

Original Studies

Prevalence and Risk Factors for LSD Use among Young Women

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Abstract. *Study Objective:* To report the lifetime prevalence of lysergic acid diethylamide (LSD) and to identify unique correlates of using this substance in the last year among a large multiethnic sample of sexually active adolescent and young adult women aged 14 to 26 yrs.

Design, Setting, Participants: A cross-sectional survey, administered at university-based ambulatory reproductive health clinics, was completed by 904 women between April and November of 1997 to identify risk factors associated with their use of LSD within the past 12 months. Subjects who reported lifetime, but not past 12 months' use of marijuana, LSD, or other illicit drugs were excluded, leaving a sample of 368 nonusers and 56 users of LSD. In addition, 231 young women who reported only using marijuana in the last year were used as a comparison group to identify unique factors associated with LSD use.

Results: Of the total sample (n = 904), 13% (n = 119) reported lifetime use of LSD, and 58% (n = 536) reported lifetime use of marijuana. Logistic regression analyses controlling for age and race/ethnicity found distinct profiles for those who reported using LSD or only marijuana in the last year when compared to those who reported no substance use. Common to both groups was reporting being drunk at least 10 times during the last year, regular smoking of at least half a pack of cigarettes, and identification as a high-sexual-risk taker. However, LSD users as compared to nonusers were more likely to report white ethnicity (as compared to nonwhite), be less than or equal to 17 years of age (as compared to at least 18 years), report a history of physical abuse, and be categorized as having severe depressive symptomatology. In contrast, those who reported only using marijuana were more likely to report single marital status, young

age at first intercourse, having half or more of their friends use marijuana, and poor grades.

Conclusions: The female LSD user presents a distinct profile that might aid clinicians in identifying potential LSD use in this population as well as alerting clinicians to the relationship between LSD use and high-risk sexual behaviors.

Key Words. Adolescents—LSD—Marijuana—Correlates—Identification

Introduction

During the early 1990's reported LSD use among adolescents began to rise, countering a steady decline in usage that began in the 1970's.¹ The decline in popularity of this illicit drug among teens in the 1970's and early 1980's was believed to be secondary to concerns with adverse effects advertised in the news such as brain and gene damage, as well as "bad trips," uncontrollable flashbacks, and dangerous behaviors while under the influence. This is evidenced by a high proportion of adolescents from 1975 to 1991 seeing great risk associated with trying LSD.¹ However, after 1991 use began to rise as perceived risk declined. In fact, lifetime prevalence as reported by twelfth-graders in 1997 doubled over the previous decade, reaching almost 14%, with annual use reported to be about 8.8%.¹ This rise has been attributed to *generational forgetting*—the current generation of adolescents and young adults has not had opportunities to learn about the adverse consequences of LSD. Concerns have therefore been raised about setting the stage for a whole new epidemic of LSD use.²

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Substance use and abuse is a major contributor to mortality and morbidity among youth³ and is commonly linked with other high-risk behaviors that compromise the health of this population,⁴⁻⁶ including precocious sexual activity and other high-risk sexual behaviors such as unprotected intercourse, greater number of partners, and nonmonogamous sexual relationships.^{7,8} Survey data collected among youth enrolled in high school and college indicate that males as compared to females are more likely to use most illicit drugs, but these gender differences tend to be greatest at the highest frequency levels of use and among the oldest teens.¹ Unfortunately, little data has been forthcoming describing the prevalence and correlates of hallucinogen use,² especially among sexually active female adolescents and young women.

