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Addiction epidemiology in adolescents receiving inpatient psychiatric treatment

Michael F. Weaver^{a,*}, Madeleine A. Dupre^b, Karen L. Cropsey^a, J. Randy Koch^a, Bela A. Sood^a, Jenny L. Wiley^a, and Robert L. Balster^a

^aVirginia Commonwealth University, Richmond, VA 23298, United States

^bCommonwealth Center for Children and Adolescents, Staunton, VA 24402, United States

Abstract

This study sought to characterize adolescent psychiatric inpatient populations from two sites and to determine correlates of substance use disorders (SUD). Screening procedures for SUD differ substantially between these sites. A retrospective review of adolescent inpatients ($n=636$) revealed that the populations were similar in gender, race and age. Rates of SUD at the site with a formalized SUD screening regimen were higher (39%) than those at the other site (16.5%). Similar correlates of SUD were observed across sites, including older age, legal involvement, sexual activity, childhood disruptive disorder, and tobacco use. These results suggest that SUD is a major issue in adolescent psychiatric patients. More rigorous screening for SUD and its correlates may facilitate earlier detection of substance use in this vulnerable population.

Keywords

Co-occurring disorders; Dual diagnosis; Adolescents; Epidemiology; Treatment

1. Introduction

Studies have shown that up to 65% of adolescent psychiatric inpatients with a primary Axis I disorder had co-morbid substance use disorders (SUD) (Deas-Nesmith, Campbell, & Brady, 1998; Hovens, Cantwell, & Kiriakos, 1994; Wise, Cuffe, & Fischer, 2001), but up to 80% of adolescents with psychosis had a co-morbid SUD (Strakowski, Keck, McElroy, Lonczak, & West, 1995; Swadi & Bobier, 2003). Most adolescent psychiatric inpatients in the Commonwealth of Virginia are served by only two major public hospitals. Site 1 is a university-operated facility located in an urban environment. Site 2 is a state-operated facility located in a small city that admits children and adolescents in need of acute-care crisis stabilization, which uses a standardized SUD screening protocol with urine drug screening and the Substance Abuse Subtle Screening Inventory (SASSI) (Sweet & Saules, 2003). Site 1 relies on non-standardized

*Corresponding author. Virginia Commonwealth University, P. O. Box 980109, 1200 East Broad Street, 11th Floor, South Wing, Richmond, VA 23298-0109, United States. Tel.: +1 804 828 1283; fax: +1 804 828 9906. E-mail address: mfweaver@vcu.edu (M.F. Weaver)..

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clinical interviews with patients and their parents/guardians. The goals of this retrospective chart review were (1) to describe and characterize these two populations and (2) to determine unique and shared correlates of SUD in these populations. Of particular interest are the effects of different admission criteria and SUD screening procedures on rates of SUD diagnosis in each population.

2. Methods

This study was approved by the University Institutional Review Board of Site 1 and the Clinical Review Committee of Site 2. A retrospective chart review was performed for inpatients admitted to the two facilities between July 1, 2003 and June 30, 2004. Exclusion criteria were: age < 12 or > 18 years at time of admission, or mental retardation, or pervasive developmental disorder. A diagnosis of SUD was determined by reviewing physician and nursing documentation in the medical record, based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000). Results of a pilot test at Site 1 showed an inter-rater reliability for two independent raters of 83–100% across individual items of 5% of the sample, and inter-rater reliability at Site 2 was 85–99% for four independent raters (alpha score of agreement was calculated for each variable to arrive at this range) for 10% of the sample.

We used descriptive statistics to characterize each population. Subsequently, we used Chi-square or ANOVA procedures to compare and contrast the two populations on key variables of interest. We examined frequencies of tobacco use as well as frequencies of diagnosis of SUD at discharge at each treatment center. Separate univariate analyses, including Chi-square and *t*-tests, were used at each facility to determine correlates of receiving an SUD diagnosis upon discharge from the psychiatric facility. In addition, logistic regression models utilized data from each of the two sites separately. All variables of interest were forced-entered into the logistic regression equation. For all analyses, the *p*-value was set at 0.05.

