



The substance use disorder treatment gap among US college students: Findings from the 2021 National Survey on Drug Use and Health

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HIGHLIGHTS

- An estimated 21 % of US college students met DSM-5 criteria for an SUD in 2021.
- Less than 5 % of college students with an SUD received treatment.
- Treatment receipt differed by age, insurance, level of education, and enrollment.
- Receipt of treatment also varied based on SUD severity and type.

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ABSTRACT

Background: Substance use and substance use disorders (SUD) are prevalent among college students. Information about the gap between substance use treatment need versus treatment receipt can guide efforts to increase service access. This study examined past-year DSM-5 SUD and receipt of treatment among US college students. **Methods:** Past-year DSM-5 SUD and treatment receipt were estimated among a sample of 6115 college students aged 16 and older and a comparison group of non-students from the 2021 National Survey on Drug Use and Health, weighted to be nationally representative. Among the college student sample, multiple logistic regression was used to identify factors associated with past-year SUD. Bivariate analyses were used to compare socio-demographic and substance use differences between college students who received treatment and those who had an SUD but did not receive treatment.

Results: Weighted prevalence of past-year SUD among college students was 21.8 %. Only 4.6 % of students who had an SUD received treatment in any setting. Relative to non-students with SUD, proportionately fewer college students with SUD received treatment. Among college students, age, sex, past-year psychological distress, and past-year substance use were significantly associated with past-year SUD; and receipt of treatment differed significantly by age, insurance type, level of education, and enrollment status. College students who received treatment had greater prevalence of stimulant, opioid, tranquilizer, and poly-SUDs and more severe SUD symptomology than those who did not receive treatment.

Conclusion: Additional efforts are needed to engage college students with SUDs in acceptable, evidence-based treatment services.

1. Introduction

Substance use and related harms are highly prevalent on college

campuses (Arterberry et al., 2020; Patrick et al., 2023). In 2022, college students demonstrated a higher prevalence of alcohol use (80.5 % vs 72.7 % in the past year) and binge drinking (27.7 % vs 23.9 % in the

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past two weeks) than non-college student young adults (Patrick et al., 2023). Among US college students, rates of alcohol and cannabis co-use have increased over time, demonstrating an annualized change of 46 % from 2002 to 2018 (McCabe et al., 2021). Recent years have also seen a statistically significant upward trend in simultaneous use of alcohol and cannabis among US college students ages 18–22 (Hai et al., 2022). Although less prevalent, approximately 5.6 % of college students report past-year nonmedical prescription drug use (Patrick et al., 2023), with estimates ranging from 8.4 % for prescription stimulants to 3.7 % for prescription opioids (American College Health Association., 2023). Students who use prescription drugs nonmedically are more likely to meet criteria for a substance use disorder (SUD) (McCabe et al., 2021). The use of other drugs, such as hallucinogens and cocaine, is also more common among college students than the general US population of individuals aged 12 and older (5.0 % versus 3.0 % and 3.3 % versus 1.9 %, respectively) (Patrick et al., 2023; Substance Abuse and Mental Health Services Administration., 2023). Taken together, these patterns contribute to estimates suggesting a high prevalence of SUDs on US college campuses (Arterberry et al., 2020; Caldeira et al., 2009).

Substance use and SUDs can lead to academic, social, and health consequences. Students with frequent or heavy substance use often grapple with academic setbacks, including lower grade point averages, reduced study hours, class absenteeism, attrition, and post-graduation unemployment (McAlaney et al., 2020; Palmer et al., 2012; Welsh et al., 2019). Furthermore, left unaddressed, SUD can precipitate early morbidity and mortality, underscoring the urgency of specialty treatment and health care (Sanchez-Roige et al., 2022). For example, over 1500 college students die each year from alcohol-related unintentional injuries, including motor-vehicle crashes (Hingson et al., 2017). In addition to these human costs, the economic cost of SUD exceeds \$700 billion annually in healthcare, social service, criminal/legal, and reduced productivity (McCollister et al., 2017).

Several efficacious psychosocial and pharmacological treatments for SUD exist (Boness et al., 2023; Davis et al., 2016; Kelly et al., 2020; Wakeman et al., 2020), including interventions tailored to the needs and preferences of college students (Welsh et al., 2019). For example, screening and brief intervention programs (Hennessy et al., 2019; Seigers and Carey, 2010) and internet- and smartphone-delivered interventions (Watkins and Sprang, 2018) have been shown to reduce the quantity, frequency, and negative consequences associated with alcohol use among college students. The past two decades have seen enormous growth of collegiate recovery programs, campus-based SUD recovery support services (Ashford et al., 2018). Still, few people who could benefit from treatment receive it. National estimates suggest that only about 13 % of individuals meeting diagnostic criteria for an SUD receive specialty treatment (Sahker et al., 2024). This disparity between treatment need and treatment receipt is commonly referred to as the treatment gap.

