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Factors related to cigarette smoking and intent to quit among adolescent inpatients with psychiatric and substance use disorders

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Abstract

Purpose—Smoking behaviors and intent to quit have not been well studied among adolescent psychiatric patients. The current study examined the relationships between smoking-related variables (smoking status/heaviness, and intent to quit), psychiatric diagnoses and symptomatology, and substance use, among adolescents receiving psychiatric inpatient care.

Methods—Baseline data from a randomized controlled trial, testing the effect of a brief intervention on substance use, with 151 psychiatrically hospitalized adolescents with comorbid psychiatric and substance use disorders (diagnosed using semi-structured interviews) were examined for this study.

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Contributors

Dr. Minami led the study idea, analyses, and manuscript writing. Dr. Bloom contributed to refining the study goals and the first draft of the manuscript. Dr. Brown, with Dr. Abrantes, led the original trial from which the data for this project were obtained and contributed to the study idea and manuscript revisions. Dr. Yong and Ms. Brinkman contributed to revising the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

Dr. Richard Brown is CEO and receives equity shares in Health Behavior Solutions, Inc., a company that promotes products and services for health behavior change, including smoking cessation. The business interests of Health Behavior Solutions, Inc. relate to the topic of this study. All other authors declare they have no conflicts of interest.

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Results—Of 151 inpatients aged 13–17 years, 112 (74.2%) were smokers (self-report), of whom 59 (52.7%) expressed intent to quit within 3 months and 36 (32.1%) within 30 days. There were no differences in psychiatric diagnoses or alcohol, marijuana, or any drug use among smokers and nonsmokers. On the other hand, smokers reported significantly greater occurrences of negative consequences from alcohol use, drug use, and total substance use than nonsmokers. Separate analyses also revealed that heavier smokers reported greater negative consequences from alcohol/drug/total use. Similarly, while no difference in externalizing or internalizing symptoms was observed across smokers vs. nonsmokers, heavier smokers reported significantly more severe externalizing symptoms, but not internalizing symptoms, than lighter smokers. Intention to quit smoking did not vary as a function of psychiatric symptomatology or substance use.

Conclusions—Smoking was related to several psychiatric and substance use problems. Notably, adolescent psychiatric inpatient smokers reported intention to quit smoking regardless of psychiatric disorders, psychiatric symptom severity, or other substance use.

Keywords

Psychiatric Inpatient; Adolescent; Smoking; Intent to Quit; Substance Use; Psychiatric Disorder; Comorbidity

1. Introduction

Only 8.0% of U.S. high school students reported past month cigarette smoking in 2016 compared to 16% in 2011 (Jamal et al., 2017). However, consistent with data on adults, adolescents with psychiatric and substance use disorders (SUDs), especially those who are engaged in treatment for these disorders, have much higher smoking rates than the general population (DeHay et al., 2012; Ramsey et al., 2002). Some studies have examined psychological, peer, and family predictors of smoking behavior in this population (Grana et al., 2012; Nargiso et al., 2012; Picotte et al., 2006; Ramo et al., 2010). Ramo et al. (2010) included adolescent smokers recruited from both inpatient and outpatient SUD treatment settings. They found that SUD severity was not related to intention to quit smoking or smoking cessation self-efficacy. Grana et al. (2012) recruited adolescents from outpatient mental health settings and found that psychiatric treatment and symptomatology measures were not related to the severity of nicotine dependence or desire to quit. Rates of SUD diagnosis was not reported, but about half had used alcohol and/or marijuana and 22% reported illicit drug use in the past month.

SUDs in adolescents are associated with high rates of psychiatric comorbidity (Kandel et al., 1999; Lewinsohn et al., 1995; Roberts et al., 2007) and suicidality (D'Eramo et al., 2004; Nock et al., 2013; Ramchand et al., 2008). When adolescents with SUDs present for treatment, especially those with comorbid psychiatric disorders, they typically present in mental health rather than in SUD treatment settings (Merikangas et al., 2011; SAMHSA, 2012). To date, smoking behavior among adolescents with comorbid psychiatric and substance use disorders who are receiving inpatient psychiatric treatment has not been well studied. We conducted a study within an inpatient setting (Ramsey et al., 2003) which indicated that compared to non-smokers, smokers had a greater number of lifetime psychiatric diagnoses, were more likely to have SUDs and disruptive behavior diagnoses,

and were also more likely to have engaged in binge drinking and smoking marijuana. A greater understanding of smoking behavior and intent to quit and their associations with substance use and psychiatric symptomatology may help develop appropriate smoking cessation interventions that can be integrated into inpatient care. The current study used baseline data from a clinical trial (Brown et al., 2015) to extend the previous findings above by examining the relationships between smoking behavior, intent to quit smoking, psychiatric diagnoses, substance use, and psychiatric symptomatology.