3. Results

3.1. Comparison between the facilities

During the study year, Site 1 had 554 admissions, and final Site 1 sample size was 316 adolescents (see Table 1). Site 2 had 391 adolescent admissions, with a final sample size of 320 adolescents.

As expected, there was a high incidence of SUD among patients at these two facilities, with 16.5% at Site 1 and 39.1% at Site 2. At both sites, the most common SUD was alcohol abuse or dependence (6% at Site 1 and 17.6% at Site 2), followed by marijuana abuse or dependence (4.7% at Site 1 and 12.5% at Site 2) and polysubstance dependence (1.6% at Site 1 and 4.1% at Site 2). The two populations were similar in age, gender, and racial composition. Site 2 adolescents had more severe psychosocial problems as evidenced by significantly more history of legal involvement, more parents with histories of legal problems, more family history of mental illness and substance abuse, more history of aggressive or self-injurious behaviors and were more often victims of abuse (physical, sexual, or emotional). Adolescents at Site 2 were also less likely to be attending school in regular classrooms and were more likely to be sexually active. Finally, adolescents at Site 2 were more likely to receive a diagnosis in the following diagnostic categories: Childhood Disruptive Disorders, Anxiety Disorders, or Adjustment Disorders. No differences were found between the two facilities for diagnoses of Mood or Psychotic Disorders.

3.2. Univariate correlates of substance use disorders

Because the populations and the rates of SUD at the two facilities were different, separate analyses of the correlates of SUD were calculated for each site. Table 2 shows the correlates of a substance use diagnosis at discharge for each of the facilities. An Analysis of Variance (ANOVA) was calculated to determine differences in age for diagnosis of SUD at discharge for both sites. For both sites, adolescents diagnosed with an SUD were significantly older than their peers who were not diagnosed with an SUD [Site 1: 15.75 vs. 14.88; $F(1,315)=14.67$, $p<0.001$; Site 2: 15.46 vs. 14.48; $F(1, 319)=30.66$, $p<0.001$]. Adolescents from both sites who were diagnosed with an SUD were significantly more likely to be sexually active and use tobacco. At Site 1, males were more likely to receive an SUD diagnosis than females. At Site 2, adolescents with an SUD were also more likely to be diagnosed with a mood disorder, have a family history of substance use, and also be involved in the juvenile justice system.

3.3. Unique correlates of substance use disorders

Table 3 shows the correlates of receiving an SUD diagnosis at discharge at Site 1. Being older and use of tobacco were independent correlates of receiving an SUD diagnosis at discharge. Use of tobacco was associated with 2.62 increased odds of receiving an SUD diagnosis. Overall, the model was significant (chi-square=8.59, $df= 19$, $p<0.001$), with 85.8% of the sample correctly classified according to the presence or absence of SUD diagnosis.

This same procedure was used to determine the correlates of receiving an SUD at Site 2 (Table 4). Older age, diagnosis of a mood disorder, history of legal involvement, history of sexual activity, and use of tobacco were all independent correlates of being diagnosed with an SUD. Having been a victim of abuse was associated with not receiving an SUD. Use of tobacco increased the odds of receiving an SUD 5-fold, while legal involvement, being sexually active, and receiving a diagnosis of a mood disorder all doubled the odds of having an SUD. Overall, the model was significant (chi-square=118.48, $df= 19$, $p<0.001$), with 77.4% of the sample correctly classified according to the presence or absence of SUD diagnosis.

4. Discussion

The results of this study clearly demonstrate that use of illicit substances (including alcohol, since its use is illegal until age 21) is not uncommon in adolescents hospitalized for psychiatric illness. Rates of diagnosis of SUD significantly varied across setting, with twice as many adolescents at Site 2 receiving an SUD diagnosis compared to adolescents at Site 1 (39% vs. 17%, respectively). Site 2 used a standardized substance abuse screening protocol, while Site 1 relied primarily on non-standardized clinical interviews. Site 2 received patients from home environments that were more disrupted, including those with (1) higher rates of personal and parental involvement in the justice system, (2) greater degree of familial history of both mental illness and substance abuse, and (3) greater enrollment in alternative educational settings.

