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Computer Self-administered Screening for Substance Use in University Student Health Centers

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Abstract

Objective: To characterize the prevalence of tobacco, alcohol, and drug use and the acceptability of screening in university health centers.

Participants: 502 consecutively recruited students presenting for primary care visits in February and August, 2015, in two health centers.

Methods: Participants completed anonymous substance use questionnaires in the waiting area, and had the option of sharing results with their medical provider. We examined screening rates, prevalence, and predictors of sharing results.

Results: Past-year use was 31.5% for tobacco, 67.1% for alcohol (>4 drinks/day), 38.6% for illicit drugs, and 9.2% for prescription drugs (non-medical use). A minority (43.8%) shared screening results. Sharing was lowest among those with moderate-high risk use of tobacco (OR=0.37, 95% CI 0.20–0.69), alcohol (OR=0.48, 95% CI 0.25–0.90), or illicit drugs (OR=0.38, 95% CI 0.20–0.73).

Conclusions: Screening can be integrated into university health services, but students with active substance use may be uncomfortable discussing it with medical providers.

Keywords

screening; alcohol; illicit drugs; tobacco; student health services; alcohol use disorders; drug use disorders

Alcohol and drug use are leading health concerns on college campuses. College students have higher rates of heavy drinking than their age-matched peers,¹ and alcohol-associated injury and accidents are a leading cause of death among undergraduates.² Unhealthy alcohol use is associated with assault, poor academic performance, health problems, suicide, and the onset of substance use disorders.^{2–7} Young adults also have high rates of drug use, including non-medical use of stimulants and opioid pain medications,⁸ and of fatal drug overdose.^{9,10} Although heavy episodic drinking among young adults has declined in recent years, alcohol-related overdose deaths and hospitalizations have seen a dramatic increase.¹¹ Driven primarily by alcohol use in combination with opioids and/or sedatives, hospitalizations of young adults for overdose involving alcohol in combination with other drugs rose by 26% between 1998–2014.¹¹ In sum, rates of substance use among young adults, including college students, exceed those of the general adult population and may contribute to short- and long-term health consequences if undetected.¹²

Primary care medical appointments represent an opportunity to identify and provide early interventions to young adults with unhealthy use or substance use disorders. Integrating substance use screening and brief interventions (SBI) into routine contacts with health care providers is a widely recommended approach to early identification and intervention for unhealthy substance use.^{13–15} Alcohol SBI is recommended by the US Preventive Services Task Force,^{15–17} and was a Tier 1 recommendation of the NIAAA College Drinking Task Force.¹⁸ The U.S. Surgeon General's report on addiction recommends screening for other drug use as well as alcohol.¹⁹

University student health centers are an under-utilized resource for addressing unhealthy alcohol and drug use. The majority of university students use their on-campus student health center.²⁰ Although substance use is a leading cause of morbidity in college students, and brief intervention is effective in this population,²¹ student health center medical clinics have not implemented alcohol or drug screening as standard practice.^{22–24} Only about 1/3 of four year college or university health centers regularly screen for unhealthy alcohol use, and just over 10% of those use a standardized screening instrument.²³

Barriers to screening for substance use in primary care settings often include a lack of provider time, comfort, and organizational support.^{25–27} A computer self-administered screening approach can address many of these barriers, and can make screening more acceptable to students. Computer self-administered screening conducted before the clinical encounter can help to overcome time and workflow constraints in busy medical clinics, and has the potential to improve the quality of screening by delivering validated questionnaires with high fidelity^{28,29} and to reduce the under-reporting of stigmatized behaviors such as alcohol and drug use.^{30,31}

We studied a tablet computer self-administered screening approach in student health center clinics at one private and one public university in New York City. We adapted previously validated computer self-administered screening tools^{32,33} to be completed on iPads in the waiting area, prior to the medical visit. The aims of our pilot study were to assess the feasibility and acceptability of this screening approach, and to measure the prevalence and severity of drug and alcohol use among university health center patients.

Methods

Setting

Study sites were two student health centers in New York City. One health center served a private university, located in Manhattan, and the other served a public university, located in Brooklyn. These sites were intentionally selected to assess screening feasibility and acceptability in a private versus public university, and to represent diverse campus environments. The private university is a large institution located in the borough of Manhattan, with over 59,000 students, approximately 29,000 of which are undergraduates.³⁴ Admissions are highly competitive, and it is ranked among the top 30 U.S. universities by U.S. News and World Report.³⁵ Students are 27% White, 18% Asian, 15% Hispanic, and 7% African American; 22% are visiting from countries outside the U.S. *The student health center serves approximately 24,000 patients (both undergraduate and graduate students), and sees approximately 11,000 visits per month.* The public university is located in the borough of Brooklyn, and serves approximately 14,000 undergraduate and 3,000 graduate students.³⁶ Students are ethnically and racially diverse, with 19% identifying as Hispanic and 28% White, 18% African American, and 16% Asian. The student health center has a total caseload of approximately 1,800 patients, and 400 visits per month.

