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RESEARCH BRIEF

Correlates of Nonmedical Prescription Opioid Use Among U.S. Adolescents

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Introduction: The purpose of this study is to assess risk factors, including other substance use, for nonmedical prescription opioid use among U.S. adolescents.

Methods: A secondary data analysis of the 2017 Youth Risk Behavior Survey was conducted (n=10,175) in 2018. The outcome was nonmedical prescription opioid use. Predictor variables included other substance use, mood, sleep, academic performance, and demographic characteristics. Survey-weighted procedures in SAS, version 9.4 were used, and an adjusted logistic regression model was conducted.

Results: Among the sampled adolescents, 13.8% (95% confidence limit=12.4%, 15.3%) reported nonmedical prescription opioid use. Nonmedical prescription opioid use was more likely among participants aged 15 years (versus 16 years), American Indian/Alaskan Natives, and those who reported being sad or hopeless. All other substance use was significantly associated with increased odds of nonmedical prescription opioid use. Nonmedical prescription opioid use was 1.5 times more likely among electronic vapor users (AOR=1.58, 95% CI=1.34, 1.86), 2 times more likely among cigarette (AOR=2.49, 95% CI=2.16, 2.88) and marijuana users (AOR=2.45, 95% CI=2.05, 2.93), and almost 3 times as likely among alcohol users (AOR=2.98, 95% CI=2.18, 4.07).

Conclusions: Study findings suggest a need for more interventions for nonmedical prescription opioid use among adolescents in the U.S. Information on nonmedical prescription opioid use should be added to all substance use prevention programs for adolescents. Moreover, future research needs to identify longitudinal predictors of adolescent nonmedical prescription opioid use to inform prevention efforts.

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INTRODUCTION

Approximately 4.3% of U.S. adolescents (aged ≥12 years) used prescription pain relievers nonmedically (nonmedical prescription opioid use [NMPOU]) in the past year[1] and roughly 54,000,000 people have ever reported NMPOU.[2] The 2015 National Survey on Drug Use and Health indicated that the prevalence of past-year NMPOU was 3.9% among adolescents aged 12–17 years.[3] Although use trends among adolescents appear to be downward,[4] NMPOU is important to monitor, including correlates for use, given the U.S. has seen an increase in NMPOU-related deaths in the last decade.[5]

Although much has been learned about NMPOU in adulthood,[6–8] less is known about trends and correlates in adolescents. Previous research found that factors including sleep insufficiency, depressive symptoms, sexual risk behaviors, and suicidal behavior[9–12] are associated with NMPOU. Studies have found that NMPOU at an earlier age not related to a medical condition may result in dependence and lifetime use.[13–15] This study

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assesses risk factors, including other substance use, for NMPOU among U.S. adolescents.

METHODS

The 2017 Youth Risk Behavior Survey (YRBS) collected data among 9th–12th grade students (n=14,765). The school response rate was 75%, and the student response rate was 81%.[16] Details regarding the data are reported elsewhere.[17] A complete case analysis for key variables of interest was conducted. Less than 2% of the sample were missing data for the outcome variable (n=255 removed; n=10,175). Additional information on the variable missingness is in the user guide.[16] The study received exempt status from the North Texas Regional IRB for de-identified data.

The outcome variable was NMPOU, which was obtained by asking: *During your life, how many times have you taken prescription pain medicine without a doctor's prescription or differently than how a doctor told you to use it? (Count drugs such as codeine, Vicodin, OxyContin, hydrocodone, and Percocet)*. This was operationalized as used and never used. This measure, and the following substance use measures, were determined to be reliable and valid.[18]

Predictor variables related to other substance use and known risk factors from the literature[9] were selected. Specifically, using cigarettes, electronic vapor products, alcohol, and marijuana were included. A measure of mood was included; participants were asked if they felt sad or hopeless for at least 2 weeks in the past year (*yes* or *no*). Sleep was operationalized as getting at least 8 hours of sleep or getting less than 8 hours on an average school night. Academic performance was dichotomized as in the past 12 months, getting mostly A's and B's or otherwise. Demographic variables included gender, age, and race/ethnicity.

Analyses used survey-weighting procedures to account for the complex sample design using SAS, version 9.4. Survey-weighted frequencies with 95% confidence limits (CLs) and crude ORs with 95% CIs were estimated for each predictor variable. The adjusted analysis, using logistic regression, modeled the AORs and 95% CIs of NMPOU, while controlling for all predictor variables.