Racial/ethnic differences in drug use among youth have been noted, with African Americans reporting the lowest annual prevalence for virtually all drugs—licit and illicit—at all grade levels.^{1,9,10} Whites, on the other hand, report the highest rates by 12th grade of most drugs, including LSD and marijuana.^{1,9,10} In contrast, Hispanics in early grades have higher rates than whites for using marijuana, but comparable rates for LSD use.^{1,11}

The identification of behavioral markers for LSD use is particularly important as primary care providers are often uncomfortable screening for substance use among adolescents.¹² In fact, when clinicians do screen for substance use, they usually inquire about licit drug use such as alcohol and cigarettes, and if they screen for illicit drug use, specific drugs are typically collapsed into a single category, i.e., drug use.¹³ Research conducted by Kandel and colleagues¹⁴ describes a progressive pattern of drug use, from nonuse to legal drug use to marijuana use, and finally to use of other illicit substances such as LSD. Although a number of risk factors for use of marijuana have been identified^{15,16} and prior research indicates that risk factors differ by substance use category,¹⁷ most studies have not sought to identify whether risk factors for LSD use are unique.² Thus, research that could identify specific factors associated with LSD use could help clinicians identify those youth at greatest risk.

The purpose of this study was to report the lifetime prevalence of LSD use and to identify correlates of use in the last year among a large multiethnic sample of sexually active adolescent and young adult women aged 14 to 26 yrs. In order to determine the unique factors associated with using LSD in the last year, risk factors for LSD use were contrasted with those risk factors found for those young women who reported using only marijuana in the last year when both groups were compared with those who reported never using any illicit substances. Two separate logistic regression

models were created. First, young women who reported using LSD in the last year were contrasted with those who reported no current or past illicit substance use. Second, those who reported using only marijuana (no other illicit drug use) in the last year were compared to those who reported no current or past illicit substance use. In this way, review of factors and behaviors of each substance use group might provide insight into the screening and identification of those young women who reported using LSD.

Methods

Sexually active women aged 14 to 26 yrs who presented to one of two community-based family planning clinics operated by the Department of Obstetrics & Gynecology at The University of Texas Medical Branch at Galveston and who self-identified their race/ethnicity as either caucasian, African American, or Mexican American, were not currently pregnant or within 6 weeks postpartum, and did not demonstrate an obvious cognitive/mental impairment, were eligible to participate in the study. Although we attempted to consecutively recruit subjects, it is likely that some eligible women were missed due to clinic traffic patterns or scheduling. A total of 990 young women were approached during the study period. Fifty-four patients (5%) refused to participate because of time constraints; 32 subjects agreed to participate but did not complete the entire questionnaire. Thus, a total of 904 women completed the survey. The only difference noted between those who completed and those who either refused or did not finish the questionnaire was Spanish language. Therefore, our results may not be representative of primarily Spanish-speaking young women who presented to these family planning clinics.

With Institutional Review Board approval, a bilingual research assistant approached subjects in the clinic waiting area. The project was presented to subjects as a study of health behaviors and drug use among adolescents and young adult women. The research assistant outlined study requirements and eligibility criteria in Spanish or in English. After informed oral consent was obtained, the research assistant oriented each subject to the customized questionnaire, reviewed instructions to each section, and provided examples of the correct way to complete the bubble sheets so these data could be electronically scanned. Each subject then completed the self-administered questionnaire in English or Spanish. To assure anonymity, subjects were instructed to avoid placing identifying information on the completed questionnaire. Opportunities to clarify instructions and ask questions about the research instrument were provided. Participants received \$5.00 as compensation for their time and effort. Each subject

was given a handout that provided information about drug and alcohol abuse and about agencies that provide services for drug dependence and sexual assault.

The self-report measure was customized on scannable computer sheets after we completed pilot testing ($n = 25$) to ensure readability, ease of understanding, and completion time. To ensure an accurate Spanish translation, the questionnaire was first translated into Spanish by the bilingual research assistant and then translated back into English by a second bilingual research assistant not associated with the project. The final 12-page measure was divided into sections. The demographic and reproductive health section elicited information on the subject's age, parental education and employment status, race/ethnicity, current living arrangements, school enrollment and grades achieved during last school year, last grade completed, age at menarche, parity, gravidity, number of spontaneous or elective abortions, and age at first intercourse. In addition, two questions assessed the lifetime occurrence of physical or sexual victimization. Finally, each subject completed a slightly modified version of the Scale of Sexual Risk-Taking to provide an index of each subject's high-risk sexual behavior.¹⁸ The Scale of Sexual Risk-Taking is a 13-item self-report instrument that yields a weighted composite score comprised of specific behaviors associated with high risk (nonmonogamous sexual partnerships, intercourse with intravenous drug users) and moderate risk (use of alcohol or drugs prior to sex, contraceptive use, history of pregnancy). Our measure included 11 of the original 13 items, since only sexually active adolescent and young adult women were surveyed and we did not inquire about the frequency of intercourse during the last year.

