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Problem Behaviors and Psychological Distress Among Teens Seen in A National Sample of Emergency Departments

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Abstract

Objective—Problem behaviors such as substance use and peer aggression frequently co-exist, and are common among youth seen in emergency departments (EDs). EDs are increasingly urged to screen for both psychological distress and problem behaviors. To inform screening and intervention efforts, we aimed to identify classes of problematic substance use and peer aggression in a sample of adolescents from 16 pediatric EDs, and to examine the relative prevalence of psychological distress in identified classes.

Methods—We completed a cross-sectional survey of youth (n = 5001) presenting for any reason to 16 pediatric EDs across the United States, using validated measures of demographics, alcohol and substance use, and peer aggression. We used standard latent class analysis (LCA) techniques to create behavioral risk classes of adolescents, based on violence and substance use variables; then conducted logistic regression to examine the relationship between psychological distress and latent classes.

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Results—Three classes of problem behaviors were identified: low-risk (few problem behaviors, 91.2% of sample), medium risk (high cigarette smoking; moderate violence, alcohol, substance use, 5.2%), and high risk (high levels of all problem behaviors, 3.5%). A significant directional association ($p < .001$) between worse psychological distress and higher risk behavior classes was noted, even after adjusting for demographics.

Conclusions—Youth seen in the ED for any reason, who report higher levels of past-year substance use and peer aggression, are significantly more likely to report negative mood symptoms. Targeted screening and interventions for this population may be indicated.

Keywords

Adolescent; substance use; violence; latent class analysis; emergency department

Introduction

Psychiatric complaints are the fastest growing reason for adolescent ED visits,¹ with ~560,000 children seen in U.S. pediatric emergency departments annually for psychiatric complaints². Emergency medicine providers are also increasingly encouraged to identify and intervene for youth with undiagnosed or subsyndromal psychiatric disorders.³ Universal screening for psychiatric symptoms among adolescent ED patients may be useful, but is time intensive.⁴ Psychiatric symptoms and disorders – particularly depression and anxiety disorders – may be more prevalent among youth with a history of peer violence⁵ and alcohol and other drug use.⁶ It may, therefore, be useful to conduct targeted screening of these patients.

“Problem” or risk behaviors, defined by Jessor et al. as socially undesirable or prohibited behaviors, often cluster in teens.^{7,8} Such constellations of risk are thought to occur for two reasons: first, many problem behaviors have common developmental pathways (e.g., high impulsivity); second, some problem behaviors may serve a causative role (e.g., using drugs reduces inhibitions, increases aggression, and thereby increases the likelihood of getting into fights).^{9,10} The problem behaviors of physical aggression and alcohol and other drug use (including tobacco use) are particularly strongly associated.^{11,12} ED-based screening and brief interventions can effectively reduce violence and substance use, and may also result in reduced psychological distress.^{13,14}

Prior research on the relationship between adolescent problem behavior and psychological distress has been either community based or based out of a single ED, limiting generalizability. Identifying classes of problem behavior that correlate with psychological distress may help focus ED providers, by indicating which adolescents would most benefit from being screened for mental health problems in the ED. As a first step toward this goal, this analysis aimed to: 1) determine classes of problem behaviors among a national sample of adolescents from 16 pediatric EDs across the U.S.; 2) examine the relative prevalence of psychological distress in the identified classes of problem behavior. We hypothesized that classes of problem behaviors would be identified, and that higher-risk classes would correlate with higher psychological distress.

Methods

Study Setting and Population

This cross-sectional study was conducted in 16 pediatric EDs across the US involved in the Pediatric Emergency Care Applied Research Network (PECARN), a federally funded network that was established in 2001. This was a planned sub-analysis of the full sample of baseline data from a larger study.¹⁵ Each site received Institutional Review Board (IRB) approval prior to study enrollment. A Certificate of Confidentiality was obtained from the US Department of Health and Human Services to protect adolescent participants against potential legal implications of self-reported problem behaviors.

Procedures

Youth aged 12–17 who were medically, cognitively and behaviorally stable in the opinion of clinical staff and being treated for a non-life-threatening injury, illness or mental health condition were approached by research staff. Additional criteria for exclusion of youth were: 1) in severe acute emotional distress (e.g. suicidal, or suspected by the clinical staff of being a victim of child abuse); 2) cognitively impaired and unable to provide informed assent; 3) unaccompanied by an adult qualified to give written parental permission for the youth's participation in research; 4) unable to read and speak English or Spanish or whose parents were unable to read and speak English or Spanish; 5) previously enrolled in this study; or 6) had neither a telephone nor an address of residence.