2. Methods

2.1 Participants

Participants were 151 adolescents with comorbid psychiatric and substance use disorders enrolled in a randomized trial examining the effects of a brief motivational interviewing (MI) intervention for substance use provided during inpatient psychiatric treatment on substance use outcomes after hospital discharge (Brown et al., 2015). They were recruited from the psychiatric inpatient units at Butler Hospital and Bradley Hospital in Rhode Island. Inclusion criteria were 1) being 13 to 17 years of age, 2) meeting DSM-IV criteria for a non-nicotine SUD and one or more current Axis I disorders (other than a SUD), and 3) having phone access. Exclusion criteria included a current DSM-IV diagnosis of psychotic disorder, mental retardation, or pervasive developmental disorder.

3. Procedure

After the consent process, all participants completed a baseline assessment during their psychiatric hospitalization, for which they received a \$50 gift certificate. Participants were then randomly assigned to MI or treatment as usual. All data in this study were from the baseline assessment (pre-intervention) that were administered to the adolescent participants. Detailed study procedures are described elsewhere (Brown et al., 2015). The original study was approved by Butler Hospital Institutional Review Board.

4. Measures

4.1 Psychiatric and Substance Use Disorder Diagnoses

The Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime (K-SADS-PL) (Kaufman et al., 1997) was administered to the adolescent participants to obtain clinical information about the participants and onset of SUD.

4.2 Smoking Status, Smoking Heaviness, and Intent to Quit

Those who verbally reported current cigarette smoking (smoker vs. non-smoker) were asked to select a smoking heaviness category: 1 = less than 1 a day, 2 = about 1–15 cigarettes a day, 3 = about 16–25 cigarettes a day, or 4 = over 26 cigarettes a day. Intent to quit smoking (i.e., plan to stop smoking in the next 30 days or within the next 3 months) was assessed with 2 separate questions (Yes/No).

4.3 Other Substance Use

Daily non-nicotine substance use during the 3 months prior to hospitalization was assessed using the Timeline Followback (TLFB) (Sobell and Sobell, 1996). An average number of days of substance use per month was calculated for alcohol, marijuana, other drugs, and any substance use.

4.4 Negative Consequences of Substance Use

The Adolescent Problem Use Scale (APUS) (Chassin et al., 1991) was used to assess the occurrence of negative (social, health, and legal) consequences of alcohol, drug, and total substance (alcohol and drugs) use.

4.5 Psychiatric Symptomatology

The Youth Self Report (YSR) (Achenbach, 1991) that comprises two main scales (internalizing and externalizing symptoms) was used to assess psychiatric symptomatology.

5. Data Analyses

Differences in demographics, rates of psychiatric and SUDs, and onset/duration of SUDs by smoking status were tested using chi-square or t-tests. We also tested whether intent to quit differed by smoking heaviness using regression. Next, smoking heaviness and intent to quit were regressed onto each disorder (presence or absence), controlling for gender, to examine differences across smokers with and without a psychiatric or substance use disorder. A series of linear regressions were conducted where smoking status, smoking heaviness, and intent to quit were predictors of substance use, negative consequences of substance use, and psychiatric symptomatology in separate models, controlling for race (i.e., white vs. non-white) and gender. For smoking heaviness and intent to quit models, only smokers were included. The potential moderating role of gender was also explored; however, no significant interaction effects were observed.

6. Results

6.1 Participant Characteristics

Thirty-nine participants (25.8%) were nonsmokers, and 112 (74.2%) were smokers (Table 1). Of smokers, 59 (52.7%) intended to quit within 3 months and 36 (32.1%) within 30 days. Male smokers (vs. female) smoked significantly more cigarettes per day ($b = 0.33$, $SE = 0.15$, $p = .027$) and heavier smokers were significantly less likely to intend to quit in the next 30 days ($b = -0.324$, $SE = 0.146$, $p = .029$), but not in the next 3 months ($p = 0.130$). No differences in the onset or duration of SUDs across smoking status were found (Table 2). Approximately two-thirds of smokers with SUDs started smoking after the onset of their SUD.

