A Chart Review of Substance Use Screening and Related Documentation among Adolescents in Outpatient Pediatric Clinics: Implications for Practice

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Research

Keywords: Drug and alcohol screening, Substance-Related Disorders, Adolescent, Primary Care

Posted Date: January 2nd, 2020

DOI: https://doi.org/10.21203/rs.2.19943/v1

Version of Record: A version of this preprint was published at Substance Abuse Treatment, Prevention, and Policy on May 25th, 2020. See the published version at https://doi.org/10.1186/s13011-020-00276-

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Abstract

Background: Despite recent reductions, youth substance use continues to be a concern in the United States. Structured primary care screening is recommended, but not widely implemented. The purpose of this study was to describe substance use screening in a large academic medical center, assess related factors, and evaluate screening documentation to inform practice.

Methods: We abstracted a random sample of 127 records of patients aged 12-17 and coded clinical notes to identify screening cases and related characteristics. We then analyzed descriptive patterns within the data to calculate screening rates, characteristics of screening, and used multivariable logistic regression to identify related factors.

Results: Rates of screening by providers were 72% for common substances (alcohol, marijuana, tobacco). The primary method of screening was use of clinical pneumonic cues rather than standardized screening tools. A total of 6% of patients reported substance use during screening. Older age and racial/ethnic minority status were associated with provider screening in multivariable logistic regression models.

Conclusions: Despite recommendations, low rates of screening in primary care persist. Failure to use a standardized screening tool may contribute to low screening rates and biased screening. These findings may be used to inform implementation of standardized and structured screening in the clinical environment.

Introduction

Alcohol, drug and other substance use is a key concern for providers of adolescent medical and behavioral health care in the United States (US). Despite overall reductions in youth substance use over the past 5 years, opioids, marijuana and binged alcohol continue to see sustained use in adolescent and young adult populations.(1) Cigarette smoking continues to decline among adolescents in recent years, however e-cigarette use or vaping of nicotine, marijuana and/or flavorings has increased dramatically.(1) By 12th grade, 48% of teens have tried an illicit drug.(1) Marijuana remains the most heavily used drug, with 30% of all 8th -12th graders having tried it in their lifetime and 6% of 12th graders reporting daily use. However, of all substances overall, alcohol remains the most commonly used in the teenage population. As early as 8th grade, 24% of students have tried alcohol. By the end of high school, 60% have tried alcohol, and 40% have been drunk; 18% of 12th graders report having been drunk in the last 30 days. Binge drinking is common with 14% of 12th graders having consumed > 5 alcoholic beverages at one time in the prior 2 weeks.

Teens who use drugs or alcohol are susceptible to negative consequences. Substance use is associated with risky teen behavior and related morbidity including teenage pregnancy, sexually transmitted infections, and domestic violence,(2) as well as social and legal issues related to substance abuse including criminal behavior, school failure, and family problems.(3) Furthermore, the leading cause of

mortality between youth aged 10–24 years old is unintentional injury, and substance use increases this risk.(4)

Beyond the immediate implications of adolescent substance use, early drug use is a predictor of future addiction.(5, 6) While undergoing crucial periods of development, the adolescent brain is particularly vulnerable to developing substance use disorders.(7) In addition, substances of abuse have the potential to trigger long-term neurocognitive changes. Marijuana and alcohol use during developmental years have been shown to impair learning, negatively affect functional brain activity, and can even lead to permanent IQ loss.(8, 9) The area of the brain that is responsible for assessing situations and controlling impulses, the prefrontal cortex, is not fully mature until the mid-20 s.(7) While this makes teens more susceptible to substance use disorders, it also provides a critical time frame for impactful guidance. Given the numerous medical, social, and cognitive effects of early initiation of substance use, pediatricians are in the unique position to intervene on a pattern of behavior that could affect their patients' lives beyond just adolescence.