The magnitude of the treatment gap varies based on clinical and sociodemographic characteristics. Among US individuals aged 12 or older with an SUD, Asian Americans are less likely to receive treatment than their White counterparts (Sahker et al., 2023), and adolescents and young adults are less likely to receive treatment than adults aged 26 or older (Lipari et al., 2017). Treatment utilization is greater among people with opioid use disorder relative to people with alcohol or cannabis use disorder, and among people with severe SUDs relative to people with mild or moderate SUDs (Bohler, 2023). Together, these trends suggest the treatment gap may be greater among college students, particularly given social norms surrounding alcohol and cannabis use on college campuses (Willis et al., 2019). A 2009 study of undergraduate students at a large public university estimated that nearly half of all students met criteria for an SUD at some point during their first three years of college, and only 9 % of those with an SUD sought help (Caldeira et al., 2009). However, current and national information about past-year treatment need and utilization among US college students is limited.

In recent years, social distancing measures to reduce the spread of

COVID-19 have impacted college student substance use and treatment access. An estimated one in four college students increased their use, while about a third decreased their use (Firkey et al., 2022). In-person service use declined, and many treatment services moved to the virtual environment (Saloner et al., 2022). Given the shifting substance use landscape on US college campuses – both prior to (McCabe et al., 2021) and following (Firkey et al., 2022) the COVID pandemic – updated knowledge about the treatment gap among college students is warranted. This study uses nationally representative data to examine prevalence and correlates of treatment need and receipt of treatment among US college students.

2. Material and methods

The 2021 National Survey on Drug Use and Health (NSDUH) is a cross-sectional survey administered by the SAMHSA via in-person household and computer-based interviews. The survey is part of a series (1971 to present) administered annually that can be weighted to be representative of US non-institutionalized civilians ages 12 years and older. Data are collected in each state and the District of Columbia. Respondents provide a variety of demographic, mental health, substance use, and treatment-related information. Further detail about NSDUH procedures has been published elsewhere (Substance Abuse and Mental Health Services Administration., 2022). All respondents were asked if they “go to school.” Those who responded affirmatively were asked what grade they were in. The analytic sample for the present study included persons ages 16 and older who reported being in their first, second, third, fourth, or fifth or higher year of college or university at the time of the survey, and a comparison sample of non-students aged 16 and older who met DSM-5 criteria for an SUD. This secondary data analysis was deemed exempt from review by the Wayne State University Institutional Review Board.

2.1. Measures

2.1.1. Past-year SUD and receipt of treatment

Past-year SUD and receipt of treatment were coded dichotomously (0 = no, 1 = yes). Following NSDUH’s approach, participants were classified as having a past-year SUD if they met DSM-5 criteria for an alcohol or other drug use disorder and/or if they received SUD treatment in the past year in any setting (i.e., a hospital, inpatient or outpatient rehabilitation facility, mental health center, emergency room, doctor’s office, carceral facility, mutual aid group, or virtually). Treatment setting was categorized as specialty, physical/mental healthcare, mutual aid group, criminal legal system, virtual/telehealth, or any setting, each coded dichotomously as non-mutually exclusive categories, as individuals may have received treatment via multiple settings and modalities. Participants who indicated that they had received treatment for alcohol or other drug use in any setting in the past year were considered to have received treatment.

2.1.2. Substance use

Past-year use of alcohol, cannabis, cocaine, methamphetamine, heroin, hallucinogens, and inhalants; and nonmedical use of prescription opioids, prescription stimulants, and prescription benzodiazepines were each measured dichotomously (0 = no use, 1 = past year use). These data were used to construct a past-year polysubstance use variable based on the number of substances endorsed (0, 1, 2, 3 or more). DSM-5 criteria were used to assess for past-year alcohol, cannabis, stimulant, opioid, hallucinogen, inhalant, and tranquilizer use disorders, individually (0 = no use disorder, 1 = use disorder). With these data, following the approach of Peltier et al. (2022), past-year poly-SUD was coded in three categories (1 SUD, 2 SUDs, 3 or more SUDs). SUD severity was coded as 0 = none, 1 = mild, 2 = moderate-to-severe. Past-year substance use and polysubstance use were examined as independent variables in analyses comparing college students with SUD to those without,

and past-year SUD type and poly-SUD were examined in analyses limited to those with an SUD.

