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Screening adolescents for substance use-related high-risk sexual behaviors

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Abstract

Background: This analysis was undertaken to determine whether adolescents who screened positive for high-risk substance use with the CRAFFT questions were also more likely to engage in risky sexual behaviors than their peers, and to determine the test-retest reliability of a substance use related sexual risk behaviors inventory.

Methods: 12- to 18-year-old clinic patients completed a multi-part questionnaire that included 8 demographic items, the CRAFFT substance use screen, and a 14-item scale assessing sexual behaviors associated with substance use. Participants were invited to return one week later to complete an identical assessment battery.

Results: Of the 305 study participants, 49 (16.1%) had a positive CRAFFT screen (score of 2 or greater, indicating high risk for substance abuse/dependence) and 101 (33.9%) reported sexual contact during the past 90 days. After controlling for gender, age, race, and number of parents in household, adolescents with a positive CRAFFT screen had significantly greater odds of having sexual contact after using alcohol or other drugs, of having a sexual partner who used alcohol or other drugs, of having sex without a condom, and of having multiple sexual partners within the past year, compared to their CRAFFT negative peers. The substance use related sexual risk behaviors inventory has acceptable test-retest reliability and the 10 frequency questions have scale-like properties with acceptable internal consistency (standardized Cronbach's Alpha = .79).

Conclusion: Clinicians should pay special attention to counseling CRAFFT-positive adolescents regarding use of condoms, and the risks associated with sexual activity with multiple partners, while intoxicated, or with an intoxicated partner.

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Introduction

The link between adolescents' psychoactive substance use and engaging in high-risk sexual behaviors, such as having sexual intercourse without a condom and sex with multiple partners, has been well established.¹⁻⁴ A recent study in the United Kingdom found that 40% of sexually active 13- and 14-year-olds said they were drunk or high when the first had sex, and 10% of 15- and 16-year-olds said they had sex after drinking that they later regretted.⁵ Similar statistics have been reported in the US.⁶ Furthermore, studies have found that the relationship between substance use and sexual risk behaviors is bidirectional; teens' risk for substance use positively correlates with the number of sexually active friends they have;^{3, 4, 7} an association between onset of drug use and sexual activity has also been documented.^{2, 8}

Consistent with these findings, Problem Behavior Theory postulates that involvement in any one problem behavior provides opportunities to learn and to practice other proscribed behaviors, and thus increases the likelihood of involvement in multiple risk behaviors.⁹ Therefore, identifying one risk behavior in clinical practice suggests the need to screen for others. An integrated approach to intervention addressing multiple risk behaviors simultaneously might have the greatest overall health impact.

Screening is a procedure applied to general populations to quickly determine whether an individual is likely to have a condition that requires further assessment and/or intervention. Screening tests are typically designed to be very sensitive (i.e., the screen will correctly identify nearly all patients who have the condition) at the expense of specificity (i.e., the screen will correctly rule out patients who do not have the condition). Patients who screen positive therefore require additional assessment. Assessment is a more detailed and comprehensive process that seeks to determine the type of intervention needed.

Professional societies such as the American Academy of Pediatrics recommend that adolescents be screened annually for both high-risk sexual behaviors as well as for drug and alcohol use as part of routine primary care.^{10, 11} Recent work has demonstrated that clinical impressions of even experienced physicians significantly underestimate substance use disorders.¹² Therefore, screening for substance use disorders should begin with a standardized, validated screening tool, such as the CRAFFT tool¹³ (fig 1). It is unknown whether adolescents with a positive CRAFFT screen are also more likely to engage in substance-related high-risk sexual behaviors. The goal of this study was to determine whether teens with a positive CRAFFT screen are more likely than their peers to engage in substance-linked sexual risk behaviors.

Methods

We performed a secondary analysis of data collected as part of a cross-sectional, observational study on the relationship between alcohol and other drug risk and spirituality in adolescents. The objective of the primary study was to identify aspects of adolescents' religiousness and spirituality associated with lower risk of alcohol use. The authors found most measures of *religiousness* (i.e., Commitment, Organizational Religiousness, Private Religious Practices, and Religious and Spiritual Coping – Negative) were not significantly correlated with drinking status. By contrast, measures of *spirituality* (i.e., Forgiveness, Religious and Spiritual Coping – Positive, Daily Spiritual Experiences, and Belief) were significantly and negatively associated with drinking. However, in a multivariable model, only Forgiveness remained as a significant, negative correlate of drinking during adolescence.