To help guide pediatricians through this intervention process, the American Academy of Pediatrics (AAP) issued a policy statement in 2011 (revised in 2016) detailing the pediatrician's role in decreasing the burden of substance use among adolescents.(10, 11) The statement endorses the use of Substance Use Screening, Brief Intervention, and Referral to Treatment (SBIRT) as a method to systematically address teen drug and alcohol use.(10, 11) The Substance Abuse and Mental Health Services Administration (SAMHSA) in the US defines SBIRT as "an evidence-based practice used to identify, reduce, and prevent problematic use, abuse, and dependence on alcohol and illicit drugs."(12) Substance use is measured along a range of abstinence, to limited use, to problematic use, and finally to development of a use disorder.(10) Screening is not intended to make a diagnosis, but rather to delineate level of risk.(10) The importance of screening for all adolescents is supported by the fact that most substance related consequences during adolescence do not occur as a result of addiction, but rather due to the fact that any degree of substance use comes with risks in this population.(11) By determining where a patient falls on the spectrum of misuse, a clinician can appropriately direct the next steps in care. Although a variable range of between 50–86% of pediatricians report screening for substance use,(11) they often use psychosocial screening mnemonic tools such as the HEEADSSS (home, education/employment, eating, activities, drugs, sexuality, suicide/depression, safety from injury/violence) or SSHADESS (strengths, school, home, activities, drugs/substance use, emotions/eating/depression, sexuality, safety) instead of a structured screening tool.(13) However, prior research suggests that clinician perception alone is not accurate in determining the level of substance use, and the use of a standardized and validated screening protocol results in higher detection rates.(3, 14) The AAP policy statement endorses the importance of utilizing a validated and age-appropriate screening tool, such as the CRAFFT, Screening to Brief Intervention (S2BI) or Brief Screener for Tobacco, Alcohol and Other Drugs (BSTAD).(10, 11) The level of use reported via these screeners may then trigger a brief intervention, a screening outcome-responsive conversation that focuses on raises awareness and encourages a patient to consider behavior change.(10)

Despite AAP recommendation and the evidence base for SBIRT, this method is not widely implemented in adolescent primary care. Patient factors that may impede screening include level of comfort to discuss sensitive topics(15) and concern about confidentiality.(16) For providers, barriers include time constraints, feeling less capable of making a diagnosis, disagreements on who should implement screening tools, perception of difficulty in discussing substance use, and doubt regarding effectiveness of intervention.(17, 18) Evidence suggests that pediatric primary care providers who reported feeling prepared to diagnose substance use disorders have higher levels of screening(19) and additional training and resource support may help providers implement brief intervention with or without referral to treatment.(11, 17)

In adults, SBIRT has been shown to be effective in reducing alcohol and drug use(20, 21) and is backed by the U.S. Preventative Services Task Force (USPSTF) for this purpose.(22) In the adolescent population, the base of evidence is still evolving. Not only is SBIRT difficult to study in the teen population, given changing and variable developmental stages, but results for the efficacy of intervention are mixed.(23, 24) Some studies have shown efficacy of brief motivational interviewing to decrease subsequent substance use,(25) whereas others have not.(26) Recently, the USPSTF released draft recommendations promoting brief interventions and educational messages as effective at preventing tobacco use in adolescents.(27) However, the USPSTF has cited insufficient evidence for the clinical utility of substance use screening and intervention when applied widely in pediatric primary care environments.(22) Nevertheless, SAMHSA, AAP and other professional groups continue to advocate for universal screening and intervention.(2, 11, 28) Reductions in even mild to moderate adolescent substance use have considerable potential to reduce long-term sequelae; however, further research on SBIRT is necessary to help substantiate the use of the model in the adolescent population.

The purpose of this study was to describe substance use screening among adolescents in the outpatient clinics of a large academic medical center in the Midwest (i.e., frequency of screened, diagnosis, referral), to assess factors associated with screening, and evaluate the documentation of screening in the medical records to inform integration of SBIRT into the routine practice.

Methods

This study involved a retrospective chart review of unique patient medical records at a large academic children's hospital in the Midwest. The Institutional Review Board (IRB) at the local site granted an exemption from IRB review, given abstraction and analysis of de-identified data.