2.1.3. Psychological distress

Past-year psychological distress was measured using the Kessler Psychological Distress (K-6) scale (Kessler et al., 2002). The K-6 is a validated instrument for measuring recent non-specific psychological distress that is included in the PhenX toolkit (Hamilton et al., 2011) and widely used in substance use research (e.g., Klein and Washington, 2023; Mark et al., 2021; Verplaetse et al., 2021; Weinberger et al., 2019). The questionnaire consists of six items measuring frequency of symptoms of psychological distress (e.g., feeling nervous, hopeless, restless, sad) on a five-point scale ranging from all of the time (= 4) to none of the time (= 0). For the current study, for consistency with the past-year SUD measure, participants were asked to think about one month in the past year when their symptoms were the worst. The six items were summed for a total possible score ranging 0–24. Higher scores indicate greater past-year psychological distress.

2.1.4. Sociodemographics

Demographic variables were coded categorically and included

biological sex (male, female), age (16–20, 21–25, 26+), level of education (graduate, undergraduate), enrollment status (full-time, part-time), insurance type (private or combination of public and private, public-only, uninsured), and self-identified race or ethnicity. Racial-ethnic identity was coded as non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, non-Hispanic multiracial, and Hispanic. Individuals who identified as Native American, Alaska Native, Hawaiian Native, and other Pacific Islander were excluded due to low sample sizes within the analytic sample. Sexual orientation (coded dichotomously as heterosexual or gay/lesbian/bisexual) was included in the bivariate analyses only as this question was not asked of individuals under age 18.

2.2. Analysis

Data cleaning and analyses were performed using SAS 9.4. Survey procedures were used for all weighted analyses with provided sample weights to adjust for nonresponse, noncoverage, and oversampling in some groups and to enhance generalizability of inferences. Missingness was minimal in the dataset, as variables were selected when possible that contained previously imputed values. However, the NOMCAR statement was included in the logistic regression to reduce potential for

Table 1

Characteristics of college student sample from the 2021 National Survey of Drug Use and Health.

Sample Characteristics	College Students with SUD (n = 1327)		College Students without SUD (n = 4850)		p
	Unweighted n	Weighted %	Unweighted n	Weighted %	
Age					<.0001
20 years or younger	404	22.9	1832	33.0	
21–25 years	592	39.3	1805	27.6	
26 years or older	331	37.8	1213	39.4	
Sex					.3575
Male	572	48.9	1985	46.1	
Female	755	51.1	2865	53.9	
Race and Ethnicity					.0172
Non-Hispanic White	760	56.2	2544	50.9	
Non-Hispanic Black	139	13.5	565	16.3	
Non-Hispanic Asian	70	5.6	496	9.5	
Non-Hispanic Multiracial	66	3.7	221	1.9	
Hispanic	278	20.9	974	21.4	
Sexual orientation ^a					<.0001
Heterosexual	923	76.8	3990	86.3	
Gay, lesbian, or bisexual	362	23.2	731	13.7	
Education level					.3211
Graduate	254	20.6	1034	22.9	
Undergraduate	1073	79.4	3816	77.1	
Enrollment status					.0369
Full-time	882	60.5	3515	66.0	
Part-time	440	39.5	1307	34.0	
Insurance type					.0461
Uninsured	113	9.3	463	10.6	
Public insurance only	301	28.8	1039	23.0	
Private insurance	860	62.8	3192	66.4	
Past-year psychological distress: 0 – 24, (M) [SD] ^b	(11.93)	[7.04]	(7.80)	[6.75]	<.0001
Past-year substance use					
Alcohol	1244	94.1	2946	61.6	<.0001
Cannabis	944	69.2	873	19.2	<.0001
Cocaine	142	10.2	40	0.9	<.0001
Methamphetamines	24	2.5	3	<0.1	<.0001
Heroin ^c	6	0.2	2	0.2	.0063
Hallucinogens	256	17.6	101	1.8	<.0001
Inhalants	56	3.2	26	0.4	<.0001
Nonmedical use of prescription opioids	78	6.3	62	1.0	<.0001
Nonmedical use of prescription stimulants	142	10.0	66	0.9	<.0001
Nonmedical use of prescription benzodiazepines	81	4.6	26	0.4	<.0001
Past-year polysubstance use					<.0001
0 substances	20	1.1	1805	35.8	
1 substance	345	27.7	2147	45.5	
2 substances	551	41.6	718	15.5	
3+ substances	411	29.5	180	3.2	

Note: ^aFrequency estimates for sexual orientation should be interpreted with caution, as this question was not administered to persons under age 18. ^bContinuous scores for psychological distress were obtained using unweighted means and standard deviations for interpretability. Mean comparison was conducted using a survey-weighted ANOVA. ^cComparisons and weighted estimates should be interpreted with caution in the presence of small cell sizes. Bold font indicates p values <.05

bias by including cases with missing values in the variance estimation for the full model.

