

INTERNATIONAL ARTICLE

Substance Use in Female Adolescents With Eating Disorders

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Purpose: To determine the prevalence of substance use in adolescents with eating disorders, compare the results with a data set of Ontario high school students, and explore why adolescents with eating disorders do, or do not, use various substances.

Methods: From January 1999 to March 2000, 101 female adolescents who met the DSM-IV criteria for an eating disorder were followed up in a tertiary care pediatric treatment center. They were asked to participate in a cross-sectional study using a self-administered questionnaire assessing substance use and investigating reasons for use and nonuse; 95 agreed to participate and 77 completed the questionnaire (mean age, 15.2 years). The patients were divided into two groups: 63 with restrictive symptoms only, 17 with purging symptoms. The rates of drug use between subjects and their comparison groups were compared by z-scores, with the level of significance set at .05.

Results: During the preceding year, restrictors used significantly less tobacco, alcohol, and cannabis than grade- and sex-matched comparison populations, and purgers used these substances at rates similar to those of comparison subjects. Other drugs seen frequently in the purgers included hallucinogens, tranquilizers, stimulants, LSD, PCP, cocaine, and "ecstasy." Both groups used caffeine and laxatives, but few used diet pills. Restrictors said they did not use substances because they were bad for their health, tasted unpleasant, were contrary to their beliefs, and were too expensive. Purgers generally used substances to relax, relieve anger, avoid eating, and "get away" from problems.

Conclusions: Female adolescents with eating disorders who have restrictive symptoms use substances less frequently than the general adolescent population but do not abstain from their use. Those with purging symptoms use substances with a similar frequency to that found in the general adolescent population. Because the sample size for the purging group was small, firm conclusions cannot be drawn from our analysis. Health care providers who treat adolescents with eating disorders are in a good position to identify those who use substances and may be at risk for substance abuse. © Society for Adolescent Medicine, 2002

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Eating disorders in adolescence have a prevalence of 0.5% for anorexia nervosa (AN) and 5% for bulimia nervosa (BN) [1]. Both these disorders are associated with high rates of comorbidity. Substance abuse disorders have been well-defined in adult women with BN, who are more likely to have drug and alcohol abuse disorders than the general population [2]. Adults with AN rarely use substances [3].

Reports based on self-administered questionnaires indicate that the most commonly used drugs among adolescents in the province of Ontario are alcohol (67.5%), cigarettes (29.2%), and cannabis (29.3%) [4]. The few studies that have focused on the use of alcohol in adolescents with symptoms of

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disordered eating [5–9] have had many limitations: They failed to address the rates of substance use in clinical populations of adolescents with eating disorders, did not examine the use of substances other than alcohol, and did not identify patterns of substance use in patients with restrictive eating behaviors. Only one study has compared substance use in adolescents with BN and AN [10]. It showed that those with BN used various substances more frequently than those with AN, but it was limited by the absence of a control group.

None of these studies asked about the use of laxatives, diet pills, syrup of ipecac, or diuretics. Although these may not be thought of as drugs of abuse, they are commonly used in populations of adolescents and adults trying to control their weight and may be associated with serious side effects and medical complications [11–15].

No studies to date have looked at reasons for drug and alcohol use among adolescents with eating disorders. Studies of healthy adolescents without eating disorders suggest that they drink alcohol for peer acceptance; improvement of mood; enjoyment; and relief of shyness, nervousness, tension, anger, sadness, or loneliness [16,17]; they abstain because they dislike its taste, feel it is bad for their health and a waste of money, have seen others drink to excess, and consider it against their religious or personal beliefs [16].

We hypothesized that adolescents who exhibit bingeing and purging would use various substances more than the general population of adolescents and that those who exhibit purely restrictive behaviors would use them less often, with the possible exception of substances that may aid in weight loss (e.g., amphetamines, diet pills, laxatives, diuretics). The objectives of this study were threefold: to determine the prevalence of substance use in adolescents with eating disorders followed in a tertiary care center, compare this group to a data set of Ontario high school students, and explore reasons that this group uses, or abstains from using, various substances.