6.2 Psychiatric and Substance Use Disorder Diagnoses

No differences in rates of any psychiatric disorders across smoking status were observed. Smokers were more likely to have alcohol and other substance abuse/dependence, but not marijuana abuse/dependence (Table 1). Separate regression analyses showed that smokers

with post-traumatic stress disorder (PTSD), but not other disorders, were heavier smokers ($b = 0.29$, $SE = 0.14$, $p = .042$)¹, compared to smokers without PTSD, controlling for gender. Smokers with marijuana abuse/dependence, but not alcohol or other substance abuse/dependence, were heavier smokers than smokers without marijuana abuse/dependence ($b = 0.68$, $SE = 0.22$, $p = .003$). Neither intent to quit smoking within 30 days nor 3 months differed by any psychiatric or substance use disorders.

6.3 Alcohol, Marijuana, and Drug Use

There were no differences in mean days per month of alcohol, marijuana, other drugs, or any substance use among smokers and non-smokers, controlling for gender and race. Among smokers, heavier smokers were more likely to use marijuana ($b = 2.87$, $SE = 1.36$, $p = .038$) or any substances more frequently ($b = 2.53$, $SE = 1.26$, $p = .047$), compared to lighter smokers, but not alcohol or other drugs. Neither of the intent to quit variables predicted alcohol, marijuana, other drugs, or any substance use.

6.4 Negative Consequences of Substance Use

Smokers reported significantly greater negative consequences from alcohol ($b = 1.78$, $SE = 0.81$, $p = .029$), drug ($b = 1.92$, $SE = 0.93$, $p = .041$)², and total substance use ($b = 3.70$, $SE = 1.49$, $p = .014$) than non-smokers, controlling for gender and race. Separate analyses revealed that heavier smokers, compared to lighter smokers, reported a greater number of negative consequences from alcohol ($b = 1.30$, $SE = 0.55$, $p = .020$), drug ($b = 1.48$, $SE = 0.62$, $p = .018$), and total substance use ($b = 2.78$, $SE = 0.98$, $p = .005$). Again, intent to quit smoking within 30 days or 3 months was not related to negative consequences of substance use.

6.5 Psychiatric Symptomatology

No differences in externalizing² or internalizing symptoms were observed across smoking status. However, heavier smokers reported significantly more severe externalizing symptoms⁴ ($b = 3.11$, $SE = 1.21$, $p = .012$), but not internalizing symptoms, than lighter smokers. Neither of the intent to quit variables was related to psychiatric symptomatology.

7. Discussion

The current study built upon previous findings (Grana et al., 2012; Ramsey et al., 2003) by examining relationships among cigarette smoking, other substance use, and psychiatric symptomatology in a sample of psychiatrically hospitalized adolescents with comorbid substance use disorders (SUDs). Most participants were smokers, providing additional evidence that rates of smoking among adolescents with psychiatric and substance use disorders remain elevated compared to the general adolescent population. More than half of the smokers intended to quit within 3 months and one third intended to quit within 30 days. Consistent with findings from an outpatient setting reported by Grana et al. (2012) as well as adults with psychiatric and substance use problems (Prochaska et al., 2006; Prochaska,

^{1,2}These differences did not reach statistical significance ($ps = .064/.071$) without gender in the model.

^{2,4}Excluding one item about tobacco use (of 32 items) from an externalizing score did not change the findings.

2011), intent to quit was not related to psychiatric or substance use disorders, psychiatric symptoms, other substance use, or consequences of other substance use. Therefore, smoking cessation interventions should be offered irrespective of diagnoses or symptom severity in adolescent inpatient psychiatry settings. Such settings may provide a unique window of opportunity for smoking cessation intervention, given that tobacco use is often prohibited and patients have an opportunity to experience abstinence. We have previously tested a brief MI intervention to address tobacco use among psychiatrically hospitalized adolescents (Brown et al., 2003) and found that MI was more effective, compared to brief advice only, among those who had no plan to change their smoking behavior prior to the intervention, but less effective for those who had already intended to quit. These results suggest that future approaches should be tailored to participants' level of motivation/readiness to quit.

We found no differences in rates of any specific psychiatric disorder or in internalizing or externalizing psychiatric symptoms between smokers and non-smokers. This finding is somewhat in contrast to Ramsey et al. (2003), who reported that smokers were more likely to have disruptive behavior diagnoses than non-smokers. However, unlike the current sample, not all participants in Ramsey et al. (2003) had comorbid SUDs, and there is a high comorbidity rate between SUDs and disruptive behavior disorders (Roberts et al., 2007). We also found that smokers and non-smokers did not differ in mean days per month of other substance use, but smokers were more likely to have some types of SUDs and also reported significantly greater consequences from other substance use. Among smokers, heavier smokers reported greater externalizing symptoms than lighter smokers. Smoking heaviness was also positively correlated with having a marijuana use disorder, mean days of substance use, and negative consequences from substance use. Overall, these findings suggest that smokers, especially heavier smokers, were more likely to engage in substance use associated with impairment, distress, or disruptive behavior, although the overall frequency of substance use may not differ from that of non-smokers. However, the findings should be interpreted with caution given the following limitations of this study: 1) all participants were from one psychiatric hospital, the majority were female and Caucasian, and 2) we did not correct for multiple comparisons.