Weighted frequencies were calculated and compared using Rao-Scott χ^2 . Percentages and p values reported in Tables 1, 2, 4, and S1 are weighted, while the frequencies are reported as unweighted to enhance interpretability. Weighted bivariate analyses were used to compare college students with SUDs to those without SUD (Table 1) and college students with SUDs to non-students with SUDs (Table 2). A multiple logistic regression model was calculated among the college student sample to examine the relationship between past-year SUD and various demographic characteristics and substance use patterns (Table 3). A regression analysis was performed to evaluate for multicollinearity and all VIFs were <1.5 , indicating minimal multicollinearity unlikely to affect the results of the final model. Results are reported as adjusted odds ratios (aOR) and 95 % confidence intervals (95 % CIs) and were considered statistically significant if the CIs did not contain 1. Though we initially planned a logistic regression to examine factors associated with receipt of treatment among college students with a past-year SUD, this was not feasible due in part to the small number of persons who received treatment (weighted 1.5 %, unweighted $n = 56$ of 1211 who met criteria for SUD) and the small cell sizes (< 5) that violate the assumptions of the logistic regression model; such an analysis would require a sample size of approximately 1667 individuals considering the low rate of treatment receipt. Thus, weighted bivariate analyses were examined to compare those who received treatment to those who had an SUD but did not receive treatment (Table 4). Odds ratios were calculated for these bivariate analyses. Supplemental analyses were conducted to explore severity of SUDs by SUD type and to examine the contribution of polysubstance use to college student SUDs (Tables S1, S2).

Table 2

Frequencies (unweighted n and weighted %) and Rao-Scott chi-square statistics comparing people not in college with a past-year substance use disorder (SUD) to college students with a past-year SUD.

Sample Characteristics	College Students with SUD ($n = 1327$)		Non-students with SUD ($n = 9138$)		p
	Unweighted n	Weighted %	Unweighted n	Weighted %	
Past-year substance use					
Alcohol	1244	94.1	7972	86.3	$<.0001$
Cannabis	944	69.2	5543	54.3	$<.0001$
Cocaine	142	10.2	762	8.2	.1312
Methamphetamines	24	2.5	406	4.5	.0854
Heroin ^a	6	0.2	189	2.4	$<.0001$
Hallucinogens	256	17.6	1219	10.6	$<.0001$
Inhalants	56	3.2	335	2.5	.2968
Nonmedical use of prescription opioids	78	6.3	999	10.6	.0032
Nonmedical use of prescription stimulants	142	10.0	659	5.7	.0006
Nonmedical use of prescription benzodiazepines	81	4.6	623	5.7	.2323
Past-year SUD type					
Alcohol	886	69.1	5521	62.8	.0038
Cannabis	604	43.2	3605	32.9	$<.0001$
Stimulants	117	9.6	817	8.8	.5776
Opioids	57	4.6	988	12.7	$<.0001$
Hallucinogens	28	1.4	112	1.0	.3040
Inhalants ^a	4	0.5	84	0.8	.5640
Tranquilizers	45	2.7	440	4.7	.0305
Past-year poly-SUD					.0002
1 SUD	993	76.6	6999	78.8	
2 SUDs	253	17.3	1581	15.4	
3+ SUDs	71	5.9	414	4.2	
SUD severity					$<.0001$
None	58	3.8	702	9.1	
Mild	663	46.8	4485	50.7	
Moderate to severe	606	49.4	3951	40.2	
Past-year treatment receipt					
Specialty treatment	15	2.9	165	3.6	.6140
Physical/mental health care	42	2.5	497	5.8	.0005
Mutual aid group	20	2.1	285	3.5	.0999
Criminal legal system	2	0.4	59	0.7	.4347
Virtual/telehealth treatment	29	2.2	379	4.0	.0956
Any setting	58	4.6	708	8.1	.0169

Note: ^aComparisons and weighted estimates should be interpreted with caution in the presence of small cell sizes. Abbreviations: SUD, substance use disorder.

3. Results

More than one in five college students (unweighted $n = 1327$, weighted frequency 21.8 %) met DSM-5 criteria for an SUD in the past year. College students with SUDs differed from college students who did not meet criteria for an SUD (Table 1). Briefly, proportionally more students who reported SUDs were 21–25 years old ($p <.0001$), non-Hispanic White ($p = .0172$), gay/lesbian/bisexual ($p <.0001$), part-time students ($p = .0369$), and publicly insured ($p = .0461$). Those who met criteria for an SUD also reported greater psychological distress ($M = 11.93$, $SD = 7.04$) than those without an SUD ($M = 7.80$, $SD = 6.75$, $p <.0001$). As shown in Table 1, past-year substance use was more prevalent among students with SUDs for all substances assessed ($ps <.01$).