The strongest univariate correlates of a diagnosis of SUD at both facilities were tobacco use and sexual activity. Older age was strongly associated with SUD in each individual population. Correlates for one or both sites included diagnosis of mood or conduct disorder, family history of SUD, and contact with the juvenile justice system.

One particularly intriguing finding of the logistic regression model for Site 2 was the negative correlation between being a victim of abuse and diagnosis of SUD; that is, victims of abuse were less likely to be diagnosed with SUD. It is possible that the substantial difference in rigor of the screening processes for SUD vs. physical/sexual abuse at Site 2 resulted in enhanced detection of SUD in the absence of similar increases in detection of physical or sexual abuse.

The limitations of this study are common to most retrospective studies of this nature. First, the populations chosen for this study are relatively small and geographically confined, suggesting the need for caution in generalization of the results. Second, data collected for this study are correlative, with the attendant caveats concerning attribution of causality. Third, the two centers from which subjects were selected have very different practices with respect to documentation of SUD as well as admission criteria.

In summary, co-morbid presentation of psychiatric disorders and SUD during adolescence presents special challenges to clinicians and researchers. In this study, rates of SUD were higher in both inpatient populations than in the general adolescent population. This suggests that co-occurring substance abuse is a major issue that must be addressed in adolescent psychiatric inpatients. Formal screening for correlates such as those described in this study may facilitate detection of SUD in psychiatrically ill youth, and wider implementation of this practice may lead to earlier identification of SUD in adolescent psychiatric inpatients.

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Table 1

Comparisons between patients at two inpatient adolescent psychiatric facilities

Variable	Site 1 (n=316)	Site 2 (n=320)
Male	48.4%	49.1%
White	58.9%	56.3%
Patient in regular education	69.9%	49.4%
First hospitalization	52.2%	58.8%
Current or past legal involvement	25.9%	60.9%
Current or past legal involvement (parents)	9.8%	26.6%
Family history of mental illness	28.8%	54.4%
Family history of substance abuse	25.6%	64.4%
Mood disorder at discharge	74.1%	70.6%
Anxiety disorder at discharge	11.1%	39.1%
Psychotic disorder at discharge	5.1%	7.5%
Adjustment disorder at discharge	1.9%	14.7%
Childhood disruptive disorder at discharge	20.9%	59.4%
Substance use disorder at discharge	16.5%	39.1%
Any tobacco use	33.9%	61.9%
History of sexual activity	38.3%	54.1%
History of self-injury	38.3%	67.2%
History of any abuse	32.3%	58.0%
History of aggression	31.0%	72.5%

Table 2
Univariate analyses for correlates of substance use disorders in two inpatient adolescent psychiatric facilities

Variable	Substance use diagnosis ^a		
	Site 1 (n=316)	Chi-square	Site 2 (n=320)
Gender	Male	20.9%	43.9%
	Female	12.3%	34.4%
Race	White	17.2%	39.4%
	Other	15.4%	38.6%
Education	Regular	15.8%	40.5%
	Other	17.9%	37.7%
Hospitalization	First	17.6%	41.0%
	Multiple	15.2%	36.4%
Legal history	Yes	19.5%	49.7%
	No	15.4%	22.4%
Parental legal history	Yes	17.2%	47.1%
	No	9.7%	36.2%
Family history of mental illness	Yes	16.5%	42.5%
	No	16.4%	34.9%
Family history of substance abuse	Yes	15.3%	45.1%
	No	19.8%	28.1%
Mood disorder at discharge	Yes	14.1%	44.7%
	No	23.2%	25.5%
Anxiety disorder at discharge	Yes	14.3%	39.2%
	No	16.7%	39.0%
Psychotic disorder at discharge	Yes	6.3%	29.2%
	No	17.0%	39.9%
Adjustment disorder at discharge	Yes	0%	38.3%
	No	16.8%	39.2%
Childhood disruptive disorder at discharge	Yes	22.7%	43.2%
	No	14.8%	33.1%
Tobacco use	Yes	28.0%	54.5%
	No	10.5%	13.9%

Variable	Substance use diagnosis ^a		
	Site 1 (n=316)	Chi-square	Site 2 (n=320)
Sexually active	Yes	24.0%	53.8%
	No	11.8%	21.8%
History of self-injury	Yes	13.2%	39.1%
	No	18.5%	39.0%
History of any abuse	Yes	14.7%	36.2%
	No	17.3%	43.3%
History of aggression	Yes	13.3%	39.2%
	No	17.9%	38.6%

^a Indicates the percentage in each category that was diagnosed with substance dependence disorder.