Lifetime and last 12 months' frequency of substance use was assessed in a manner consistent with other commonly used measures to assess drug and alcohol use in adolescents. This section was preceded by definitions and common street names for each drug assessed. Subjects were asked to indicate the number of times in their lifetime and within the last year (none, 1–2, 3–5, 6–9, 10–19, 20–39, or 40 or more) that they had used beer, wine, or wine coolers; hard liquor; marijuana; LSD; or other types of illicit drugs as well as their frequency of being drunk or very high. Using a Likert scale, we assessed the perceived risk of harm to people (none, slight, moderate, and great) for experimental and regular use as well as disapproval (do not disapprove, disapprove, and strongly disapprove) of peers who use this drug experimentally or regularly.

Each subject also completed standardized measures of self-esteem and depressive symptoms. The Rosenberg Self-Efficacy Scale¹⁹ is a 10-item measure that

has been used extensively with adolescents.^{21–24} It possesses good reliability and has strong convergence with other measures of self-esteem. The Beck Depression Inventory, Short Form²⁰ is a 13-item instrument commonly used to screen for depressive symptoms. The psychometric properties are appropriate for this population, and it has been widely used in research protocols involving adolescents.^{25–28}

Data Definitions

Lifetime and past 12 months' use of marijuana or LSD was identified if the subject reported using either drug one or more times during these specific time frames. Subjects were categorized into mid-adolescence, late adolescence, and young adulthood if they reported their age to be 14–17 yrs, 18–21 yrs, or 22 yrs or older, respectively. Each female was considered single if she affirmed that she was not living with or married to a male partner and was considered employed if she stated she worked full- or part-time. Enrollment in school was coded as either yes or no depending on whether the young woman reported that she was currently enrolled in junior high, senior high, a general educational development (GED) program leading to a high school diploma, or college. In addition, a subject was defined as a school drop-out if she reported she had received a GED or was currently enrolled in a GED course, or if she reported that she was not currently enrolled in school and she had not completed the 12th grade. Each subject's grades while in school were categorized into B's or better, mostly B's and C's, or mostly C's or lower. Depending on the age at which each subject reported menarche (≤ 10 yrs or $\mu 10$ yrs) and age at first coitus (≤ 15 yrs or $\mu 15$ yrs), these were collapsed into two categories, i.e., early vs. all others. Lifetime number of sexual partners was classified into 1–2, 3–5, or 6 or more, depending on the young women's self-report. The Scale of Sexual Risk-Taking was categorized into three categories based on the distribution of scores into low (scores ≤ 8), moderate (9–12), and high ($\mu 12$). Young women with total scores of 11 or higher on the depression screening inventory were considered to demonstrate severe depressive symptoms, and women with scores of 29 or lower on the self-esteem measure were identified as having low self-esteem. The use of these scores represents standardized cutoffs to suggest the presence of severe depressive symptoms and low self-esteem. The frequency of substance use was categorized as none, once or twice, 3 to 9 times or 10 or more times in the last 12 months. Finally, number of friends who engaged in various substance use or other high-risk behaviors were collapsed into two groups: about half, most, or all of her friends engaged in substance use or high-risk behaviors; and some or none of her friends engaged in these behaviors.