3.1. Comparison between college students with SUD and non-students with SUD

As shown in Table 2, compared to non-students with SUDs, proportionally more college students with SUDs endorsed past-year use of alcohol, cannabis, hallucinogens, and nonmedical use of prescription stimulants ($ps <.0001$), but fewer endorsed past-year use of heroin ($p <.0001$) and prescription opioids ($p = .0006$). College students with SUDs met SUD criteria for two (17.3 % compared to 15.4 %) and three or more substances (5.9 % compared to 4.2 %) at higher rates compared to non-students with SUD ($p = .0002$). The prevalence of specific types of SUDs varied significantly between college students with any SUD and non-college students with any SUD; college students had higher prevalence of alcohol use disorder (69.1 % compared to 62.8 %, $p = .0038$) and cannabis use disorder (43.2 % compared to 32.9 %, $p <.0001$), but

Table 3

Logistic regression predicting past-year DSM-5 substance use disorder (SUD) among college students ($n = 6113$).

Predictor (reference category)	Adjusted Odds Ratio	95 % Confidence Intervals (CI)
Age (16–20 years old)		
21–25 years old	1.60	1.21–2.12
26 and older	1.57	0.99–2.49
Sex (female)		
Male	1.54	1.15–2.05
Race (non-Hispanic White)		
Hispanic	1.13	0.81–1.59
Non-Hispanic Black or African American	1.09	0.68–1.78
Non-Hispanic Asian	0.84	0.42–1.68
Non-Hispanic multiracial	1.93	0.81–4.59
Education level (undergraduate)		
Graduate	0.76	0.48–1.19
Enrollment status (full-time)		
Part-time	1.21	0.87–1.68
Insurance type (private)		
Uninsured	1.02	0.67–1.56
Public only	1.45	0.98–2.14
Past-year psychological distress	1.07	1.05–1.10
Past-year substance use		
Alcohol	5.49	3.76–8.01
Cannabis	4.98	3.62–6.85
Cocaine	1.97	0.95–4.07
Methamphetamine	14.04	1.82–108.00
Heroin	0.17	0.02–1.32
Hallucinogens	2.27	1.34–3.84
Inhalants	1.52	0.39–5.95
Nonmedical use of prescription opioids	3.80	1.43–10.09
Nonmedical use of prescription stimulants	2.89	1.25–6.73
Nonmedical use of prescription benzodiazepines	4.63	1.85–11.58

Note: Overall, 21.0 % ($n = 1267$) of college students met criteria for a substance use disorder in the past year and/or received SUD treatment in any setting. Bolded values indicate $p < .05$. The psychological distress scale (K-6) was entered as a continuous variable; therefore, the odds ratio indicates the change in odds associated with a 1-point increase on the scale.

lower prevalence of opioid use disorder (4.6 % compared to 12.7 %, $p < .0001$) and tranquilizer use disorder (2.7 % compared to 4.7 %, $p = .0305$). Students with SUD and non-students with SUD were also compared on SUD severity; compared to non-students, students had greater prevalence of moderate-to-severe SUDs (49.5 % compared to 40.2 %, $p < .0001$). Proportionally more students had moderate-to-severe alcohol ($p = .0470$) and cannabis ($p < .0001$) use disorders, but were comparable in severity to non-students on all other SUD types (Table S1). Past-year treatment receipt was significantly different between college students and non-students, with students having lower prevalence of treatment in any setting (4.6 % compared to 8.1 %, $p = .0169$) and at physical or mental health care facilities (2.5 % compared to 5.8 %, $p = .0005$).

3.2. Predictors of SUD among college students

Factors associated with past-year SUD are presented in Table 3. Compared to younger students (ages 16–20), students who were 21–25 years old had increased odds of meeting DSM-5 SUD criteria (aOR = 1.60, 95 % CI 1.21–2.12). Male students had greater odds of past-year SUD than female students (aOR = 1.54, 95 % CI 1.15–2.05). Greater past-year psychological distress was associated with increased odds of past-year SUD; each 1-point increase in past-year psychological distress was accompanied by a small but statistically significant increase in odds of past-year SUD (aOR = 1.07, 95 % CI 1.05–1.10).

Students were more likely to meet DMS-5 criteria for an SUD if they reported past-year use of alcohol (aOR = 5.49, 95 % CI 3.76–8.01),

Table 4

Bivariate comparisons between college students who met criteria for a DSM-5 substance use disorder (SUD) but did not receive treatment and those who received substance use treatment in any setting.