Prior to initiating the study, primary care providers (PCPs) were asked to participate. At the private university health center only one clinical team (consisting of 4 PCPs) was invited to participate, because we lacked sufficient resources in this pilot study to provide iPads for all patients presenting for care. At the smaller public university health center, all 5 of the clinic's PCPs were invited, and agreed to participate. PCPs received 45-minute training sessions (2 sessions led by lead author (JM) at the private university; 1 session led by the clinic's medical director at the public university). These sessions covered screening, brief intervention and referral to treatment for alcohol and drug use, and the specific screening tools used in the study.

Participants, Recruitment, and Study Procedures

The study was conducted at the private university for 15 consecutive days in February, 2015, and at the public university for 16 consecutive days in August, 2015. Recruitment procedures differed by site. At the private university, students who registered for a medical visit with one of the participating PCPs were asked by the clinic receptionist to complete screening as part of their medical care. All patients of the participating physicians were considered potentially eligible for participation. At the public university, a research assistant (RA) approached students immediately after they checked in for a medical appointment, and offered participation in the study. Individuals who were approached by the RA were considered potentially eligible for participation. Eligibility criteria at both sites were as follows: age 18 or older; fluent in English; and current patient of the student health center.

At both sites, students were handed a tablet computer that delivered informed consent and the screening instruments. The opening screens of the tablet presented an IRB-approved informed consent document, at the end of which individuals were asked to click to indicate if they agreed or declined to participate. Participants were informed that screening was

confidential, but that after completing screening, they would choose whether to keep their results confidential or to share them with their medical provider.¹ Screening questions were delivered on the tablet computer immediately after the individual gave consent for participation. All study procedures were approved by the respective Institutional Review Boards of New York University School of Medicine and the City University of New York.

Screening instruments

Participants first received the Substance Use Brief Screen (SUBS), a four-item screener to assess past year unhealthy tobacco, alcohol, illicit drug, and prescription drug use.³³ The SUBS defines unhealthy use of alcohol as ‘4 or more alcoholic drinks in a day,’ and of prescription drugs as ‘use of prescription medications “recreationally”, while any use of tobacco or illicit drugs is classified as unhealthy use. The SUBS has been validated for computer self-administration in adult primary care patients.³⁷ Those screening positive for substance use on the SUBS received corresponding items on the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST).³²

The ASSIST used in this study was based on the Audio Computer Assisted Self Interview (ACASI) ASSIST that was developed and previously validated in adult primary care patients.³² The ACASI ASSIST is an 8-item structured assessment for tobacco, alcohol, and 10 classes of commonly used illicit and prescription drugs.^{32,38} Individuals screening positive for tobacco and alcohol on the SUBS received, respectively, the tobacco and alcohol items on the ASSIST (beginning with Question 2 about past 3 months use). Individuals screening positive for illicit and/or prescription drugs on the SUBS were queried about use of all drug classes on the ASSIST (beginning with Question 1 about lifetime use). Those reporting lifetime use of any drug (not including tobacco or alcohol) were asked about injection drug use. Participants could skip questions or terminate the screening at any time. Following completion of the SUBS and ACASI ASSIST, individuals completed 6 items related to sexual activity followed by demographic questions (age, sex, and educational program).

After all questionnaires were completed, the tablet displayed substance use screening results to the participant. Each substance that the participant reported using was reported as low-, moderate-, or high-risk use. Following the results screen, the tablet asked participants to choose whether to share the substance use screening results with their medical provider, or to keep them confidential (Figure 1). For those who chose to share results, a printout of the substance use screening results was generated and delivered by clinic staff to the medical provider at the point of care. Further actions, which could include manually entering patients’ results into the electronic health record and discussing them with the patient, were at the discretion of the medical provider. Because we were interested in studying screening as part of routine care, participants did not receive incentives for participation.

¹At the end of the questionnaire you will receive your results and will be given the option of sharing those results with your medical provider.

Option 1: If you decide to share your results, they will be used only by your medical provider(s). This information can help them to give you better medical care.

