



Original contribution

Patterns and correlates of drug-related ED visits: results from a national survey

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Abstract

Purpose: Drug treatment can be effective in community-based settings, but drug users tend to underuse these treatment options and instead seek services in emergency departments (EDs) and other acute care settings. The goals of this study were to describe prevalence and correlates of drug-related ED visits.

Basic procedures: This study used data from the National Epidemiologic Survey on Alcohol and Related Conditions, which is a nationally representative survey of 43 093 US residents.

Main findings: The overall prevalence of drug-related ED visits among lifetime drug users was 1.8%; for those with a lifetime drug use disorder, 3.7%. Persons with heroin dependence and inhalant dependence had the highest rates of ED visits, and marijuana dependence was associated with the lowest rates. Multivariate analyses revealed that being socially connected (ie, marital status) was a protective factor against ED visits, whereas psychopathology (ie, personality or mood disorders) was a risk factor.

Conclusions: Significant variability exists for risk of ED use for different types of drugs. These findings can help inform where links between EDs with local treatment programs can be formed to provide preventive care and injury-prevention interventions to reduce the risk of subsequent ED visits.

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Drug use and abuse is a major public health problem that can lead to serious health consequences, criminal involvement, employment problems, strained relationships, home-

lessness, poor treatment compliance and outcomes, and lower quality of life [1-5]. Drug treatment can be effective in community-based settings, but drug users tend to underuse these treatment options and instead seek services in emergency departments (EDs) and other acute care settings [6-9]. These settings are often the most expensive and least effective way of addressing drug problems. Research on

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substance use disorders consistently demonstrates that drug problems often require treatment over the course of several months [10]. Recent research also shows that drug-related ED use is increasing [11], resulting in billions of dollars in costs to the public health care system [12-17]. The costs are even higher when other drug treatment services and criminal justice expenditures are considered [18].

1. Importance

Research on the burden of alcohol and associated ED and acute care service use is well developed, but little is known about drug-related burden and associations. Increasing this body of research is necessary given evidence suggesting that the consequences of drug use on ED and primary care service settings may be greater than those of alcohol use alone [17,19]. This research is needed to ensure that supportive policies are implemented and funding delivered to treat these chronic conditions in community-based settings [20]. This research can also contribute to the development of effective and efficient assessments and brief interventions appropriate for ED and acute care settings [21]. Finally, identifying repeat ED and acute care service users, and describing their clinical and psychosocial profiles, can lead to targeted approaches for treatment of persons who have the greatest impact on the health care system [20]. Leading experts in alcohol and drug treatment services recommend using population-based surveys to understand the burden placed by substance misuse on the general health care system and characteristics of substance-related service users [19,21].

1.1. Goal of this investigation

The goal of this investigation was to gain a better understanding of drug-related ED visits using nationally representative data. Specifically, this study sought to (1) describe sociodemographic patterns and correlates of drug-related ED visits and (2) examine prevalence of drug-related ED visits for different types of drug use and drug use disorders.

2. Methods

2.1. Subjects, sampling, and interviews

This study used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), which is a nationally representative survey of 43 093 noninstitutionalized US residents 18 years and older [22]. The NESARC was based on a multistage sampling design, oversampling young adults, Hispanics, and blacks to obtain reliable statistical estimation in these subpopulations and to ensure appropriate representation of racial/ethnic groups.

The overall response rate was 81%. Data were weighted at the individual and household levels and to adjust for oversampling and nonresponse on select demographic variables. Data were also adjusted to be representative of the US population as assessed during the 2000 census.

In the administration of this survey, US Census Bureau workers, trained by National Institute on Alcohol Abuse and Alcoholism staff, administered the Alcohol Use Disorders and Associated Disabilities Interview Schedule—*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) version (AUDADIS-IV). AUDADIS-IV is a structured interview designed for administration by trained lay interviewers. AUDADIS-IV assesses 10 DSM-IV (APA, 2000) substance use disorders and has evidenced good-to-excellent reliability for the assessment of substance use disorders [23,24]. Descriptions of the NESARC survey, sampling protocol, and related publications are described in detail in prior studies [22-24]. These data are publicly available, and all identifying information have been removed. This secondary data analysis met exemption from institutional review board approval.