Sample Characteristics	Treatment Not Received ($n = 1327$) Frequency (weighted %)	Treatment Received ($n = 58$) Frequency (weighted %)	p-value
Age			.0051
20 years or younger	390 (23.6)	14 (8.2)	
21–25 years	573 (40.0)	19 (26.5)	
26 years or older	306 (36.5)	25 (65.3)	
Sex			.1137
Male	549 (48.0)	23 (66.1)	
Female	720 (52.0)	35 (33.9)	
Race and Ethnicity			.2814
Non-Hispanic White	729 (56.8)	31 (44.6)	
Non-Hispanic Black	136 (13.7)	3 (8.8)	
Non-Hispanic Asian	69 (5.8)	1 (2.6)	
Non-Hispanic Multiracial	58 (3.4)	8 (10.2)	
Hispanic	265 (20.3)	13 (33.7)	
Sexual orientation ^a			.1905
Heterosexual	884 (76.7)	39 (80.1)	
Gay, lesbian, or bisexual	344 (23.3)	18 (19.9)	
Education level			.0289
Undergraduate	1022 (78.7)	51 (93.3)	
Graduate	247 (21.3)	7 (6.7)	
Enrollment status			.0012
Full-time	853 (61.9)	29 (30.0)	
Part-time	412 (38.1)	28 (70.0)	
Insurance type			.0100
Uninsured	110 (9.1)	3 (14.2)	
Public insurance only	275 (26.4)	26 (59.1)	
Private insurance	835 (64.4)	25 (26.6)	
Past-year SUD type			
Alcohol use disorder	849 (68.8)	37 (76.4)	.4564
Cannabis use disorder	579 (42.5)	25 (56.9)	.2899
Stimulant use disorder	106 (8.2)	11 (38.9)	<.0001
Opioid use disorder	49 (3.7)	8 (23.8)	.0003
Hallucinogen use disorder ^b	25 (1.3)	3 (4.6)	.1115
Inhalant use disorder ^b	4 (0.6)	0	-
Tranquilizer use disorder	37 (2.2)	8 (13.3)	.0001
Past-year poly-SUD			<.0001
1 SUD	974 (78.9)	19 (30.0)	
2 SUDs	237 (16.8)	16 (30.2)	
3+ SUDs	58 (4.3)	13 (39.8)	
SUD severity			.0005
Mild	658 (50.5)	5 (9.4)	
Moderate to severe	564 (49.5)	42 (90.6)	

Note: ^aFrequency estimates for sexual orientation are conducted only in those ages 18 years and older as this question was not administered to youth. ^bWeighted percentages and statistical tests should be interpreted with caution in the presence of small cell sizes. Use disorder variable frequency estimates in the treatment received column and p values should be interpreted with caution due to small cell sizes. Abbreviations: SUD, substance use disorder. Bold font indicates p values <.05.

cannabis (aOR = 4.98, 95 % CI 3.62–6.85), or hallucinogens (aOR = 2.27, 95 % CI 1.34–3.84); or nonmedical use of prescription opioids (aOR 3.80, 95 % CI 1.43–10.09), stimulants (aOR = 2.89, 95 % CI 1.25–6.73), or benzodiazepines (aOR = 4.63, 95 % CI 1.85–11.58). Use of methamphetamine (aOR = 14.04, 95 % CI 1.82–108.00) was also significantly associated with the odds of SUD, however this should be interpreted with caution given the small cell sizes for methamphetamine use and the wide confidence intervals. No differences were found among those who used heroin, cocaine, or inhalants. A supplemental analysis was conducted to explore the contribution of polysubstance use to college student SUDs (Table S2). Compared to students who reported past-year use of one substance, those who used two substances had over four times greater odds of meeting DSM-5 criteria for an SUD (aOR 4.08, 95 % CI 3.00–5.60) and those who used three or more substances had over 13 times greater odds of meeting SUD criteria (aOR 13.05, 95 % CI 9.34–18.24).