Methods

Sample

From January 1999 to March 2000, 101 female adolescents between ages 12 and 17 years diagnosed by the fourth *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) criteria with an eating disorder [AN, BN, or “eating disorder not otherwise specified” (EDNOS)] [18,19], who presented to a pediatric

eating disorder treatment center at The Hospital for Sick Children, Toronto, were asked to participate. Only those with reading difficulties were excluded. Of the 104 patients, 9 declined participation and 15 failed to complete the questionnaire because of time constraints. A total of 80 females completed the questionnaire. Our study population was divided into two groups based on their symptoms. We had previously shown that among adolescents with eating disorders, those with bingeing and/or purging symptoms resembled one another more closely than they did patients with restrictive symptoms [20]. The study enrolled 63 subjects who had primarily restricting symptoms (AN-R, EDNOS-restrictive subtype) and 17 with bingeing and/or purging symptoms (BN, AN-BP, EDNOS-purging subtype). Of the 24 adolescents approached who did not complete the questionnaire, 22 were restrictors and 2 were purgers. They had similar body mass indexes (BMIs) to those who participated in the study.

The comparison group consisted of a data set of 4894 adolescents attending high school in Ontario, who were sampled in 1999 through the Drug Use Among Ontario Students (DUAOS) survey by the Addiction Research Foundation [4]. This study was approved by the Research Ethics Board at The Hospital for Sick Children.

Measures

After informed consent had been obtained, the subjects were asked to complete a self-administered questionnaire requesting details about their use of alcohol and various drugs.

This questionnaire included questions taken from the DUAOS survey, a validated questionnaire, with permission from the Addiction Research Foundation [4]. It included questions about the use of substances commonly reported in the adult literature (tobacco, alcohol, cannabis, barbiturates, amphetamines, tranquilizers, hallucinogens, cocaine) [21] and those found to be used in the Ontario high school population (glue, solvents, heroin, ecstasy, dimenhydrinate, and steroids) [4]. Because we were using the measure to look at a population of subjects with eating disorders, questions that addressed the use of substances often associated with eating disorders (laxatives, diet pills, diuretics, and syrup of ipecac) [11] were formatted to resemble the DUAOS questions and were included in the questionnaire.

Our instrument also included questions about the reasons for both use of, and abstention from, substances based on those found in the previously cited

Table 1. Descriptive Characteristics

Variable	Restrictors (<i>n</i> = 60) ^a	Purgers (<i>n</i> = 17) ^a
Mean age (years)	15.1 (12–17)	15.8 (13–17)
Mean grade	9.8 (7–12)	10.4 (7–12)
BMI (kg/m ²)	16.9 (13.2–21.3)	18.9 (14.8–23.4)
Months since diagnosis	7.1 (1–49)	3.1 (1–10)

^aValues are expressed as means, with ranges in parentheses.
BMI = body mass index

studies [3,16,17]. In addition, there were open-ended questions that prompted subjects to supply their own reasons. The questionnaire was developed by the primary investigator, pretested in focus group sessions held with members of the hospital's Division of Adolescent Medicine and Substance Abuse Teams, and revised accordingly. It included 74 questions and took, on average, 20 min to complete.

Analysis

Rates of use of various substances over the previous 12 months were compiled for both the restricting and the purging groups. Each group was then compared with a grade-matched comparison group taken from the students sampled by the Addiction Research Foundation [4]. Adjustments were made to the comparison group data to exclude males. The rates of drug use between subjects and their comparison groups were compared by *z*-scores, with the level of significance set at .05. The descriptive data on reasons for substance use and reasons for abstinence were compiled using frequencies.

Results

The restricting group was younger, with a lower BMI (Table 1), which was not unexpected. The wide range of values for the BMI in the restricting group reflects the recruitment of subjects at different stages of treatment.

The three most commonly used substances in both groups were alcohol, cigarettes, and cannabis. Those with restrictive symptoms used significantly less of each of these substances than their matched comparison group (Table 2). In contrast, the purging groups used each of these drugs with a similar frequency to their matched comparison group, with the exception of tranquilizers. The purgers used significantly more tranquilizers than their matched comparison group.