2.2. Measurement

2.2.1. Drug use and drug use disorders

In this study, drug use refers to any lifetime history of any nonnicotine drug for purposes of getting high, including amphetamines, sedatives, tranquilizers, opioids, cannabis, cocaine and crack, hallucinogen, inhalants, heroin, and other drugs. Drug use disorder refers to meeting DSM-IV criteria for either drug abuse or drug dependence for any of the aforementioned drug types.

2.2.2. Drug treatment and ED service use

Participants were asked to reply yes or no to the questions: “Have you ever gone anywhere or seen anyone for a reason that was related in any way to your use of medicines or drugs—a physician, counselor, Narcotics Anonymous, or any other community agency or professional?” Participants who endorsed this question were then asked whether they used any of 14 different treatment services, such as 12-step, clergy, outpatient, and inpatient (the full set of services are summarized in Table 3). Use of ED services was based on the question, “In your entire life, did you ever go to an emergency room for any reason related to your drug use?” (yes/no).

2.2.3. Sociodemographic variables

Several sociodemographic and clinical variables were assessed in this study: racial/ethnic groups including whites (non-Hispanic), blacks, and Hispanics, sex (male, female), living area (urban, rural), marital status (married, separated, never married), annual personal income (in dollars), age (in years), and employment status (employed, unemployed). Insurance status referred to current private or public insurance at the time of interviewing (eg, Medicare,

Medicaid, CHAMPUS, CHAMPVA, VA, or other military health care). Data regarding insurance status at time of diagnosis or when treatment was sought are not available in the NESARC data set.

2.2.4. Clinical variables

Five clinical variables were included in this study: lifetime history of a DSM-IV alcohol use disorder (ie, abuse or dependence), lifetime history of an anxiety disorder (ie, social phobia, panic disorder with or without agoraphobia, and generalized anxiety disorder), and lifetime history of a mood disorder (ie, major depression, bipolar disorder, dysthymia, cyclothymia), personality disorder (ie, antisocial, avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and histrionic), and polydrug use disorder (ie, having a lifetime history of >3 nonnicotine or noncaffeine DSM-IV drug use disorders). Note that this definition of polydrug use disorder differs from that of polysubstance-related disorder as defined in DSM-IV (p. 293). Last, it is necessary to note that when assessed for anxiety disorder-related symptoms, participants were not assessed for posttraumatic stress disorder-related symptoms.

2.2.5. Analytic plan

Analyses were computed using SUDAAN Version 9.0 (Research Triangle Institute, Research Triangle Park, NC) [25]. This system implements a Taylor series linearization to adjust standard errors of estimates for complex survey

sampling design effects including clustered data. χ^2 tests were used to make bivariate comparisons of study variables. Multivariate logistic regression analyses were used to examine service use and barriers among racial and ethnic groups, while adjusting for other sociodemographic and clinical variables. These covariates were selected based on theoretical plausibility and prior empirical findings.

3. Results

3.1. Characteristics of drug-related ED service users

Approximately 21.2% of persons in the NESARC survey reported a lifetime history of drug use, and 9.4% of the sample met lifetime criteria for a drug use disorder (abuse or dependence; excludes alcohol and nicotine). χ^2 tests were used to identify associations between drug-related ED visits and other sociodemographic and clinical variables. Analyses were conducted separately for persons with lifetime drug use and a lifetime drug use disorder. The overall prevalence of drug-related ED visits among lifetime drug users was 1.8%; for those with a lifetime drug use disorder, 3.7%.

