 75% higher than that of schizophrenic patients without substance use disorder and that the number of people hospitalized was also three times higher in the comorbidity group. However, there is a lack of studies comparing treatment costs and hospitalization rates between co-occurring polysubstance users and single/no substance users receiving care for their physical diseases. Integrated treatment services for patients with psychiatric disorders and co-occurring substance use along with prevention and early screening strategies should be expanded to improve physical health outcomes, thereby reducing medical costs.

### **Study Limitations**

This study used a cross-sectional design to explore differences in the prevalence of physical disease by polysubstance users and single/no substance users with mental disorders in residential treatment programs, meaning a causal relation-

ship cannot be guaranteed. The sample for this study came from residential treatment programs where the homeless were overrepresented; therefore, there may be skewed findings such as the high prevalence of severe mental disorders, polysubstance use, and physical diseases. Due to the limitations of the Chi-square analyses used in this study, important variables such as age, smoking status, and mental disorders which may be potential risk factors for physical disease, were not controlled, indicating the need for further research study.

## 5. Conclusion

This study found that polysubstance users with mental disorders had more respiratory, digestive, musculoskeletal, and HIV/AIDS infectious diseases compared to single/no substance users with mental disorders. Therefore, strategies to manage comorbid physical disease and polysubstance use in patients with mental disorders should include prevention and early screening of co-occurring polysubstance use in high-risk groups, and the development and implementation of appropriate and adequate comprehensive treatment services to integrate medical and psychiatric services.

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## Conflicts of Interest

The authors declare that they have no competing interests.

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