Statistical Plan and Analysis

We compared demographic and reproductive characteristics, licit substance use behaviors, reported peer substance use behaviors and practices, perceived risk of harm of various substances, and disapproval of people who use substances between users and nonusers using chi-square or Student's *t*-tests, depending on the level of measurement. Separate comparisons were conducted for those who reported using LSD in the last year as compared to those young women who did not report any other substance use besides cigarettes and alcohol and those who reported using only marijuana as compared to those who did not report any current or past substance use. Results were considered significant if the *P* value was less than 0.05. Finally, separate stepwise logistic regression analyses using likelihood ratio tests were conducted to identify correlates of annual LSD and marijuana use. Variables significant at the $P < 0.10$ level were considered for entry into the logistic regression, and multicollinearity among significant variables was assessed. As a result of the high degree of multicollinearity between the reported frequencies of beer, wine, and wine cooler use, use of hard liquor, and number of times drunk, we used the variable number of times drunk or high in the last year for all multivariate analyses. Further, number of times drunk was recoded into those who reported drunkenness 10 or more times and those who reported being drunk 9 times or less. All data were analyzed using SPSS 10.05 for Windows 98.²⁹

Results

Of the total sample who completed the survey ($n = 904$), 13% ($n = 119$) reported lifetime use of LSD, and 58% ($n = 536$) reported lifetime use of marijuana. Slightly less than half (54 of 119; 45%) of those who reported lifetime use of LSD reported that they had used this substance 6 or more times, whereas over half (315 of 536; 59%) of lifetime marijuana users reported using marijuana 6 or more times. However, a large proportion (100 of 119; 84%) of lifetime LSD users also reported concurrently using marijuana 6 or more times.

Among lifetime LSD users the mean age of first LSD use was 15.8 yrs ($SD = 2.47$ yrs), and among lifetime marijuana users a similar mean age of first use was found for marijuana (15.5 yrs, $SD = 2.82$). However, the mean age of onset for first use of marijuana among those who reported lifetime use of LSD was 14.5 yrs ($SD = 2.44$ yrs).

In order to identify the correlates of past 12 months' use of LSD, three categories of substance use were created: nonuser (no current or lifetime history of any substance use, aside from alcohol or cigarettes), LSD

use (self-reported past 12 months' use of LSD), and marijuana use only (self-reported past 12 months' use of only marijuana). Subjects who reported lifetime usage of any illicit substance without usage in the past year ($n = 207$) were excluded from all subsequent analyses. In addition, subjects were excluded from both the non-user and marijuana-use-only categories if they reported lifetime use of any other illicit substance ($n = 43$). A total of 248 subjects were excluded under these criteria, leaving a total of 656 females: nonusers = 368; LSD users = 56; and marijuana-only users = 231. With the exception of being older, those who were excluded did not demonstrate any other significant differences on other demographic factors from those young women included in the present analyses.

A number of significant demographic differences emerged when comparing nonusers with those who reported last year's use of LSD or only marijuana (Table 1). LSD users and marijuana-only users were significantly more likely to be 21 or younger, to report single marital status, and to be enrolled in an educational program, and were less likely to be a high school drop-out. While members of each racial/ethnic group were equally likely to report using marijuana only,

Table 1. Selected Demographic Characteristics Among Sexually Active Females Stratified by Substance Use*

Variable	Substance Use in the Last Year		
	Nonuser (n = 368)	Marijuana only (n = 231)	LSD (n = 56)
Variable	N (%)	N (%)	N (%)
Age			
14–17 years	88 (24)	84 (36) [§]	26 (46) [§]
18–21 years	154 (42)	98 (42)	26 (46)
22–26 years	126 (34)	49 (21)	4 (7)
Race			
African American	161 (44)	105 (45)	0 (0) [§]
Mexican American	111 (30)	61 (26)	18 (32)
Caucasian	96 (26)	65 (28)	38 (68)
Single marital status	248 (67)	191 (83) [§]	46 (82)
Current male partner	304 (83)	182 (79)	39 (70)
Employed	170 (46)	86 (38)	25 (45)
Mom's Education (<12 th)	107 (30)	53 (23)	13 (24)
Lives with parent	119 (44)	86 (52)	26 (72) [§]
Not enrolled in school	172 (47)	91 (39)	18 (32)
High school dropout	190 (52)	121 (52)	19 (34)
Grades repeated (≥ 1)	96 (26)	79 (34)	19 (34)
Grades achieved in last year of school			
B or better	207 (57)	88 (38)	25 (45)
C	129 (35)	107 (47)	19 (34)
$<C$	30 (8)	34 (15) [§]	12 (21) [§]