RESULTS

Among the sampled adolescents, 13.8% (95% CL=12.4%, 15.3%) reported NMPOU. For those who reported NMPOU, 6.2% (95% CL=5.6%, 6.9%) indicated 1 or 2 times; 5.4% (95% CL=4.7%, 6.2%) 3 to 19 times; and 2.1% (95% CL=1.8%, 2.5%) ≥20 times. With regard to other substances, 28.5% (95% CL=25.7%, 31.4%) reported cigarette use; 41.4% (95% CL=38.4%, 44.3%) reported electronic vapor product use; 61.2% (95% CL=58.8%, 63.7%) reported alcohol use; and 35.2% (95% CL=32.6%, 37.8%) reported marijuana use. In the adjusted model, participants aged 15 years were more likely to report NMPOU (AOR=1.30, 95% CI=1.01, 1.67) compared with participants aged 16 years. Adolescents who identified as American Indian/Alaskan Native were more than 2 times as likely (AOR=2.37, 95% CI=1.06, 5.29) to report NMPOU compared with white participants. Similarly, participants who reported being sad or hopeless for at least 2 weeks in the past year were more than 2 times as likely (AOR=2.22, 95% CI=1.80, 2.73) to report NMPOU compared with those who were not.

All other substance use was significantly associated with increased odds of NMPOU. NMPOU was 1.5 times more likely among electronic vapor users (AOR=1.58, 95% CI=1.34, 1.86); 2 times more likely among cigarette (AOR=2.49, 95% CI=2.16, 2.88) and marijuana users (AOR=2.45, 95% CI=2.05, 2.93); and almost 3 times as likely among alcohol users (AOR=2.98, 95% CI=2.18, 4.07). Results and demographic information are in Table 1.

DISCUSSION

Among a nationally representative survey of U.S. high school students, more than 1 in 8 (13.8%) reported lifetime NMPOU. This number represents a decline from 19.8%[11] in 2009 and 17.8% in 2013[9] in the YRBS results, but more than the 3.9% for adolescents reported in the 2015 National Survey on Drug Use and Health.[3] Correlates for NMPOU included age, race (American Indian/Alaskan Native), and feeling sad or hopeless in the last 2 weeks. All other substance use (alcohol, cigarettes, e-cigarettes or vape, and marijuana) were associated with greater likelihood of NMPOU.

One important finding is greater NMPOU by American Indian/Alaskan Native students. Other studies have demonstrated mixed findings for race, including reporting black adolescent NMPOU was lower than that for whites, non-Hispanic.[9] Although Ayers et al.[9] used the 2013 YRBS data, they combined American Indian/Alaskan Native into an "other, non-Hispanic" category; thus, no comparison was available. Though many studies collapse the race variable with fewer resulting options, assessment of finer categorizations of race/ethnicity is needed to better understand and address health disparities. The findings, however, align with those of Swaim and Stanley,[19] who reported that Native American students living on reservations were at a high risk for substance use when compared with other U.S. youth. Although opioid or prescription pain medicine was not specifically assessed, these findings demonstrate a significant substance use–related health disparity for this population. These findings indicate additional resources for prevention of substance use among American Indian/Alaskan Native adolescents are needed.[20]

Prior research[9] has shown greater NMPOU among those reporting depressive symptoms as well as a

Table 1. NMPOU Among Youth Risk Behavior Survey 2017 Participants (N=10,175)