As part of the primary study, a subset of participants (N=93) returned one week after initial assessment for a retest with the identical assessment battery to measure test-retest reliability.

Detailed methods of the parent study¹⁴ and test-retest subset 15 have been published elsewhere and are briefly summarized below.

Patients

This project recruited a convenience sample of 12- to 18-year-old adolescents consecutively presenting for either urgent care or routine primary care at one of three adolescent medicine clinics in Boston, MA. Potential participants were approached in the waiting room by a research assistant (RA) or by the medical care provider at the end of the visit, and, if interested in participating, were referred to the RA to provide signed, informed consent/assent. Parents of patients under the age of 18 who accompanied the teen to the medical visit provided signed consent and those who were not present consented by telephone. The Children's Hospital Boston Committee on Clinical Investigation and the Tufts New England Medical Center Human Investigations Review Committee approved this protocol. The RA asked all teens that agreed to participate the CRAFFT (see figure 1) and then supervised participants' completion of a self-administered, multi-part questionnaire that included 8 demographic items, including the number of parents in the household and highest parent education level (markers of socioeconomic status). All participants received a \$25 merchandise certificate as compensation for their time.

CRAFFT Screen for High Risk Alcohol and Other Drug Use

The CRAFFT questions are a 6-item screening tool that identifies adolescents at high risk for a diagnosis of substance abuse or dependence. Previous work has demonstrated that the CRAFFT is both valid¹³ and reliable¹⁵ for use with adolescent patients.

Substance use related sexual risk behaviors inventory

The measurement tool for this analysis consisted of a 14-item forced choice-response questionnaire about sexual practices in general and specifically in the context of alcohol or other drug use. The investigators constructed these items by adapting previously developed measures.¹⁶⁻¹⁸ For example, participants were asked, "In the past 3 months, how many times did you have sexual contact with another person after you had been using drugs?," and then given frequency choices varying from "never" to "20 or more times" as possible responses. The questionnaire assessed the frequency of sexual contact under the following conditions: after drinking alcohol, after using drugs, with another person who had been using alcohol, with another person who had been using drugs, without a condom, with another person who had ever used a needle to shoot drugs, against his/her will, under pressure/ when s/he didn't really want to or when too drunk or high to know what s/he was doing. Sexual contact was defined as "any type of contact between your vagina/penis, rectum, or mouth and another person's genitals, or theirs with yours, with or without a condom." We decided to assess "sexual contact" rather than "sexual intercourse" to expand the range of sexual behaviors that were included, and because, during pilot testing, many younger teens (11-12 year olds) did not understand the term "sexual intercourse." The questionnaire also assessed the age of first sexual contact, whether the participant had been diagnosed with a sexually transmitted infection in the past 3 months, and the number of sexual partners in the past 12 months.

Data Analysis

For each of the 10 frequency items on the survey of sexual behavior we dichotomized responses to "ever" or "never" because for most items, few teens reported engaging in a behavior more than 1-2 times. We calculated simple frequencies for all items. We computed odds ratios comparing participants with a positive (i.e., CRAFFT total score of 2 or more) versus negative CRAFFT screen for each sexual behavior item, controlling for age, gender, race and ethnicity (Hispanic, black, white, or other) and number of parents in the household (dichotomized as 2

vs. < 2). We used a Generalized Estimating Equation (GEE) analysis to obtain adjusted precision estimates, thereby accommodating the multi-site study design. We ran these analyses in SUDAAN 9.01 software. In cases where cell size made adjusted odds ratios unstable, we have reported crude odds ratios. We assessed item level test-retest reliability of the substance use related sexual risk behaviors inventory by calculating the one-way random Intraclass Correlation Coefficient (ICC) for absolute agreement for non-dichotomous response questions, and Cohen's Kappa for dichotomous (yes/no response) questions. We assessed the internal consistency of the 10 frequency items in the survey by evaluating Cronbach's alpha and alpha-if-item-deleted.