3.3. Treatment Receipt

While more than one out of five college students met DSM-5 criteria for a past-year SUD, only 1.1 % of college students received treatment in the past year (unweighted $n = 58$, 4.6 % of those with an SUD). Students who had an SUD but did not receive treatment differed from students who received treatment on multiple sociodemographic and substance use indicators (Table 4). At the bivariate level, receipt of treatment differed by age, with proportionately more older students having received treatment ($p = .0051$). Receipt of treatment was more prevalent among students who were enrolled part-time compared to full-time students ($p = .0012$), and among undergraduates compared to graduate students ($p = .0289$). Regarding insurance type, proportionately more students with public insurance or no insurance had received treatment, whereas proportionately fewer with private insurance had received treatment ($p = .0100$). The prevalence of specific types of SUD varied between those who did and did not receive treatment; those who received treatment had greater prevalence of stimulant use disorder (OR = 7.17, 95 % CI 2.19–23.48, $p < .0001$), opioid use disorder (OR = 8.22, 95 % CI 1.94–34.72, $p = .0003$), and tranquilizer use disorder (OR = 6.74, 95 % CI 2.21–20.60, $p < .0001$). No statistically significant associations were found related to alcohol, cannabis, or hallucinogen use disorders ($ps > .10$) and no person who met criteria for inhalant use disorder received treatment. The prevalence of two SUDs (30.2 % compared to 16.8 %) and three or more SUDs (39.8 % compared to 4.3 %, $p < .0001$) was higher among those who received treatment. Finally, moderate-to-severe SUDs were more prevalent among those who had received treatment ($p = .0005$).

4. Discussion

Substance use treatment utilization was low among this nationally representative sample of US college students. While more than one in five college students met criteria for a DSM-5 SUD, less than one in 20 (4.6 %) of those with an SUD received treatment. This discrepancy is larger than the treatment gap observed among non-students in this sample (8.1 %), the general US population, and other subpopulations of people with SUDs, including young adults (Krawczyk et al., 2022; Mekonen et al., 2021; Sahker et al., 2024). Findings indicate a need for increased education and outreach among college students and highlight considerations for engaging college students in treatment services.

Among college students, age, sex, past-year psychological distress, and past-year substance use were significantly associated with past-year SUD. Like the general US population, male students were more likely to meet SUD criteria than females; however, research suggests sex and gender differences in SUD are narrowing and should continue to be monitored among the college student population (McHugh et al., 2018). Findings related to age demonstrate an increased likelihood of SUD among college students ages 21–25. These findings extend on prior

research which has primarily examined SUDs among younger, traditionally aged college students (Arterberry et al., 2020; Caldeira et al., 2009). Our findings are in line with a large body of research showing substance use and SUDs tend to increase in adolescence and peak in young adulthood (McCabe et al., 2019; Patrick et al., 2023), and underscore the importance of considering both traditional-aged and non-traditional (i.e., older) college students when designing campus-based health programs. The association between higher levels of psychological distress and SUD signals the importance of integrated mental health and substance use services. Integrated care is associated with better outcomes, and specialty treatment providers serving college students should be prepared to assess and address co-occurring psychiatric conditions (Sterling et al., 2011; Weiss et al., 2007, 2009).

While part-time students were no more likely than full-time students to have an SUD, proportionately more part-time students had received treatment. It could be that students who received treatment reduced their course load to part-time so that they could better balance academic demands with their treatment or recovery. Alternatively, it is also possible that many part-time students were employed and were more likely to be detected and seek treatment when their SUD impacted their work performance. Prospective data is needed in future research to examine these factors and establish directionality. Similarly, we found undergraduate and graduate students were equally likely to meet DSM-5 SUD criteria, but proportionately more undergraduate students had received treatment. If replicated, these findings may indicate a need to increase treatment accessibility for graduate students in rigorous academic programs via flexible service delivery (e.g., telehealth), open curriculums (e.g., online courses), and appropriate accommodations (e.g., through student disability services). Qualitative interviews with students in recovery suggest flexible curriculums help make higher education more attainable for people in or seeking SUD recovery (Pasman et al., 2024). Further research is needed to examine the mechanisms underlying the associations between education level, enrollment status, and treatment receipt, to facilitate treatment engagement among full-time and graduate students with SUD.

Stimulant use disorder, opioid use disorder, tranquilizer use disorder, and poly-SUDs were more prevalent among college students who received treatment relative to those who did not receive treatment. Conversely, proportionately fewer students with a single SUD received treatment, and alcohol and cannabis use disorders were not significantly associated with treatment utilization. However, among college students and non-students with alcohol and cannabis use disorders, college students had greater SUD symptom severity. These findings may be related to social norms surrounding alcohol and cannabis use on college campuses (Willis et al., 2019). Lack of SUD recognition is the number one reason people with an SUD do not receive treatment (SAMHSA, 2023). Previous research has shown college students often overestimate the substance use of their peers (Cox et al., 2019; Dempsey et al., 2016). It could be that because alcohol and cannabis use are perceived as prevalent or socially acceptable, students with symptomatic use do not consider their use to be problematic. Alternatively, it is possible that students with alcohol or cannabis use disorders recognize a need for treatment, but do not feel ready to seek treatment because of the role of alcohol and/or cannabis use in campus life. Indeed, qualitative studies have found students in SUD recovery often perceive alcohol and other drug use to be central to campus culture, which is discussed as a threat to students' recovery efforts (Ashford et al., 2018; Hennessy et al., 2021; Terrion, 2013). Campus-based social norms campaigns have been shown to reduce alcohol and other drug use among college students, particularly those who overestimate the use of their peers (Hembroff et al., 2021; Mattern and Neighbors, 2004; Pischke et al., 2021). Messages that portray heavy alcohol and cannabis use as the exception rather than the norm may shift perceptions and encourage help-seeking among students with alcohol and cannabis use disorders. However, research to explore perceptions of treatment need and barriers to treatment utilization among college students with alcohol and cannabis use disorder is

needed.