Adolescents were approached consecutively, according to time of room assignment, during randomized shifts generated by the PECARN Data Coordination Center based on each site's staff availability. After parental consent and adolescent assent, adolescents used a tablet computer to self-administer a battery of measures on substance use as well as problematic and risky behavior. Procedures have been previously described in Bromberg et al.¹⁵

Measures

The Alcohol Use Disorders Identification Test (AUDIT) is a screen for alcohol-related disorders; questions focus on past-year quantity and frequency of alcohol use, including binge drinking.¹⁶ The Diagnostic Inventory for Screening Children (DISC) was used to identify past-year use of cigarettes and marijuana.¹⁷ The Drug Use Questionnaire (DUQ) examines past-year substance use.¹⁸ The Global Appraisal of Individual Needs (GAIN) includes multiple questions about past-year peer aggression ("been a bully or threatened others," "started a physical fight," or "used a weapon in a fight").¹⁹ The Spanish versions of these measures were translated from English to Spanish and then back translated to ensure accuracy.

The outcome variable for the logistic regression was the MHI-5, a well validated and widely used tool to screen for psychological distress.²⁰ The MHI-5 consists of 5 questions, asking about the degree to which participants felt calm and peaceful, down in the dumps, downhearted and blue, very nervous, and happy in the past 12 months. Standard MHI-5 scoring was used, in which negative questions (down in the dumps, downhearted and blue, nervous) were given lower scores for more frequent symptoms, and positive questions

(calmness, happiness) were given higher scores for more frequent symptoms. Raw scores are then transformed into t-scores ranging from 0 – 100. A score <70 indicates psychological distress. Internal consistency of the MHI-5 composite in this study was good ($\alpha = 0.81$).

Data Analyses

We used standard latent class analysis (LCA) techniques to create behavioral risk classes of adolescents, based on predefined, theoretically-based violence (GAIN) and substance use (DISC, DUQ) variables. We started with a minimum of two classes and added further classes until no further statistical and theoretical improvements were observed. The number of classes was assessed using Bayesian Information Criteria (BIC) and G^2 , with smaller values reflecting improved fit. We chose the final model based on theoretical as well as quantitative measures of fit. Covariates (e.g., demographic characteristics) were not used in LCA analyses. We did not include diagnostic categories (e.g., DSM-V alcohol use disorder, conduct disorder) in the LCA, as these diagnoses would rarely be available in the ED setting. Local independence was assessed by inspecting residual plots and within-class contingency tables. LCA was performed using R language and environment version 3.3.1 (R Core Team, Vienna, Austria, 2016) and the poLCA R package version 1.4.1.²¹ Once the final LCA model was chosen, we examined baseline demographics and frequency of risky behaviors by class.

We then investigated association between problem behavior class and outcome measures (psychological distress, determined by MHI-5). We conducted bivariable and multivariable logistic regression, using theoretically- and statistically-indicated independent variables (specifically, age, gender, race, ethnicity), to examine the association between the outcome measure (mood symptoms) and the class designations. These analyses were performed using SAS software, version 9.4 (SAS Institute, Cary, NC).

Results

As described elsewhere,¹⁵ 5001 adolescents completed the baseline survey. Mean age was 14.5 years (SD 1.7). The majority self-reported as female (54.6%), white (54.2%), and non-Hispanic (72.6%). On self-report of behaviors in the past year, 22.3% reported any past-year peer aggression (of whom 13.7% reported being a bully two or more times, 12.9% reported starting two or more physical fights, and 2.0% reported using a weapon in two or more fights in the past 12 months); 15.4% reported past-year marijuana use, 6.1% past-year use of other drugs, 7.8% past-year cigarette smoking, and 9.7% reported six or more drinks in the past year. (See TABLE 1.)

The best-fitting LCA model for problem behaviors contained 3 Classes. It included the problem behavior variables of past-year alcohol use (6+ drinks in the past-year, from DISC), any past-year non-marijuana drug use (from DUQ), any past-year smoking (from DISC), and the combined past-year peer aggression variable (from GAIN).