Most of the restrictors who had used alcohol had used it only on special occasions, whereas the purgers more commonly used it monthly or weekly. Similar trends were seen with both cigarettes and cannabis.

During the preceding year, laxatives were used by over half of the purgers, whereas only 14% of restrictors had used them. Most of those in both groups who used laxatives had done so only a few times a month, and very few had used them on a more regular basis. Very few adolescents in either group used diet pills. Only one in each group had used syrup of ipecac, and none had used diuretics. Figure 1 shows the use of caffeine, which was frequent in both groups. In the purging group, 35% were consuming more than five caffeinated beverages a day.

Because the purging group reported using various drugs with a similar frequency to that of the general

Table 2. Substance Use in Past 12 Months in Female Restrictors

Substance	Restrictors (<i>n</i> = 60) ^a	Comparison Group (Grade-matched, Age-adjusted) ^a	<i>p</i> Value*
Cigarettes	7.9 (1.0, 14.8)	32	<.0001
Alcohol	36.5 (24.3, 48.7)	67.1	<.0001
Cannabis	12.7 (4.2, 21.2)	28.8	.006
Stimulants	1.7 (0, 4.9)	10.2	.04
Tranquilizers	0	2.1	NS
LSD	1.7 (0, 4.9)	7.9	NS
PCP	0	3.5	NS
Hallucinogen	6.7 (0.4, 13)	13.7	NS
Cocaine	1.7 (0, 4.9)	3.5	NS
Ecstasy	1.7 (0, 4.9)	5.1	NS

**z*-scores, *p* < .05.

^aValues are expressed as percentage of subjects who have used the substance in the past 12 months, with confidence intervals in parentheses below the value.

NS = not significant.

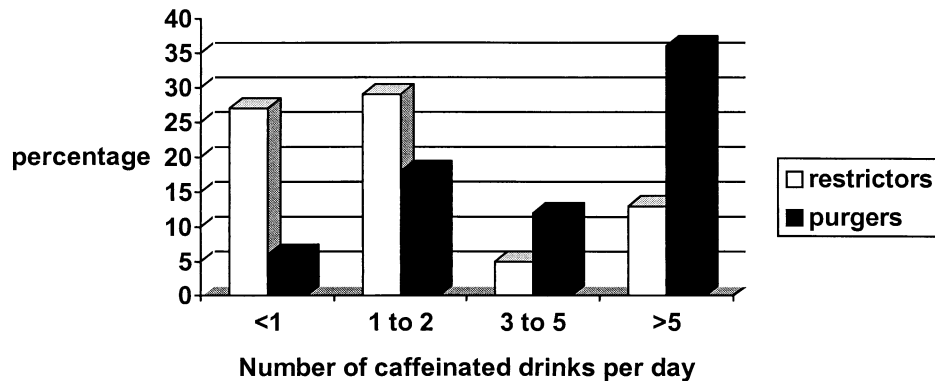


Figure 1. Caffeine Use in Female Restrictors and Purgers in the Past 12 Months

adolescent population, their reasons for use are presented in Figure 2. Common reasons were to release anger, avoid eating, and get away from problems. Members of the restricting group reported that they abstained from most substances chiefly because they considered the substances bad for their health, too expensive, ill-tasting, and opposite their beliefs (Figure 3). Over 60% abstained from alcohol use to avoid weight gain.

Discussion

Our results support the hypothesis that adolescents with restrictive eating disorders use significantly less

alcohol, tobacco, and cannabis than the general adolescent population. This finding is consistent with most literature on adult women with AN [3], although one recent outcome study showed an increased incidence of alcohol dependence in women with AN [22].

However, our results did not support the second hypothesis. In an unexpected finding, our adolescents with bingeing and purging symptoms did not use substances significantly more often than the general adolescent population. In evaluating the findings, our adolescents with purging symptoms used less alcohol and cigarettes than the comparison population but used more of the other substances.