Though natural recovery from SUDs does occur (e.g., “maturing out”, Lee and Sher, 2018), outcomes tend to be better with early intervention (Carney and Myers, 2012; Stockings et al., 2016). Further, most adolescents with severe SUD symptoms do not age out of symptomatic use over a 32-year period (McCabe et al., 2022). In the current study, approximately half of college students with an SUD had moderate-to-severe symptomology. Moreover, poly-SUDs and moderate-to-severe SUDs were more prevalent among students with any SUD compared to non-students with any SUD. Therefore, increasing the accessibility and acceptability of treatment services among college student populations is important. Some research suggests young people with substance use concerns are often interested in non-abstinent treatment goals, and many who feel they have resolved a past substance use concern do not consider themselves to be “in recovery” (Pasman, Clift, et al., 2023; Smith et al., 2023; Subbaraman and Witbrodt, 2014). A harm reduction approach may therefore be more palatable for some college students with SUDs and should be offered alongside traditional abstinence-based treatment programs. Indeed, data from focus groups with college students indicate students prefer that programming acknowledge the reasons students use alcohol and other drugs and oppose content that could be interpreted as fear-mongering (Andraka-Christou et al., 2019). Increasing the visibility of substance use services may also be important, as many college students reporting heavy or frequent substance use are unaware of the services available to them (Pasman, Agius, et al., 2023). Visible and well-resourced collegiate recovery programs may help close the SUD treatment gap among college students, and may serve students interested in both abstinent and non-abstinent recovery pathways (Association of Recovery in Higher Education., 2024). Finally, it is important that mainstream health care providers assess college students for SUDs and intervene when indicated, as the current study found treatment in physical and mental health care settings was significantly less prevalent among college students with SUD relative to their non-student counterparts. Further research is needed to investigate college students’ reasons for not receiving treatment and identify strategies for engaging college students in substance use services.

Certain limitations should be noted. First, the study was based on a nationwide probability sample and weighted to be nationally representative of the overall US population; thus, the subpopulation of respondents who were in college at the time of the survey may not have been truly representative of college students across the nation as weights were based on the general population. We excluded Indigenous Peoples due to low representation in the analytic sample. Further, the small number of students who received treatment—while markedly concerning in itself—limited our ability to make inferences related to socio-demographic characteristics and substance use patterns that predict treatment receipt. Changes to the NSDUH during COVID limit the ability to combine the 2021 data with previous waves. Further, the 2022 NSDUH includes an updated measure of treatment receipt which cannot be compared to the 2021 treatment data. Future research should examine this updated measure and combine NSDUH cohorts to ensure the statistical power necessary to examine smaller racial/ethnic groups (e.g., American Indian/Native American) and conduct multivariable analyses predicting treatment utilization. Finally, this study was constrained by NSDUH measures, and further work is needed to examine the influence of other student- and college-level factors (e.g., two- or four-year institution, fraternity/sorority participation) on past-year SUD and treatment utilization.

Still, within the context of the shifting substance use landscape on college campuses (Firkey et al., 2022; McCabe et al., 2021), findings from this nationally representative study provide needed information about the SUD treatment gap among US college students and point to subpopulations of college students who could benefit from targeted outreach and intervention. Future research should examine college students’ reasoning for not seeking and/or receiving treatment,

including perceived need for treatment and access barriers. Qualitative methods would be ideal for deeply exploring college students’ perceptions of treatment need, treatment-seeking experiences, and preferences for treatment provision. This line of research is needed to reduce the health and social consequences of SUDs on college campuses.

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CRediT authorship contribution statement

Emily Pasman: Writing – original draft, Methodology, Conceptualization. **Lisa Blair:** Writing – original draft, Methodology, Formal analysis, Data curation. **Marvin Solberg:** Writing – original draft. **Sean McCabe:** Writing – review & editing, Conceptualization. **Ty Schepis:** Writing – review & editing, Methodology. **Stella Resko:** Writing – review & editing, Supervision, Conceptualization.

Declaration of Competing Interest

No conflict declared.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.dadr.2024.100279](https://doi.org/10.1016/j.dadr.2024.100279).

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