As summarized in Table 1, among persons with lifetime drug use, the prevalence of having lower educational attainment, being not currently married, and having lower income was higher among those with at least one drug-

Table 1 Sociodemographic composition of subgroups defined by their ED use among persons with any psychoactive drug use or a DSM-IV drug use disorder

	Any drug use			Any drug use disorder		
	ED use (%)	No ED use (%)	χ^2 (df), <i>P</i>	ED use (%)	No ED use (%)	χ^2 (df), <i>P</i>
Race/ethnicity			1.04 (2), 0.36			1.00 (2), 0.37
White	70.6	77.1		71.1	77.5	
Black	10.6	9.5		11.3	9.3	
Other	18.9	13.5		17.6	13.3	
Education			4.53 (2), .01			1.81 (2), .17
Less than high school	17.4	11.1		17.6	13.2	
High school/GED	34.3	25.9		33.2	29.1	
Some college or greater	48.3	63.1		49.1	57.8	
Marital status			9.94 (2), <.01			8.85 (2), <.01
Married	38.6	58.2		36.8	55.5	
Widowed/divorced/separated	30.5	15.3		31.1	16.1	
Never married	31.0	26.6		32.1	28.5	
Household income			9.70 (3), <.01			9.30 (3), <.01
\$0-\$19 999	42.0	20.3		43.3	22.4	
\$20 000-\$34 999	23.0	17.9		23.6	19.7	
\$35 000-\$69 999	20.2	32.5		19.1	32.8	
\$70 000 and greater	14.8	29.3		14.0	25.1	
Age			0.68 (2), .51			0.39 (2), .68
18-34	36.8	40.6		38.3	42.2	
35-54	56.0	50.8		55.6	52.7	
55+	7.2	8.7		6.1	5.1	
Sex: male	60.7	56.6	0.79 (1), .38	61.4	64.2	0.39 (1), .53

related ED visit than those without a drug-related ED visits. Among persons with a lifetime drug use disorder, the prevalence of having at being currently not married and having a low income was higher among those who had at least one drug-related ED visit than those who had not.

3.2. ED use by drug type

To examine how the percentage of persons with a drug-related ED visit differs for each drug, the weighted percentage of users who had a drug-related ED visit was estimated separately for each type of drug examined. These percentages, as well as unweighted sample sizes are presented in Table 2. Although heroin was the least commonly used drug, persons who had ever used heroin had a high percentage of drug-related ED visits (18.54%; SE, 3.66). In contrast, marijuana was by far the most commonly used drug, but individuals who used marijuana had a low prevalence of drug-related ED visits (1.71%; SE, 0.16). For all remaining drug types, the prevalence of drug-related ED visit among people who had used that drug ranged between 3.92% and 6.33%.

Among persons with a drug use disorder, the results were similar to those of persons who had ever used a drug. Individuals with a heroin use disorder had the highest prevalence of drug-related ED use (26.83%; SE, 5.17), and individuals with a marijuana use disorder had the lowest (3.05%; SE, .34). Persons with other drug use disorders had a prevalence of ED use between 7.53% and 16.02%,

Table 2 Prevalence of drug-related ED visits by type of drug use and lifetime drug use disorder

Drug type	N	Drug-related ED visit % (95% CI)
Amphetamine use	1750	4.5 (3.6-5.7)
Amphetamine use disorder	765	7.9 (6.1-10.3)
Sedative use	1609	5.3 (4.2-6.8)
Sedative disorder	402	11.3 (8.4-14.9)
Tranquilizer use	1301	6.3 (4.9-8.1)
Tranquilizer use disorder	372	13.1 (10.0-16.9)
Opioid use	1815	5.2 (4.2-6.6)
Opioid use disorder	521	10.5 (7.9-13.8)
Cannabis use	8172	1.7 (1.4-2.1)
Cannabis use disorder	3297	3.1 (2.4-3.8)
Cocaine/crack use	2528	4.2 (3.3-5.2)
Cocaine/crack use disorder	1159	7.6 (6.0-9.6)
Hallucinogen use	2176	3.9 (3.1-4.9)
Hallucinogen use disorder	623	7.5 (5.7-9.8)
Inhalant use	664	6.2 (4.4-8.8)
Inhalant use disorder	138	16.0 (10.4-23.9)
Heroin use	150	18.5 (12.3-26.9)
Heroin use disorder	104	26.8 (17.8-38.3)
Other drug use	87	12.3 (6.5-22.0)
Other drug use disorder	39	14.5 (5.9-31.3)

All drug use disorders based on DSM-IV criteria.