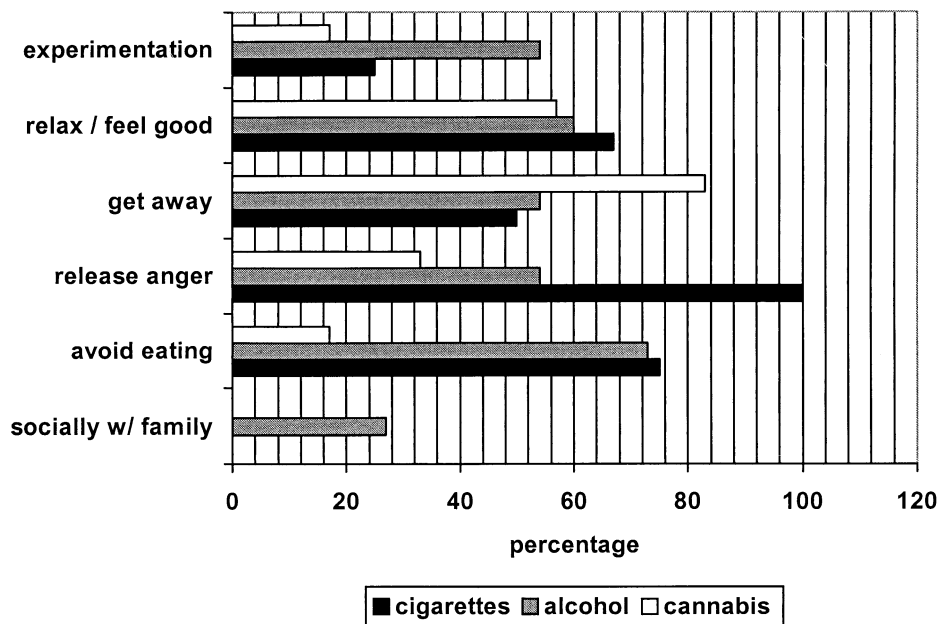


Figure 2. Reasons for Use of Substances in Female Purgers

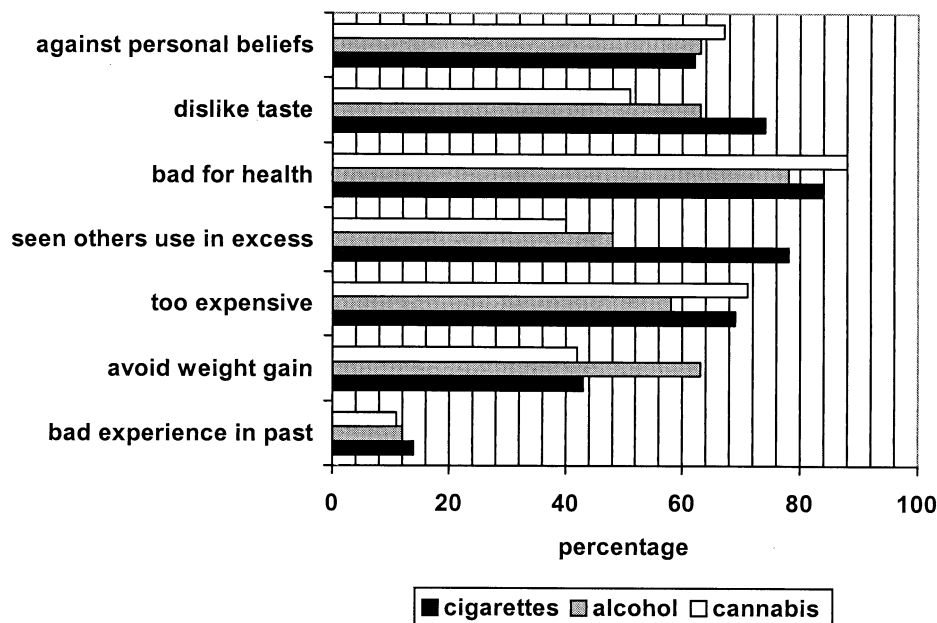


Figure 3. Reasons for Not Using Substances in Female Restrictors

Four subjects were responsible for all the use of illicit substances (stimulants, tranquilizers, LSD, PCP, hallucinogens, cocaine, and ecstasy).