As shown in TABLE 1, Class 1 (“low-risk” for problem behaviors) was 91.2% of the sample; Class 2 (“moderate-risk”) was 5.2% of the sample; and Class 3 (“high-risk”) was 3.5% of the sample. The Classes were distinct in terms of both demographics and problem

behaviors. Class 1 had a lower mean age, higher proportion of African-American youth, higher average grades in school, and lowest rates of alcohol and cannabis use and aggression. Class 2 had a higher percentage of females; all Class 2 participants reported having smoked a cigarette in the past year. Class 2 also had a moderate amount of alcohol and cannabis use, and moderate rates of peer aggression. Class 3 had the highest rates of all the above problem behaviors and the lowest grades.

On adjusted logistic regression (see TABLE 2 and FIGURE 1), we found a significant, directional association between worsening psychological distress and higher risk Classes. A strong relationship was observed between the combined MHI-5 score and the 3 Classes, as well as between the responses to individual MHI-5 questions and the Classes. Unadjusted logistic regression results (not shown) were very similar.

Discussion

In this analysis of a systematic sample of adolescents presenting to pediatric EDs across the U.S. for any chief complaint, we identified 3 distinct Classes of problem behaviors. We also demonstrated a strong association between these Classes and worse scores on the MHI-5, supporting our hypothesis that patients with multiple problem behaviors are more likely to experience psychological distress.

Although most youth presenting to these 16 EDs for care fell into a “low-risk” group of problem behaviors, a significant proportion (10%) were categorized as having higher-risk behavior patterns. Single site studies, conducted in large urban settings, have found that adolescents seen in the ED have high rates of self-reported problem behaviors.^{22–24} Our findings suggest this high prevalence of problem behaviors persists across a broad range of pediatric EDs. The ED may therefore be an important location for identifying youth with problem behaviors.

Most EDs do not screen for mental illness unless a patient has a psychiatric chief complaint.²⁵ The strong correlation between psychological distress and increasing classes of problem behaviors, as observed in our analysis, may be useful in guiding decisions about screening of adolescents for psychological distress. In our analysis, the highest-risk Class of adolescents (with high rates of peer aggression and drug and alcohol use) reported significantly higher overall psychological distress, and specifically feeling more “nervous” “blue” and “down” and less “calm” and “happy,” as compared to the two lower-risk Classes. Although a portion of youth in the lower risk groups also reported psychological distress, our results show that psychological distress is more likely to be identified among teens presenting to the ED with a history of problem behaviors.^{6,12} Our results also suggest that ED physicians may wish to purposefully ask youth who report substance use and involvement in peer violence about their mental health. Conversely, youth reporting mental distress to an ED provider may also report higher rates of problem behaviors.

Future work should examine whether and how to operationalize targeted screening of youth for problem behaviors and psychological distress (e.g., what screening questions to ask, how to ask them), and what to do with a positive result. Barriers to implementation must be

considered, including the lack of high-quality, short screening measures for adolescent mental health, violence, and substance use in the ED; lack of ED practitioner time; lack of community resources once an issue is identified; and concerns about stigma.^{25,26} Some literature has described universal ED-based adolescent mental health screening,^{3,24} and the value of interventions for adolescent mental health, violence, and substance use issues identified by targeted screening.^{14,27} Future studies should address the feasibility and utility of such targeted screening and interventions, and should elucidate which issue (the problem behavior, or the psychological distress) is most easily or effectively ameliorated.

Some study limitations exist. Although enrollment occurred in pediatric EDs across the country, the sample may not be nationally representative; enrolling EDs were primarily academic hospitals in major metropolitan areas. Additionally, this study reports on overall distress, not diagnoses; no diagnostic interviews were utilized in the larger study, nor did we collect information about specific psychiatric disorders (e.g., mania, post-traumatic stress).

In conclusion, this study shows clear classes of problem behaviors among adolescents seen in the ED as well as a strong association between higher classes of problem behaviors and worsening psychological distress. ED clinicians should consider specifically screening adolescents who report a history of peer aggression and alcohol or other drug use for psychological distress, and vice versa. Future studies should examine optimal screening practices, and identify feasible and efficacious referral and intervention strategies.

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What's New

Youth seen in pediatric EDs across the U.S. report high rates of problem behaviors. Those with higher rates of substance use and peer aggression are more likely to report psychological distress, and may benefit from targeted screening and interventions.