Study Sample

We restricted the sampling frame to cases pertaining to well-child visits for patients ages 12–17, in calendar year 2017 at the three outpatient clinics of the hospital with the largest number of adolescent patients (duplicates were eliminated by including only the first visit within the observation period for patients with multiple visits). Given the labor-intensive task of coding and sorting, we selected 10% of

cases by computer-generated random number and de-identified these records for further analysis. The sample size for analysis was based on the descriptive nature of the research questions and multivariable analysis with up to five independent variables and an estimate of 20 events per variable.(29)

Measurement and Coding

Variables abstracted from the medical record included age (aged 12–17), race/ethnicity, gender, primary source of insurance, substance use diagnostic code, all elements of social history, history of present illness (HPI), and assessment plan. Narrative fields were coded by two separate coders (BR, KG) to classify cases as screened (or not screened) for each substance (alcohol, marijuana, tobacco, other substances); record how they were screened (i.e., clinical approach); whether or not they screened positive for use and, if positive, the assessment plan (including counseling by the provider by type of counseling, and/or referral for further assessment and treatment). Discrepancies in coding were resolved by discussion and consensus.

Statistical Analysis

SPSS version 25 was used for all analyses. We describe sample characteristics and screening of substance use among patients using measures of frequency, central tendency and dispersion. Socio-demographic factors were regressed on the screening variable (i.e., screened for use of alcohol, marijuana, tobacco, and/or other substances) in multiple variable logistic regression models ($p < .05$). Dummy variables were created for race/ethnicity (racial ethnic minority vs. all others), gender (female vs. all others), and insurance status (Medicaid recipient vs. all others) for analysis in the multivariable model based on patterns of association with the outcome of interest.

Results

A total of 1,270 eligible records were included in the sampling frame, from which we drew a sample of 127 cases for analysis. In terms of socio demographic characteristics (Table 1), the mean and modal age was 14 (SD = 1.44; Note there were no patients aged 17 years). Most patients (76%) identified as Black or Latino in terms of primary race/ethnicity, and most were male (54%) in terms of sex. Primary insurance status was listed most often as Medicaid or Medicaid Managed Care.

Rates of screening (Table 2) were 72% for alcohol, marijuana and tobacco (each substance), and 66% for other substances. All screening was completed using clinical mnemonic cues (e.g., HEEADSSS, SSHADESS). A total of 6% of screened patients reported alcohol use and 6% marijuana use, and only 1 patient reported smoking (i.e., reporting vaping, but type of substance not defined); none reported other substance use. In the vast majority of cases (92%), patients who reported substance use were provided with either anticipatory guidance or counseled using brief motivational strategies to reduce use. Factors associated with screening for any substance in the multivariable logistic regression model included older age and racial/ethnic minority status (Table 3).

Table 1
Sample characteristics of adolescent patients (N = 127)

	n (%)
Age	
12	29 (23)
13	18 (14)
14	32 (25)
15	25 (20)
16	23 (18)
17	0 (0)
Race/ethnicity	
Black	48 (38)
Latinx	48 (38)
White	17 (13)
Asian	9 (7)
Other	5 (4)
Gender	
Female	59 (47)
Male	68 (53)
Insurance type	
Medicaid or Medicaid managed care	114 (90)
Private	11 (9)
Self-pay	2 (1)

Table 2
Distribution of Screening and Reported Use

Substance	Screened N (%)	Report use N (%)
Alcohol	91 (72)	8 (6)
Marijuana	91 (72)	8 (6)
Tobacco	92 (72)	1 (1)
Other drugs	84 (66)	0 (0)

Table 3
Multivariable logistic regression on completed screening for any substance*

Factors	B	p	Odds Ratio	95% CI for Odds Ratio	
				Lower	Upper
Age	2.24	.000	9.40	3.93	22.44
Race/ethnic minority	3.68	.004	39.80	3.25	486.74
Female	1.15	.097	3.15	.81	12.23
Medicaid	.57	.580	1.78	.23	13.53
Constant	-34.48	.000	.000		