Option 2: If you decide not to share your results, no one in the clinic will see your responses. Your anonymous data will be used in research only.

Measures

Guided by the overall study objectives, we collected measures of feasibility (proportion of eligible patients screened), substance use prevalence, and choice to share screening results with the primary care provider (yes/no). Past year substance use was measured from the SUBS for tobacco, alcohol, illegal drugs and prescription drugs. SUBS screening was considered positive if any use was reported (i.e. any response other than ‘Never’). Lifetime use, current (past 3-months) use, and risk level was assessed using the ACASI ASSIST. Level of risk for each substance used was calculated using standard ASSIST methodology and validated cutoffs.³⁹

Statistical analysis

We calculated descriptive statistics for the entire sample and by study site, with sites compared using chi-square tests for categorical variables and two-sided t-tests for continuous variables. To examine predictors of sharing screening results with the PCP, we conducted bivariate analyses and then a multivariate logistic regression analysis. The dependent variable was the participant’s choice to share (vs. not share) results with the PCP. The independent variables were gender; age; educational program (dichotomized as undergraduate vs. other); study site; and moderate- or high-risk use (based on ASSIST score) of each of the following substance classes: tobacco, alcohol, illicit drugs, and prescription drugs. Analyses were conducted among participants having data for all variables of interest in STATA version 14 (StataCorp LP, College Station, TX).

Results

Of the 947 individuals eligible for screening, 542 (57%) received the computer tablet to complete the screening questionnaires (Figure 2). At the private university, where the tablet was distributed by clinical staff, 50% received it; at the public university, where the tablet was distributed by the RA, 81% received it. Of all private and public patients who received the tablet, 502 (93%) completed screening.

Participant characteristics (Table 1):

The mean age of participants was 24.0 years (SD = 5.7), and the majority (62.6%) was female. In comparison to the public institution, participants at the private university were significantly younger (mean age 23.3 vs. 25.2 years) and were less likely to be undergraduate students (59.8% vs. 70.1%).

Prevalence of substance use (Table 2):

Past year use: Based on the SUBS results, 31.5% of all participants reported past year tobacco use, and over two-thirds (67.1%) reported past year unhealthy alcohol use. Thirty-nine percent reported illicit drug use, and 9% reported non-medical prescription drug use, in the past year. Among the 46 participants reporting any prescription drug use, 33 (71.7%) also reported illicit drug use.

Lifetime and current use: On the ACASI ASSIST, lifetime use of any drug (illicit or non-medical prescription drug use) was reported by 39.4% of participants; 38.2% reported

illicit drug use, and 16.9% reported non-medical prescription drug use. Current (past 3 months) use was 26.3% for tobacco, 63.8% for alcohol, and 32.3% for any drug. The most frequently reported drug was marijuana, for which 38.1% of participants reported lifetime use, and 28.9% reported current use. For any drug other than marijuana, 23.9% of participants reported lifetime use, and 10.4% reported current use. Prescription stimulants, hallucinogens, and cocaine were the other drugs that were most frequently reported. Most participants with past-year use of a substance also reported current use (83.5% for tobacco, 95.0% for alcohol, 77.8% for illicit drugs, and 63.0% for prescription drugs).

Risk level: Moderate risk alcohol use was identified in 61 participants (12.2%), and moderate risk drug use was identified in 89 participants (17.7%). Most moderate risk drug use was of marijuana (15.5% of participants), followed by prescription stimulants (2.2% of participants). Five participants had high risk alcohol use, and 2 participants had high risk drug use (of marijuana in both cases). The prevalence of moderate or high risk illicit drug use was higher among undergraduates compared to other students (73.8% vs. 26.2%, $p<0.01$), but there were no significant differences between these groups with respect to tobacco, alcohol, or prescription drug use.

Comparison of substance use prevalence between sites:

The prevalence of lifetime use of tobacco and alcohol did not differ significantly between sites, but a difference was detected with respect to drug use. Lifetime drug use was significantly higher in the private university in comparison to the public university (42.7 vs 32.7%, $p<0.05$). In examining specific drug classes, a significant difference was seen only with respect to cocaine, for which lifetime use was reported by 12.3% of private university and 6.1% of public university participants ($p<0.05$). With respect to current use, site differences were seen only for alcohol, which was reported by 70.0% of private university, and 53.7% of public university participants ($p<0.0001$). No significant differences were seen between the sites for moderate risk or high risk use of any substance.

