



Original article

Nonmedical Prescription Stimulant Use Among Girls 10–18 Years of Age: Associations With Other Risky Behavior



Catherine Woodstock Striley, Ph.D., M.S.W., M.P.E. *, Natalie E. Kelso-Chichetto, M.S.W, and Linda B. Cottler, Ph.D., M.P.H.

Department of Epidemiology, College of Public Health and Health Professions and College of Medicine, University of Florida, Gainesville, Florida

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A B S T R A C T

Purpose: Little is known about the risk factors for nonmedical use (NMU) of prescription stimulants among adolescent girls. We aimed to measure the association of nonmedical prescription stimulant use with empirically linked risk factors, including weight control behavior (WCB), gambling, and depressed mood, in pre-teen and teenaged girls.

Methods: We assessed the relationship between age and race, gambling, WCB, depressive mood, and nonmedical prescription stimulant use using multivariable logistic regression. The study sample included 5,585 females, aged 10–18 years, recruited via an entertainment venue intercept method in 10 U.S. metropolitan areas as part of the National Monitoring of Adolescent Prescription Stimulants Study (2008–2011).

Results: NMU of prescription stimulants was reported by 6.6% ($n = 370$) of the sample. In multivariable logistic regression, 1-year increase in age was associated with a 21% (95% confidence interval [CI]: .15, .28) increase in risk for NMU. Whites and other race/ethnicity girls had 2.67 (CI: 1.85, 3.87) and 1.71 (1.11, 2.65) times higher odds for NMU, compared to African-Americans. Depressive mood (adjusted odds ratio: 2.69, CI: 2.04, 5.57) and gambling (adjusted odds ratio: 1.90, 1.23, 2.92) were associated with increased odds for NMU. A dose-response was identified between WCB and NMU, where girls with unhealthy and extreme WCB were over five times more likely to endorse NMU.

Conclusions: We contribute to the literature linking WCB, depression, gambling, and the NMU of prescription stimulants in any population and uniquely do so among girls.

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IMPLICATIONS AND CONTRIBUTION

In this study using an entertainment-intercept recruited sample of adolescent girls aged 10–18 years, increased age, white race, depressive mood, gambling, and weight control behavior were significantly associated with nonmedical use of prescription stimulants. These findings highlight the importance of screening for depression, weight control, gambling, and NMU of prescription stimulants in populations treated for any of these problems.

Nonmedical prescription stimulant use among younger Americans is a growing problem. Over 2.4 million Americans reported first NMU of prescription drugs in the past year, with

one third represented by those aged 12–17 years. Nonmedical use (NMU) of prescription stimulants is high among adolescents aged 12–17 years, with lifetime use ranging from 8.5% to 14.8% and current use from 6.2% to 7.3% [1–4]. Additionally, NMU exceeds medical use of prescription stimulants among college and grade-school aged individuals [4,5].

Study of differences in NMU by sex has focused mainly on college-aged populations, reporting higher rates among males versus females. However, there are studies that indicate that the substance use gender gap is becoming smaller [6]. In fact, in a large sample of adolescents aged 12–17 years ($n = 126,764$),

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* Address correspondence to: Catherine Woodstock Striley, Ph.D., M.S.W., M.P.E., Department of Epidemiology, University of Florida, 2004 Mowry Road, PO Box 100231, Gainesville, FL 32610.

E-mail address: cstriley@ufl.edu (C.W. Striley).

females had 1.68 and 1.49 times the odds of nonpersistent and persistent NMU of prescription stimulants, respectively, compared to males [7].

NMU of prescription stimulants is associated with the use of other substances. Nonmedical users report higher rates of use of other substances compared to nonusers, including cigarette use (50% vs. 15%), binge drinking (79% vs. 45%), marijuana use (79% vs. 29%), and cocaine and/or ecstasy use (20% vs. 1%) [5,8]. Diversion of prescription stimulants increase with marijuana use [9]. Among those who report past-year NMU of prescription stimulants, 67.9% met diagnostic criteria for past-year substance use disorder of a different substance [8]. NMU of prescription drugs leads to the development of prescription drug abuse and dependence in youth 12–17 years (13.4% in males and 18% in females) [10] and later in life [11].

Mental health problems are also associated with NMU of prescription stimulants. Those who use prescription stimulants nonmedically have 2.3 times the odds of depressed mood, compared to those who do not engage in NMU of prescription stimulants, with a prevalence of 50% among the NMU group [12]. Links between depression and substance use are well known in adults [13] and in adolescent girls [14]. Major depressive episodes are prevalent with rates of about 9% of adolescents increasing to 28% by 19 years of age [15].