Results

Demographics

Our final sample consisted of 305 adolescents aged 12- to 18-years-old, with a median age of 16 (Table 1). Our sample was diverse in gender, race, and socioeconomic status. A total of 49 adolescents (16.1%) had a positive CRAFFT screen, similar to rates reported in other primary care settings.

Compared to those who were CRAFFT-negative, CRAFFT-positive participants were more likely to be older, but did not differ significantly as to gender, race/ethnicity, or socioeconomic status. CRAFFT-positive participants were more likely to have had lifetime and current sexual contact.

Reliability

Retest completers ($n=93$) did not differ from those who did not participate in retest ($n=212$) on frequency of endorsement or magnitude of response for any of the substance use related sexual risk behaviors inventory questions at baseline. The individual questions of the substance use related sexual risk behaviors inventory had acceptable test-retest reliability, with ICC ranging from $r = .66$ to $.94$ for the non-dichotomous questions and Cohen's Kappa measure of agreement $k = .88$ and $.71$ for the two dichotomous (yes/no) questions. The 10 frequency questions had scale-like properties, with standardized Cronbach's alpha = $.79$, raw Cronbach's alpha = $.70$ and raw alpha if item deleted ranging from $.68$ to $.74$, indicating acceptable internal consistency.

Sexual Risk

Compared with their CRAFFT-negative peers, CRAFFT-positive teens were more likely to engage in sexual contact after drinking alcohol, using drugs, when very high or drunk, with a partner who had used alcohol or drugs, without a condom, and with multiple different partners.

There was no statistically significant difference between CRAFFT-positive and CRAFFT negative adolescents with regard to sexually transmitted infection or rates of forced or pressured sex based on CRAFFT screen status. However, the effect sizes are suggestive and the non-significant finding should be viewed cautiously because of the small sample size.

Discussion

This study shows that adolescents with a positive CRAFFT screen are more likely to participate in substance-related and other high-risk sexual behaviors than their CRAFFT-negative peers. In particular, 43% of CRAFFT positive youth reported sexual contact without a condom in the past three months – as compared to 17% for CRAFFT negative youth. This supports the findings of previous work that has demonstrated drug and alcohol problems are associated with high-risk sexual behaviors¹⁹ and is consistent with Problem Behavior Theory. The findings

support an overlap in domains of behavior – drug and sexual risk behaviors occur together – e.g., drinking may occur just before having sex, consistent with previous work.⁸

This study was conducted in three separate clinical sites, and participants represented both genders and a mix of race/ethnicity and socio-economic status groups. All of the participants were from the greater Boston metropolitan area. Because of the small sample and its non-representative nature our findings may have limited generalizability. However, this study does provide preliminary evidence suggesting that clinicians should ask questions about sexual experiences while under the influence of psychoactive substances for youth who are CRAFFT positive. While clinicians should deliver general sexual behavior screening and counseling to all adolescents, CRAFFT positive youth may need specific counseling to avoid situations in which both substance use and sex may occur such as heavy drinking while attending a party with boys and girls.

Limitations

A number of study limitations should be noted. We used a convenience sample and required parental consent for participants under the age of 18, which likely biased the sample toward a lower-risk group of participants.²⁰ Less than half (41%) of all eligible adolescents agreed to participate, and the most common reason given for refusal was “not enough time.” We therefore may have unintentionally underrepresented adolescents with high risk alcohol and drug use as well as sexual risks, and thus underestimated the actual differences between low and high risk groups. However, we found similar rates of sexual contact in the past three months (33.9%) as for those who reported sexual intercourse in a large, national, school-based study (33.9%), and slightly lower rates of current alcohol use (33.8% vs 38.3%) and current marijuana use (13.8% vs 20.2%).⁶

A low-risk sample may also have reduced our power to detect differences between the two groups. Despite this limitation, we found statistically significant differences between CRAFFT-positive and CRAFFT-negative adolescents in 7 of 10 high-risk sexual behaviors, though confidence intervals for our findings are very broad, which limits our ability to estimate the actual effect size. Thus our study should be viewed as an initial exploration into the relationship between CRAFFT positivity and high risk sexual behavior. Because of the small number of CRAFFT positive adolescents, this study may be underpowered to detect actual differences in the rates of sexually transmitted infection and pressured or forced sexual contact between CRAFFT-positive and CRAFFT-negative adolescents. Future studies could address these limitations by recruiting larger samples in order to provide more definitive clinical guidance.