Sharing screening results with the primary care provider (Table 3):

Across the total sample, 43.8 % ($n=220$) of participants elected to share their substance use screening results with their primary care provider. In bivariate analyses, participants from the public university and those with moderate-high risk use of tobacco, alcohol, or illicit drugs were less likely to share their results with the PCP. In the multivariate analysis, the odds of sharing results were lower among participants from the public institution (adj. OR=0.40, 95% CI 0.26–0.64), and among women (adj. OR = 0.78, 95% CI 0.63– 0.96) and in those who had moderate-high risk use of tobacco (adj. OR = 0.37, 95% CI 0.20–0.69), alcohol (adj. OR = 0.48, 95% CI 0.25–0.90), and illicit drugs (adj. OR=0.38, 95% CI 0.20–0.73).

Comment:

This study assessed the acceptability of computer self-administered screening for substance use conducted in university health centers. We found that screening was acceptable to students, as the vast majority (93%) of those who received the tablet-based screening tool

completed it. Participants reported high rates of tobacco, alcohol, and drug use, indicating that students were willing to report substance use behavior on the screener. However, less than half of those who completed screening elected to share screening results with their primary care provider. Individuals with moderate-high risk tobacco, alcohol or drug use were significantly less likely to share their results than those with low-risk or no use.

An important finding is that rates of current substance use in our university student sample were generally higher than what has been documented in general population surveys of young adults. Current tobacco use was reported by over one-quarter of the sample, in comparison to the tobacco use rate of 13% among young adults in the New York City Community Health Survey.⁴⁰ It is important to note that both campuses are tobacco free, yet because they are located in dense urban areas, a student need only walk outside of a campus building to smoke. Alcohol was the most frequently reported substance, and 64% of participants had current alcohol use. This rate of alcohol use is slightly higher than what is seen in the general NYC young adult population,⁴⁰ and may be attributed in part to the higher prevalence of substance use that is typically observed in populations seeking medical care in comparison to general population samples,^{41,42} but is also consistent with national data showing that heavy episodic drinking and heavy alcohol use is more frequent among college student populations.^{1,8}

Notably, although rates of current drug use were lower than rates of current alcohol use in our study population, moderate-risk use was more frequent for drugs than for alcohol. A full 17.7% of participants had moderate-risk drug use (illicit or non-medical prescription drug use), while 12% had moderate-risk alcohol use. Marijuana was by far the most commonly used drug and had the highest rates of moderate-risk use, while 5.4% of participants had moderate-risk of a drug other than marijuana.

The guideline-recommended intervention for moderate-risk alcohol use is a brief motivational counseling intervention, which has a strong evidence base in adult primary care patients, as well as in university students.^{21,43,44} The recommended intervention for moderate-risk drug use is less clear, as brief intervention programs to reduce unhealthy drug use have demonstrated mixed results in adult primary care patients.^{45–47} However, it may still be argued that screening for drug use is justified based on the high prevalence of drug use in this population, and the impact of drug use on the diagnosis and treatment of other medical and psychiatric conditions. Certainly the failure to identify substance use behavior represents a missed clinical opportunity to intervene early before substance use progresses. It also suggests a missed public health opportunity, as young adults who use substances at moderate and high risk levels have greater susceptibility to comorbidities (injury, infectious disease (HCV, HIV, etc.)). Individuals classified as having high-risk use on the ASSIST are likely to have a substance use disorder. High-risk alcohol and drug use were rare in this population of university students, in which only 5 participants (1%) had high-risk alcohol use, and 2 had high-risk drug use (both for marijuana). Although beyond the scope of this study, further assessment and treatment for substance use disorders, which could be delivered by behavioral health providers in the student health center or by referral to specialty addiction treatment, is the indicated intervention for these individuals.

Perhaps the second most compelling finding from this study is the general reluctance of women and participants with moderate-high risk tobacco, alcohol or drug use to share their results with their PCP. Only half of the participants chose to share their screening results, and the odds of sharing results were significantly lower among those with tobacco, alcohol and drug use. Thus, we found that the population for which a substance use intervention would be indicated is the least likely to disclose their use. Women were also less likely to share their results, which is consistent with prior research suggesting that substance use is even more stigmatized among women.⁴⁸