*Analyses conducted separately for LSD and marijuana only using nonusers as comparison group. Denominator term varies across variables due to missing data. Percentages may not total 100 because of rounding.

[§] $P < 0.01$.

^{||} $P < 0.05$.

LSD use was reported by caucasians and Mexican Americans only.

Similar reproductive health characteristics differentiated these two groups of young women (Table 2). We found that LSD users and marijuana-only users were significantly more likely than nonusers to be categorized as high-sexual-risk takers and to report younger age at first coitus and a greater number of lifetime sexual partners. Surprisingly, young women who reported only using marijuana in the last year as compared to nonusers did not differ in the proportion of those who reported consistent contraceptive use during the last year.

As can be seen in Table 3, a significantly greater frequency of reported use of cigarettes, beer/wine/wine coolers, or hard liquor in the last year, and greater number of times drunk, was endorsed by users of LSD and those who reported only using marijuana as compared to nonusers. Among marijuana-only users, 39% ($n = 89$) used this substance 2 or fewer times in the past year, 34% ($n = 79$) used 3 to 9 times, and 27% ($n = 63$) used 10 or more times. As might be expected, marijuana use in the last year was more frequent among those who reported LSD use, where 13% ($n = 7$) reported using marijuana 2 or fewer times, 25% ($n = 14$) 3 to 9 times, and 63% ($n = 35$) 10 or more times. Slightly over half ($n = 31$) of those who used LSD in the last year also reported other

Table 3. Frequency of Substance Use in the Last Year Among Sexually Active Females Stratified by Substance Use*

Variable	Substance Use in the Last Year		
	Nonuser ($n = 368$)	Marijuana only ($n = 231$)	LSD ($n = 56$)
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Cigarettes			
None	302 (82)	107 (46) [§]	16 (29) [§]
1–5 per day	27 (7)	68 (29)	10 (18)
Half a pack or more	39 (11)	56 (24)	30 (54)
Beer/Wine/Coolers			
None	122 (33)	15 (6) [§]	1 (2) [§]
Once or twice	74 (20)	39 (17)	2 (4)
3–9 times	119 (32)	75 (32)	16 (29)
10 or more times	53 (14)	102 (44)	37 (66)
Use of hard liquor			
None	235 (64)	7 (13) [§]	47 (20) [§]
Once or twice	54 (15)	8 (15)	55 (24)
3–9 times	53 (14)	15 (27)	61 (26)
≥10 times	25 (7)	25 (45)	68 (29)
Times drunk			
None	263 (72)	3 (5) [§]	65 (28) [§]
Once or twice	58 (16)	9 (16)	62 (27)
3–9 times	36 (10)	20 (36)	55 (24)
≥10 times	10 (3)	24 (43)	47 (21)
Binge drinking (last 2 wks)	51 (14)	36 (65)	100 (44)

*Analyses conducted separately for LSD and marijuana only using nonusers as comparison group. Denominator term varies across variables due to missing data. Percentages may not total 100 because of rounding.

[§] $P < 0.01$.

^{||} $P < 0.05$.