Variable	NMPOU, weighted % (95% CL) (*n*=1,386)	No NMPOU, weighted % (95% CL) (*n*=8,789)	Crude OR (95% CI)	AOR (95% CI)
Participants	13.8 (12.4, 15.3)	86.2 (84.7, 87.6)	—	—
Sex				
Female	54.2 (51.1, 57.3)	51.4 (48.5, 54.3)	1.12 (0.96, 1.31)	0.98 (0.84, 1.13)
Male	45.8 (42.7, 48.9)	48.6 (45.7, 51.5)	ref	ref
Age, years				
≤14	8.8 (6.2, 11.4)	12.0 (10.8, 13.2)	0.80 (0.53, 1.21)	1.23 (0.79, 1.91)
15	22.1 (19.2, 25.0)	25.4 (24.1, 26.7)	0.95 (0.75, 1.20)	**1.30 (1.01, 1.67)**
16	23.6 (19.6, 27.6)	25.8 (24.2, 27.4)	ref	ref
17	28.2 (25.7, 30.7)	24.0 (22.3, 25.7)	1.29 (0.98, 1.69)	1.13 (0.85, 1.50)
≥18	17.3 (14.7, 19.9)	12.8 (11.6, 14.0)	**1.48 (1.10, 1.99)**	1.12 (0.82, 1.52)
Race/ethnicity				
American Indian/Alaskan Native	0.8 (0.0, 1.7)	0.4 (0.2, 0.5)	**2.39 (1.03, 5.55)**	**2.37 (1.06, 5.29)**
Asian	1.7 (0.8, 2.7)	3.6 (2.5, 4.7)	**0.49 (0.31, 0.77)**	1.03 (0.58, 1.83)
Black or African American	8.3 (5.6, 10.9)	11.2 (8.5, 13.9)	**0.75 (0.57, 0.99)**	0.90 (0.69, 1.17)
Native Hawaiian/other Pacific Islander	0.7 (0.0, 1.5)	0.8 (0.3, 1.2)	0.92 (0.31, 2.70)	1.05 (0.28, 3.89)
White	56.3 (49.8, 62.8)	57.3 (51.8, 62.8)	ref	ref
Hispanic/Latino	10.3 (7.1, 13.6)	9.4 (7.3, 11.6)	1.12 (0.80, 1.57)	0.98 (0.76, 1.27)
Multiple, Hispanic	13.7 (11.6, 15.7)	12.0 (10.0, 14.0)	1.16 (0.92, 1.46)	1.06 (0.84, 1.34)
Multiple, non-Hispanic	8.1 (5.1, 11.1)	5.3 (4.4, 6.2)	1.56 (0.98, 2.49)	1.33 (0.82, 2.16)
Cigarette use				
Yes	66.6 (63.1, 70.1)	22.4 (19.9, 24.9)	**6.92 (6.05, 7.92)**	**2.49 (2.16, 2.88)**
Never	33.4 (29.9, 36.9)	77.6 (75.1, 80.1)	ref	ref
Electronic vapor use				
Yes	76.8 (73.6, 80.0)	35.7 (33.0, 38.4)	**5.97 (4.98, 7.16)**	**1.58 (1.34, 1.86)**
Never	23.2 (20.0, 26.4)	64.3 (61.6, 67.0)	ref	ref
Alcohol use				
Yes	92.9 (91.2, 94.6)	56.2 (53.7, 58.7)	**10.22 (7.90, 13.22)**	**2.98 (2.18, 4.07)**
Never	7.1 (5.4, 8.8)	43.8 (41.3, 46.3)	ref	ref
Marijuana use				
Yes	75.0 (71.6, 78.3)	28.8 (26.5, 31.1)	**7.40 (6.28, 8.71)**	**2.45 (2.05, 2.93)**
Never	25.0 (21.7, 28.4)	71.2 (68.9, 73.5)	ref	ref
Sad or hopeless				
Yes	55.3 (51.5, 59.1)	27.4 (25.6, 29.2)	**3.28 (2.74, 3.92)**	**2.22 (1.80, 2.73)**
No	44.7 (40.9, 48.5)	72.6 (70.8, 74.4)	ref	ref
Sleep				
Sufficient	18.7 (15.8, 21.5)	26.3 (24.6, 28.1)	**0.64 (0.52, 0.80)**	0.95 (0.79, 1.15)
Insufficient	81.3 (78.5, 84.2)	73.7 (71.9, 75.4)	ref	ref
Academic performance				
Mostly A's and B's	64.5 (60.2, 68.9)	78.3 (75.7, 81.0)	**0.50 (0.42, 0.60)**	0.85 (0.69, 1.06)
Mostly C's–F's	35.5 (31.1, 39.8)	21.7 (19.0, 24.3)	ref	ref

Note: Boldface indicates statistical significance ($p<0.05$). Percentages are survey-weighted.
CL, confidence limit; NMPOU, nonmedical prescription opioid use.

positive association between suicidal behavior and prescription drug use.[11] This NMPOU analysis also found a positive association with mood. These associations between low mood and NMPOU need further study to inform interventions that address adolescents' underlying mental health needs.

This study is important because it examines other common substances used by adolescents: cigarettes, electronic vapor products, alcohol, and marijuana. Moderate-to-strong associations with NMPOU were found for all substances, which is not a new finding that risky substance use behaviors are typically correlated among adolescents.[21]

This contributes to information that could guide co-use of substances and associations with low mood in education and prevention programs. In an overview of systematic reviews[22] for adolescent substance abuse interventions, approximately one third (16 of 46) intervened on multiple substances, whereas the majority focused on one at a time. Assessment of the interventions revealed school-based primary prevention programs were effective for substance co-use.[22]

Limitations

The study is not without limitations. Smaller group sizes for minority racial/ethnic groups resulted in a loss of precision for these estimates. Additionally, this is the first YRBS administration with the wording changed specifically to NMPOU and does not capture severity of use. This new wording is imperative given the growing opioid epidemic but does not allow for direct comparison to other studies. Owing to the structure of this survey, there was a higher proportion of missingness for the later survey questions. List-wise deletion for a complete case analysis was used.[23] Self-reporting bias may also be present. Finally, as these data are cross-sectional, causality cannot be determined.

CONCLUSIONS

The current findings suggest a need for appropriate prevention and intervention programs that target co-use of substances, particularly opioids. Some adolescents may be at a greater risk, which should be assessed and monitored closely. Furthermore, intervention programs should be culturally appropriate for adolescents at greatest risk. Future research should identify longitudinal predictors of adolescent NMPOU to inform targeted prevention efforts for multiple substance use.

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at https://doi.org/10.1016/j.amepre.2019.05.006.

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