Students may have multiple concerns about discussing their substance use with a university health center provider, including confidentiality and fear that the information might impact their financial aid,⁴⁹ sports team participation,⁵⁰ university housing, or academic standing,⁵¹ as well as the stigma of being identified with a substance use problem.⁵² These concerns also extend to mental health problems, for which only a minority of affected students seek treatment,^{52,53} but may be particularly acute when drug use is involved due to the added consequences of engaging in an illegal behavior. Our findings suggest that screening in the student health center can identify individuals with unhealthy alcohol, tobacco and other drug use, and that students' sensitivity to reporting this information to their provider is high. This raises additional questions, not tested here, about the accuracy of reporting when students are not given a choice regarding disclosure of their screening results. Although additional research is needed, a multifaceted approach to screening that alternates between anonymous and reported results may be warranted to assess population and clinical risks, respectively. Reticence to report substance use to providers may also signal concerns about receiving interventions on campus or being referred to treatment. Education about confidentiality protections and the role of health center providers could help to reassure patients that they will not be harmed by disclosing their substance use to PCPs. Exploration of how simply receiving screening results, (while keeping them confidential from health care providers), impacts substance use behavior in this population, may also be warranted.

An important difference between the two study sites was the procedure for distributing the tablet. At the private university, the tablet was given by front desk staff, while at the public university a research assistant approached students in the waiting room and offered them the tablet. The staff-driven approach, while more consistent with real-world practice, resulted in only half of eligible students receiving the tablet. Based on discussions with staff in the clinic, we believe that the rate of distribution of the tablet would have been higher if screening was implemented as part of regular care for all patients, rather than limited to the patients of just one team of providers. Nonetheless, some decrement in the screening rate should be anticipated when relying on clinical rather than research staff.⁵⁴

Limitations:

Our study has a number of strengths, including a large sample size, the inclusion of public and private university settings, and the gathering of detailed information on substance use prevalence and severity. However, as a pilot study it also has a number of limitations. While they serve student populations with different demographic characteristics, both study sites were urban universities located in New York City, and our results may not generalize to

other areas. Because many patients in the private university health center were not offered the tablet, we do not know what proportion would have participated in screening had it been available to them. Screening was confined to the Spring and Summer of 2015, and may include fluctuations in substance use behavior (e.g. Spring Break), that would not have been seen at other times of the calendar year. Importantly, allowing patients to choose whether or not to share their screening results with medical providers is not standard practice. While we may expect that more individuals would have declined screening, or reported less honestly on their alcohol and drug use had disclosure been mandatory, our study design does not allow us to directly compare the results of anonymous versus provider-informed screening approaches. We also do not have information about whether or how PCPs used screening results to address alcohol and other drug use when those results were shared.

Because we were interested in assessing the acceptability of screening, we allowed participants to skip items on the substance use screeners. This led to some missing values. However, considering that there were no consequences of skipping items, it is notable how infrequently this occurred. The maximum number of missing values for a question about lifetime, past-year, or current substance use was 15 (3% of the sample skipped the item on current marijuana use), and many of the items had only one or two missing values.

Conclusions

We found that anonymous screening for substance use in university health centers is feasible and well accepted by individuals presenting for primary care medical visits, and that there is a high prevalence of unhealthy tobacco, alcohol, and drug use in this population. However, individuals who are most in need of services to address alcohol and drug use were the least likely to share screening results with their medical provider. These findings support the integration of screening into university health services, but emphasize the importance of discussing confidentiality with students in college health care settings, as well as offering alternative sources of care for substance use, such as anonymous or off-campus services. To reach individuals at greatest risk, further research is needed on the feasibility, acceptability, and effectiveness of approaches to delivering substance use screening services both inside and outside the university health centers.

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Figure 1:
Screening process in the student health centers

Figure 2.
Eligibility and participation in screening at the two student health centers

Table 1:

Characteristics of the study population (N=502)

Characteristic	Total (N=502) N (%)	Private (N=337)	Public (N=165)
Age (years)^I			
Mean, SD	24.0, 5.7	23.3, 4.9 ^{**}	25.2, 6.9 ^{**}
Median	22.0	21.0	24.0
Range	36 (18–54)	35 (18–53)	36 (18–54)
Missing value ^I : n=32			
Gender²			
Female	309 (62.6%)	212 (64.1%)	66 (40.5%)
Male	182 (36.8%)	116 (35.0%)	97 (59.5%)
Transgender / Other	1 (0.6%)	3 (0.9%)	0 (0.0%)
Missing value ^I : n=8			
Current education program³			
Undergraduate	303 (63.1%)	193 (59.8%) [*]	110 (70.1%) [*]
Master's	135 (28.1%)	91 (28.2%)	44 (28.0%)
Doctoral	37 (7.7%)	35 (10.8%)	2 (1.3%)
Other	5 (1.0%)	4 (1.2%)	1 (0.6%)
Missing value ^I : n=22			

^I Missing value because participant did not provide a response to this item.^{*}
p< 0.05^{**}
p< 0.01

Table 2.