Table 2. Selected Reproductive Health Characteristics Among Sexually Active Females Stratified by Substance Use*

Variable	Substance Use in the Last Year		
	Nonuser ($n = 368$)	Marijuana only ($n = 231$)	LSD ($n = 56$)
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Early menarche (≤ 10 yr)	45 (12)	33 (14)	6 (11)
Age at first intercourse (≤ 15 yr)	150 (41)	153 (66) [§]	43 (77) [§]
Gravidity (≥ 1)	212 (58)	102 (44) [§]	20 (36) [§]
Scale of sexual risk taking			
Low	321 (88)	128 (56)	12 (21)
Moderate	21 (6)	38 (17)	12 (21)
High	21 (6)	63 (28) [§]	32 (57) [§]
Number of lifetime sexual partners			
1–2	196 (53)	56 (24)	7 (13)
3–5	109 (30)	79 (34)	17 (30)
≥ 6	62 (17)	95 (41) [§]	32 (47) [§]
Consistent contraceptive use in last year	203 (55)	114 (50)	21 (36)

*Analyses conducted separately for LSD and marijuana only using nonusers as comparison group. Denominator term varies across variables due to missing data. Percentages may not total 100 because of rounding.

[§] $P < 0.01$.

^{||} $P < 0.05$.

illicit drug use (cocaine, crack, amphetamines, etc.) in the last 12 months.

Reported peer alcohol and cigarette use was also high among these two groups (Table 4). Among those who reported only using marijuana during the last year, very few reported that half or more of their peers used LSD or other illicit drugs. In contrast, LSD users were significantly more likely, as compared to nonusers, to report that half or more of their peers were using marijuana, LSD, and/or other illicit drugs. In addition, LSD users were significantly less likely to disapprove of people who frequently smoked or consumed alcohol (Table 4).

Nonusers as compared to LSD users were significantly more likely to perceive great risk of harm from smoking 10 or more cigarettes (49% vs. 29%, $P < 0.01$), consuming 5 or more drinks once or twice each weekend (40% vs. 14%, $P < 0.01$), or taking LSD once or twice (62% vs. 20%, $P < 0.01$). Similar significant relationships were observed across these three variables when marijuana-only users were compared to nonusers. That is, 49% of marijuana-only users as compared to 33% of nonusers reported great

Table 4. Reported Peer Substance Use Behaviours and Disapproval of People who Use Substances Among Sexually Active Females Stratified Substance Use*

Variable	Substance Use in the Last Year		
	Nonuser (n = 368)	Marijuana only (n = 231)	LSD (n = 56)
Half or More Peer Use [†]	N (%)	N (%)	N (%)
Alcohol	137 (38)	163 (71) [§]	56 (100) [§]
Cigarettes	79 (22)	112 (49) [§]	50 (89) [§]
Marijuana	38 (10)	129 (56) [§]	50 (89) [§]
LSD	2 (1)	7 (3) [§]	35 (63) [§]
Other illicit drugs	5 (1)	12 (5) [§]	18 (33) [§]
Get drunk at least weekly	47 (13)	78 (34) [§]	35 (63) [§]
Have dropped out of school	38 (10)	51 (22) [§]	17 (30) [§]
Disapprove of People who Smoke ≥10 cigarettes			
None	103 (28)	115 (50) [§]	41 (75) [§]
Some	118 (32)	68 (30)	6 (11)
Strong	145 (40)	46 (20)	8 (15)
Take LSD once or twice			
None	45 (12)	40 (17)	43 (77) [§]
Some	84 (23)	69 (30)	9 (16)
Strong	236 (65)	122 (53)	4 (7)
Have ≥5 drinks once or twice each weekend			
None	112 (31)	120 (52) [§]	41 (73) [§]
Some	121 (33)	63 (28)	12 (21)
Strong	132 (36)	46 (20)	3 (5)

[†]Reference group is none of few peers use or engage in behavior.

*Analyses conducted separately for LSD and marijuana only using nonusers as comparison group. Denominator term varies across variables due to missing data. Percentages may not total 100 because of rounding.

[§] $P < 0.01$.

^{||} $P < 0.05$.

risk from smoking 10 or more cigarettes ($P < 0.01$), 40% vs. 24% reported great harm from consuming 5 or more drinks once or twice on the weekends ($P < 0.01$), and 62% vs. 55% reported great harm from using LSD once or twice ($P < 0.01$).