The purgers may not have shown a significant increase in substance use over that of the comparison group for several reasons. Our small sample size in this group may have resulted in a lack of enough statistical power to show a difference: We may have shown a significant change in the use of other substances between the groups if we had had a larger sample size. However, if future studies confirm that purgers have similar rates of drug use to those of the general population, then it might be that those who purge do not manifest increases in rates of substance use until they have had the disorder for many years or have reached adulthood.

In adult women, studies have shown that those with BN have a higher incidence of alcohol or drug abuse disorder than the general population [2] and that women with alcohol abuse commonly have eating disorder symptoms [23,24]. Studies of high school students who showed an increased use of alcohol among those who engage in bingeing or purging did not address the use of other substances [5–9]. The one study that looked at a clinical population of adolescents with eating disorders found that patients with BN used alcohol, cigarettes, and other drugs (amphetamines, barbiturates, hallucinogens, marijuana, tranquilizers, and cocaine) more often than patients with AN [10] but failed to com-

pare their patients with control subjects. In adult populations, various explanations for the comorbidity of eating disorders and substance abuse have been proposed: an addictive personality, self-medication, family dysfunction, genetic predisposition, and neurotransmitter modulation [3].

It was surprising to see that there were not more adolescents using laxatives regularly, especially in the purging group, and that few in either group used diet pills or diuretics. Caffeine use was high in both groups: Perhaps many of these young women drink caffeinated beverages to suppress appetite or substitute for a meal. Caffeine has physiologic effects that might seem beneficial to those with an eating disorder, such as increased metabolism, increased muscle work output for endurance activities, and delaying the onset of fatigue [25].

This study had some limitations. Because we used a tertiary care population, we recognize that our results may not be generalizable to eating disordered populations as a group. In addition, there were 24 subjects who were approached for participation but did not complete the questionnaire. Reasons for their lack of participation in this study were not explored because of the confidential nature of the subject matter. Consequently, those who did not participate may have had different rates of substance use from those who participated, thus potentially altering our results. The comparison group consisted of a large sample of adolescents in the high school settings who

were not screened for eating disorders. The sample may therefore have contained some adolescents with disturbed eating patterns or overt eating disorders. The matching of comparison group to study group represents an estimate based on the values published in the Addiction Research Foundation data set [4]. Although every effort was made to match the values for grade and gender appropriately, some discrepancies could have occurred.

As described earlier, our questionnaire primarily included questions taken from the DUAOS survey [4], a validated questionnaire. In addition, a small number of questions that addressed the use of substances often associated with eating disorders were developed and added. These questions were based on previous studies cited in the literature and pre-tested in focus groups. Although these additional questions were not validated, it was not the goal of this study to establish an instrument that was independently reliable and valid. This, however, is the first descriptive study to use this modified questionnaire and address the issues of substance use in adolescents with eating disorders.

Another possible limitation involves the use of a self-administered questionnaire; however, responses were kept confidential and not shared with the subjects' treatment team in the hope that these young women would answer the questions honestly. Finally, as previously noted, the sample size in our purging group was small and did not have sufficient power to show a statistical difference, therefore limiting our ability to draw firm conclusions from our analysis of this group.

This research enhances our knowledge about the association between eating disorders and substance use in adolescents, but several unanswered questions remain for future study. A larger sample of adolescents with purging-type eating disorders needs to be examined to confirm that they do have similar rates of drug use to the general adolescent population, unlike their adult counterparts. In addition, studies need to explore whether adolescents with eating disorders and substance use have a psychopathology different from those without substance use. The literature suggests that people with eating disorders and substance abuse may have increased impulsivity [10], anxiety, suicidal tendencies, and personality disorders (borderline and histrionic) [26]. With this information, we may be able to better identify adolescents at risk so that early treatment can be initiated.

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