Self-induced vomiting is associated with NMU of prescription stimulants among women 18–25 years of age [16,17]. Self-induced vomiting is a type of unhealthy and extreme weight control behavior (WCB). Such behavior is common among girls: fear of gaining weight and distress about weight/shape are endorsed by 63.2% and 33.6% of girls, respectively [18]; 61% of adolescent females report some unhealthy WCB (fasting, eating very little food, using food supplements, skipping meals, or smoking cigarettes to lose or keep from gaining weight) with 17% reporting chronic dieting [19]; 22% report extreme WCB (self-induced vomiting or using diet pills, diuretics, or laxatives in order to control their weight [19]. Unhealthy and extreme WCBs are correlated with use of other substances, including NMU of psychotherapeutics in young adults [20].

Gambling and eating disorders have been associated with substance use in general [21–23]. Internet gamblers are over three times more likely to use substances in general than non-gamblers [24]. Research also supports the relationship between gambling and increased rate of self-induced vomiting [25] and depression [22,26,27]. Between 36% and 58% of adolescent girls report some type of gambling behavior [28,29]. The link between gambling, eating disorders, and drug use is postulated to be through increased impulsiveness [23].

The National Monitoring of Adolescent Prescription Stimulants Study provides a unique opportunity to assess the relationships between NMU of prescription stimulants, depression, WCB, and gambling among a national sample of adolescent girls aged 10–18 years. We theorized that NMU of prescription stimulants in adolescent girls will be significantly associated with age, race, depressed mood, WCB, and Internet gambling. The aim of this paper was to test these relationships at a bivariate and multivariable level.

Methods

The National Monitoring of Adolescent Prescription Stimulants Study assessed the medical and NMU of prescription stimulants among youth 10–18 years of age via an entertainment

venue intercept method in 10 U.S. metropolitan areas (Boston, Cincinnati, Denver, Houston, Los Angeles, New York, Philadelphia, St. Louis, Seattle, and Tampa). Methods including survey development and testing for reliability have been reported; kappas varied from .6 to 1.0 [1]. Adolescents were invited to participate by highly trained rater/interviewers (RIs) at malls, skate parks, movie theaters, and other places where youth congregate. Coordination of RIs was conducted by study coordinators in St. Louis; CHW shifts were scheduled during all weekly and weekend shifts when youth could be expected to be out in the community.

Independent data collection occurred beginning in fall of 2008, followed by a second data collection in spring of 2009, a third in fall of 2010, and a fourth in spring of 2011. Research Interviewers recruited and elicited verbal consent. The Washington University Human Research Protection Office approved this research. Survey completion took approximately 15 minutes; \$10 gift cards were given for remuneration. Prescription stimulants elicited included Adderall or Adderall XR, Concerta, Daytrana, and Ritalin (SA or LA). NMU included endorsing use other than by mouth (except for the Daytrana patch), use of more than prescribed, use of someone else's medication, and use "just because," "out of curiosity," or "to get high." Those who endorsed use to lose weight were also considered nonmedical users as this is not a recommended treatment in overweight or obese adolescents [30].

Age was treated as a continuous variable with a range of 10–18 years of age as reported by the participant. Race was collapsed into four categories: white, African-American, Hispanic (if endorsed regardless of other race endorsed), or "other" (due to the limited sample size; Alaska Native, Asian, Pacific Islander, American Indian, Middle Eastern, bi- or multi-racial).

WCB was assessed by type following the taxonomy commonly used in the literature [31,32]. Unhealthy WCB was assessed by answering yes to one of two questions: "Have you ever tried to lose weight by...(1) not eating for a day or two" or (2) "exercising too much." Extreme WCB was assessed by answering yes to either: "Have you ever tried to lose weight by (1) taking pills" and/or (2) "making yourself vomit." WCB was then coded into one variable including the following categories: no WCB, unhealthy WCB only, extreme WCB only, or unhealthy and extreme WCB.

Lifetime Internet gambling, specifically poker games and sports betting, was assessed with one dichotomous yes/no question. Depressed mood was assessed by answering yes to one of two questions: "In the last 12 months, have you had 2 weeks or more when you..." (1) "lost interest in things" and/or (2) "felt down or depressed."

After restricting the sample to girls only ($N = 5,706$) and deleting cases with missing data ($N = 121$), our sample size of 11,048 dropped to 5,585. We compared girls who had ever used prescription stimulants nonmedically to girls who had never used stimulants nonmedically, including both girls who had used medically only and girls who had never used stimulants. Using logistic regression, we then tested the fit of a model examining the associations between NMU of stimulants among girls 10–18 years old and several factors selected on our review of the literature and theorized relationships.

Results

The mean age of the total sample of girls was 15.02 years (confidence interval: 14.97, 15.08). Among them, 45% endorsed

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