Discussion

While evidence suggests that provider screening of adolescents for substance use in primary care may be increasing in recent years, which may be attributable to a response to local and national education efforts,(30) the 72% rate of screening for key substance use found in this study is not optimal and may result in missed opportunities to address substance use for almost 30% of patients. In addition, we found that providers inconsistently asked about key aspects of substance use, such as the frequency, quantity of consumption and problem behavior. In response to screening questions, we found that patients in this sample reported use of alcohol and marijuana at very low rates (6%), when compared to national samples of high school age youth. This may be the result of social desirability bias in the clinician-patient encounter. This low rate of report is more akin to reports of recent (last month) use by high school age youth.(1) Thus, standardized screening may reduce the potential for recency bias, identify youth who use substances intermittently, and improve consistency and quality of screening overall.

Finally, the association of screening in this study with older patient age is consistent with a prior large, nationally-representative study of adolescent primary care providers conducted more than 15 years ago.

(31) We also found that providers tended to screen racial/ethnic minority youth more often than White youth. These results highlights the need for continued education efforts among providers; lack of standardized screening may result in failure to adequately screen all adolescents, regardless of age or race/ethnicity.

Implications

Study results have informed the approach to screening at our outpatient primary care clinics. To improve screening and intervention practices, we are building screening tools into our electronic medical record with the intention of deploying the screener on at least an annual basis to all adolescents seen in the primary care setting. Deploying this screening tool in the waiting room, prior to clinical visit, on a smartphone or tablet, with automated calculation of the screening score will save provider time. The implementation of the standard screener will also facilitate interaction with the patient with an option to review or adjust answers during the clinical visit, or assist the adolescent in completing the screener if needed. Given the importance of provider education and confidence regarding substance use intervention, we will also conduct additional training around using and interpreting the screening tool, as well as training on providing brief interventions for positive screens. For those adolescents who may benefit from referral to treatment, we have designed an adjunctive substance use program and related resources, including a referral database to share with providers and families. Of note, for other practices that may not have the time or resources to build screening tools into their electronic medical record, paper and electronic versions of some of the validated screening tools are available online.

Limitations

Results from this study are limited by the inclusion of a small number of outpatient clinics at one academic children's hospital, thus findings may not generalize to other clinics or hospital settings. Patients in this setting were almost evenly split in terms of male and female gender, were diverse in terms of race and ethnicity (87% non-White), and largely publicly insured, thus findings may not generalize to other, less diverse populations. Finally, based on the limitations of data abstracted from medical records, we were unable to determine why providers did or did not screen, thus obstacles for specific providers are not known.

Conclusions

In summary, despite the AAP recommendation for routine screening of substance use among adolescents in primary care, evidence from this study suggests that low rates of screening by providers persist and may be suppress screening by age and race/ethnicity. In addition, not using a standardized screening tool may result in failure to detect important characteristics of use, such as frequency, quantity and problem behavior. We provide one example of a hospital-level self-examination and the incorporation of universal, automated and structured screening in response to findings. We hope this will encourage and promote other health care institutions to do the same.

List Of Abbreviations

AAP	American Academy of Pediatrics
BSTAD	Brief Screener for Tobacco, Alcohol and Other Drugs (BSTAD)
S2BI	Screening to Brief Intervention (S2BI)
HPI	History of Present Illness
IRB	Institutional Review Board
SAMHSA	Substance Abuse and Mental Health Services Administration
SBIRT	Substance Use Screening, Brief Intervention, and Referral to Treatment
US	United States
USPSTF	United States Preventative Services Task Force

Declarations

Ethics approval and consent to participate

This protocol has determined to be exempt from review by the Institutional Review Board of Ann & Robert H. Lurie Children's Hospital of Chicago.

Consent for Publication

Not applicable.

Availability of data and materials

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

Research herein was supported in part by the National Institute on Drug Abuse of the National Institutes of Health under Award Number R01DA041071. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Authors' contributions

LK, NK and MR designed all aspects of the study. BR and KG coded medical records data. AM completed study data analysis and created Tables 1-3. LK, BR and MR drafted the manuscript. The manuscript has been read and approved by all authors.

Acknowledgements

Not applicable.

Author's information (optional)

Not applicable.

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