Substance use prevalence and risk level in the study population (N=502)

Substance	Past year use	Lifetime use ^a N (%)	Current use ^b N (%)	Low risk N (%)	Moderate risk N (%)	High risk N (%)
Tobacco	158 (31.5%)	N/A	132 (26.3)	403 (80.3)	73 (14.5)	13 (2.6)
Missing:			3	3		
Alcohol	337 (67.1%)	N/A	320 (63.8)	400 (79.7)	61 (12.2)	5 (1.0)
Missing:	1		7	36		
Any illicit drug	194 (38.6%)	192 (38.2)	151 (30.1)	418 (83.3)	82 (16.3)	2 (0.4)
Missing:	1	8				
Any prescription drug	46 (9.2%)	85 (16.9)	29 (5.8)	475 (94.6)	15 (3.0)	0 (0.0)
Missing:	2					
Any drug	207 (41.2%)	198 (39.4)	162 (32.3)	411 (81.9)	89 (17.7)	2 (0.4)
Missing:		9				
Any drug other than MJ	N/A	120 (23.9)	52 (10.4)	475 (94.6)	27 (5.4)	0 (0.0)
Missing:		2				
Specific drug class						
Marijuana	N/A	191 (38.1)	145 (28.9)	399 (79.5)	78 (15.5)	2 (0.4)
Missing:		7	15	23		
Hallucinogens	N/A	67 (13.4)	18 (3.6)	485 (96.6)	6 (1.2)	0 (0.0)
Missing:		7	10	11		
Rx stimulants	N/A	61 (12.2)	19 (3.8)	480 (95.6)	11 (2.2)	0 (0.0)
Missing:		6	6	11		
Cocaine	N/A	51 (10.2)	18 (3.6)	490 (97.6)	2 (0.4)	0 (0.0)
Missing:		6	6	10		
Rx sedatives	N/A	50 (10.0)	13 (2.6)	484 (96.4)	6 (1.2)	0 (0.0)
Missing:		6	8	12		
Inhalants	N/A	26 (5.2)	7 (1.4)	490 (97.6)	2 (0.4)	0 (0.0)
Missing:		6	7	10		
Rx opioids	N/A	19 (3.8)	4 (0.8)	491 (97.8)	1 (0.2)	0 (0.0)
Missing:		6	7	10		
Heroin	N/A	6 (1.2)	0 (0.0)	495 (98.6)	0 (0.0)	0 (0.0)
Missing:		6	6	7		
Methamphetamine	N/A	7 (1.4)	1 (0.2)	496 (98.8)	0 (0.0)	0 (0.0)
Missing:		6	6	6		

Notes to Table 2:

^a Individuals reporting any use of illicit or prescription drugs in the past 12 months (on the SUBS) received the ACASI ASSIST items on lifetime drug use for all drug classes.

^bThe ACASI ASSIST items on current use of tobacco or alcohol use were administered only to those who reported use in the past year use of those substances, respectively, on the SUBS instrument The ACASI ASSIST items on current use of illicit or prescription drugs were administered to individuals who reported lifetime use of those drug classes.

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Table 3.

Odds of sharing results with the primary care provider (N=502)

Variable	Bivariate analysis OR [95% CI]	Multivariate analysis OR [95% CI]
Demographic characteristics		
Gender (ref = male)	0.93 [0.77; 1.11]	0.78 [0.63; 0.96], p<0.05
Age (continuous variable)	1.02 [0.98; 1.05]	1.03 [0.99; 1.08]
Educational degree (ref= Undergraduate)	0.82 [0.57; 1.18]	1.26 [0.76; 2.11]
Site (ref = private university)	0.52 [0.35;0.77], p<0.05	0.40 [0.26;0.64], p<0.0001
Substance use characteristics		
Tobacco, moderate-high risk (ref = low risk)	0.40 [0.24; 0.67], p<0.05	0.37 [0.20; 0.69], p<0.01
Alcohol, moderate-high risk (ref = low risk)	0.44 [0.25; 0.78], p<0.05	0.48 [0.25; 0.90], p<0.05
Illicit drugs, moderate-high risk (ref = low risk)	0.32 [0.18; 0.55], p<0.001	0.38 [0.20; 0.73], p<0.01
Prescription drugs, moderate-high risk (ref = low risk)	0.85 [0.30; 2.43]	2.18 [0.63; 7.62]