Conclusion

This work supports the construct validity of the CRAFFT screening tool, and the acceptable test-retest reliability and internal consistency of the substance use related sexual risk behavior inventory. Clinicians should use a positive CRAFFT as an opportunity to present brief medical advice and counsel high-risk youth about the risks of sexual contact while intoxicated or with an intoxicated partner. Future research with larger groups and more “high risk” adolescents is necessary in order to further refine screening and assessment recommendations.

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- C - Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?
- R - Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?
- A - Do you ever use alcohol/drugs while you are by yourself, ALONE?
- F - Do you ever FORGET things you did while using alcohol or drugs?
- F - Do your family or FRIENDS ever tell you that you should cut down on your drinking or drug use?
- T - Have you gotten into TROUBLE while you were using alcohol or drugs?

Figure 1.
The CRAFFT Questions

Table 1

Participant demographics, N=305.

	Total (N=305)	CRAFTT + (n=49)	p^a
Median age in years (range)	16.0 (12.0-18.9)	17.2 (14.2, 18.9)	<.01
Female, N (%)	203 (66.6%)	31 (63.3%)	.62
Race/Ethnicity, N (%)			
○ Hispanic	123 (40.3%)	14 (28.6%)	.09
○ Non-Hispanic Black	103 (33.8%)	15 (30.6%)	
○ Non-Hispanic White	45 (14.8%)	10 (20.4%)	
○ Other	34 (11.1%)	10 (20.4%)	
Two-parent household, N (%)	138 (45.2%)	20 (40.8%)	.53
Parent education level, N (%)			
○ Not HS Graduate	41 (14.4%) ^b	6 (12.2%) ^c	.97
○ HS Graduate	125 (44.0%) ^b	20 (40.8%) ^c	
○ College Graduate	118 (41.5%) ^b	19 (38.8%) ^c	
Any lifetime sexual contact	130 (43.6%) ^d	32 (71.1%) ^e	<.01
Any recent sexual contact (past 3 months)	101 (33.9%) ^d	26 (57.8%) ^e	<.01

^a Chi-Square test for difference in proportion of CRAFTT+ by demographic category.^b percent of 284 who completed the question about parent education level^c percent of 45 who completed the question about parent education level^d percent of 298 who completed questions about sexual behavior^e percent of 45 who completed questions about sexual behavior

Table 2

Prevalence (percent), adjusted odds ratios and 95% confidence intervals for engaging in sexual behaviors in CRAFFT-positive vs. CRAFFT-negative youth, controlling for age, gender, and race/ethnicity.

	Total N=305	CRAFFT + n=45	CRAFFT - n=256	OR (95% CI)
Any sexual contact in previous 3 months	45.6	71.1	40.8	2.1 (1.0-4.3) *
Sexual contact after drinking alcohol	8.8	26.1	5.6	5.7 (2.8-11.8) **
Sexual contact after using drugs	4.4	15.6	2.4	5.1 (2.4-10.9) **
Sexual contact when very drunk or high	1.4	6.4	0.4	16.9 [#] (1.7-166.3) **
Sexual contact with a partner who had used alcohol	8.4	21.7	6.0	4.5 (1.1-19.1) *
Sexual contact with a partner who had used drugs	5.4	19.1	2.8	5.2 (1.3-20.5) *
Sexual contact without a condom	17.2	42.6	12.4	3.5 (2.6-4.7) **
Sexual contact with 3 or more partners in the past 12 months	5.5	20.0	2.8	8.8 (2.8-27.1) **
Diagnosed with an STD	7.4	16.7	4.7	5.7 (0.9-37.1)
Forced sexual contact	1.0	2.1	0.8	2.7 [#] (0.2-30.2)
Pressured sexual contact	2.7	4.3	2.4	1.8 [#] (0.1-50.5)

[#] crude odds ratio

* p<.05

** p<.01