The proportion of those young women who were identified as having severe depressive symptomatology was strongly associated with using LSD in the last year ($P < 0.001$). Specifically, 38% ($n = 21$) of LSD users as compared to 15% ($n = 55$) of nonusers were identified as having severe depressive symptoms. Moreover, LSD users were more likely to be identified as having low levels of self-esteem (38% vs. 24%, $P < 0.04$). No difference emerged between marijuana-only users as compared to nonusers on these two variables. With regard to lifetime physical and sexual victimization, both LSD and marijuana-only users were significantly more likely to report histories of physical (48% vs. 24%, $P < 0.001$ for LSD; 39% vs.

24%, $P < 0.001$ for marijuana) and sexual assault (29% vs. 13%, $P < 0.001$ for LSD; 22% vs. 13%, $P < 0.01$ for marijuana).

The results of the logistic regression analyses are presented in Table 5. Distinct profiles of those who reported using LSD and marijuana only emerged. Common to both were reports of being drunk more than 10 times during the last year, regular smoking of a half a pack of cigarettes or more per day, and identification as a high-sexual-risk taker. However, LSD users as compared to nonusers were more likely to report white ethnicity (as compared to nonwhite), be 17 years of age or less (as compared to at least 18 yrs), report a history of physical abuse, and be categorized as having severe depressive symptomatology. On the other hand, marijuana-only users were more likely to report single marital status, young age at first intercourse, having half or more of their friends use marijuana, and poor grades. Interestingly, high sexual risk-taking followed by 10 or more times drunk in the last year were the most important correlates of using LSD, whereas reporting half or more of your friends using marijuana followed by 10 or more times drunks were the most important correlates of only reporting marijuana use.

Discussion

Our results indicate that this population of sexually active female adolescents and young adults have similar rates of lifetime use of LSD (13%) as reported in other surveys,^{1,30} and half of these young women report using LSD one or more times in the last year. Prior data suggests that the use of hallucinogens by African Americans is virtually nonexistent across all ages of adolescents and young adults.^{2,9} In fact, we found that none of our African American young women reported using LSD. However, the proportion of African Americans who reported using marijuana was much greater than either caucasian or Mexican American women. Thus, similar to other researchers, we cannot generalize our findings regarding LSD use to African American young women.

Importantly, we found a distinct profile for the female LSD user that may aid the busy clinician with identification. Young white females who engage in frequent high-risk sexual behaviors and who exhibit depressed mood were more likely to report using LSD in the last year when compared to those who did not report any substance use. Moreover, teens with a history of physical abuse and those who report being drunk or high on a monthly or more frequent basis are young women who the clinician should carefully evaluate. Unfortunately, owing to the cross-sectional nature of our data, we are unable to make attribution

to directionality. Thus, what came first—LSD use, high-risk sexual behaviors, other drug use behaviors, or depressive symptoms—remains unanswered. Regardless, other researchers have found similar relationships between LSD use and negative affect,^{9,10,33} ethnicity,^{9,10} and young age.³² In fact, it has been reported that females as compared to males tend to have younger first opportunities to use hallucinogens.³¹ We found that those young women most likely to report using only marijuana in the last year were more likely to be single and to report lower academic achievement, a young age at first intercourse, and that half or more of their friends currently use marijuana. Thus, this profile is similar to other research describing a common behavior syndrome⁴ where those adolescents who engage in illicit drug use are more likely to demonstrate poor school achievement, as well as engage in high-risk sexual activities, binge drinking, and tobacco use.³⁵