^b $p<0.05$.

^c $p<0.001$.

^d $p<0.01$.

Table 3
Logistic regression correlates of substance dependence for Site 1 ($n=316$)

Variable	β	SE	Wald	p-value	Odds ratio	95% CI
Older age	0.37	0.13	7.67	0.006	1.45	1.11–1.88
Male	0.43	0.36	1.44	0.231	0.65	0.32–1.37
White	0.15	0.38	0.15	0.700	1.16	0.55–2.44
Regular education	0.12	0.38	0.11	0.746	1.13	0.54–2.37
First hospitalization	–0.17	0.36	0.23	0.630	0.84	0.42–1.70
Legal history	0.10	0.38	0.07	0.792	1.13	0.53–2.30
Parental legal history	–0.91	0.72	1.62	0.202	0.40	0.10–1.63
Family SA history	0.14	0.42	0.11	0.742	1.15	0.51–2.59
Family MH history	–0.07	0.40	0.03	0.870	0.94	0.43–2.05
Mood disorder	–0.71	0.38	3.47	0.063	0.49	0.23–1.04
Anxiety disorder	–0.01	0.59	0.00	0.983	0.99	0.31–3.13
Adjustment disorder	–20.04	0.00	0.00	0.999	0.00	0.00–0.00
Disruptive disorder	0.73	0.42	2.99	0.083	2.07	0.91–4.72
Psychotic disorder	–1.39	1.13	1.50	0.221	0.25	0.03–2.30
Tobacco use	0.96	0.36	7.20	0.007	2.62	1.30–5.30
Self-injury history	–0.38	0.37	1.02	0.312	0.69	0.33–1.42
Abuse history	–0.42	0.40	1.06	0.304	0.66	0.30–1.46
Sexually active	0.60	0.38	2.46	0.117	1.82	0.86–3.84
Aggression history	–0.49	0.40	1.48	0.224	0.61	0.28–1.35

Table 4
Logistic regression correlates of substance dependence for Site 2 ($n=320$)

Variable	β	SE	Wald	<i>p</i> -value	Odds ratio	95% CI
Older age	0.34	0.11	10.62	0.001	1.41	1.15–1.64
Male	– 0.19	0.34	0.32	0.570	0.83	0.43–1.73
White	0.15	0.32	0.23	0.635	1.16	0.62–2.17
Regular education	– 0.48	0.31	2.41	0.121	0.62	0.34–1.13
First hospitalization	– 0.11	0.33	0.11	0.743	0.90	0.47–1.71
Legal history	0.89	0.34	6.80	0.009	2.43	1.25–4.75
Parental legal history	0.39	0.34	1.28	0.257	1.47	0.76–2.86
Family SA history	0.36	0.33	1.18	0.278	1.43	0.75–2.71
Family MH history	0.25	0.31	0.69	0.406	1.29	0.71–2.34
Mood disorder	0.91	0.35	6.67	0.010	2.49	1.25–4.99
Anxiety disorder	0.10	0.32	0.09	0.764	1.10	0.59–2.07
Adjustment disorder	0.25	0.46	0.29	0.591	1.28	0.52–3.14
Disruptive disorder	0.58	0.32	3.27	0.071	1.79	0.95–3.36
Psychotic disorder	0.69	0.64	1.15	0.284	1.99	0.56–7.03
Tobacco use	1.65	0.36	21.49	<0.001	5.23	2.60–10.52
Self-injury history	0.11	0.35	0.10	0.748	1.12	0.56–2.23
Abuse history	– 0.64	0.32	4.00	0.045	0.53	0.38–0.95
Sexually active	0.75	0.31	5.67	0.017	2.11	1.14–3.91
Aggression history	– 0.35	0.35	1.01	0.315	0.71	0.36–1.39