In conclusion, our findings demonstrate that a majority of psychiatrically hospitalized adolescents with comorbid psychiatric and substance use disorders use tobacco and that most intend to quit soon. Intention to quit smoking was unrelated to diagnoses, psychiatric symptom severity, or other substance use. Integrating smoking cessation treatment in adolescent inpatient psychiatric treatment settings may improve cessation rates among this high-risk population.

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Highlights

- The majority of adolescent psychiatric inpatient smokers have intention to quit.
- Cigarette smoking was related to several psychiatric and substance use problems.
- Intent to quit was unrelated to substance use or psychiatric symptom severity.
- It is important to integrate smoking intervention into adolescent inpatient settings.

Table 1

Demographics and current psychiatric diagnoses by smoking status.

	Non-Smokers (N=39)	Smokers (N=112)	<i>p</i>
	<i>m (sd)/ n(%)</i>	<i>m (sd)/ n(%)</i>	
Age	15.79 (1.06)	15.87 (1.03)	0.712
Female	25 (64.1%)	75 (67.0%)	0.480
White	28 (71.8%)	102 (91.1%)	0.006 *
Black	4 (10.3%)	5 (4.5%)	0.237
Hispanic	5 (12.8%)	5 (4.5%)	0.126
<i>Psychiatric Diagnoses</i>			
Depressive Disorders	21 (53.8%)	65 (58.0%)	0.789
Mania/Hypomania	0 (0.0%)	8 (7.1%)	0.113
Conduct disorder	22 (56.4%)	63 (56.3%)	1.000
Oppositional Defiant Disorder	2 (5.1%)	11 (9.8%)	0.516
Post-Traumatic Stress Disorder	14 (35.9%)	38 (33.9%)	0.978
Acute Stress Disorder	1 (2.6%)	1 (0.9%)	0.451
Obsessive Compulsive Disorder	3 (7.7%)	6 (5.4%)	0.696
Panic Disorder	2 (5.1%)	10 (8.9%)	0.732
Social Anxiety Disorder	5 (12.8%)	12 (10.7%)	0.949
Generalized Anxiety Disorder	8 (20.5%)	18 (16.1%)	0.699
Attention Deficit Hyperactivity Disorder	11 (28.2%)	35 (31.3%)	0.878
Bulimia	1 (2.6%)	4 (3.6%)	1.000
Anorexia Nervosa	2 (5.1%)	4 (3.6%)	0.649
Alcohol Abuse or Dependence	22 (56.4%)	84 (75%)	0.047 *
Marijuana Abuse or Dependence	35 (89.7%)	101 (90.2%)	1.000
Other Substance Abuse or Dependence	9 (23.1%)	54 (48.2%)	0.011 *

*
p < 0.05

Table 2

Onset and duration of substance abuse/dependence by smoking status.

	Non-smokers	Smokers	
	<i>m (sd)</i>	<i>m (sd)</i>	<i>p^a</i>
Age of alcohol abuse/dependence onset (n=22/75) ^b	15.27 (1.28)	14.99 (1.27)	0.373
Age of THC abuse/dependence onset (n=34/89) ^b	15.02 (1.33)	14.93 (1.36)	0.712
Age of other drug abuse/dependence onset (n=9/45) ^b	15.20 (1.39)	15.04 (1.20)	0.722
Duration (months) of alcohol abuse/dependence (n=22/75) ^b	13.36 (12.71)	19.26 (13.84)	0.078
Duration (months) of marijuana abuse/dependence (n=34/89) ^b	15.18 (13.86)	17.31 (14.01)	0.455
Duration (months) of drug abuse/dependence (n=9/45) ^b	14.56 (14.88)	19.33 (12.14)	0.304
	Smokers		
	Alcohol <i>n(%)</i>	Marijuana <i>n(%)</i>	Other drugs <i>n(%)</i>
Smoking preceded onset of substance abuse/dependence	22/70 ^c (31.4%)	27/85 ^c (31.8%)	16/44 ^c (36.4%)

^aThe results from regressions, controlling for gender and age, did not change the significance of the findings.^bThe number of participants who provided clear onset of substance abuse/dependence (n=non-smokers/smoker).^cThe denominator indicates the number of participants who provided clear onset for both smoking and respective substance (i.e., alcohol, marijuana, or other drugs) abuse/dependence.