Although considerable work has illustrated the pathways to alcohol, cigarette, and marijuana use, less attention has been given to identifying the antecedents to the use of other illicit drugs.¹¹ For example, according to Kandel and colleagues,³⁴ most women follow sequences such as alcohol or cigarette use preceding marijuana use and alcohol, cigarettes, and marijuana preceding other illicit drugs. Our data offer support to this notion that adolescent females demonstrate a progression from licit to illicit drug use. Although we cannot be certain of the sequence, we found that common to both LSD and marijuana-only users was the reported use of cigarettes and abuse of alcohol. Moreover, among LSD users, almost all reported concurrent use of marijuana. Finally, among LSD users the average age of marijuana initiation was 14.5 yrs as compared to 15.5 yrs for marijuana-only users. Thus, it may be that those young women who

progress to LSD are those who began using licit substances at an early age, with marijuana use beginning in the early teen years. Alternatively, it has been suggested that illicit drug users may use certain drugs with particular pharmacokinetic parameters and properties. Specifically, those drugs with rapid absorption, rapid entry into the central nervous system, a short half-life, and high free drug clearance are pharmacokinetic characteristics which predict a high potential for use and abuse.^{36,37} This theoretical belief purports that drug use and perhaps progression may be more related to personal preferences for how fast and effectively the drug alters mood.

Noncontinuation rates of drug use have been calculated as an indication of the proportion of people who have reported using a drug but do not continue using it. Previous research has found the noncontinuation rate among high school users of LSD to be 38%, whereas our data found the rate to be 50%. Boys et al³³ found that one of the most common reasons for reported LSD use was to achieve elation or euphoria. It is possible that our larger discontinuation rate may be due to the numbers of young women who are using this substance in an effort to manipulate mood. As these women age they may become more aware of potential side effects or find alternative methods of self-medicating their depressive symptoms and discontinue using LSD.

Some limitations of our study deserve mention. We chose to examine prevalence and correlates of LSD use in an at-risk population of female adolescents and young adults residing in southeastern Texas. Our findings may not generalize to sexually active females who present to other primary care settings, females not sexually active, male adolescents and young adults, or women from other geographic locations. Secondly, as mentioned, our data are cross-sectional and causality

Table 5. Adjusted Odds Ratios (AOR) and 95% Confidence Interval of Factors Associated with LSD and Marijuana Use*

Factor	LSD		Marijuana	
	AOR	95 % CI	AOR	95 % CI
14–17 yrs vs. 18–26 yrs	4.22	1.61, 11.06		
White ethnicity vs. Mexican American	3.36	1.31, 8.64		
High vs. low-to-moderate sexual risk taking	22.12	8.21, 59.60	3.47	1.78, 6.75
Smokes $\geq$ half pack vs. $\leq$ 5 cigarettes per day	3.88	1.47, 10.23	2.43	1.34, 4.43
Lifetime report of physical abuse	2.63	1.05, 6.60		
Severe depressive symptomatology	4.31	1.60, 10.23		
$\geq$ 10 times drunk or high vs. $\leq$ 9 times in last year	8.83	2.90, 26.91	7.67	3.13, 18.81
Disapproval of people who have $\geq$ 5 drinks each weekend	0.33	0.17, 0.66		
Single marital status			1.98	1.15, 3.42
Grades achieved last year in school				
About C's			1.73	1.08, 2.77
< C's			2.65	1.32, 5.32
Young age at first intercourse ($\leq$ 15 yrs)			2.09	1.30, 3.36
Half or more friends use marijuana			11.35	6.41, 20.08

*Adjusted for race/ethnicity, age, and all variables listed.

cannot be inferred. Finally, we relied on self-reported use of licit and illicit drugs. Although the survey was anonymous, we cannot be sure that those who denied using LSD, marijuana, or other drugs were, in fact, nonusers.

Although there has been recent concern about the increased use of LSD among adolescents, our prevalence of lifetime use is consistent with other nationally collected data collected at similar points in time. It remains to be seen what public health impact will result from the recent "rediscovery" of hallucinogen use by today's youth.² Despite our findings that about half of lifetime LSD users did not report using LSD in the last year, we cannot infer from our data whether the current cohort of LSD users will blossom into problematic users of marijuana or other illicit drugs. Regardless, the female LSD user does appear to portray a distinct profile, which should aid clinicians in the identification of these patients in order to provide adequate evaluation and treatment of the consequences of high-risk sex and other health-compromising behaviors.

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