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FIGURE 1. MHI-5 SCORES¹ BY CLASS

¹Lower total scores indicate more severe psychological distress, with scores <70 a cutoff for severe psychological distress. [See attached file]

TABLE 1
Demographic and baseline characteristics of the sample, by latent class

Numbers are N (%), unless otherwise specified. Missing responses were excluded from calculation of percentages.

	Latent class			Overall (N = 5001)
	1, Low Risk (N = 4563)	2, Moderate Risk (N = 262)	3, High Risk (N = 176)	
Age (years) [Mean (SD)]	14.4 (1.65)	15.5 (1.39)	15.5 (1.36)	14.5 (1.66)
Gender				
Male	2096 (45.9%)	95 (36.3%)	80 (45.5%)	2271 (45.4%)
Female	2467 (54.1%)	167 (63.7%)	96 (54.5%)	2730 (54.6%)
Race				
White	2054 (53.5%)	141 (62.9%)	90 (60.4%)	2285 (54.2%)
Black or African American	1262 (32.9%)	47 (21.0%)	30 (20.1%)	1339 (31.8%)
Other	190 (4.9%)	11 (4.9%)	7 (4.7%)	208 (4.9%)
Multiple	333 (8.7%)	25 (11.2%)	22 (14.8%)	380 (9.0%)
Ethnicity				
Hispanic or Latino	1192 (27.4%)	69 (27.4%)	48 (29.3%)	1309 (27.4%)
Not Hispanic or Latino	3166 (72.6%)	183 (72.6%)	116 (70.7%)	3465 (72.6%)
Grades				
As and Bs	2922 (66.3%)	110 (45.8%)	70 (41.9%)	3102 (64.4%)
Mostly Cs	1144 (26.0%)	87 (36.3%)	57 (34.1%)	1288 (26.7%)
Mostly Ds	342 (7.8%)	43 (17.9%)	40 (24.0%)	425 (8.8%)
AUDIT Score				
0-1	4085 (92.6%)	128 (54.2%)	31 (21.2%)	4244 (88.5%)
2-3	165 (3.7%)	37 (15.7%)	17 (11.6%)	219 (4.6%)
4	45 (1.0%)	18 (7.6%)	13 (8.9%)	76 (1.6%)
5+	117 (2.7%)	53 (22.5%)	85 (58.2%)	255 (5.3%)
Marijuana use in past year	463 (10.3%)	158 (63.5%)	134 (82.2%)	755 (15.4%)
6+ alcoholic drinks in past year[/]	250 (5.6%)	95 (38.8%)	132 (80.5%)	477 (9.7%)
Past-year cigarette use[/]	0 (0.0%)	262 (100.0%)	124 (74.3%)	386 (7.8%)
Non-marijuana drug use in past year[/]	105 (2.6%)	0 (0.0%)	166 (100.0%)	271 (6.1%)
Past-year peer aggression[/]	871 (19.8%)	96 (38.9%)	107 (63.3%)	1074 (22.3%)
Past-year bullying of others	542 (12.2%)	55 (22.0%)	67 (40.1%)	664 (13.7%)
Past-year physical fights with others	497 (11.1%)	60 (23.6%)	77 (44.8%)	634 (12.9%)
Past-year use of a weapon in fights	67 (1.5%)	14 (5.5%)	17 (9.8%)	98 (2.0%)

[/]Variable was included in the latent class analysis model.

TABLE 2
Adjusted odds ratios of mental health outcomes (by self-report of symptoms “all of the time” or “most of the time”) and total MHI5 score <70^I, by latent class

(Adjusted for age, race, gender, and ethnicity.)

Latent Class (compared to lowest risk class)			
Outcome	2 vs 1	3 vs 1	P-value
Nervous	2.0 (1.4, 2.8)	2.8 (1.9, 4.1)	<.0001
Calm	0.6 (0.5, 0.9)	0.5 (0.4, 0.8)	<.0001
Blue	2.7 (1.8, 3.9)	4.8 (3.2, 7.2)	<.0001
Happy	0.6 (0.4, 0.8)	0.4 (0.3, 0.5)	<.0001
Down	2.6 (1.6, 4.0)	4.7 (3.0, 7.5)	<.0001
MHI5 Total Score <70 ^I	2.2 (1.7, 3.0)	4.5 (3.0, 6.7)	<.0001

^I MHI-5 total score <70 is a cutoff for psychological distress