Table 3 Drug-related service use among individuals with and without a drug-related ED visit among persons with a lifetime drug use disorder

Service type	ED visit (%)	No ED visit (%)	χ^2 , <i>P</i>
NA/AA/12-step	67.0	59.2	4.5, .04
Family/social services	36.0	17.3	11.1, .001
Detoxification	56.3	33.2	15.7, <.001
Inpatient	59.2	22.5	40.9, <.001
Outpatient/partial hospitalization	49.4	32.2	10.5, .002
Rehabilitation	61.7	47.6	7.1, .01
Methadone maintenance	10.6	3.6	6.7, .02
Halfway house	24.5	8.1	15.4, <.001
Crisis center	15.5	3.5	12.6, <.001
Employee assistance program	15.2	7.8	3.3, .08
Clergy/priest/rabbi	29.3	17.7	6.0, .02
Private professional	68.3	51.1	9.0, .004
Other	23.3	8.8	13.3, <.001

NA, narcotics anonymous; AA, alcoholics anonymous.

depending on the drug. Although not formally tested, ED visits appeared to be more common for each drug examined among those who met criteria for a disorder than the larger group of persons who reported lifetime use (with or without a disorder).

3.3. Differences in service use

The prevalence of other drug-related service use among individuals who have and have not had a drug-related ED visit was also examined among individuals with a drug use disorder (Table 3). Across all types of services assessed, individuals who have had a drug-related ED visit were more likely to report also having used other services. The most frequently used services among individuals who have had an ED visit were “narcotics/alcoholics anonymous or any 12-step meeting” (67.0%) and private professionals, including psychiatrists, psychologists, social workers, and others (68.3%).

3.4. Factors associated with one or more drug-related ED visits

Logistic regression was used to further examine the relationship between drug-related ED visits and several demographic and mental health variables, as well as number of lifetime drug use disorders, alcohol use disorder, and service use, among individuals with a drug use disorder. Table 4 reports the odds ratio and 95% confidence interval for each independent variable used in the multivariate regression analysis. The odds of having a drug-related ED visit for persons with a drug use disorder who had been widowed, divorced, or separated was 1.8 times the odds

Table 4 Multivariate association between service use and drug-related ED visits among persons with a drug use disorder

	Odds ratio	95% CI
Sex: male	0.98	0.60-1.61
Education (less than high school is reference)		
High school/GED	0.96	0.50-1.86
Some college or greater	0.91	0.46-1.79
Marital status (never married is reference)		
Married	0.80	0.42-1.52
Widowed/divorced/separated	1.81	1.04-3.15
Household income (\geq \$70 000 is reference)		
\$0-\$19 999	1.06	0.47-2.42
\$20 000-\$34 999	1.10	0.50-2.44
\$35 000-\$69 999	0.57	0.25-1.27
No. of drugs disorders (1 is reference)		
2	1.00	0.34-2.91
\geq 3	2.21	0.86-5.69
Alcohol use disorder	0.54	0.25-1.18
Mood disorder	1.79	1.07-2.00
Any personality disorder	1.60	1.03-2.48
Any service use	2.12	0.56-8.01

Values in bold are statistically significant based on an odds ratio that does not bound 1.0.

compared to persons who were married (odds ratio, 1.81; 95% confidence interval [CI], 1.04-3.15). Having a mood disorder increased the likelihood of a drug-related ED visit by 1.79 times among persons with a drug use disorder (95% CI, 1.07-3.00). Similarly, the odds of having a drug-related ED visit for persons with a personality disorder were 1.6 times the odds compared to persons without a personality disorder (95% CI, 1.03-2.48). Age, sex, race, education, number of drug use disorders, alcohol use disorder, and anxiety disorder were not significant correlates of having a drug-related ED visit.

4. Discussion

To date, this is the first study that has used nationally representative data to examine patterns and correlates of drug-related ED visits. This study overcomes challenges of limited generalizability and regional variability that are common to clinic-based surveys. A particularly important feature of this study is the focus on drug-related ED visits across different classes of drugs, which enables a better understanding of the service consequences of different drug types. This is particularly important for tailoring interventions and targeting services.

The overall prevalence of drug-related ED use among persons with lifetime drug use and those with a lifetime drug use disorder was low. However, disaggregating the prevalence by types of drugs of abuse revealed that the prevalence is driven downward by the high prevalence of

marijuana use and disorders but low ED use for that particular substance. However, drugs such as heroin, inhalants, and “other drugs” were less commonly used but associated with significantly higher rates of ED use for individuals who use marijuana. Thus, the low overall rate can be attributed to the large number of marijuana users and those with a marijuana use disorder and the relatively low risk of ED visits for this drug. This finding indicates that ED clinicians see a disproportionate number of individuals who use substances such as heroin, inhalants, and “other drugs” and may be uniquely well positioned to provide drug-related interventions and make referrals to drug treatment specifically for these substances.

Interestingly, the prevalence of ED use among lifetime users of heroin and “other drugs” (18.5% and 12.3%, respectively) approached the same rate of ED use among those with a parallel lifetime drug use disorder (26.8% and 14.5%). For other drugs, the prevalence of ED use twice as prevalent among persons with substance use disorder compared to persons who reported lifetime use only. This demonstrates the substantial consequences of heroin use and abuse on the health care system, underscoring the need for intervention among those with and without a heroin use disorder. The types of drugs included in the “other drug use” category were not available in the data set. However, results suggest the importance of doing a wide range of assessments for specific types of drug use as opposed to only major classes of drugs.

The high prevalence of ED use among persons with an inhalant use disorder is also particularly notable. Inhalant use disorders were associated with a high prevalence of ED visits, second only to heroin. Inhalants are among the most common and dangerous of all types of psychoactive substances but the least studied [26], and few studies exist on patterns of service use among this group. These findings indicate the need for future work on inhalant use disorders and emergency service use. Although these findings further confirm the significant consequences of inhalant use and the need for prevention, it is also important to consider that inhalants are an indicator of multiple psychiatric and substance use comorbidities [27,28], which could be the underlying factors for ED use. The ED facilities may be particularly well positioned to reach out to inhalant users who are otherwise missed through current outreach efforts and to engage in research with this understudied population.

Some psychosocial and clinical factors also emerged in the multivariate analysis. Specifically, being socially connected (ie, marital status) was a protective factor against ED visits, whereas psychopathology (ie, personality or mood disorder) was a risk factor. These findings are consistent with other research on drug use disorders and their functional impacts. Future research should consider the direction of effects and effect sizes in disaggregated analyses. It was beyond the scope of the current study to examine the different multivariate associations due to low cell counts and

the risk of committing a type II error. However, this study provides the basic framework for a disaggregated approach to facilitate analysis of specific drug types with adequate sample sizes.

Regarding service use, persons who reported an ED use were likely to have also reported lifetime use of other services. It is possible that referrals for other services were received from the ED. However, the limitations of the existing data do not allow us to determine pathways or temporal ordering of service use. Other services used could be a response to the ED treatment (eg, inpatient treatment) or part of the pathway (eg, crisis center). However, these data can be used to help inform where links between EDs with local treatment programs can be formed to provide preventive care and injury-prevention interventions to reduce the risk of subsequent ED visits.

4.1. Study limitations

The findings should be considered in the context of the study limitations. For example, data are not available on the number of drug-related ED visits, which is necessary for understanding the differential risks of different types of drug use. Although this study considered the role of other drug use disorders regarding ED visits, the study could not effectively address possible complex interactions between different types of drugs and resultant ED visits. The specific reasons for ED visits were not available in this data set. Although the survey clearly queried respondents about specific drug-related ED visits, the nature of the injuries and type of medical attention sought would be particularly informative. Finally, the NESARC was not designed to provide information on whether an intervention provided in the ED was effective in reducing drug use, accessing treatment services, or preventing future ED use.

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